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A Subsurface Study of the Pleistocene Deposits in Kearney County and Adjoining Parts of Adams, Franklin, and Webster Counties (Includes Text Analyses and Thesis Material)

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A SUBSURFACE STUDY OF THE PLEISTOCENE DEPOSITS IN KEARNEY COUNTY AND ADJOINING PARTS OF ADAMS, FRANKLIN, AND WEBSTER COUNTIES

by Vincent H. Dreeszen

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By

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I.

INTRODUCTION

Purpose of Investigation

This thesis is a report on a subsurface study of the Pleistocene deposits of Kearney County and adjoining parts of Adams, Franklin, and Webster counties in Nebraska for the purpose of establishing preliminary correlations of the geologic formations present in this and adjoining areas.

The test well records and samples studied as a basis for this report are of and from test holes drilled with hydraulic rotary equipment of the Conservation and Survey Division, University of Nebraska, in cooperation with the Water Resources Branch, Ground Water Division, of the United States Geological Survey in their regional ground water investigations program.

The problem was suggested to the writer by Mr. E. C. Reed, as a project of the correlation of the Pleistocene sands and gravels along a north-south profile in south central Nebraska by means of textural analyses. It was believed that a study of the textural characteristics of the separate sand and gravel formations would contribute to their differentiation and would be of particular value where significant silt and clay separating beds are absent in thick sand and gravel deposits involving more than one formation. A north-south profile line was selected which is located in the central part of an area of thick Pleistocene sand and gravel deposits. Textural and acid solubility analyses

were made on most of the test hole samples along this profile line, designated C-D (Figure 11) in this report. Certain correlation possibilities were indicated when the results of these studies were plotted in profile, but it was believed by the writer than insufficient evidence was furnished for exact correlations. Microscopic examination of the samples was made to determine profiles of weathering, buried soils, and other characteristics which could be used as criteria for identification and correlation. The original scope of the problem was enlarged and three north-south profile lines of test holes were selected, two to the west and one to the east of the line on which the textural analyses were made. In addition, an east-west profile was studied to connect the north-south profiles. Geologic profile sections were prepared along these additional lines based on a study of field logs and supplemented by microscopic examination of many of the samples.

The purpose of this report is to present preliminary identifications and correlations of the Pleistocene periglacial deposits over a given area in which much of the Pleistocene geology is obscured by a thick mantle of loess. Studies of the field logs, supplemented by laboratory tests on the test hole samples, have been the basis for the results given in this report. The laboratory tests consisted of binocular microscopic examination and of partial textural analyses and acid soluble determinations. It is hoped that the information obtained and presented in this report will, in addition to contributing to the general knowledge of the area, assist in evaluating the quality of samples collected with hydraulic rotary drilling equipment operated under the supervision of a geologist with the principal purpose being the procurement of samples for geologic and hydrologic study.

Acknowledgments

The writer is indebted to Dr. G. E. Condra, Dean and Director of the Conservation and Survey Division, University of Nebraska, and to Mr. E. C. Reed, Associate Director of the Conservation and Survey Division, for placing at his disposal records and samples of test holes drilled in the area of this investigation and for permitting this study to be made in connection with the regular water and geologic survey program. Special thanks and acknowledgments are due Mr. Reed for suggesting the problem and for generously giving his time, encouragement, and advice in many phases of the preparation of this report. His interest and assistance have contributed materially to the value of this report.

The writer is also indebted to Dr. A. L. Lugn of the University of Nebraska who sponsored the graduate work and whose advice and helpful criticism have been very valuable in the preparation of the manuscript.

Mr. Arnold I. Johnson, supervisor of the Cooperative State-Federal Hydrologic Laboratory generously offered facilities of the laboratory and gave help and advice in laboratory technique.

Thanks are extended to Mr. James Thorp, Principal Soil Correlator, Division of Soil Survey, U. S. Department of Agriculture, for his helpful advice on buried soils and factors in their development. The writer wishes to thank co-workers Ellis D. Gordon and James D. Kersey for helpful assistance and to Maynard G. Christenson who assisted the writer in drafting the maps and profile sections.

Location of Area

The area of investigation covered in this report lies west of the till border, between the Platte River Valley which borders the area to the north and the Republican River Valley which lies immediately to the south. The till border is about forty miles to the east of the northern part of the easternmost profile line (A-B) and is about twenty to thirty miles east of the easternmost test hole on the east-west profile line J-K. The area of investigation is indicated on the Index Map, Figure 1.

The area covers approximately 1,300 square miles and is principally an undissected loess plain. Kearney, most of Adams, the northwest part of Franklin, and the northern one-quarter of Webster counties are very slightly dissected, with large areas of loess plain intact. The extreme southern margin of the portion of the plain covered in this investigation is largely and deeply dissected by drainages which flow into the Republican River. The Little Blue River heads in the vicinity southeast of Minden in Kearney County and flows eastward across the southern portion of Adams County into which it is incised rather deeply.

REVIEW OF PREVIOUS INVESTIGATIONS

Many persons have studied the Pleistocene of Nebraska in more or less detail and much material appears in the geologic literature. It is beyond the scope of this report to present a review of this literature except where it applies most directly to this investigation.

A. L. Lugn (1935, pp. 21-23) presented a review of the earlier work on the Pleistocene deposits of Nebraska in which he cited the works and observations of some of the geologists who participated in the early studies. Condra, Reed, and Gordon (1947, pp. 1-2) listed the names of other geologists who have studied the Pleistocene more or less closely in Nebraska and adjoining areas and made special mention of the contribution made to the study of the Pleistocene by the State and Federal Soil Survey technicians who have taken into account the geology and topography of the land in their mapping and soil classification of the State.

Lugn (1935, pp. 1-213) made a most comprehensive study of the Pleistocene Geology of Nebraska which has formed the basis for most of the later investigations. Lugn in Lugn and Wenzel (1938, pp. 14-61) presented a discussion of the Pleistocene deposits with special reference to south-central Nebraska and he included logs of test holes (1938, pp. 66-80) drilled in the Platte Valley in connection with that investigation. He states, "as a result of this investigation data have been collected which appear to indicate that the Pleistocene formations in south-central Nebraska can be correlated with the Pleistocene of eastern Nebraska and Iowa." (p. 14).

Condra, Reed, and Gordon (1947, pp. 1-73) reviewed previous studies of the Pleistocene in Nebraska and introduced new data based on subsurface

investigation and further study of surface exposures and they presented further conclusions. Their classification of the Pleistocene was presented in a correlation table showing the relation of Nebraska Pleistocene to continental glaciations on a cyclic basis involving erosion, alluviation, eoliation and soil formation (p. 12). Lueninghoener (1947, pp. 1-82) made a geomorphological study of the lower Platte River Valley in eastern Nebraska to establish the post-Kansan chronological order of events in terms of erosions and depositions that transpired. He emphasized the cyclic nature of the events and the major influence that had been exercised by climatic control.

Schultz and Stout (1948, pp. 553-588), in a paper presented to the Geological Society of America at the Symposium on the Pleistocene of the Great Plains, June 1948, discussed the terraces and related sediments of the Great Plains in relation to the dating of the fossil mammal occurrences and as an aid in showing the relation of the Pleistocene stratigraphic faunal and climatic record. Frye, Swineford and Leonard (1947, pp. 501-523) utilized the occurrence of lenticular deposits of volcanic ash (Pearlette) associated with fossil mollusks as a datum for interregional correlation of the Pleistocene deposits of the central Great Plains with the glaciated area. However, their work merely corroborated the conclusions of Nebraska workers which were based on stratigraphic studies.

The Upland formation (Lugn, 1935) was renamed as the Sappa formation and redefined (Reed, 1948, p. 1346).

In the recent years E. C. Reed, Associate Director of the Conservation and Survey Division, University of Nebraska, has done considerable work on the subsurface Pleistocene deposits in the peri-

glacial area of south-central and central Nebraska and in the glaciated eastern portion of the state. His studies have been based on the records of over 2,000 test holes drilled in the cooperative State and Federal Ground Water Investigations Program. He has prepared a number of regional geologic profiles, thickness maps, a Pre-Cenozoic topographic map, various regional ground-water maps, and a number of preliminary ground-water maps with accompanying geologic profile sections of several counties, including those in the area of this investigation. This unpublished material has been consulted freely in the preparation of this report and the accompanying contour maps and geologic profile sections.

Dr. C. E. Condra and Mr. Reed (1950, in press) revised the earlier Pleistocene publication (1947) on the basis of studies of further extensive subsurface information and on critical studies of surface materials.

In recent years several M.S. degree theses have been written which have contributed to the general knowledge of the Pleistocene (Wright, 1947; Kersey, 1949; Frankforter, 1949; and Stoesz, 1949). Kersey's report was a study of test hole information along a north-south line to the north and 11 miles to the east of the area covered in this report. Kersey utilized test hole records and samples in a textural and acid soluble percentage study along lines similar to that used in this study.

Leonard (1950, pp. 1-48) reported in detail on the molluscan fauna associated with beds containing the Pearlette volcanic ash and has furnished an important stratigraphic correlation tool in the form of an assemblage of fossils which he found restricted to the beds of Yarmouth age. He presented several conclusions (pp. 43-45) on the paleoecology of Yarmouth time in the midcontinent region.

Samples of charcoal associated with artifacts of terrace-fill and

of organic horizons of buried soils on the upland have been submitted to Dr. W. F. Libby of the Institute for Nuclear Studies, University of Chicago, for Carbon 14 analysis within the past year by E. C. Reed, C. B. Schultz, and J. Thorp. It is believed that the Carbon 14 analysis will permit considerable precision in dating horizons in which the organic matter occurs. Results of this study have not yet been published.

METHODS OF PROCEDURE

Field Technique

This report was prepared from a study of field logs and samples obtained with hydraulic rotary test drilling equipment during the 1947, 1948, and 1949 seasons* as a part of the cooperative groundwater resources Investigation Program of the Conservation and Survey Division, University of Nebraska, and the Ground-Water Division, United States Geological Survey.

The writer took most of the samples and logged most of the test holes used as a basis for this report. The 1947 test hole drilling was under the supervision of E. D. Gordon, who was in charge of the test drilling program from June 1944 to June 1949 as an employee of the Conservation and Survey Division, University of Nebraska. Mr. Gordon supervised the 1947 drilling and assisted the writer in taking and logging the samples of the test holes of that year used in this report. The 1949 samples were taken by the writer with the help of Hubert Unger. Of the two 1948 test holes used, the samples for 29-B-48 were taken by the writer with the help of Lewis Hubka and the samples for 26-A-48 were taken by E. D. Gordon and J. B. Kersey. Messrs. Unger, Hubka, and Kersey were employees of the Groundwater Division of the Water Resources Branch of the United States Geological Survey. Mr. Gordon (1949, pp. 1-90) gave an excellent discussion of hydraulic test hole drilling procedure and described the sampling procedures (1949, pp. 19-21) which have been developed in the Nebraska Geological Survey drilling program.

The test holes were drilled along north-south lines and were located in most instances along the road right-of-way. The test hole sites were

* The record of one test hole drilled in 1931 (10-31) under the supervision of A. L. Lugn (1938, p. 74) was also studied.

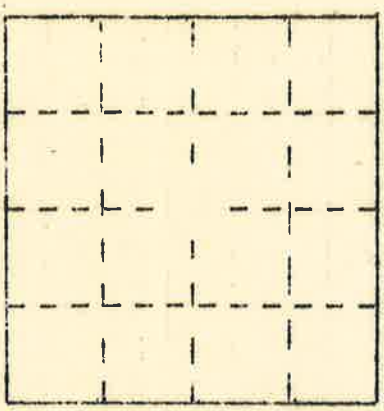
chosen to give regional ground-water control of the area under investigation. The usual test hole spacing interval was three miles. County soil maps and U.S.G.S. Topographic maps were used for field location of test holes. The portal of the test hole was located as accurately as possible from the quarter, half, or section lines. In addition each test hole was located exactly in relationship to prominent local landmarks and notation was made of the location of the drilling site with respect to its topographic position. The test holes were designated by number of hole drilled by a particular drilling rig in that year, e.g. number of test hole (59), by rig used("B") designating(1000-A, Failing rig), and by year ('47) giving the test hole number 59-B-47. Samples were sacked in 3 1/2" x 5" cloth bags, and each bag was labeled with the test hole number and complete legal description and depths from which the sample was taken. A 4 1/4" to 4 1/2" three wing drag bit was used to drill the test holes. The test holespenetrated the entire Pleistocene section in all cases and were terminated in bedrock of Tertiary or of Cretaceous age.

The drilling time in tenths of a minute for each five-foot interval was recorded on a prepared field log form (Figures 2, 3 and 4) along with the drilling action, a description of the sample as to type of material, texture, color, degree of calcareousness, and any other pertinent information. The sampling interval averaged slightly less than 4 feet and was determined either by lithologic changein character of the material or, if there were no lithologic changes, by arbitrary five-foot intervals. Samples were caught in a small pit in a trench which led from the portal of the test hole to a sampling pit and then to the first of two connecting settling pits. The settling pits were approximately three feet square

Report Number_____

Altitude_____

NEBRASKA WATER SURVEY --- DRILLERS LOG



Well Number_____ Date_____

County_____ Sec.___, T.___, R.___ E/W.

