

RESOURCE FILE

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RESOURCE COMPILATION SECTION

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AEC RESEARCH AND DEVELOPMENT REPORT

PRELIMINARY NOTES ON DISTRIBUTION OF URANIUM IN THE
FLORIDA PEBBLE PHOSPHATE FIELD AND SUGGESTIONS
FOR STUDYING AND SAMPLING

TEM-73

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RM00-73

Trace Elements Memorandum Report 73

UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

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(200)
T6
no. 73

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TEMP 73
RM00-73

Preliminary notes on distribution of uranium in the
Florida pebble phosphate field and
suggestions for study and sampling

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Leached, uranium-bearing bed

Distribution:--The accompanying map and sections show examples of the present state of information about the occurrence of the "leached" uranium-bearing bed in the Florida pebble phosphate district. The dashed lines on the map define, as closely as present data permit, the limit of the area in which this bed contains significant amounts of uranium. The figures next to localities on the map indicate first, the thickness of the bed in feet; and second the uranium content in thousandths of percent. For example, the figures 16-10 next to the TVA localities in Secs. 9 and 10, T. 32 S., R. 26 E. indicate 16 feet at 0.010 percent uranium. A "0" by a locality indicates either that the uranium content is less than 0.001 percent or less than the concentration in the underlying phosphate beds (matrix of the miners) or that the leached bed is not present.

The present information is sufficient only tentatively to define the southern limit of the leached bed or its uranium-bearing portion and to indicate two areas where it is absent to the north of that line. The critical limit of the bed appears to be rather well defined by the north and south pits of the Boyette mine and areas of TVA drilling in Sec. 30, T. 32 S., R. 26 E. It is presumed that the line closes to the east, north, and west, but present data are insufficient to determine its location. The "leached" bed has been removed by erosion in the area near the Noralyn mine where the underlying Hawthorne lime-

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by authority of letter from J4 one of 2/29/66
by [Signature] 3/23/66
(Signature of person making change, and date thereof)

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JAN 29 2001

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stone is close to the surface. In the vicinity of the Eleanor mine a sandy clay bed, which contains very little uranium, is in the same stratigraphic position as the "leached" bed. Similar local variations can be expected throughout the area, but more information is needed before the distribution of these variations can be determined. Conversely a small outlying area of the bed is present in the northwest part of T. 33 S., R. 26 E.

As shown in the accompanying table the average uranium content of the leached zone is between 0.010 and 0.020 percent. Locally, however, the content is much greater, being 0.043 percent at one point in the north pit of the Boyette mine, and 0.034 percent in some TVA drill holes in Secs. 9 and 10, T. 32 S., R. 26 E. where the bed has its maximum thickness of 16 feet.

No estimate of tonnage can be made at this time. It is noteworthy that the uranium-bearing bed is not economic as a source of phosphate and is presently being stripped as overburden and discarded.

Three mine sections and one section of TVA drilling are appended. These have been chosen to illustrate the variation vertically as well as laterally. Grade figures are shown in whole numbers, indicating thousandths of per cent. The grade figures are weighted averages for the thicknesses indicated.

Proposed program of study:--We believe the discovery of this bed, which is now discarded by the companies, may warrant careful reconsideration on your part as to your contemplated plans for laboratory investigations, pilot plant testing, and other recovery problems.

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The explanation of the greater uranium content in the leached bed overlying the minable portion of the Bone Valley phosphate is not apparent at present. Rove, Ingerson, Rabbitt, Sottinelly, and two Survey mineralogists will visit the project ^{the} week of January 16 to lay plans for detailed chemical, physical, and mineralogic study of the bed to evaluate its significance. Rove's visit will overlap for a day the visit by Fulton and Warren so that they may be fully informed in the field of the occurrence of the overlying zone, as well as variations in values in the minable phosphate.

Proposed sampling program for minable phosphate

With reference to the minable phosphate beds we wish to call your attention to a proposed modification of our sampling procedure, and outline a proposed program of mill sampling to be correlated with our field sampling.

The assay values shown on the sections are for material as it occurs in the pits. As you know, only part of this raw material goes into recoverable products in the mills. We do not now have any data that permits us to advise you of the probable ultimate distribution of these uranium values from a particular pit into pebble, table, flotation, slime, or other waste products for a particular mill. In order to be able to supply you with more specific data on the distribution of uranium values in the mine pits we propose to split all our samples before assaying into four sized-fractions comparable with company practice. These fractions will also be somewhat comparable to the products produced by the mills.

