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UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

MEMORANDUM ON GROUND-WATER CONDITIONS IN THE VICINITY
OF CHEYENNE, LARAMIE COUNTY, WYOMING

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Prepared in cooperation with the State Engineer of Wyoming
and the City of Cheyenne

During 1954, measurements of depths to water levels in the city supply wells of Cheyenne, Wyo., and in selected observation wells in the well field were continued as a part of the water-level measurement program in cooperation with the City of Cheyenne, and a study of the effects of pumping on the water levels in both the old field and new field was made. As the city renewed its exploratory program to find additional ground water in the Federal area north and east of the present well field and in the area south of Borie, assistance was given by analyzing and evaluating the results of the test drilling. The logs of the test holes will be compiled upon completion of the test-drilling program. The water-level measurement program will be expanded to include wells in these new areas.

Water levels in the old field continued to decline but at a somewhat greater rate than during the past 2 years. (See attached graph.) The greater decline in water level this year in the old field is probably due to the expanding zone of influence caused by pumping the northernmost wells in the new field. As the cone of depression around each well in the new field expands, the water levels in the old field wells nearby will be affected more and more, and eventually, after several years, water levels in the two fields will fluctuate more or less uniformly.

Water levels in wells in the new well field continued to decline rapidly during the year, as is to be expected in the early stages of the development of a well field. The rate of decline was slightly less than in 1953, even though there was a greater amount of pumpage during 1954. During subsequent years, as the cones of depression of the wells in the new field continue to expand, the rate of decline of water levels can be expected to decrease gradually. Development of water in the new field (about 973 million gallons were pumped in 1954) has not been in progress long enough to permit checking the original estimate of the potential yield of the new field. However, it appears that more water could be pumped from the southern part of the field.

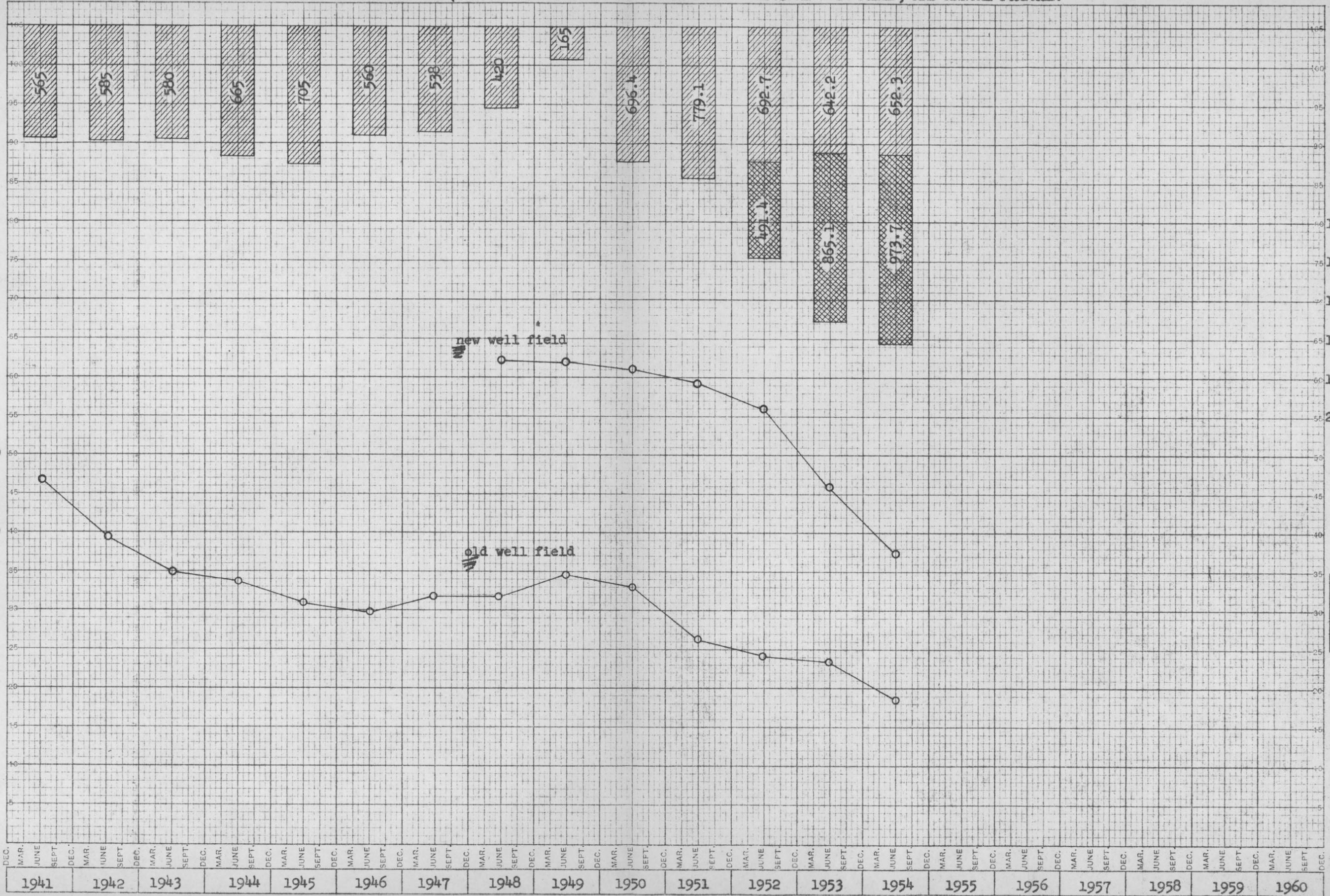
The study of the pumpage-drawdown relationship in both fields indicates that the development of the well fields is taking place fairly uniformly and that probably the old well field and the northern part of the new well field are being pumped at a rate close to the long-range potential yield of the area. The wider spacing between the four southernmost wells in the new well field and the comparatively small drawdowns indicates that these wells could probably be pumped at a somewhat higher rate. By pumping at a higher rate, the cones of depression of these wells would be induced to expand northward to the central part of the new well field and thus intercept a larger portion of the underflow through the area.

The attached hydrograph shows the average water levels in the two fields and the quantities of water pumped.

GRAPH SHOWING AVERAGE NON-PUMPING WATER LEVEL IN THE CHEYENNE MUNICIPAL WELL FIELD, AND ANNUAL PUMPAGE.

Water level below land surface, in feet

annual pumpage, in millions of gallons



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