Loc. in section: ___ft. N/S of S/N quarter, half, or section line.
(circle and Cross out) ___ft. W/E of E/W quarter, half, or section line.

Located in (underline): Upland, side slope, terrace, bottom land, ravine

Local Description_____

Drilling crew_____

Recorder_____ T.D._____

WATER LEVEL
Tape held_____
Water cut_____
Depth to water_____
Date_____ Time_____

DRILLING TIME RECORD

DEPTH		TIME		
From	To	From	To	min.

DRILLERS LOG

DEPTH		Description and Driller's Notes: (Material, color, texture, hardness, etc; drilling action)
From	To	

NEBRASKA WATER SURVEY—FIELD LOG

Report No................

Altitude..............................

Well Number ....T.D............................ Date ....

County...Loc: ....Sec............., T............N., R............ E W

Loc. in section: ....ft. N S of S N quarter, half or section line.
(circle and
cross out) ....ft. W E or E W quarter, half, or section line.

N

Located in (circle): Upland, side slope, terrace, bottomland, ravine.

Local Description: ....

....

Recorder: ....

Drilling Crew: ....

SYMBOLS	CALC. CONTENT	HYD. PRESS.	DRILLING ACTION	
	N: Non-calc. S: Slightly M: Moderately V: Very calc.	Blank: None L: Low M: Medium F: Full	E: Even, smooth C: Crunchy I: Intermittently rough	r: Slightly rough R: Mod. rough R̲: Very rough

WATER LEVEL MEASUREMENTS

Date ....

Time ....

Tape Held...

Water Cut...

Depth to water..

Hole open to...*...............ft.

*C = caved; P = plugged.

DRILLING TIME RECORD					DEPTH		Hydraulic Pressure	Drilling Action	FIELD LOG	
DEPTH		TIME							Description and Driller's Notes: (Material, color, texture, hardness, and other notes)	Calc. Cont.
From	To	From	To	min.	From	To				

Figure 3. Primary Sheet of Field Log, 1949 Series

SUMMARY OF TEST HOLE CONDITIONS

TEST HOLE NO. _____ T.D. _____ ft. E. Date _____

LOCATION: _____ Sec. _____, T. ____ N., R. ____ W

DRILL BIT: SIZE: _____ inches; CONDITION OF BIT: Before Drilling _____

TYPE: _____ After Drilling _____

Changed bit at _____ feet; Condition of 2nd bit: _____

AQUAGEL: Used _____ lbs. when starting test hole. Added _____ lbs. at _____ feet.
Added _____ lbs. at _____ ft. Added _____ lbs. at _____ feet.
Added _____ lbs. at _____ ft. Added _____ lbs. at _____ feet.

DRILLING FLUID: _____
(Condition, viscosity, thinned at what depths, etc.)

_____

DRILLING FLUID LOSS: _____
(Normal? Excessive loss at any point or depth range?)

_____

DRILLING FLUID PRESSURE: (Low, normal, high, very high) _____, at _____ ft.
_____, at _____ ft.

AMOUNT OF WATER USED: _____

SAMPLES:

Relative velocity of cuttings in coming to the surface: _____
(Slow, normal, fast)

Test Hole Condition: _____
(Open in good condition, tendency to plug at what depths, etc.)

_____

General Condition and Relative Value of Samples: _____

_____

BENCH MARKS: _____

LOCAL WELL DRILLERS: _____
(If contacted in field, give name, address, and information

_____
obtained from them; use back of sheet, if necessary)

LOCATION OF NEW IRRIGATION WELLS IN AREA: _____

_____

OUTCROP INFORMATION: _____
(Location with relation to local outcrops, formation contacts, etc.)

_____
(Sketch geologic section on back of sheet if desirable)

REMARKS: _____
(Other unusual conditions encountered)

_____

_____

_____

_____

_____

and 2.5 feet deep with a shallow trough connecting them. The suction hose for the mud pump was placed in the second pit. The trench was V-shaped near the test hole portal tapering to a U-shape and was relatively narrow and shallow down to the sampling pit with enough gradient to allow little settling of cuttings above the sample pit. The sampling pit was constructed with about 1 1/2 times the width of the trench and a few inches deeper with a restriction in the form of a dam, the width of the sampling pit, at its down-stream end. A large size, heavy duty, kitchen sieve about eight inches in diameter and with approximately 1/4-mesh screen was used for sample taking.

A continuous sampling procedure was followed in most instances. This method has proved to be the most accurate means of collecting satisfactory samples. Using this method, from the moment the cuttings first appear at the surface, portions of the cuttings were examined at regular intervals until drilling stopped and the cuttings were circulated out of the hole. If no apparent differences were discerned the portions were combined. Large quantities of cuttings were saved whenever possible and these were washed and a representative portion sacked.

A visual quantitative evaluation of the total amount of cuttings and proportionate amounts of the different sizes of materials in the drilled interval was kept. This was necessary in evaluating the sample obtained and in determining proportion of sample to be saved in sand and gravel intervals, especially under conditions of abnormal drilling fluid consistency or where the particle size of the interval was very fine.

Cuttings were washed free of drilling "mud" by surging the sample in the strainer in a bucket of water. Sands and gravel were washed into another smaller vessel submerged in the bucket of water and the

water decanted from the smaller vessel.

In the collection of sand and gravel samples portions of the total sample were caught and combined in a container (a gallon can proved satisfactory). The continuous sampling method proved to be of most value in the sampling of this type of material because of the different settling velocities of the diversified grain sizes. Sand and gravel layers usually drill rapidly, often in 0.1 to 0.5 of a minute, causing the material to be concentrated in a short column as it starts up the hole. However, there is a natural sorting action and the larger and heavier grains lag with respect to the smaller lighter grains causing the material to be distributed through a relatively long column by the time they reach the surface. An additional factor, making it necessary to sample continuously, is the tendency of a proportionately large percentage of the fine textured and lighter grains to be carried through the sampling pit in suspension while the coarser grains settle out.

To avoid the loss of an excessive amount of drilling fluid in permeable formations, it was necessary to use a thickening agent. Aquagel, a commercial powdered preparation of bentonite, was used. Hydrated lime was used as a flocculating agent in some instances. The amount of Aquagel used depended on conditions expected or encountered in the hole. In the thick sand and gravel sections approximately 75 pounds of "gel" were mixed initially with about 350 gallons of water. Lime was not added except where ground cracks, porous buried soils, or permeable conditions caused the loss of an excessive amount of drilling fluid. It was necessary on some occasions to add more Aquagel. After excessive fluid loss had been stopped the drilling fluid was thinned when practicable to a more nearly normal condition dependent upon such factors as

proximity of water supply, conditions of sample obtained, possibility of further loss of drilling fluid, or the possibility of the caving in of a permeable zone. When the drilling fluid was thinned it was necessary to circulate about five minutes per hundred feet of hole to allow the thicker drilling fluid in the hole to equalize in weight with the clear water added and to give the suspended material an opportunity to settle out. Notations of when "mud" was thinned or thickened were made in the log.

A standard practice of allowing the hole to clean out by circulation after each five-foot interval drilled was followed to eliminate contamination of samples. This practice was varied in that the full ten foot stem was drilled in the very fast drilling sand and gravel sections. This procedure was followed because of the tendency of the hole to "bell" out opposite the bit if circulation were maintained for any length of time or the upper portion of the remaining five-foot interval would be removed by the jetting action of the circulating fluid.

The settling pits were cleaned out when necessary in order to avoid contamination of samples by the recirculation of cuttings.

Elevations were established for all of the test holes in the area of this report by means of an altimeter survey based on established elevations of United States Coast and Geodetic Survey or by means of an instrument survey by a level party using a Dumpy level. It is believed that the altimeter elevations are accurate within approximately two feet.

Ground-water levels were established by the wetted-tape method in all of the test holes drilled.

Laboratory Technique

General.

The records from 59 test holes representing a total footage of 17,047 feet were examined in the preparation of this report and this study was supplemented by laboratory work on the samples where further analyses seemed advisable and where time permitted.

The laboratory work consisted of binocular microscopic examination of the samples from test holes along the lines of profile, and of mechanical textural analyses along one profile line (C-D), supplemented by some acid soluble percentage determinations on the southern end of this profile. Notations have been made of the basis for the lithological descriptions and correlations as given in the detailed records of the test holes, pages 36 to 181.

The samples from the test holes drilled were stored in the Conservation and Survey Division's storeroom, pending further laboratory study. Representative portions of approximately 50 grams were packaged in sample envelopes to form a part of the Division's permanent file.

Microscopic Analyses.

In this portion of the laboratory work, descriptions of many of the test hole samples were made from examinations under the binocular microscope and interpreted in relation to the information given on the field log. The information recorded as the result of microscopic description consisted of: the type of material, texture, color, mineral content, calcareous content, and any other pertinent characteristics. These described characteristics are discussed in the following paragraphs. The order of the description is the same as that used in the detailed lithologic records of the test hole samples, pages 36 to 181.

The sample was first described as to the dominant type of material in the sample, e.g. clay, silt, or sand. If two types of material were present in about equal quantities, the predominant material was preceded with a qualifying term, e.g. clayey silt, sandy silt, or sand and gravel. In the description of sand and gravel, the lower percentage limit of the grains of gravel size for which the sample still could be called a sand and gravel was placed at approximately 30 percent. If one or two lesser types of material were present, the predominant material was listed first and followed by qualifying adjectives, e.g. "silt, slightly clayey" or by phrases such as "sand with some gravel." An attempt was made to qualify the secondary material type with the terms "slightly," "moderately," or "very" and, in the case of sands and gravels, with the terms "traces," "a little," "some," and "much."

The lithologic type, in the case of the unconsolidated strata, is controlled principally by grain size. It is difficult to distinguish (on the basis of microscopic examination alone) between the upper limits of clay and the lower limits of silt and also between the upper limits of silt and the lower limits of fine sand. In the coarser grain sizes, direct comparison was made between the test hole sample and a grain size kit containing a series of different sieved grain sizes of material ranging from silt to coarse gravel. The grain sizes used in this report are given in Table I. Estimates of percentage totals of sand and gravel contained in the sample were made in some cases although this is difficult to determine and not too reliable because the portion of the original field sample which has been packaged for the permanent file may not be completely representative. This was believed to be the case in some of the samples of sands and gravels which were examined microscopically and which were also divided into grain sizes by mechanical sieve analyses. This apparent

difference may be due to the fact that the samples are sacked in a wet condition and through handling, particularly when the sacks were not full, the smaller and heavier grains would tend to settle downward leaving the larger and lighter grains near the top of the sack from which the packaged sample is taken for the file. However, probably no great readjustment would result in this manner.

Color descriptions of the samples in the field log have not been particularly good in the past. It is a generally recognized fact that there is little agreement among a group of observers on the exact color designation for any one sample of material, Rice, Nickerson, and Thorp (1941, pp. 3-6). The writer was unable to improve upon the color terms used in the field description of the samples to a great extent due to the lack of time for so many direct color comparisons. However, direct comparison of some of the samples, particularly of those from the two western profiles (E-F and G-H), were made with standard color charts. The standard used was a group of seven color charts, hues 10R to 5YR, adapted from Munsell color charts for use in soil color determination by the Division of Soil Survey, U. S. Department of Agriculture, and prepared by the Munsell Color Company, Baltimore, Maryland. Some use was made of the provisional names for soil colors that have been assigned to groups on the charts by the Division of Soil Survey. It was found that the range of colors from 2.5 YR to 5 Y included most of those encountered in the Pleistocene formations of the area investigated. Wall (1948) presented a thesis on correlation of the Dakota Group (Cretaceous System) along a selected profile line of deep wells in Nebraska in which he made a color study, using the above-mentioned color charts, as the primary correlation factor. However, Wall's study involved principally the mass colors of samples,

often involving more than one lithologic type.

Color was used as a basis in recognizing the presence of buried soils as indicated by dark humic horizons, or, in their absence, color was used as a basis for determining subsoil horizons where the original color of the material was changed as a result of soil-forming processes. Subsoil characteristics were indicated by the presence of profiles of weathering or of leaching where original mineral composition had been altered or constituents removed. Evidences of soil forming effects were sought on formations of loess, loess-like material, silts and clays, and on sands and gravels.

Mr. James Thorp, Principal Soil Correlator, U. S. Department of Agriculture, in his description of the color of loesses, published by Condra, Reed, and Gordon (1949, pp. 39-41) has pointed out that the colors of loess deposits are dependent on its mineral composition and that the chief pigments are compounds of iron and manganese with varying degrees of oxidation and hydration. The principal soil-forming factors--time, climate, biological conditions, source of material, along with the rate of accumulation and ultimate thickness--all help to determine the mineral character of the loess.

The important effects of moisture, drainage conditions and time are discussed by Mr. Thorp. Moisture conditions, especially when organic compounds are added to the soil water by biological activity, greatly effect the colors of loess and soils. Under good drainage conditions with an excess of water, iron and manganese compounds are dissolved and carried away; with less water saturation the iron and manganese compounds may be precipitated to form yellow and brown oxides with varying degrees of hydration. The red colors are generally associated with lower degrees of hydration and seem to develop with time under conditions of good drainage.