Our sampling to date (as is well exemplified on the accompanying

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cross-sections) has indicated that uranium values vary markedly within a single bed and along a single working face. We recommend that you plan and solicit company cooperation in carrying out on your behalf, a continuing sampling program in the mills of the various sized products and wastes that can be coordinated as closely as practicable with our detailed field sampling. The purpose would be to correlate information on uranium distribution obtained by pit sampling with its distribution in the mill products. If successful, such a correlation would make it possible to estimate in what mill products the uranium shown by the pit and other field samples would be distributed. We believe that only after several months--or maybe a year--of such closely coordinated mill and field sampling will you be able to appreciate fully the possible significance that the variations in field sample values may have in your plans for treatment and recovery of the uranium from the different parts of the field and different plants. Rove plans to discuss this with Fulton and Warren while in Florida.

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Cross Sections

1. The North-South cross section of the American Agricultural Company's No. 11 Washer is included to show one area where the top bed of the Bone Valley is not significantly different in content from the underlying phosphatic beds of the Bone Valley. The only significant change in content in this section is the slightly higher values in the basal bed of the Bone Valley, and the drop in values in the Hawthorne.

2. The East-West section in the Boyette #3 Washer of the American Agricultural Chemical Company is one which shows the high percentage in the top, leached bed of the Bone Valley. It is interesting to note that the clay bed in the middle of the mineable Bone Valley is essentially barren, and where this bed lenses out the high values in the leached bed are very little different from the values in the Bone Valley below it. Again, there is a significant drop in the values of the Hawthorne.

3. The dog-leg section in the Warren Washer of Swift and Company is interesting. The east-west part of the section shows a relatively high content in the upper bed of the Bone Valley, whereas in the north-south part of the section, the content decreases to the point where it is not significantly different from that below the leached bed. The clay bed underlying the leached bed is practically barren.

4. The TVA section is included to show that the same features observed in the mine faces are brought out by analyses of the drill hole samples.

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Notes to Accompany Map Showing Distribution of U

The appended map is designed to show the occurrence of "leached" U-bearing bed in the Florida Pebble Phosphate District. The thickness of the bed is indicated by the first number adjacent to the mine or TVA drill site and the second number indicates the percentage of U in thousandths of a per cent, thus the TVA locations in sections 9 and 10, T32S, R26E, is designated by 16-10. The 16 refers to the thickness of the bed and the 10 means 0.010% U. A "0" by a location indicates either that the concentration is below 0.001%, or less than the concentration in the matrix, or that the "leached" bed is not present. The dashed lines separate as completely as present data permit, the areas containing significant concentrations from those below.

The Hawthorn limestone is within a few inches of the surface at the Noralyn Mine and the "leached" bed has been removed by erosion in this area. A similarly negative area occurs in the Eleanor Mine, but the reason is not presently apparent. A sandy clay bed is in the same stratigraphic position as the "leached" zone, but it contains no significant amount of U. Similar local variations can be expected throughout the area, but our information is not detailed enough at the present time to bring out these variations. The critical line passes between the north and south pits at the Boyette Mine and between areas of TVA drilling in Section 30, T32S, R26E. It is presumed that this line closes to the north, east and west, but present data are insufficient to permit its accurate location.

The maximum concentration of the ore occurs in the north pit of the Boyette Mine where it reaches 0.043%. The maximum value in the TVA samples occurs in sections 9 and 10, T32S, R26E, where the value is 0.034%. The maximum thickness of the "leached" bed occurs in the same location and amounts to 16'.

No estimate of tonnages is possible at this time, but reserves are believed to be quite high. It is noteworthy that the U-bearing bed is not economic with respect to phosphate and is presently being stripped as overburden and discarded by the operating companies.

A table summarizing data shown on the map is appended. It is pointed out that values and thicknesses represent average figures for the areas involved.

Three mine sections and one section of TVA drilling are appended. These have been chosen to illustrate the variation vertically as well as laterally. Grade figures are shown in whole numbers, indicating thousandths of per cent. The grade figures are weighted averages for the thicknesses indicated.

