

MEMORANDUM ON PRESENT STATUS OF THE SALINE FRONT
to supplement
Progress report on water supply for
the Point Mugu Naval Base, Ventura County, California
By Arthur A. Garrett

The progress report of August 1948 for the Bureau of Yards and Docks indicated (p. 40) that the Geological Survey was proceeding with field location and sampling of active wells and open casings between the Port Hueneme and the Point Mugu Naval Bases, and within a mile or so of the coast, to determine whether ocean water has advanced inland in the coastal aquifers and to define the present position of the front of such ocean-water intrusion, insofar as possible.

The sampling was done July 21 and August 25-27, 1948. In all, 23 active wells and two open casings were sampled. The waters in the open casings were tested with portable electrical conductivity equipment to determine their salinity. Of the three wells cited on page 26 of the progress report as suggesting contamination, Nos. 9-W-2 and 11-X-1 were not found, and it is likely they have been destroyed. Well 9-W-1, also mentioned on page 26, was inactive when canvassed by the Geological Survey so that a water sample could not be obtained. Plate 8, accompanying this memorandum, shows the wells sampled by the Geological Survey, critical wells for which analyses have been made by other agencies, and the chloride content of the waters, as described on the plate explanation.

Two important features were disclosed by the field canvass. This memorandum summarizes in brief these features:

1. The quality of water yielded from the unnumbered well 0.5 mile south of Hueneme Road and just east of Perkins Road is suggestive

of contamination, possibly from the ocean. The sample taken August 26 contained 450 parts per million of chloride. The owner of the well reported that the water "recently had become unfit for use." Thus, this well may be about at the present front of active saline-water migration landward through the coastal aquifers. Well 9-W-4, 0.25 mile north of the unnumbered well and 143 feet deep, was traversed with the conductivity electrode. No log is available for the well and the position of the perforations is not known. From water surface (15.1 feet below land surface) to 135 feet below land surface the water contained about 200 parts per million of dissolved solids. From 135 feet to bottom the dissolved solids content increased linearly to about 540 parts. The dissolved solids content of native waters of that part of the Oxnard Plain for which the chloride content ranges from 45 to 50 parts is about 650 parts per million based on electrical conductivity. Hence, water of somewhat lower dissolved solids content must have collected in the well since it was last pumped. If the perforations in the well are now open to one or more of the coastal aquifers, it is reasonably certain that contamination has not yet reached the well. Thus, the front of contamination presumably lies somewhere between this well and the unnumbered well 0.25 mile south.

2. Analyses of water from wells 10-W-8, 10-W-15, and 11-W-3, all south of Caspar Road (pl. 8), suggest the existence of a local area yielding water definitely poorer in quality than is normal for the area as a whole. This condition may represent a lobe or wedge of saline water extending inland from the ocean to the south. However, until further evidence can be obtained, this inference is unsubstantiated. More likely is the

possibility that conditions here are similar to those at wells 11-W-15 and 11-W-20, about 2 miles northeast, which yield water containing from 58 to 578 parts of chloride. The latter area is thought to yield water naturally more saline than the adjacent areas of normal water because of the presence of shallow aquifers that contain natively inferior water which can enter the casing in varying quantities depending upon existing water-level differentials.

The chloride content of water from well 10-W-14 (16,500 parts per million) is not representative. The well was drilled to a depth of 250 feet in 1922, and as inferred from the log, the casing presumably was perforated below 140 feet. When visited in August 1948, the well was only 86 feet deep and the water level was about 8 feet below land surface--at least 8 to 10 feet above the "static" levels in nearby active wells. The conductivity traverse run by the Geological Survey showed some vertical change in salinity which is not considered significant because the well probably is not now open to any of the coastal aquifers. The casing of the well is corroded off at land surface and is within a few feet of a drainage ditch. Hence, at some period of tidal over-run the well may have been filled with ocean water thereby accounting for the extremely high chloride content of the water now present.

The information on chemical quality of well waters shown on plate 8 indicates that, as of August 1948, if salt water is moving inland from the ocean into the producing coastal aquifers in the reach between the Port Hueneme and Point Mugu Naval Bases:

1. Near Port Hueneme the front of this saline contamination has not advanced inland more than 0.4 mile.
2. Along the northwest lobe of the Point Mugu Naval Base property,

the front has not advanced inland more than 0.6 mile (well 10-W-21) to 0.8 mile (well 10-W-8).

For the present, therefore, there is no danger of saline intrusion from the west or southwest into the existing or proposed wells at the Point Mugu Naval Base. The conditions of saline intrusion directly to the south of the Point Mugu well field can be learned only by constructing observation wells, as described on pages 38 and 39 of the progress report.

U. S. Geological Survey
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