Under conditions of saturated ground water and poor drainage the iron in loess and soil deposits is reduced, resulting in somber colors with bluish and greenish tints.

The mineral content of the sands and gravels was described only in a general way, often by a mass color. Most of the material consisted of quartz and feldspars of granitic origin with small percentages of dark silicates and occasionally other metamorphic materials. A more detailed petrographic study than was attempted in this investigation would be necessary to determine the possibility of using mineral content of the Pleistocene sands and gravels as a correlation criterion.

Estimates of the degree of rounding and of the grain surface characteristics of the sands and gravels such as frosting, pitting, and polishing were noted where such characteristics were believed to have significance. It would be necessary to wash many of the samples in order to permit an accurate evaluation of the grain surface textures. A detailed study of this kind could not be made because of limitations of time.

The calcareous content of the samples was qualitatively checked in the field with a 25 per cent solution of hydrochloric acid and recorded in the field log. The samples which were studied microscopically were checked against the field log notation by dropping small portions of a representative part of the sample into a shallow dish containing a 25 per cent solution of hydrochloric acid. The original calcareousness of the material was difficult to determine where the sample contained relatively large amounts of secondary calcium carbonate. This difficulty was occasioned, not necessarily by the manner in which the sample was collected, but because of the manner in which the sample was processed, i.e. the sample was sacked in a very wet condition, it was dried, and then it was necessary to crush the dry hard sample to remove it from the field sack

and reduce that portion to the size that could be packaged for the permanent file. This procedure resulted in a mixing of the sample so that secondary lime cannot always be distinguished from primary lime.

Other characteristics noted in the microscopic description were: structure, mineral staining, and the presence of contained material such as fossils, concretions, and reworked material.

Textural Analyses

Sample Preparation.

The sample bags containing the field samples collected, as previously described, were arranged in order on a specially prepared divided tray about three feet square. Legs were placed on one end of the tray so that the surface could be tilted at an angle of about 30°, resulting in ease of handling and a minimum of spilling of the samples. It was found that there was an average weight of about 300 grams of sand and gravel and about 250 grams of the silts and clays available in the sacks for laboratory analysis. This represented the amount of sample left after approximately 50 grams had been packaged for the permanent file.

The non-silty sands and gravels were disaggregated with no particular difficulty. The entire sample was placed in a mortar and pestled with a rubber tipped pestle for approximately one minute. The sample was then placed in a long handled pan and washed under the tap until the pan (two-quart capacity) was about two-thirds full. This was allowed to settle for a few moments and most of the water was decanted. The sample was washed with a small amount of water into a shallow nine-inch pan and was allowed to stand for several minutes. Most of this water was removed by decanting, and the sample was then dried in the electric oven at a temperature of 100-110°C. for approximately 30 minutes to one hour, after which it was allowed to regain room temperature. After the drying process it was again pestled for about one minute. This process prepared the sample for splitting.

It is believed that the washing process was necessary because of the need for complete disaggregation and for the removal of the drilling

"mud." A series of tests were made on ten samples representing the interval 200 to 250 feet from test hole 56-B-47. The unwashed sample was put through a series of sieves for ten minutes in the Ro-Tap Testing Sieve Shaker. The portion retained on each sieve was weighed and per cent determined. This entire sample was recombined and washed by the method described above. The sample was again sieved and the per cent retained on each sieve determined. Sieve loss was kept to an average of about one-tenth of one per cent. It was found that an average of 3.8 grams or a little over 1.1 per cent of material was lost using an original sample averaging 332 grams. About 50 per cent of the loss in washing was in the material passing through the 250 mesh screen (diameter of screen one-sixteenth mm.). There was an approximate one per cent loss on each of the number 9 and 13 mesh sieves with some of this being gained back on the 16 and slightly less on the 60 mesh sieve with a very slight gain to no change on the 115 and 250 mesh sieves.

The washing procedure was followed on all of the sand and gravel samples with the exceptions of those from test holes 55 and 56-B-47. Notations of whether the samples were washed or unwashed appear in Table 2.

Disaggregation of the silty sands, silts, and clays was more difficult than for sand and gravel samples. The entire content of the laboratory portion of the sacked sample was emptied into a mortar and was crushed with a wooden pestle to a size which would pass through a screen with openings two millimeters in diameter. This sample was disaggregated further with a common rolling pin, care being taken not to apply sufficient pressure to break any of the grains. The sample was then ready for splitting.

A fifty gram sample* of the silty sands, silts, and clays and a hundred gram sample of sands and gravels was obtained by taking the prepared sample and splitting it by the use of the Jones Sample splitter, Krumbein and Pettijohn (1938, p. 45). The desired size sample was obtained by alternately resplitting the right and left halves. Full fifty gram samples were not available in a few instances where the sampling interval was small. Exceptions to the use of one hundred gram samples of sands and gravels are indicated in the discussion of textural analysis procedure.

The selected portions of the samples of the sands and gravels were ready for sieve analyses without further processing.

The fifty gram samples of the silty sands, silts, and clays on which acid soluble analyses were not carried out were disaggregated further by the use of a soft rubber pestle. These samples were wet sieved. The samples which were acid treated were ready for that process without further disaggregation.

Mechanical Sieve Analyses.

It was necessary to devise a procedure for sieve analysis that would be both accurate and fast. A total of 588 separate samples were tested in this manner.

The total amount of the available laboratory sample of the sand and gravels averaging about 300 grams in weight was used in sieve analyses for test holes 55, 56 and 57-B-47. Where most of the grain sizes in the sample were below gravel size approximately 150 grams were obtained by splitting the original sample. The samples from test holes 55 and 56-B-47 were screened without further washing in the laboratory. The procedure

* Air dried weight.

was changed in processing the remaining samples in that they were prepared for sieve analyses by washing, as discussed on page 23 and a standard sample of 100 grams of sand and gravel was used because some of the sieves were overloaded with a 300 gram sample.

All of the sands, silty sands, silts, and clays consisting of 50 gram samples were wet-sieved. These samples were prepared for sieving by the procedure previously discussed in connection with sample preparation. In the case of the samples for which acid soluble percentages were determined the insoluble residue was used for sieve analyses.

Some aggregates were encountered in the more clayey subsoil samples of both the acid and non-acid treated materials. Most of these aggregates were broken up in the wet sieving process by gently rubbing them with the index finger. Because of the elimination of most of this material below one-sixteenth millimeter in diameter by the wet sieving process very little further trouble was encountered with silt and clay aggregates. In dry sieving the portion of the sample retained on each of the coraser screens was examined with a hand lens and the portions retained on the one-eighth and one-sixteenth millimeter screens were studied for evidences of grain aggregation with a binocular microscope. Small concretions of iron oxide were common and in the samples from test hole 53-B-47 siliceous aggregates were frequent in the highly calcareous section. The aggregate material made up only a small percentage of the whole sample and was distributed throughout the various lower grade sizes proportionally to the actual percentage determined for the finer grade sizes.

Wet sieving consisted of washing the material of silt and clay particle sizes through a 250 mesh Tyler sieve with openings of 0.625 millimeters in diameter. The material retained on the sieve was washed into a shallow pan and most of the water decanted. It was then dried

at a temperature of 100-105°C. for about thirty minutes after which it was allowed to cool to room temperature and weighed, the weight being recorded as the "wet wash residue." The material passing through the 250 mesh screen (finer than one-sixteenth millimeter) is hereafter referred to as the silt and clay percentage. The weight of this material was found by subtracting it from the total weight of the sample used.

The wet wash residue and the selected samples of sands and gravels were all dry screened through a set of eight Tyler nested sieves, the size and mesh of which are given in Table I. The sieves were placed in a Ro-Tap Testing Sieve Shaker for a period of twelve minutes for the larger samples and ten minutes for the fifty gram samples. It was found that samples sieved for longer periods of time failed to change the amount retained on any one screen more than one-tenth of one per cent and that a longer period of time caused an excessive portion of the particles to lodge on the screens. The material caught on each screen was weighed, the weight recorded, and the percentage of each grade calculated. All results were recorded on special record sheets (see Figure 5). The coarse portions of the samples which were wet sieved were found to contain some material which would pass through the 250 mesh sieve on dry screening. This weight was added to that of the silt and clay fraction.

TABLE I.

Sieve Sizes and Grain Size Classification

Sieve Opening in mm.	Mesh	*Classification	
Over 8	2.5	Coarse gravel	
8 - 4	5	Medium gravel	1
4 - 2	9	Fine gravel	
2 - 1	16	Very coarse sand	2
1 - 0.5	32	Coarse sand	
0.5 - 0.25	60	Medium Sand	
0.25 - 0.125	115	Fine sand	3
0.125- 0.0625	250	Very fine sand	
Less than 0.0625	Pan	Silt and clay	4

The divisions shown on the right hand side of the table are those used for plotting the textural analyses results shown on Geological Profile Section C-D.

*Classification used by the Conservation and Survey Division, University of Nebraska.

TEST HOLE #_____ Figure 5 DATE_____

SAMPLE DEPTH_____ Sample Computation Sheet TEST BY_____

		TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE							
ACID INSOLUBLE							
ACID SOLUBLE							
WET WASH RESIDUE (250 MESH)							
THROUGH (250 MESH)							
RO TAP TIME_____ WT. OF SAMPLE_____							
SIEVE OPENING IN MM	MESH						
OVER 8	2.5						
8 - 4	5						
4 - 2	9						
2 - 1	16						
1 - 0.5	32						
0.5 - 0.25	60						
0.25 - 0.125	115						
.125-0.0625	250						
PAN							
CUMULATIVE WT.							
SIEVE LOSS							
TOTAL							

Acid Soluble Determination

Acid soluble percentages were determined for the interval above the sands and gravels on the four southernmost test holes of profile line C-D, Figure 11. It was hoped that this data would prove helpful in correlating this predominantly silty section and of particular use in helping to determine the age of a relatively thick, partically cemented, and highly calcareous interval in test hole 53-B-47. The acid soluble percentages were determined on the samples from these four test holes before the textural analyses were made because of the need for disaggregation of the calcareous intervals and to eliminate the acid soluble material before the textural analyses were made.

The samples were oven-dried before and after acid treatment to eliminate the weight of hygroscopic moisture as a factor in the determination of acid soluble percentages. It was believed that appreciable errors might be introduced by using air dried weights of the original sample because of variable amounts of contained moisture in different textured materials and because of changing weights due to variable atmospheric conditions.

Meinzer (1923, pp. 74-94) has discussed moisture content of air dried samples. Hygroscopic moisture is that moisture which condenses on the surface of most solid substances when exposed to ordinary atmospheric conditions. The moisure can be driven off completely and most readily only by heating at a temperature above the boiling point of water. Air dried samples which show no visible signs of moisture may still contain moisture up to several per cent of the dry weight. The moisture surrounds and is closely associated with the individual grains. The moisture so held bears a relation to the surface texture of the grains.

Hygroscopic moisture of the samples was found to range from two to four per cent of the total weight in the silts and clayey silts and from less than five-tenths of one per cent to about two per cent in the sandy silts and silty sands.

A test sample of fifty grams of air dried material from test hole 51-B-47, depth 30-35 feet (a very fine sandy silt), was allowed to set uncovered in the laboratory for a period of seventeen days from March 29 to April 15, 1949. During this time the sample was weighed several times daily. There was only three-tenths of one per cent difference between the lowest and highest hygroscopic moisture content during this time. This indicates that the change in atmospheric humidity, at least for this period of time and in a heated laboratory room, was not an important factor in changing the weight of the sample.

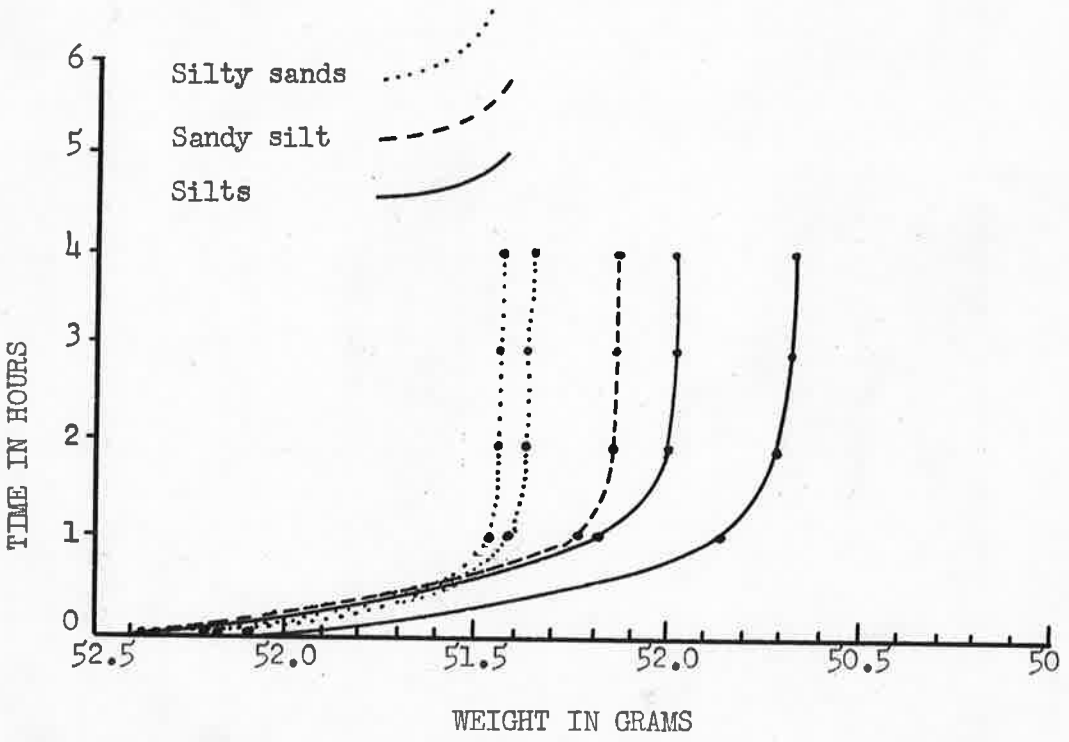
On a series of tests made of air dried samples from test hole 51-B-47, it was found that two hours in the oven at a temperature of between 105-110°C. was adequate for driving off hygroscopic moisture (see Figure 6).