Cross Sections

1. The North-South cross section of the American Agricultural Chemical Company's No. 11 Washer is included to show one area where the top bed of the Bone Valley is not significantly different in value from the underlying beds of the Bone Valley. The only significant change in values in this section is the slightly higher values in the basal bed of the Bone Valley, and the drop in values in the Hawthorne.
2. The East-West section in the Boyette #3 Washer of the American Agricultural Chemical Company is one which shows the high percentage in the top, leached bed of the Bone Valley. It is interesting to note that the clay bed in the middle of the mineable Bone Valley is essentially barren, and where this bed lenses out the high values in the leached bed are very little different from the values in the Bone Valley below it. Again, there is a significant drop in the values of the Hawthorn.
3. The dog-leg section in the Warren Washer of Swift and Company is interesting since it shows, in the east-west part of the section, the same high values in the upper bed of the Bone Valley, but in the north-south part of the section, the values fall off to the point where they are not significantly different from the values below the leached bed. The clay bed underlying the leached bed is practically barren.
4. The TVA section is included to show that the same features observed in the mine faces can be seen from analyses of the drill holes.

<u>Prospecting</u> <u>TVA</u>	<u>Area</u> <u>Acres</u>	<u>Location</u>	<u>Average %</u> <u>in 0.001's</u>	<u>Average</u> <u>Thickness</u>
4 holes/40 acres	80	Sec. 30, T32S, R26E.	10	10' Insignificant values.
1/40	160	Sec. 27, T34S, R26E.		Insignificant values on only hole sampled.
4/40	200	Sec. 6, T33S, R26E.	14	13' (Bed discontinuous)
4/40	40	Sec. 4, T33S, R26E.	24	13' Only significant sample.
4/40		Sec. 4, T35S, R26E.		Insignificant values.
4/40		Sec. 3,4,9, T35S, R21E.		Insignificant values.
4/40		Sec. 20, 21, T33S, R21E.		Insignificant values.
4/40	80	Sec. 19, 20, T32S, R26E.	12	12' (Bed discontinuous)
4/40	200	Sec. 9, 10, T32S, R26E.	10	16'
4/40		Sec. 14, 23, T34S, R21E.		Insignificant values.
4/40		Sec. 23, T33S, R25E.		Insignificant values.
4/40		Sec. 18, T33S, R22E.		Insignificant values.
4/40		Sec. 1, 12, T33S, R21E.		Insignificant values.
4/40		Sec. 18, 19, T34S, R25E.		Insignificant values.
4/40		Sec. 2, T34S, R25E.		Insignificant values.
4/40		Sec. 13, 24, T33S, R20E.		Insignificant values.
16/40	80	Sec. 4, T30S, R24E.	13	12'

<u>Prospecting</u>	<u>Location</u>	<u>Length Section</u> <u>in feet</u>	<u>Average %</u> <u>in 0.001's</u>	<u>Average</u> <u>Thickness</u>
<u>USGS</u>				
Mine Faces	Boyette - North Pit	3000	20	4'
" "	Noralyn	1000	Insignificant values	
" "	Peace Valley	2600	13	8'
" "	Boyette - South Pit	1800	Insignificant values	
" "	No. 11 Washer	800	Insignificant values	
" "	Varn Washer	1000	15	2'
" "	Eleanor	2000	Insignificant values	
" "	Warren Washer	600	12	12'

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U. S. GEOLOGICAL SURVEY

DECEMBER 1948

MAPS SHOWING DISTRIBUTION
OF
UPPER "LEACHED" OR
SANDY-CLAY BED OF THE BONE VALLEY

EXPLANATION



Area from which samples were taken.

4-20

First figure is thickness of sampled interval. Second is per cent U in thousandths: thus the sample shown is 4 ft. of 0.020% U.

0

Indicates either that bed is missing or that, if present, contained no significant amount of U.

