Technical Report Documentation Page

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Report of a Soil Corrosion Survey at the Proposed California conservation Center Near Susanville

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December 1959

6. PERFORMING ORGANIZATION

7. AUTHOR(S)
R.F. Stratfull

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W.O. B-4303GC-11 Inter-Agency Agreement Service Agreement 2235 Lab. Auth. 72-S-6209

9. PERFORMING ORGANIZATION NAME AND ADDRESS
State of California
Department of Public Works
Division of Highways
Materials and Research Department

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11. CONTRACT OR GRANT No.

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15. SUPPLEMENTARY NOTES

16. ABSTRACT

Reference is made to your letter of December 8, 1959, requesting the Materials and Research Department to perform a soil corrosion survey at the proposed site for the California Conservation Center near Susanville, California.

The field survey was performed during the week of December 14, 1959. The field data are shown on Exhibit I, Equi-Resistivity Contour Map.

As will be noted on Exhibit I, the measured resistivity of the soil varied from 600 to 20,000 ohm cm3. The average resistivity was approximately 7100 ohm cm3.

A laboratory test was performed on two soil samples obtained from locations of the high and low soil resistances.

The test result of the soil obtained from the low resistance area was: pH of 8.4 and electrical resistivity of 1200 ohm cm3.

Based upon preliminary laboratory studies, a bare steel 3/4" pipe placed in this soil would be perforated by corrosion in about 25 years.

The test result of the soil obtained from the location of high soil resistivity was: pH of 8.4 and electrical resistivity of 8750 ohm cm3. Based upon preliminary laboratory studies, a bare 3/4" steel pipe placed in this soil would be perforated by corrosion in approximately 55 years.

17. KEYWORDS
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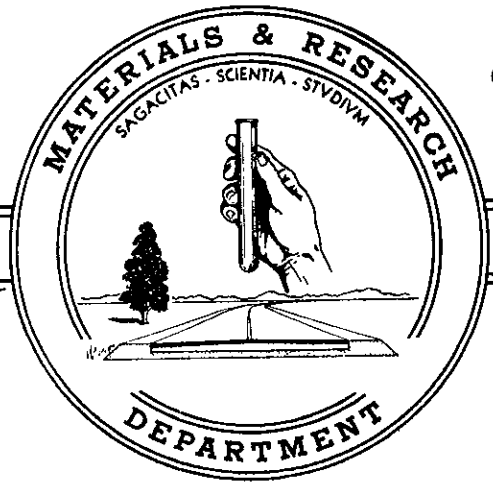
STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF HIGHWAYS

REPORT OF A SOIL CORROSION SURVEY AT THE PROPOSED CALIFORNIA CONSERVATION CENTER NEAR SUSANVILLE

December 1959



59-01

State of California
Department of Public Works
Division of Highways
Materials and Research Department

December 1959

W.O. B-4303GC-11
Inter-Agency Agreement
Service Agreement 2235
Lab. Auth. 72-S-6209

Mr. Anson Boyd
State Architect
Division of Architecture
1120 N Street
Sacramento, California

Attention: Mr. Aldo Crestetto, Civil Engineering Supervisor

Dear Sir:

Submitted for your consideration is:

REPORT OF A SOIL CORROSION SURVEY

AT THE PROPOSED

CALIFORNIA CONSERVATION CENTER NEAR SUSANVILLE

Study by . . . . . Structural Materials Section
Under general supervision of . . . . . J. L. Beaton
Work supervised and reported by . . . . . R. F. Stratfull

Very truly yours,

F. N. Hveem
Materials and Research Engineer

By
J. L. Beaton
Supervising Highway Engineer

RFS:mw
cc: ISchultz
District II

CORROSION REPORT ON CALIFORNIA CONSERVATION CENTER

Reference is made to your letter of December 8, 1959, requesting the Materials and Research Department to perform a soil corrosion survey at the proposed site for the California Conservation Center near Susanville, California.

The field survey was performed during the week of December 14, 1959. The field data are shown on Exhibit I, Equi-Resistivity Contour Map.

As will be noted on Exhibit I, the measured resistivity of the soil varied from 600 to 20,000 ohm cm^3. The average resistivity was approximately 7100 ohm cm^3.

A laboratory test was performed on two soil samples obtained from locations of the high and low soil resistances.

The test result of the soil obtained from the low resistance area was: pH of 8.4 and electrical resistivity of 1200 ohm cm^3.

Based upon preliminary laboratory studies, a bare steel 3/4" pipe placed in this soil would be perforated by corrosion in about 25 years.

The test result of the soil obtained from the location of high soil resistivity was: pH of 8.4 and electrical resistivity of 8750 ohm cm^3. Based upon preliminary laboratory studies, a bare 3/4" steel pipe placed in this soil would be perforated by corrosion in approximately 55 years.

The general geographic area is near a known corrosive alkali soil area. Although the measurements indicate that the average soil resistivity is in the range of relatively non-corrosive and non-alkali material, care should be exercised in transporting soils that originate in swales or sinks for use as fill material. Generally, corrosive alkali salts are found in areas of poor drainage or a high water table.

The corrosive alkali soils can perforate a 3/4" steel pipe in less than 2 years.

The results of the survey indicate the following:

1. The average soil resistivity is 7100 ohm cm^3, indicating a relatively non-corrosive soil. The probable time before a perforation of a 3/4" steel pipe will occur is between 25 and 55 years.

2. The soil varies between a sandy loam and a clay.

3. There is a possibility that small areas of corrosive alkali salts will be found in areas of poor drainage.

Based upon the field survey, the following are our suggestions to reduce the probability of accelerated corrosion:

A. All underground piping should be coated. All backfill should be sand or a rock-free, non-clay soil. The backfill soil should measure more than 5000 ohm cm resistance when wetted to any moisture content with distilled water.

B. Electrical insulating couplings should be placed in the underground piping at the following locations:

1. At all of the connections between State piping and those of private utilities.

2. At all connections of dissimilar metals.

3. At the soil side where any metal piping enters any building.

4. At all locations where a lateral connection is made to a main distribution line.

5. All underground main distribution lines should have electrical insulating couplings at a maximum distance of 500' center to center.

6. No piping placed in the same excavation should lie across or otherwise be in mechanical or electrical contact with other pipe except at designated locations.

7. All wells should be electrically insulated from the distribution lines.

The preceding suggestions, if carried out in field practice, should insure a minimum of 35 years of service life for the underground piping.