In the acid soluble determination procedure, a fifty gram sample prepared by the same method used in processing the silty sands, silts, and clays for sieve analyses was placed on a tared filter paper and dried in the electric oven (105-110°C) for a period of two hours. The sample was weighed immediately upon removal from the oven to two decimal places and the weight recorded. It was then placed in a tall 1000 cc. pyrex beaker, and a twenty-five per cent solution (by volume) of technical grade hydrochloric acid was added in sufficient quantity to cover the material to a depth of about one inch. The acid treated material was stirred occasionally and permitted to stand until effervescence had stopped. The

minimum time the samples were allowed to stand in the acid was eight hours; and, in most cases, the samples remained in the acid over-night. Fresh acid was then added and if effervescence occurred the sample was left in the acid for several more hours. It was necessary to add additional acid in only a few cases. In certain instances, where there was some lime cementation, the beaker and contents were gently heated on a sand bath for a period of thirty minutes and the process repeated until effervescence had ceased completely.

The beaker containing the acid treated sample was then nearly filled with water, allowed to stand for a few minutes and the water was filtered into the same filter paper which had previously contained the oven dried sample. The residue was washed into the same filter paper; and, after the acid had been removed by repeated washings, the sample was allowed to partially air dry and was then placed in the electric oven at a temperature of 105-110°C. for a period of four hours, or, as in the case of the more clayey materials, until no more appreciable moisture was driven off by continued heating. The sample and tared filter paper were again weighed immediately upon removal from the oven and the weight recorded. The sample was weighed immediately because it was found that the oven dried samples absorbed atmospheric moisture rather rapidly and that convection currents from the heated sample did not materially affect the weight when weighed to only two decimal places. The acid soluble percentage was determined and recorded. After the samples were allowed to cool, textural analyses were made as previously described.

FIGURE 6



Graph showing weight of hygroscopic moisture lost by air-dried samples in the electric oven (105-110°C.) as a function of time. Original weight of sample, 50 grams plus weight of filter paper.

PRESENTATION OF DATA

Methods of Representing Results

The results of the study of the field logs supplemented by microscopic, textural, and acid soluble analyses are presented on the following pages in tabular form for each test hole. These records are detailed lithological descriptions of the samples and include correlations of the formations encountered. This information is presented in graphic form as geological profile sections (Figures 10, 11, 12, 13, and 14). It was impossible to show all of the details of the lithologic characteristics of the formation on the profile sections without using a greatly exaggerated vertical scale. A vertical scale of two inches to one hundred feet was used on all of the profiles and a horizontal scale of one inch to the mile was used for all but the east-west profile line (J-K, Figure 14). On the east-west profile line a horizontal scale of one inch to two miles has been used. The topography was taken from the topographic maps of the area (listed in the Bibliography), supplemented by the elevations established for the test holes and by a study of the county soils maps. The topography as illustrated is graphic and may misrepresent actual conditions because of error on the topographic maps, or because of variations within the twenty-foot contour interval which was used on these maps.

The textural and acid soluble analyses are presented graphically as a modified bar histogram in the form of a percentage log for each of the test holes studied. The vertical intervals represented by the test hole samples were drawn to scale and the logs were plotted as Geological Profile Line C-D, Figure 11. This method of representation was suggested to the writer by E. C. Reed (personal interview, 1949), and has proven very satisfactory in compactly illustrating the data. The acid soluble

percentage is shown as an overlay on the silt and clay fraction of the histogram.

Because of the limited space available, grade size determinations were not shown separately on the graphic percentage logs, but were combined as indicated in Table 1 into four categories as follows: fine to coarse gravel (larger than 2 mm.); coarse to very coarse sand (1/2 to 2 mm.); very fine to medium sand (1/16 to 1/2 mm.); and silt and clay (less than 1/16 mm.). It was found that the plotting of each sieve size for a sample interval added little to its value in correlation.

The complete textural and acid soluble analysis is given in Table 2 along with hygroscopic moisture content determined for the samples on which acid soluble determinations were made. Notations of method of sieve analyses also are recorded.

Contour maps at the base of the Pleistocene, Figure 8, and at the base of the Grand Island formation, Figure 9, represent the topography of these surfaces, to mean sea-level datum. A figure representing sea level elevation at each control point is included opposite the test hole location. Records of test holes in addition to those used in the study and preparation of the profile sections were studied to furnish a more complete picture in determining the drainage pattern in pre-Pleistocene and pre-Grand Island times than could be furnished by a study of the records of test holes specifically in the area covered by this report.

RECORDS OF TEST HOLES ALONG PROFILE
LINE A-B, SIX MILES WEST OF DONIPHAN
TO FOUR MILES NORTHWEST OF COWLES;
BASED ON FIELD LOGS

TEST HOLE 14-B-49

LOCATION: 55 feet south and 114 feet west of the northeast corner of the southeast quarter of Sec. 12, T. 9 N., R. 11 W.
ELEVATION: 1925.7 feet (Altimeter)
DEPTH TO WATER: 2.3 feet.
RECORD:

DESCRIPTION	DEPTH IN FEET FROM	TO
Quaternary System, 90.5 feet:		
Todd Valley formation (?) and younger, 23.5 feet:		
Soil: moderately sandy to slightly clayey silt, very dark brown-gray.....	0	0.5
Silt, very sandy, fine to medium with some coarse sand, light buff-gray.....	0.5	0.7
Sand, fine to coarse with scattered fine to coarse gravel, light brown-gray.....	0.7	2
Soil: silty sand, fine to coarse sand with scattered fine to coarse gravel, very dark gray.....	2	3
Sand and gravel, coarse sand to fine gravel with some medium gravel, brown-gray to pinkish.....	3	15
Sand and gravel, fine sand to fine gravel with some medium and coarse gravel, brown-gray to pinkish, a few dark grains.....	15	20
Sand and gravel, medium sand to fine gravel, brown-gray to pinkish with a few dark grains.....	20	23.5
Grand Island formation, 31.5 feet:		
Silty sand, very fine to fine with some medium to coarse sand, yellow-buff.....	23.5	27.5
Sand, medium to coarse with some fine sand, brown-gray with pinkish.....	27.5	30
Sand, slightly silty, fine to very coarse sand with some fine gravel, brown-gray to pinkish.....	30	37.5
Sand, slightly silty, fine to coarse sand, brown-gray, to pinkish.....	37.5	40
Sand, fine to very coarse with a very little fine gravel, brown-gray to pinkish.....	40	45
Same with fine gravel and scattered fine to coarse Holdr gravel; slightly silty 50-55.....	45	55
Holdrege formation, 35.5 feet:		
Sand, medium to very coarse sand with some fine sand and fine gravel, brown-gray to pinkish.....	55	60
Sand and gravel, fine sand to fine gravel, brown-gray to pinkish, with thin silt layers; very little fine gravel 65-67.....	60	67
Sand and gravel, fine sand to medium gravel with some coarse gravel, brown-gray to pinkish; slightly finer texture 80-90.5.....	67	90.5

14-B-49 (Cont'd)

Tertiary System, 109.5 feet:		
Silt, olive gray	90.5	94
Silt, slightly to moderately clayey, light pinkish tan; some white calcareous areas 100-105; more clayey 103-105	94	105
Silt, slightly clayey to very fine sandy, light buff-gray, moderately calcareous	105	110
Silt, slightly clayey to very fine sandy, tan-gray, some whitish limy areas; a few limy nodules 120-125; more sandy 125-131	110	131
Sandstone, silty, very fine to fine sand, light tan in the upper part grading to light gray and light green-gray, moderately to very calcareous, a few rootlets	131	135
Same, some medium sand, light green-gray	135	147.5
Sandstone, very fine to medium sand, light green-gray, moderately to very calcareous, a few rootlets	147.5	160
Same, gray-green, moderately calcareous	160	164.5
Silty clay, in part sandy, a few limy nodules	164.5	171
Silt, clayey to very fine sandy, yellowish buff; dense limy nodules and with rounded aragonite fragments 175-180	171	180
Clay, silty to very fine sandy, light buff-gray, some limonitic staining, a few limonitic and aragonite granules	180	190
Clay, light buff-gray, some aragonite and limonitic granules	190	200
Cretaceous System:		
Clay shale, dark gray, slightly calcareous	200	260
		Total Depth

TEST HOLE 15-B-49
(Profile Line A-B)

LOCATION: 150 feet south and 12 feet west of the northeast corner of the southeast corner of Sec. 24, T. 9 N., R. 11 W.
ELEVATION: 1991.5 feet (Altimeter)
DEPTH TO WATER: 68.0 feet.
RECORD:

DESCRIPTION	DEPTH IN FEET FROM	TO
Quaternary System, 149.5 feet:		
Road fill: silty sand, medium brown-gray.....	0	0.5
Dune Sand, 3 feet:		
Sandy silt to silty sand, brown-buff.....	0.5	1
Silty sand, very fine to coarse sand, brown-buff.....	1	3
"Peorian" formation, 21.5 feet:		
Silt, slightly clayey, light buff-gray, limonitic flecks and rootlets; much limonitic staining 7-12; slightly calcareous 3-7.....	3	12
Silt, slightly clayey, light gray, a few limonitic flecks.....	12	18
Same, light buff-gray with a few limonitic rootlets; very fine sandy 20-24.5.....	18	24.5
Todd Valley formation, 53.5 feet:		
Soil: silt, very fine sandy, medium to dark brown, slightly micaceous with some limonitic staining...	24.5	27.5
Soil: silty sand, very fine grained, dark brown, dark iron staining.....	27.5	30
Soil: sandy silt, very fine to medium sand, dark brown-gray.....	30	32
Silty sand, very fine grained, medium gray to 35, light gray 35-36.....	32	36
Sand, fine to coarse, very light gray.....	36	43
Sand, slightly silty, very fine to medium sand, light gray.....	43	45.5
Silty sand, very fine grained, light gray to brownish 48-49.....	45.5	50
Sandy silt to silty sand, light gray.....	50	56.5
Sand, very fine to medium, light gray, slightly silty 60-65.....	56.5	65
Silty sand, very fine to medium sand, light gray, much limonitic staining; a few limonitic nodules 70-78.....	65	78
Sappa formation, 5.5 feet:		
Sandy silt, very fine to fine sand, medium brown-gray.....	78	83.5
Grand Island formation, 34.5 feet:		
Silty sand, very fine to fine sand, light greenish gray; less silty 85-89.5.....	83.5	89.5
Silty sand, very fine to coarse, some very coarse, light greenish gray.....	89.5	93.5
Sand, slightly silty, medium to very coarse sand, light greenish gray.....	93.5	95

15-B-49 (Cont'd)

Silty sand, very fine to coarse sand, light greenish gray; thin silt layers 95-100; less silty, grading coarser textured 100-103.....	95	103
Sand and gravel, fine sand to fine gravel with a trace of medium gravel, brown-gray with greenish, a little pink; less gravel 105-110.....	103	110
Sand, fine to coarse with a little very coarse sand, light gray.....	110	112
Sand and gravel, fine sand to fine gravel with a little medium gravel, brown-gray with pinkish and yellow.....	112	118
Holdrege formation, 31.5 feet:		
Sand, fine to very coarse with some fine gravel and a trace of medium gravel, brown-gray with pink and yellow, a few dark grains.....	118	130
Sand and gravel, fine sand to medium gravel, brown-gray with pink and yellow; less medium gravel 140-149.5.....	130	149.5
Tertiary System, 113 feet:		
Clayey silt, light gray.....	149.5	153
Silt, slightly clayey, light gray-brown.....	153	154.5
Sandy silt, very fine sandy, medium reddish brown, moderately calcareous.....	154.5	157.5
Same, light greenish gray, some white limy areas.....	157.5	164
Sandstone, very fine to medium sand, greenish gray, a few limy rootlets.....	164	169
Silty sand, very fine to fine sand, light gray, whitish calcareous zones and rootlets; some consolidation 180-190.....	169	190
Clayey to sandy silt, whitish gray, limy nodules and rootlets, very calcareous.....	190	192.5
Sandstone, very fine to medium sand, olive gray, moderately calcareous, with rootlets.....	192.5	219
Sand, very fine to medium with some coarse sand, medium gray, in part lime cemented.....	219	227.5
Silty sand to sandstone, very fine to fine sand, whitish gray, moderately calcareous.....	227.5	230
Clay, silty to very fine sandy, light gray, moderately calcareous, some dense limy nodules; some limonitic staining 235-240.....	230	240
Silty clay, tan-gray with dense limy nodules, moderately calcareous.....	240	245
Clay, slightly sandy, buff-gray, slightly calcareous.	245	250
Clay, whitish gray, much limonitic staining, slightly calcareous; a few ironstone fragments 255-260.....	250	262.5
Cretaceous System:		
Clay shale, dark gray, moderately calcareous; slightly silty 285-300.....	262.5	300
		Total Depth