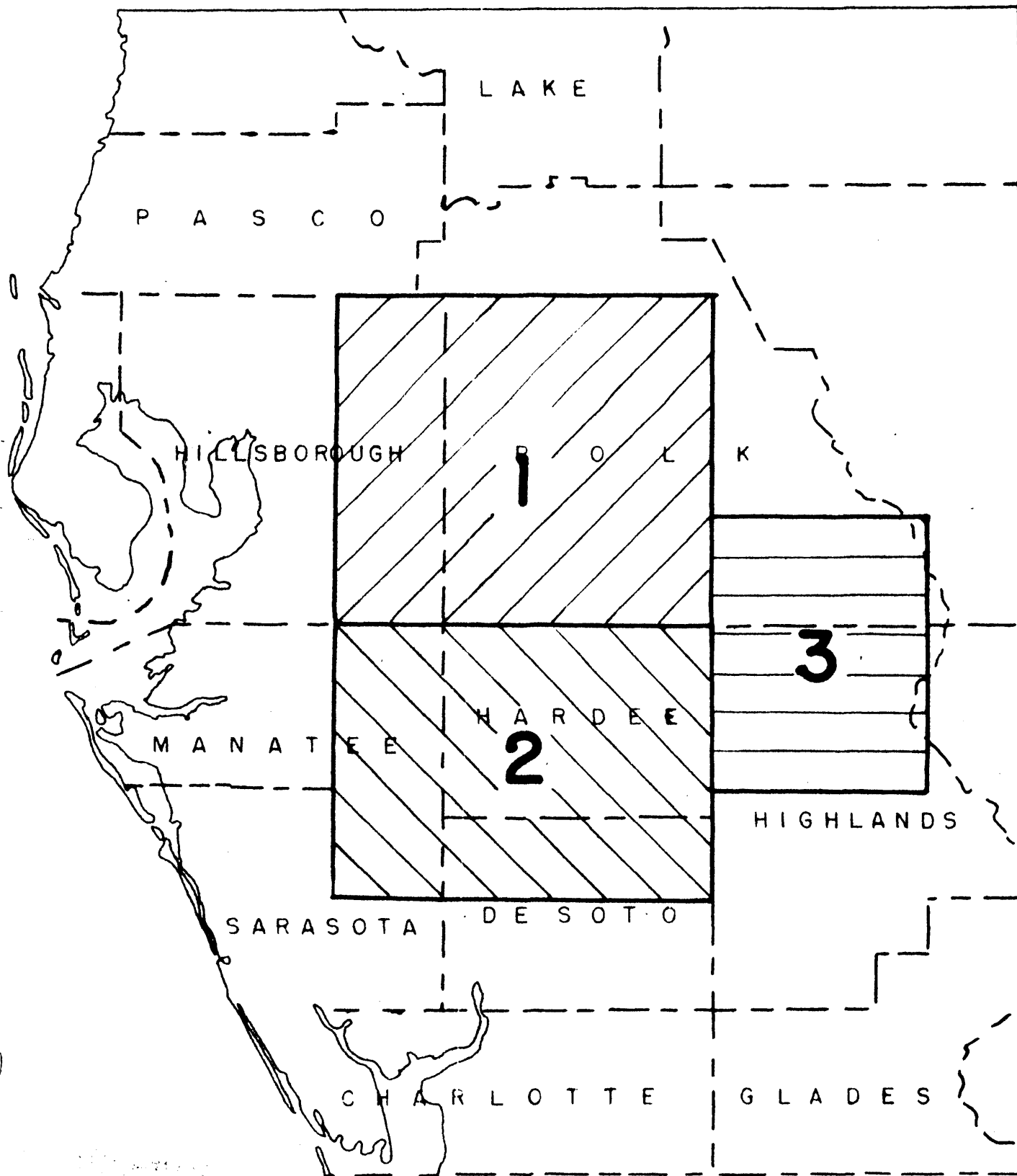
— ? —

Dashed line indicates approximate southern limit of high-grade bed.