TEST HOLE 16-B-49
(Profile Line A-B)

LOCATION: 1320 feet north and 6 feet east of the southeast corner of Sec. 36, T. 9 N., R. 11 W.
ELEVATION: 1972.9 feet (Altimeter)
DEPTH TO WATER: 21.2 feet (Perched water table)
RECORD:

DESCRIPTION	DEPTH IN FEET FROM	TO
Quaternary System, 138.5 feet:		
Road fill: silt and clayey silt, dark brown-gray	0	2.5
"Peorian" formation, 26.5 (+) feet:		
Soil: silt, very dark brown-gray to black	2.5	3.5
Silt, slightly clayey, medium brown-gray	3.5	4.5
Silt, slightly clayey to slightly sandy, very fine to medium sandy, light brown-gray	4.5	6
Silt, slightly clayey, buff-gray, a few limonitic flecks and nodules	6	7
Silt, buff to yellow-gray, much limonitic staining, moderately calcareous; a few limy nodules 8.5-11.5	7	11.5
Silt, slightly clayey to slightly very fine sandy, very light buff-gray, a few limonitic flecks and nodules, a few gastropods, slightly calcareous; a few rootlets 15-20	11.5	20
Silt, slightly clayey to very fine sandy, buff-gray, much limonitic staining	20	28.5
Todd Valley formation, 19.5 feet:		
Soil: silt, moderately clayey, medium brown, a few limonitic flecks	28.5	30.5
Silty sand, very fine to medium sand, dark buff-gray	30.5	36.5
Sand, very fine to coarse, light buff-gray	36.5	44.5
Silty sand, very fine to medium sand, light gray, some thin sandy silt zones	44.5	48
Loveland formation (?), 16 feet:		
Sand, very fine to coarse, light gray	48	54
Silty sand to sandy silt, very fine to medium sand, light brownish gray	54	55
Sand, fine to coarse with some very coarse sand, brown-gray with pinkish	55	64
Sappa formation (?), 6 feet:		
Sand, silty, very fine to fine sand, brown-gray with limonitic staining and slight cementation	64	70
Grand Island formation, 50 feet:		
Sand, fine to coarse with some very coarse sand, brown-gray to pinkish	70	75
Sand, very fine to medium, brown-gray to pinkish	75	77
Sandy silt, very fine sandy, brown-gray	77	78.5
Sand, very fine to medium, brown-gray; silty zone 83.5-84	78.5	84

16-B-49 (Cont'd)

Sand, very fine to very coarse with some fine gravel, brown-gray, some pinkish.....	84	91.5
Sand and gravel, fine sand to fine gravel with some medium gravel, brown-gray with some pink and yellow.....	91.5	105.5
Silty clay, light buff-gray.....	105.5	106.5
Sand and gravel, fine sand to medium gravel, brown-gray to pinkish; slightly less gravel 110-120.....	106.5	120
Holdrege formation, 18.5 feet:		
Sand and gravel, very fine sand to fine gravel with some medium gravel, brown-gray with pinkish; some clay balls (?) 125-130.....	120	130
Sand and gravel, very fine sand to medium gravel, brown-gray with pink and greenish.....	130	138.5
Tertiary System, 105.5 feet:		
Clayey silt, light gray and medium brown-gray.....	138.5	140
Silt, slightly clayey, yellowish brown, some white limy areas.....	140	143
Siltstone, very fine sandy, brown-gray, many limy nodules and rootlets.....	143	155
Silt to siltstone, light brown, a few rootlets; some slight calcareous consolidation 155-175; well consolidated 175-180.....	155	184.5
Clayey silt, marly, white.....	184.5	185.5
Silt, slightly clayey, brown-tan, very few rootlets, moderately calcareous.....	185.5	190
Sandy silt to sandstone, very fine sand, light tan-brown, some limy nodules.....	190	195
Sand, very fine to coarse with some very coarse sand, brown-gray, some slight calcareous cementation.....	195	200
Same, silty, more cementation.....	200	203
Silty sandstone, very fine to fine sand, very light gray, moderately to very calcareous.....	203	213
Silt, clayey to slightly sandy, light green-gray; some dense limy nodules 213-215.....	213	217
Sand, very fine to fine with some medium sand, brown-gray.....	217	220
Silty sand, very fine to fine sand, light green-gray.....	220	223
Sand, very fine to medium, light brown-gray, dark speckling; rounded aragonite and limy grains 230-234.....	223	234
Clay, light buff to light gray, much limonitic staining.....	234	244
Cretaceous System:		
Clay shale, medium dark gray, slightly calcareous; bentonitic 260-266.5.....	244	266.5
Chalky shale, silty, light gray to light brown-gray.....	266.5	280
	Total Depth	

TEST HOLE 17-B-47
(Profile Line A-B)

LOCATION: 8 feet north and 116 feet east of the southeast corner of Sec. 18, T. 8 N., R. 10 W.
ELEVATION: 1997.4 feet (Altimeter)
DEPTH TO WATER: Hole caved in at 95.7 feet.
RECORD:

DESCRIPTION	DEPTH IN FEET FROM	TO
Quaternary System, 181 feet:		
Road fill: clayey silt, dark brown-gray.....	0	1.5
"Peorian" formation, 14 (+) feet:		
Silt, slightly clayey, dark brown.....	1.5	2.5
Clayey silt, dark brown.....	2.5	3.5
Clayey silt, light buff-gray, a little limonitic staining.....	3.5	4.5
Silt, slightly clayey, buff-gray with a few limonitic flecks and rootlets, slightly calcareous...	4.5	15.5
Todd Valley formation, 31.5 feet:		
Soil: sandy silt to silty sand, very fine sand, light brown.....	15.5	17.5
Sand, very fine to medium, light brown-gray.....	17.5	23
Soil (?): sandy silt to silty sand, medium brownish gray 23-25, brown 25-27.5.....	23	27.5
Sand, very fine to fine with some medium sand, light gray.....	27.5	30
Sand, very fine to coarse, light gray.....	30	34.5
Same, less coarse sand, very slightly silty.....	34.5	40
Silty sand, very fine to medium sand, very light brown-gray.....	40	42.5
Sandy silt to silty sand, very fine to medium sand, light gray, some limonitic staining.....	42.5	47
Loveland formation, 28 feet:		
Silt, moderately clayey to slightly sandy, tan-gray with a little limonitic staining.....	47	50
Clayey silt, some imbedded very fine sand, tan to light gray.....	50	51.5
Silty sand to sandy silt, light brown-gray.....	51.5	55
Sand, moderately silty grading slightly silty, light gray, yellow tint.....	55	60
Sand, very fine to coarse, light gray, brown tint....	60	70
Sand, very fine to medium with some coarse sand, light gray, brown tint.....	70	75
Sappa formation (?), 15 feet:		
Sand, very silty, very fine to medium sand, very light gray, brown tint.....	75	78
Sand, very fine to medium with some coarse sand, very light gray, brown tint.....	78	80
Sand, slightly silty, very fine to medium sand, light gray.....	80	84.5
Sand, very silty, very fine to medium sand, very light brown-gray.....	84.5	88

17-B-49 (Cont'd)

Grand Island formation, 43.5 feet:		
Sand, fine to coarse, light gray, much iron staining 92-94	90	100
Sand, fine to very coarse with a trace of fine gravel, light brown-gray with pinkish	100	110
Same, with fine gravel and a little medium gravel	110	120
Sand and gravel, medium sand to medium gravel (approximately 30% gravel), brown-gray with green and pink	120	130
Sand, fine to very coarse with some fine gravel, brown-gray to pinkish	130	133.5
Fullerton formation, 11 feet:		
Sand, slightly silty, very fine to medium sand, medium gray	133.5	137.5
Silt, very fine sandy, light greenish gray	137.5	139
Silt, clayey, light medium gray	139	140
Silt, very fine sandy, light greenish gray 140-141, tannish gray 141-144.5	140	144.5
Holdrege formation, 36.5 feet:		
Sand, fine to very coarse with a trace of fine gravel, brown-gray with pink and green	144.5	150
Same, approximately 20% fine to medium gravel	150	160
Sand and gravel, fine sand to fine with some medium gravel (approximately 75% very coarse sand to fine gravel), brown-gray to pinkish	160	170
Gravel, some sand, medium sand to medium gravel, (approximately 75% gravel), brown-gray to pinkish.	170	181
Tertiary System, 40.5 feet:		
Clayey siltstone, greenish-gray, non-calcareous	181	190
Same, very fine sandy, medium tannish brown	190	195
Siltstone, slightly very fine sandy, light green-gray	195	198.5
Silt to siltstone, light brown-gray	198.5	200
Siltstone, very fine sandy, tannish-gray; some interbedded light gray with a few limy nodular fragments 200-205	200	210
Sand, very fine to coarse with some very coarse sand, brown-gray to pinkish	210	218.5
Silty clay, light gray, slightly calcareous	218.5	221.5
Cretaceous System:		
Clay shale, dark gray, slightly calcareous; a little ironstone 225-230; thin light gray bentonitic zones 240-258.5	221.5	258.5
Silty shale, medium gray, very calcareous	258.5	270
		Total Depth

TEST HOLE 18-B-49
(Profile Line A-B)

LOCATION: 558 feet south and 10 feet west of the northeast corner of Sec. 1, T. 7 N., R. 11 W.
ELEVATION: 1974.4 feet (Altimeter)
DEPTH TO WATER: Hole caved in at 92.9 feet.
RECORD:

DESCRIPTION	DEPTH IN FEET FROM	TO
Quaternary System, 222.5 feet:		
Road fill: silt, dark brown-gray.....	0	1.5
"Peorian" formation, 20.5 (+) feet:		
Soil: slightly clayey silt, very dark brown-gray....	1.5	2.5
Silt, moderately clayey, medium brown-gray.....	2.5	3
Clayey silt, light gray, non-calcareous.....	3	5.5
Silt, very fine to fine sandy, light brown-gray, non-calcareous.....	5.5	7.5
Silt, light buff-gray, yellow tint, many limonitic flecks, non-calcareous.....	7.5	22
Todd Valley formation, 6 feet:		
Soil (?): silt, slightly very fine sandy, medium buff-gray.....	22	24.5
Sand, slightly silty, medium brown-gray.....	24.5	28
Loveland formation, 28.5 feet:		
Silt, very fine sandy to clayey, tan-gray, pink tint.	28	30
Same, more clayey.....	30	32.5
Same, slightly clayey, more sandy.....	32.5	35
Sandy silt, very fine to fine sand, tan-gray.....	35	39.5
Silty sand, very fine to medium sand, tannish-gray...	39.5	45
Same, slightly silty, less medium sand.....	45	56.5
Sappa formation, 13.5 feet:		
Silt, slightly clayey to very fine sandy, light tannish-gray.....	56.5	60
Sand, very fine to coarse, light brown-gray with some pinkish.....	60	68.5
Silty sand, fine to very coarse, light brown-gray....	68.5	70
Grand Island formation, 30.5 feet:		
Sand, fine to coarse with some very coarse sand, light brown-gray with pinkish.....	70	90.5
Sand and gravel, medium sand to fine gravel with some medium gravel, brown-gray with pinkish.....	90.5	110.5
Fullerton formation, 4.5 feet:		
Clayey silt, buff-gray.....	110.5	111.5
Sand and gravel, medium sand to medium gravel, brown-gray with pinkish; silt layer 112.5-113.....	111.5	115
Holdrege formation, 107.5 feet:		
Sand, very fine to coarse with some very coarse sand, light gray.....	115	120
Sand, fine to very coarse with fine gravel, light brown-gray with pinkish; some medium gravel 125-130.....	120	130
Sand, fine to very coarse with some fine and a little coarse gravel, brown-gray with pinkish.....	130	140

18-B-49 (Cont'd)

Sand and gravel, medium sand to medium gravel with a little coarse gravel, brown-gray with pinkish...	140	150
Sand and gravel, fine sand to fine gravel (much very coarse sand to fine gravel), brown-gray with pinkish; some medium gravel 170-190.....	150	190
Sand, fine to very coarse with some fine gravel, brown-gray with pinkish, some iron staining.....	190	195
Sand and gravel, fine sand to fine gravel, brown-gray with pinkish; less fine gravel 210-222.5.....	195	222.5
Tertiary System, 20.5 feet:		
Silt, light brownish-gray; slightly calcareous 225-230.....	222.5	230
Silt to siltstone, very fine sandy, dark tannish-gray, moderately calcareous; many chalky fragments 240-243.....	230	243
Cretaceous System:		
Chalky silty shale, grayish white.....	243	267
		Total Depth

TEST HOLE 19-B-49
(Profile Line A-B)

LOCATION: 569 feet north and 8 feet east of the southwest corner of Sec. 18, T. 7 N., R. 10 W.
ELEVATION: 1962.7 feet (Altimeter)
DEPTH TO WATER: 88.5 feet.
RECORD:

DESCRIPTION	DEPTH IN FEET FROM	TO
Quaternary System, 253.5 feet:		
Road fill: clayey silt, dark brown-gray.....	0	1
"Peorian" formation, 17 (+) feet:		
Soil: silt, dark brown-gray.....	1	2
Clayey silt, dark brown.....	2	2.5
Silty clay, medium brown, granular texture.....	2.5	4.5
Silt, moderately clayey, medium brown, gray tint.....	4.5	5
Silt, slightly clayey, medium buff to brown, gray tint, some limonitic staining, a few limy nodules, very slightly calcareous.....	5	18
Loveland formation, 19.5 feet:		
Soil: silt, slightly sandy, very fine sandy, dark tan-brown.....	18	20
Same, very sandy, dark brown.....	20	23.5
Sandy silt to silty sand, very fine to medium sand, tan-brown.....	23.5	29.5
Sand, very fine to medium, light tan-gray; silty 34.5-37.5.....	29.5	37.5
Sappa formation, 32.5 feet:		
Silt, clayey to very fine sandy, light gray, drilled slowly.....	37.5	40
Sand, slightly silty, very fine to fine sand, light brown-gray.....	40	45
Sandy silt with some silty sand, light tan-gray.....	45	57.5
Silty sand, very fine to medium sand, light gray.....	57.5	60
Sand, very fine to coarse with some very coarse sand, light brown gray, some pink.....	60	64
Silt, clayey to slightly sandy, grading more sandy, light gray, some limonitic staining.....	64	70
Grand Island formation, 39 feet:		
Sand, moderately silty, fine to coarse with some very coarse sand, light gray.....	70	75
Same, slightly silty.....	75	78
Sand, medium to very coarse, light brown-gray with pinkish.....	78	80
Same, fine to coarse with some very coarse sand.....	80	83.5
Sandy silt, principally very fine sand, light tannish gray.....	83.5	86
Sand, fine to very coarse with a little fine gravel, brownish yellow, highly iron stained; some medium gravel 90-95.....	86	95
Sand and gravel, medium sand to fine gravel with some medium gravel, light brown-gray to pinkish; thin silt layers at 96.5 and 100.3-101.....	95	109

19-B-49 (Cont'd)

Fullerton formation, 3 feet:		
Silt, clayey to very fine sandy, light gray.....	109	112
Holdrege formation, 141.5 feet:		
Sand and gravel, medium sand to medium gravel, light brown-gray to pinkish.....	112	130
Gravel and sand, medium sand to medium gravel, brown-gray to pinkish, 60-75% gravel.....	130	150
Sand and gravel, fine sand to fine gravel with some medium gravel, light brown-gray with pinkish and yellow.....	150	160
Sand, very fine to coarse with some very coarse sand, light brown-gray with pinkish.....	160	162
Sandy silt to silty sand, very fine to medium sand, light yellowish gray.....	162	167.5
Sand and gravel, very fine sand to medium gravel, light gray with pink and yellow; slightly finer texture 180-220.....	167.5	220
Sand, fine to very coarse with some fine gravel, light gray.....	220	253.5
Tertiary System, 39.5 feet:		
Clayey silt, light gray, slightly calcareous.....	253.5	260
Calcareous silt, whitish gray.....	260	262
Siltstone, dark brown, very calcareous.....	262	265
Siltstone, very fine sandy, very light brown-gray 265-270, light greenish gray 270-279.5, very calcareous.....	265	279.5
Clayey silt, light medium gray, some rounded chalky grains, moderately to very calcareous.....	279.5	293
Cretaceous System:		
Chalky shale, pale yellow to yellowish orange.....	293	310
		Total Depth

*TEST HOLE 20-B-47
(Profile Line A-B)

LOCATION: 9 feet south and 849 feet east of the northwest corner of Sec. 6, T. 6 N., R. 10 W.
ELEVATION: 1946.6 feet (Altimeter)
DEPTH TO WATER: 92.1 feet.
RECORD:

DESCRIPTION	DEPTH IN FEET FROM	TO
Quaternary System, 305 feet:		
Road fill: very fine sandy silt, dark brown-gray....	0	1
"Peorian" formation, 22 (+) feet:		
Soil: moderately clayey silt, medium dark brown-gray.....	1	2.5
Silty clay, medium brown-gray; very pale brown-gray, less clayey 3 to 3.5.....	2.5	3.5
Silt, slightly clayey, very light buff-gray, a few limy nodules, slightly calcareous.....	3.5	11.5
Silt, slightly to moderately clayey, light buff-gray, non-calcareous.....	11.5	15
Soil: clayey silt, medium brown with some buff-gray, less clayey in lower part.....	15	18
Silt, very light buff-gray; slightly darker and slightly clayey 20-23.....	18	23
Loveland formation, 24 feet:		
Soil: clayey silt, dark brown-gray, trace of imbedded sand; slightly lighter color 25-26.5.....	23	26.5
Silt, moderately clayey to moderately sandy, very fine with a little fine to medium sand, light brown, slight red tint, grading more sandy 32-35..	26.5	35
Sandy silt to silty sand, very fine to medium with a trace of coarse sand, pale brown; more silty and slightly clayey 37.5-40.....	35	40
Silty sand, very fine to medium with some coarse sand, pale brown, yellow tint, mostly quartz, moderate rounding and frosting; slightly silty 45-47.....	40	47
Sappa formation, 23 feet:		
Soil: clayey to slightly sandy silt, principally very fine sand, light brown, slight red tint.....	47	49
Silt, moderately clayey to slightly sandy, very fine sand with a little fine to medium sand, pale brown; grades to moderately sandy at 53, trace of coarse sand below 50.....	49	53
Silt, moderately clayey to slightly very fine sandy, very pale brown; moderately sandy with a little fine to medium sand 55-57.5; more clayey 47.5-60.....	53	60
Silt, moderately clayey to moderately sandy, very fine sand with a little fine to very coarse sand, light brown, slight reddish tint; very sandy, very fine to very coarse sandy 69-70.....	60	70

* Samples 0-79 feet examined microscopically.

20-B-49 (Cont'd)

Grand Island formation, 30 feet:		
Silty sand and gravel, very fine sand to fine gravel, light brown	70	72
Sand, medium to very coarse with fine gravel, much quartz, some pink feldspar and a few dark grains, some yellow iron staining (weathered), moderate polish	72	75
Sand and gravel, medium sand to medium gravel (60% gravel), quartz, pink feldspar and some dark grains, slight weathering, moderate polish	75	78.5
Clayey to slightly sandy silt, very light gray and very pale brown	78.5	79
Sand and gravel, fine sand to fine gravel with some medium gravel, light brown gray with pinkish feldspar, slight iron staining; fine sand to medium gravel below 90	79	100
Fullerton formation (?), 5 feet:		
Sand, fine to very coarse with some fine gravel, in part silty, light brown gray	100	105
Holdrege formation, 200 feet:		
Sand and gravel, fine sand to medium gravel, light brownish gray with some pinkish feldspar	105	110
Sand and gravel, medium sand to medium gravel (much very coarse sand and fine gravel), light brownish gray with much dark metamorphics and some pink feldspar; fewer dark grains 120-130	110	130
Sand and gravel, medium sand to fine gravel, light brownish gray with some pink feldspar; grades coarser textured below 140 with medium and a little coarse gravel	130	160
Sand and gravel, fine sand to fine gravel with some medium gravel, brownish gray, some iron staining	160	176
Sand and gravel, medium sand to medium gravel with some coarse gravel, brownish gray, some iron staining	176	180
Sand and gravel, fine sand to fine gravel, brownish gray, some iron staining 180-190; much yellow-brown iron staining below 190; thin silty zone at 182	180	205
Sand, fine to coarse, very light gray, many silty clay granules, gray-green; thin light gray silt layer at 217.5	205	220
Sand, fine to very coarse, very light brown gray with some pink feldspar and some dark grains; a few dark greenish clay granules below 240; with fine gravel below 260	220	285
Sand and gravel, medium sand to medium gravel, light brownish gray with pink feldspar and some dark grains; a few green silty clay granules; silt layer at 285-286	285	290
Sand, fine to very coarse with some fine gravel, very light gray	290	305

20-B-49 (Cont'd)

Tertiary System, 76 feet:		
Silt, light tan-gray, slightly calcareous.....	305	312
Silt, light medium gray, moderately calcareous.....	312	330
Silt, light gray and light tan-gray, slightly calcareous.....	330	341.5
Silt, slightly clayey, tan-gray, moderately calcareous, a few limy nodules, trace of Cretaceous chalk fragments.....	341.5	360
Silt, light gray, moderately to very calcareous, some limy nodules and weathered Cretaceous chalk fragments; tan-gray 370-377.....	360	377
Sand, very fine to very coarse, light medium gray, many chalk grains.....	377	381
Cretaceous System:		
Chalk, white.....	281	283.5
Chalky silty shale, medium gray.....	283.5	400
		Total Depth

*TEST HOLE 21-B-49
(Profile Line A-B)

LOCATION: 519 feet north and 4 feet west of the southeast corner of the northeast quarter of Sec. 24, T. 6 N., R. 11 W.
ELEVATION: 1912.6 feet (Altimeter)
DEPTH TO WATER: 66.1 feet.
RECORD:

DESCRIPTION	DEPTH IN FEET FROM	TO
Quaternary System, 254 feet:		
Road fill: silt, dark brown-gray.....	0	2
"Peorian" formation, 16 (+) feet:		
Silt, clayey, medium dark brown-gray.....	2	3.5
Silt, light buff-gray, slight yellow tint; moderately clayey 3.5-5; more grayish, a few limonitic flecks 10-17; slightly calcareous 5-8.....	3.5	17
Soil: slightly clayey silt, pale brownish gray.....	17	18
Loveland formation, 11 feet:		
Soil: moderately clayey silt, medium dark brownish gray, a little imbedded very fine to medium sand; slightly darker and slightly more sandy 20-21.5...	18	21.5
Silt, moderately clayey to slightly sandy, very fine to fine with a little medium sand, reddish yellow; moderately sandy, 25-29, traces of coarse and very coarse sand.....	21.5	29
Sappa formation, 14.5 feet:		
Silty clay, light gray; more silty to slightly sandy 30-32.....	29	32
Slightly clayey to sandy silt, very fine to coarse with a little very coarse sand, light gray and pale brown, moderately calcareous, some white calcareous areas and a few limy nodules.....	32	37
Sand, slightly silty, fine to coarse sand, principally quartz, some rounding and frosting with some clear grains.....	37	42
Silt, moderately clayey to sandy, very fine to coarse sandy, brown-gray.....	42	43.5
Grand Island formation, 49 feet:		
Sand, fine to very coarse with some fine to medium gravel, light brown-gray with pinkish.....	43.5	53.5
Silt, very sandy, principally very fine sand, brown-gray, some iron staining.....	53.5	56
Sand, very fine to very coarse with a little fine to coarse gravel, light brown-gray with pinkish...	56	61
Sand and gravel, medium sand to fine and some medium gravel, brown-gray with pinkish, some dark staining.....	61	65
Same, medium sand to medium and some coarse gravel...	65	80
Same, medium sand to medium gravel, thin silt layer at 81.....	80	92.5
Fullerton formation, 7.5 feet:		
Silt, slightly sandy, light brown-gray, some limonitic staining in upper part; grading moderately sandy 95-100.....	92.5	100

*Samples 0-50 feet examined microscopically.