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FLORIDA PHOSPHATE PROJECT

INDEX TO PROGRESS MAPS



R21E

R22E

R23E

R24E

R25E

R26E

R27E

T27S

T28S

T29S

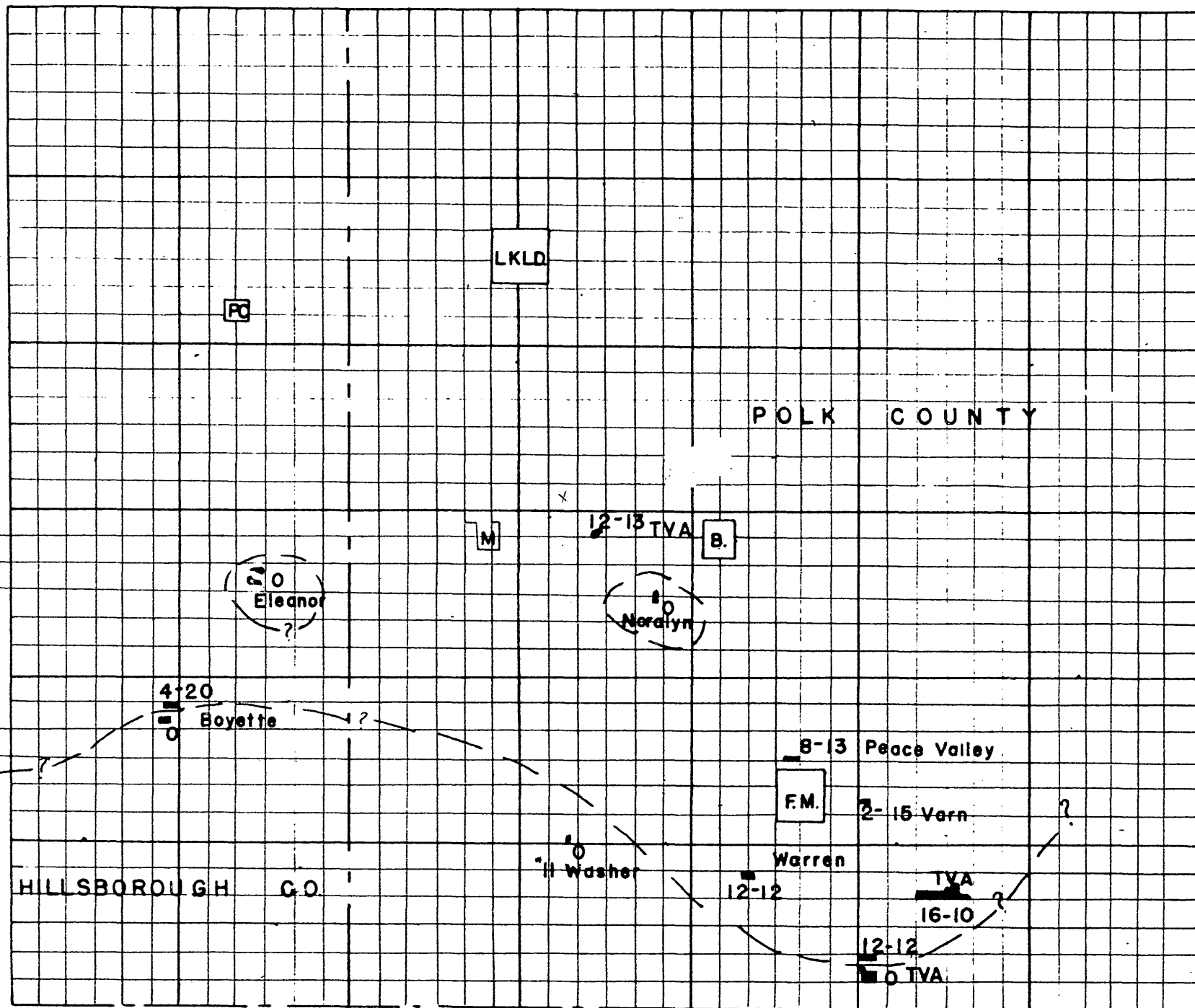
T30S

T31S

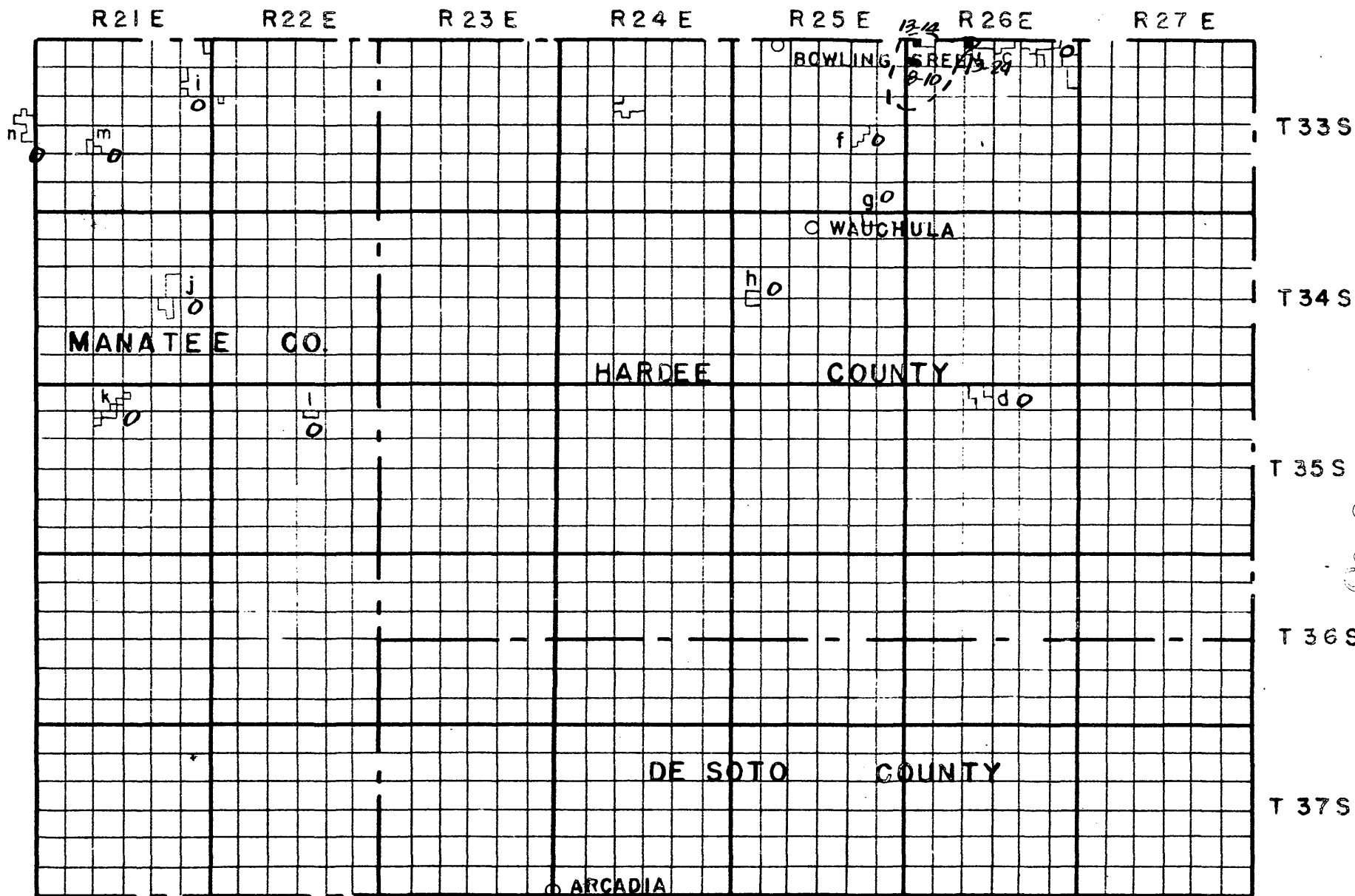
T32S

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U S GEOLOGICAL SURVEY



PROGRESS MAP AREA 2