21-B-49 (Cont'd)

Holdrege formation, 154 feet:		
Sand, slightly silty, fine to coarse with some very coarse sand, light brown-gray.....	100	104.5
Sand and gravel, fine sand to fine gravel, brown-gray with pinkish, slight iron staining 115-120...	104.5	120
Sand, fine to coarse with some very coarse sand and a little fine to medium gravel (10-25% gravel).....	120	149
Sand and gravel, fine sand to fine with some medium gravel, light brown-gray to pinkish; yellow-gray silt 166-168.....	149	200
Silty sand, fine to coarse sand with a little very coarse sand and a little gravel, light brown-gray.	200	204.5
Sand and gravel, medium sand to fine gravel with some medium gravel, brown-gray to pinkish; some light green 220-230; thin silt layer 204.5-205....	204.5	230
Sand, fine to very coarse with some fine gravel, light brown-gray.....	230	254
Tertiary System, 30.5 feet:		
Siltstone, brown, very calcareous, some thin hard limy layers.....	254	261
Silt, light buff-gray, moderately calcareous, slightly clayey 265-275; a few Cretaceous chalk grains 270-273.....	261	273
Sand and gravel, medium sand to fine gravel, consists principally of yellow chalk grains.....	273	280
Sand, fine to very coarse, light brown-gray, a few chalk grains.....	280	284.5
Cretaceous System:		
Chalky shale to chalky limestone, pale yellow with a little white.....	284.5	290
Chalky silty shale, yellow.....	290	295
Same, medium gray.....	295	300
	Total Depth	

*TEST HOLE 22-B-49
(Profile Lines A-B and J-K)

LOCATION: 551 feet south and 8 feet west of the northeast corner of Sec. 1, T. 5 N., R. 11 W.
ELEVATION: 1924.5 feet (Altimeter)
DEPTH TO WATER: 86.0 feet.
RECORD:

DESCRIPTION	DEPTH IN FEET FROM	TO
Quaternary System, 281 feet:		
Road fill: silt, dark brown gray.....	0	0.5
"Peorian" formation, 18 feet:		
Soil: silt, slightly to moderately clayey, dark brown-gray.....	0.5	2
Same, clayey silt.....	2	2.5
Same, more brownish.....	2.5	3
Silt, clayey, buff-gray; less clayey 3.5-4.....	3	4
Silt, slightly clayey, light buff-gray, slight yellow tint, less buff and yellow 12-15; slight very pale brown tint 15-18.5; slightly calcareous 5-8.....	4	18.5
Loveland formation, 11.5 feet:		
Soil: silt, moderately clayey, dark brown, slightly sandy (very fine sand) 20-21.5.....	18.5	21.5
Silt, moderately clayey to moderately sandy, very fine to fine sandy, very pale brown, pink tint....	21.5	30
Sappa formation, 33.5 feet:		
Silt, clayey, very pale brown, trace of imbedded very fine to fine sand.....	30	35
Same, moderately clayey, light yellowish brown.....	35	40
Same, slightly sandy, very fine to fine with a trace of medium sand; slightly more sandy below 45.....	40	53.5
Sandy silt to silty sand, very fine to medium with a little coarse to very coarse sand, light yellowish brown, in part slightly clayey.....	53.5	60.5
Silt, slightly clayey to moderately sandy, very fine to fine with some medium and coarse sand, very pale brown, very calcareous.....	60.5	63.5
Grand Island formation, 40.5 feet:		
Sand, fine to coarse, light brown-gray with pinkish, principally quartz, some rounding and frosting....	63.5	65
Same, fine to very coarse with some fine gravel; thin silt 69-69.5.....	65	75
Silt, slightly clayey to moderately sandy, very fine to coarse sand, light gray; more sandy 80-85; light brown-gray 82.5-85.....	75	85
Sand, fine to coarse, light brown-gray.....	85	90
Silty sand, fine to coarse with some very coarse, light gray.....	90	91.5
Sand, fine to very coarse with fine gravel, light gray; much iron staining 91.5-95.....	91.5	100

* Samples 0-107 feet examined microscopically.

22-B-49 (Cont'd)

Sand and gravel, fine sand to fine gravel with some medium to coarse gravel, light gray with pinkish	100	104
Fullerton formation, 16 feet:		
Silt, very sandy, very fine to fine sand, light tan-gray; less sandy 107-110	104	110
Silt, slightly sandy, very fine sand, medium gray, tan tint	110	115
Sandy silt to silty sand, very fine to very coarse sand, light tan-gray; drilled quietly	115	120
Holdrege formation, 161 feet:		
Sand, fine to very coarse with a little fine gravel, light tan-gray, a little iron staining	120	125
Same, fine sand to fine gravel; some medium gravel 137-140	125	140
Sand, fine to very coarse, light brown-gray with pinkish	140	150
Sand and gravel, medium sand to fine gravel, light tan-gray, some iron staining; some medium gravel 155-160	150	160
Sand, medium to very coarse, light brown-gray with pinkish; some fine gravel 160-165; scattered fine gravel 170-180 and some fine sand	160	180
Sand and gravel, fine sand to fine gravel with a trace of medium gravel, light brown-gray with pinkish	180	190
Sand and gravel, fine sand to medium gravel, light brown-gray with pinkish; slightly coarser 200-210 with more pink feldspar	190	210
Gravel, fine to coarse, some medium to very coarse sand, brown-gray to pinkish	210	217.5
Clayey silt, medium dark gray	217.5	219
Sand and gravel, medium sand to fine gravel with some medium gravel, light brown-gray with pinkish; slightly finer texture 230-240	219	240
Sand, medium to very coarse, light gray	240	260
Same, fine to coarse with some very coarse sand	260	281
Tertiary System, 137 feet:		
Silt, light gray,,non-calcareous	281	285
Same, slightly clayey, brownish tint	285	290
Same, clayey silt, more brownish, a few limy nodular fragments	290	294.5
Same, slightly clayey, light medium gray, moderately calcareous	294.5	300
Silty clay, light gray, moderately calcareous; limy nodules 305-310; a thin very fine sandy siltstone 300-301.5, gray-brown	300	310
Silt, slightly clayey, light gray, moderately calcareous, with white limy areas 310-315	310	320
Silt, clayey to very fine sandy, light tannish gray with occasional limy nodules, moderately to very calcareous	320	345.5

22-B-49 (Cont'd)

Silt, slightly clayey, medium gray, slightly calcareous, a few limy nodules.....	345.5	357
Clayey silt, light gray, tan tint, grading slightly darker gray with less tan, slightly to moderately calcareous, a few limy nodules.....	357	370
Same, light tan-gray, moderately calcareous.....	370	390
Clayey silt, medium gray, moderately calcareous.....	390	399
Same, slightly sandy (very fine sand) light medium gray, very calcareous, more sandy 410-412.5.....	399	412.5
Sand, fine to very coarse, many rounded chalk grains, much green, a few shell fragments (small gastropod or pelecypod).....	412.5	418
Cretaceous System:		
Chalky silty shale, medium gray, much speckling.....	418	430
	Total Depth	

*TEST HOLE 23-B-49
(Profile Line A-B)

LOCATION: 1038 feet south and 8 feet west of the northeast corner of Sec. 24, T. 5 N., R. 11 W.
ELEVATION: 1916.7 feet (Altimeter)
DEPTH TO WATER: 81.1 feet.
RECORD:

DESCRIPTION	DEPTH IN FEET FROM	TO
Quaternary System, 229.5 feet:		
Road fill: slightly clayey silt, dark brown-gray....	0	1.5
"Peorian" formation, 20 (+) feet:		
Soil: silt, dark brown-gray.....	1.5	2.5
Silt, clayey, medium dark brown-gray; dark brown 3.5-4.....	2.5	4
Silt, moderately clayey, buff-gray, brown tint.....	4	5
Silt, light buff-gray, slight yellow tint.....	5	10
Same, coarse textured; slightly to moderately clayey, very pale yellowish brown 20-21.5.....	10	21.5
Loveland formation, 11.5 feet:		
Soil, moderately clayey silt, dark brown; dark grayish brown with a trace of imbedded very fine to medium sand 22.5-25.5.....	21.5	25.5
Clayey silt, coarse textured, pale brown, pink tint 27-33.....	25.5	33
Sappa formation (?) 27 feet:		
Clayey silt, light yellowish brown, some isolated small areas of light greenish gray, some secondary lime; very pale brown, very calcareous 38-40.....	33	40
Clayey silt, traces of imbedded very fine to medium sand, pale brown, some limy nodules, moderately calcareous; much secondary lime 46-50; slightly very fine to fine sandy with traces of medium and coarse sand 55-60.....	40	60
Sappa formation, 7.5 feet:		
Clayey silt, very pale brown and light brownish-gray, a few limy nodules.....	60	64
Clayey silt to silty clay, a little imbedded very fine to medium sand, light brownish gray, some dark mottling; more brownish 65-67.5.....	64	67.5
Grand Island formation, 42.5 feet:		
Sand and gravel, fine sand to fine gravel, light gray with pinkish.....	67.5	70
Same, fine sand to medium gravel.....	70	85
Sand and gravel, fine sand to fine gravel, light gray, some pinkish.....	85	95
Same, some medium gravel with a little coarse gravel, grading coarser, some iron staining.....	95	110
Holdrege formation, 119.5 feet:		
Sand and gravel, fine sand to fine gravel with some medium gravel, light brown-gray to pinkish, larger percentage sand than above.....	110	125

* Samples 0-70 feet examined microscopically

23-B-49 (Cont'd)

Sand, fine sand to medium gravel.....	125	130
Sand, fine to very coarse, some fine gravel, light brown-gray with pinkish and some yellow.....	130	145
Sand and gravel, fine sand to fine and some medium gravel, light brown-gray with pinkish and yellow..	145	166.5
Sand, fine to very coarse, light brown-gray; thin silt at 166.5.....	166.5	170
Same, light medium gray, some dark speckling.....	170	180
Sand and gravel, fine sand to fine gravel with some medium gravel, light brown-gray with pinkish.....	180	195
Gravel, fine to coarse with some coarse to very coarse sand, light brown-gray with pink and yellow.....	195	200
Sand and gravel, medium sand to medium gravel with some coarse gravel, light brown-gray with pinkish and yellow.....	200	210.5
Gravel, fine to coarse with some medium to very coarse sand, brown-gray to pinkish.....	210.5	220
Sand and gravel, fine sand to fine gravel, light medium gray, a few yellowish white chalk grains, thin silt at 223.....	220	225
Same, very little gravel; thin silt at 227.....	225	229.5
Tertiary System, 72 feet:		
Silt, slightly clayey, light tan-gray, slightly to moderately calcareous, a few limy nodules.....	229.5	238.5
Clayey silt, light medium gray, moderately calcareous.....	238.5	240
Very fine sandy silt to siltstone, medium dark gray, moderately calcareous, a few limy nodules and rootlets 247-253.....	240	253
Silt, medium gray, moderately calcareous, a few limy nodules, small gastropods and rootlets.....	253	255
Silt, in part slightly clayey, light brown-gray, moderately to very calcareous, a few limy nodules and chalk fragments; tan tint 260-271.....	255	281.5
Silt, very fine sandy, yellow-orange, very calcareous.....	281.5	291.5
Sand and gravel, fine sand to fine gravel with a little medium gravel, many rounded chalk grains...	291.5	296.5
Clayey silt, yellowish gray, many chalk grains.....	296.5	301.5
Cretaceous System:		
Chalky shale, pale yellowish white.....	301.5	315.5
Chalky shale, medium gray.....	315.5	320
	Total Depth	

*TEST HOLE 24-B-49
(Profile Line A-B)

LOCATION: 102 feet south and 9 feet west of the northeast corner of Sec. 1, T. 4 N., R. 11 W.
ELEVATION: 1950.2 feet (Altimeter)
DEPTH TO WATER: 62.4 feet.
RECORD:

DESCRIPTION	DEPTH IN FEET FROM	TO
Quaternary System, 157.5 feet:		
"Peorian" formation, 19.5 feet:		
Soil: silt, dark brown-gray, very slightly calcareous	0	1.5
Silt, moderately clayey, dark grayish brown, non-calcareous	1.5	2.5
Same, brownish buff	2.5	4
Silt, light buff-gray, yellow tint, a few limonitic nodules, slightly calcareous; coarser texture 5-15; non-calcareous 10-15	4	15
Same, very light gray, buff tint, non-calcareous	15	16.5
Same, light buff-gray, slight brown to yellow tint	16.5	19.5
Loveland formation, 29 feet:		
Soil: moderately clayey silt, dark brown, slight red tint, some imbedded very fine to medium sand	19.5	21.5
Same, more clayey, dark grayish brown, slight red tint	21.5	23.5
Silt, moderately clayey, coarse textured silt with some imbedded sand, light brown	23.5	25
Clayey silt, coarse textured with some imbedded very fine to medium sand, very pale brown, yellow tint, slightly calcareous; moderately clayey below 34; slightly sandy 37.5-38.5 and moderately calcareous	25	38.5
Silt, moderately clayey to moderately sandy, very fine with some fine and a trace of medium sand, very pale brown; moderately calcareous 38.5-40, very calcareous 40-45, slightly calcareous 45-50.5	38.5	50.5
Sappa formation, 20.5 feet:		
Clayey silt, a little imbedded very fine to fine sand, very pale brown; less clayey 55-60, non-calcareous	50.5	60
Silt, slightly clayey, corase textured silt to slightly sandy, very fine to fine sand, very pale brown, non-calcareous; more clayey 67-70 with traces of medium to coarse sand	60	70
Sappa formation, 60 feet:		
Silty clay to clayey silt, traces of imbedded very fine to fine sand, very pale brown, non-calcareous, drilled very slowly	70	80

* Samples 19.5-160 feet examined microscopically.