R 28 E

R 29 E

R 30 E

R 31 E

T 31 S

○ FROST PROOF P O L K C O

T 32 S

T 33 S

AVON PARK

HIGHLANDS C O U N T Y

T 34 S



○ SEBRING

T 35 S

PROGRESS MAP AREA 3

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August 1948

NORTH-SOUTH CROSS SECTION

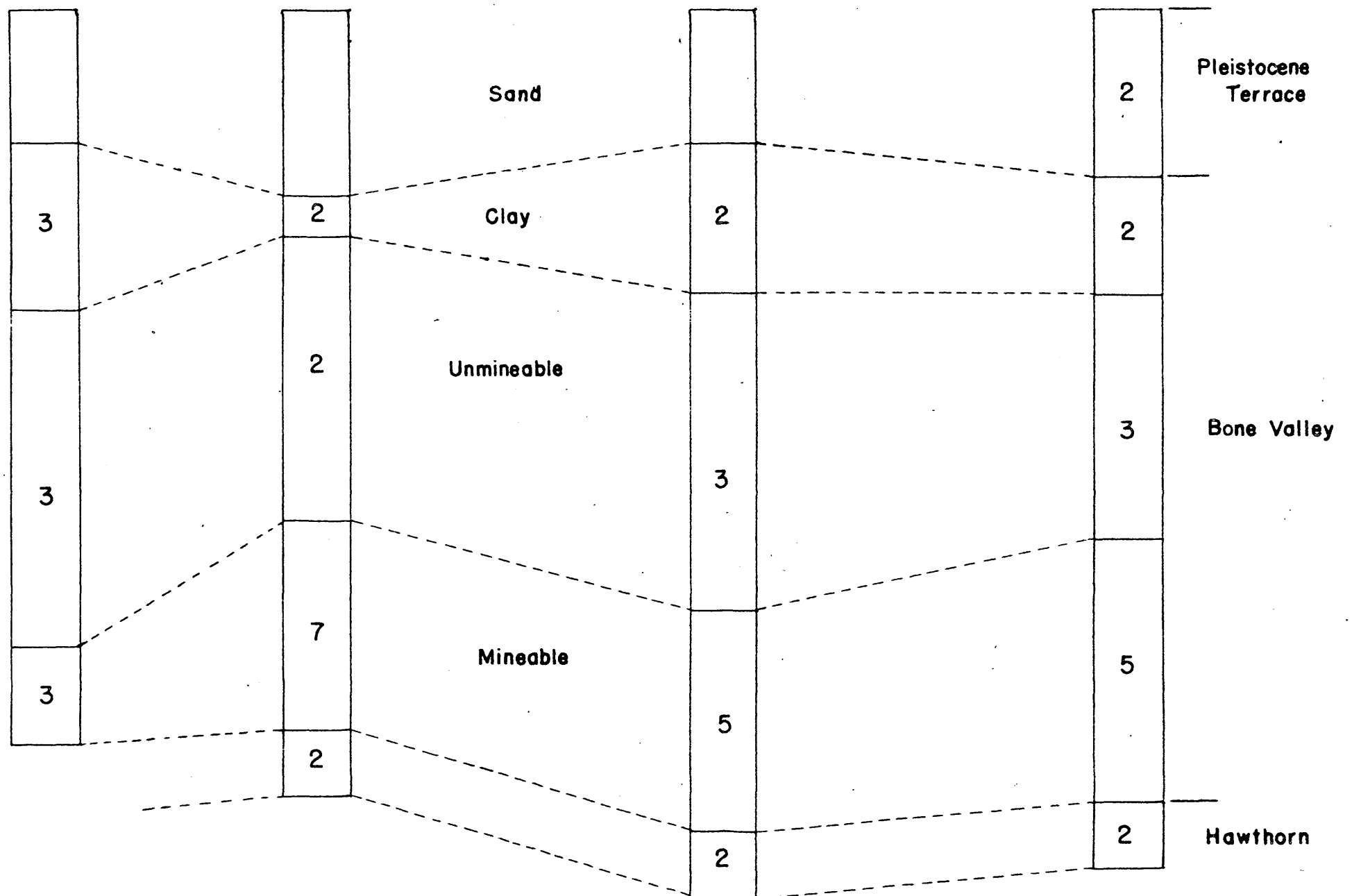
No. 11 Washer

American Agricultural Chemical Co.

Section 32 T31S, R24E

South

North



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Horizontal Scale 1" = 100'
Vertical Scale 1" = 8'

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September 1948

EAST-WEST CROSS SECTION

BOYETTE No. 3 WASHER

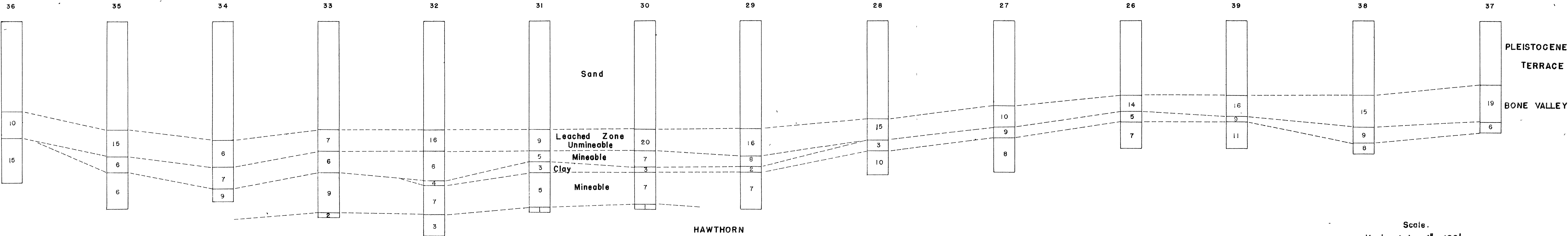
PIT No. 19

American Agricultural Chemical Co.

Section 12 T31S,R24E

West

East



Scale.
Horizontal 1" = 100'
Vertical 1" = 8'

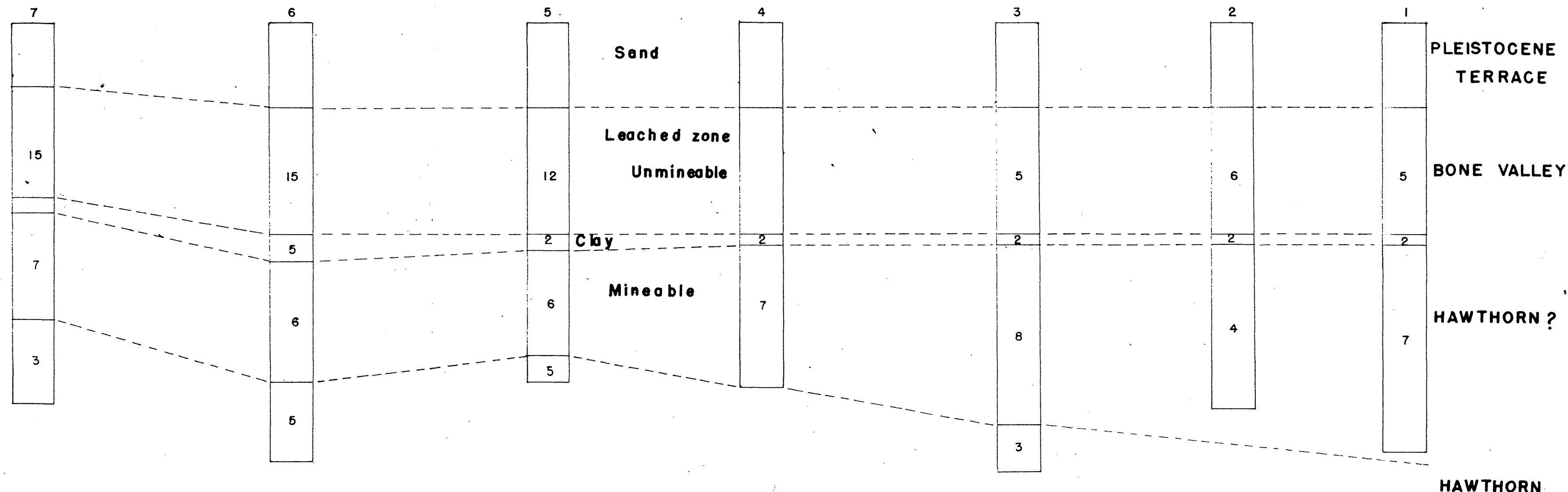
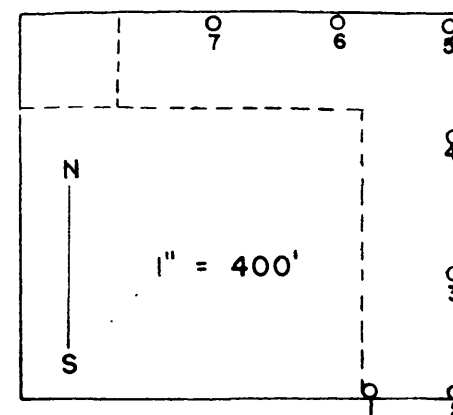
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Section 3

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CROSS SECTION
SWIFT & CO. WARREN WASHER
SECTION 16, T 32 S, R 25 E.

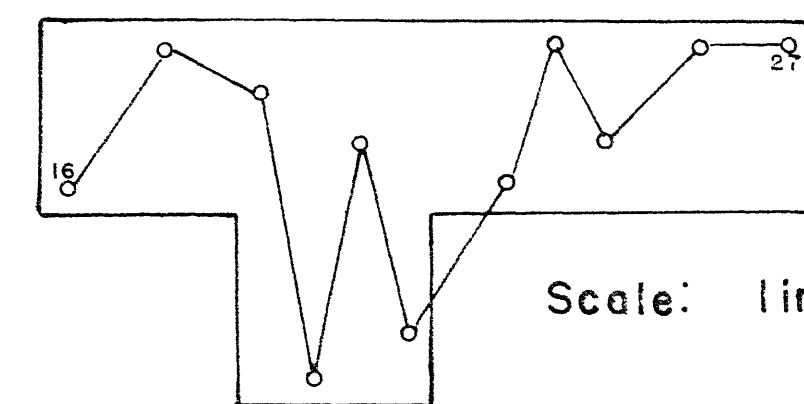
AUGUST 1948



SCALE:

Horizontal 1" = 100'
Vertical 1" = 8'

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Scale: 1 in. = 1320 ft.

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