24-B-49 (Cont'd)

Silt, moderately clayey, coarse textured silt, very pale brown; very pale yellowish brown below 85, very clayey	80	102
Same, slightly to moderately fine sandy, some fine sand; in part moderately clayey with a trace of medium sand 110-113.5, some secondary lime	102	113.5
Silt, moderately clayey, pale brown, a little imbedded very fine to medium sand	113.5	116
Silt, slightly clayey to very fine sandy with a little fine and traces of medium sand, pale brown, many limy nodules; very calcareous with some dense limy nodules 123.5-129; slightly more sandy and with some whitish gray non-calcareous silt 129-130	116	130
Grand Island formation, 15.5 feet:		
Sand, fine to very coarse with some fine gravel, light brownish gray	130	135
Same, fine sand to fine gravel with a trace of medium gravel 135-140	135	145.5
Holdrege formation, 12 feet:		
Silty sand, very fine to fine sand, white, very calcareous, in part consolidated	145.5	146
Sand, fine to very coarse with fine gravel, light brown-gray	146	150
Silt, moderately sandy, very fine to fine sand, calcareous	150	152
Sand and gravel, medium sand to fine gravel with some medium gravel, light brown-gray with pinkish.	152	157.5
Tertiary System, 17 feet:		
Silt, moderately clayey, very light brownish gray, very calcareous; a little fine to coarse sand 160-163	157.5	163
Silty sand and gravel, fine sand to medium gravel, consists principally of white and yellow rounded chalk grains	163	165
Silt, very fine sandy, yellow brown, some chalk grains, very calcareous	165	170
Same, slightly very fine sandy, yellowish brown to yellowish orange	170	174.5
Cretaceous System:		
Chalk and chalky shale, pale yellow to yellow orange with some thin interbedded white layers	174.5	192
Chalky silty shale, medium dark gray, a little brown-gray, moderate white speckling	192	200
	Total Depth	

TEST HOLE 25-B-49
(Profile Line A-B)

LOCATION: 21 feet south and 661 feet west of the northeast corner of Sec. 24, T. 4 N., R. 11 W.
ELEVATION: 1999.3 feet (Altimeter)
DEPTH TO WATER: 74.5 feet.
RECORD:

DESCRIPTION	DEPTH IN FEET FROM	TO
Quaternary System, 134.5 feet (?):		
"Peorian" formation, 20 feet;		
Soil: silt, dark brown-gray	0	1.5
Same, slightly clayey and slightly lighter in color	1.5	2
Silt, moderately clayey, light brown-gray, slightly calcareous	2	3
Soil: slightly clayey silt, medium dark brown-gray, non-calcareous	3	3.5
Silt, moderately clayey, buff-gray, slightly calcareous, a few limy nodules	3.5	4
Silt, slightly clayey, very light buff-gray, a few limonitic nodules, slightly to moderately calcareous with a few limy nodules	4	5
Silt, very light gray, slightly calcareous; many limonitic nodules 7-11	5	11
Same, slightly clayey, buff tint, non-calcareous, with pale brownish tint 19-20	11	20
Loveland formation, 55.5 feet:		
Soil: moderately clayey silt, medium brown-gray, slight tan tint	20	21.5
Silt, slightly clayey to very fine sandy, light tan-gray	21.5	25
Same, moderately clayey; less sandy with a few limonitic flecks 27-30	25	30
Silt, moderately clayey to slightly very fine sandy, reddish tan	30	35
Same, grading very sandy, very fine sand, in part granular texture	35	39
Siltstone to very fine sandstone, reddish tan, soft; more silty and slightly calcareous 43-45 with a few limy nodules	39	45
Sandy silt to silty sand, very fine sand, reddish tan, slight consolidation, non-calcareous	45	52
Silt, very fine sandy, buff-gray, slightly calcareous	52	54
Same, moderately to very calcareous with several limy nodular zones	54	66.5
Sandy silt, very fine with some fine sand, buff-gray, moderately to very calcareous; a little medium to coarse sand 70-75.5, slightly consolidated and with granular texture	66.5	75.5

25-B-49 (Cont'd)

Sappa formation, 20.5 or 55.5 feet:		
Silt, slightly clayey to very fine sandy, light brown-tan, moderately to very calcareous with large dense limy nodules, some thin soft white limy areas	75.5	90
Same, moderately clayey	90	96
Sappa formation (?) or Tertiary, 35 feet:		
Very silty sand, very fine to medium sand, white, very calcareous to marly, some consolidation	96	100
Same, more sandy, some whitish gray, in part clayey 105-114	100	114
Silty clay, light greenish gray, slightly calcareous	114	115.5
Marly silty sand, very fine to medium sand, white, much consolidation, thin dense hard limy zones 120-120.1 and 123-123.5, a few limy rootlets	115.5	128.5
Silty sandstone (?), very fine to fine sand, light gray, slightly calcareous	128.5	131
Grand Island formation (?) or Tertiary, 6 feet:		
Silty sand and gravel, very fine sand to fine gravel, many rounded chalk grains	131	133
Clayey to very fine sandy silt, much imbedded sand and gravel	133	134.5
Cretaceous System:		
Silty chalk, white (possibly reworked)	134.5	137
Chalky limestone, yellow, thin siliceous zone 137-137.1	137	138
Siliceous limestone, yellow	138	139
Shaly chalk, pale yellow and white	139	140
Silty chalky shale, orange 140-141.5; light yellow to brown-gray 141.5-144	140	144
Same, light medium brown-gray, moderate whitish speckling	144	145
Same, medium brown-gray grading darker from 146	145	150
	Total Depth	

TEST HOLE 26-B-49
(Profile Line A-B)

LOCATION: 9 feet north and 366 feet west of the southeast corner of Sec. 36, T. 4 N., R. 11 W.
ELEVATION: 2008.7 feet (Altimeter)
DEPTH TO WATER: 143.6 feet.
RECORD:

DESCRIPTION	DEPTH IN FEET FROM	TO
Quaternary System, 144 feet:		
"Peorian" formation, 18.5 feet:		
Soil: slightly clayey silt, very dark brown-gray; more brownish 1.5-2	0	2
Silt, moderately clayey, medium brown-gray; lighter color and slightly calcareous 2.5-3	2	3
Silt, light buff-gray, yellow tint, slightly calcareous	3	5
Silt, light buff-gray, yellow tint, a few limy nodules, slightly to moderately calcareous	5	8
Silt, light buff-gray, slight brown tint, slightly calcareous 8-15; a few limonitic flecks 10-18.5; slight tan tint 17-18.5	8	18.5
Loveland formation, 31.5 feet:		
Soil: silt, slightly clayey to slightly very fine sandy, dark brown-gray, non-calcareous; moderately clayey 20-22	18.5	22
Silt, moderately clayey, brown-tan; reddish tan 23-24	22	24
Silt, slightly clayey, reddish tan	24	30
Silt, slightly sandy (very fine sand), reddish tan	30	35
Same, slightly clayey	35	47
Silt, moderately sandy, very fine with some fine sand, reddish tan	47	50
Sappa formation, 85.5 feet:		
Silt, moderately clayey to very fine sandy, tan-gray, reddish tint, reddish tan 53-57, more clayey 55-57, slightly calcareous 50-53	50	57
Clayey silt, tan-gray, pinkish tint, drilled very slowly	57	61.5
Very sandy silt, very fine sand, buff-tan, gray tint	61.5	70
Silt, slightly clayey to very fine sandy, buff-tan, red tint; more sandy 75-81	70	81
Volcanic ash (Pearlette), white	81	86
Silt, moderately clayey, light medium gray, slight brown tint	86	87
Silt, moderately clayey to slightly sandy, tan-gray, a few limonitic flecks; more sandy 90-92.5, very fine to fine sand	87	92.5
Sandy silt to silty sand, very fine to fine with some medium sand, tan-gray	92.5	95
Clayey to slightly sandy silt, tan-gray	95	97

26-B-49 (Cont'd)

Clayey silt, light gray, slight green tint, some yellowish iron staining; moderately clayey 100-110, slight brown tint	97	110
Sand, very silty, very fine to fine sand, light gray, a few limonitic flecks	110	115
Silt, moderately sandy, very fine to fine sand, light brown-gray, a few limonitic flecks	115	117
Silt, slightly clayey to very fine sandy, light buff-gray with limonitic flecks; not clayey 125-130	117	130
Sandy silt, very fine to fine with some medium sand, light brownish gray, some limonitic staining	130	135.5
Grand Island formation, 8.5 feet:		
Sand and gravel, medium sand to fine with some medium gravel, light brown-gray to pinkish	135.5	144
Cretaceous System:		
Chalky shale, pale yellow	144	145
		Total Depth

TEST HOLE 27-B-49
(Profile Line A-B)

LOCATION: 439 feet south and 11 feet west of the northeast corner of Sec. 24, T. 3 N., R. 11 W.
ELEVATION: 1925.9 feet (Altimeter)
DEPTH TO WATER: 121 feet
RECORD:

DESCRIPTION	DEPTH IN FEET FROM	TO
Quaternary System, 133 feet:		
"Peorian" formation, 15 feet:		
Soil: clayey silt, medium dark grayish brown; medium grayish brown 1-1.5	0	1.5
Silt, slightly clayey, light buff-gray	1.5	2.5
Silt, light buff-gray, occasional limy nodules	2.5	12
Silt, very slightly clayey, light buff-gray, brown tint, a few limonitic flecks	12	15
Loveland formation, 46 feet:		
Soil: slightly clayey to slightly sandy (very fine sand), dark brown	15	17.5
Silt, clayey to slightly very fine sandy, light tan	17.5	20
Silt, moderately clayey, light pinkish tan, slightly calcareous	20	22
Silt, slightly clayey to very slightly sandy, (very fine sand), light buff to tan-gray, slightly calcareous; not clayey 25-30	22	30
Silt, light buff to tan-gray, non-calcareous; slightly very fine sandy 35-40	30	40
Silt, very fine sandy with a trace of fine to medium sand, light buff-gray, tan tint	40	45
Sandy silt to silty sand, very fine to medium with a trace of coarse sand, light brown-tan	45	50
Silty sand, very fine to medium with a trace of coarse sand, light brown-tan	50	61
Grand Island formation, 55.5 feet:		
Sand, fine to coarse, very light brownish gray	61	65
Same, 10% very coarse sand to fine gravel	65	70
Same, 20% very coarse sand to fine gravel with a trace of medium gravel	70	80
Sand and gravel, medium sand to fine gravel with some medium gravel, light brown-gray with pinkish, 30-40% gravel	80	85
Same, medium sand to medium gravel, 50-60% gravel	85	116.5
Holdrege formation, 16.5 feet:		
Sand, fine to coarse, very light brown-gray	116.5	121
Sand and gravel, fine sand to medium gravel, light brown-gray with pinkish, 30-40% gravel	121	133
Tertiary System, 22 feet:		
Silt, slightly clayey to very fine sandy, light brown-tan	133	137.5
Silt, grayish white, very calcareous to marly	137.5	140

27-B-49 (Cont'd)

Silt, brown-tan, moderately to very calcareous; thin light tan-gray limy layers 140-143 and with light tan-gray limy nodules 145.5-148.....	140	148
Clayey to very fine sandy silt, light yellow-brown, very calcareous, a few chalky limestone grains, rounded.....	148	151
Chalky to slightly sandy silt, yellow brown, many rounded chalky limestone grains, very calcareous..	151	155
Cretaceous System:		
Chalky shale, pale yellow with some interbedded white 155-165; yellow-orange 165-170.....	155	170
		Total Depth

RECORDS OF TEST HOLES ALONG PROFILE
LINE C-D, SIX MILES NORTHWEST OF SHELTON
TO FIVE MILES SOUTH OF CAMPBELL;
BASED ON FIELD LOGS SUPPLEMENTED WITH
MICROSCOPIC EXAMINATION OF SAMPLES

*TEST HOLE 67-B-47
(Profile Line C-D)

LOCATION: 5 feet south and 79 feet west of the northeast corner of Sec. 18, T. 10 N., R. 13 W.
ELEVATION: 2135.8 feet (Altimeter)
DEPTH TO WATER: 79.4 feet.
RECORD:

DESCRIPTION	DEPTH IN FEET FROM	TO
(Loveland soil zone exposed in road cut 27 feet above level of test hole and 100 yards south of it. Loveland and Peorian loess exposed in road cut 50 feet due north and above test hole level.)		
Quaternary System, 105 feet:		
Recent (?), 13 feet:		
Alluvium, silt, slightly sandy, very fine to fine sand, medium brown-gray (road and ditch fill).....	0	8.5
Alluvium (?), silt, slightly clayey to slightly very fine sandy, light medium brown-gray with buff tint.....	8.5	13
Loveland formation, 85 (+) feet:		
Silt, very slightly sandy, very fine sand, pale brown, reddish tint, a few limy nodules, slightly calcareous 45-60.....	13	60
Same, slightly clayey.....	60	67
Silt, pale brown with a reddish tint, slightly to moderately calcareous, a few limy nodules.....	67	79
Silt, slightly very fine to fine sandy, pale brown with a reddish tint, some whitish calcareous mottling, granular texture, drilled fast; moderately to highly calcareous 90-98, a few limy nodules.....	79	98
Grand Island formation (?), 7 feet:		
Silty sand and gravel, fine sand to fine gravel with a little medium gravel, brown-gray with pinkish and some dark metamorphics.....	98	105
Tertiary System, 247 feet:		
Sandy silt to silty sand, very fine to medium sand, olive-gray, non-calcareous.....	105	109
Silty sandstone, very fine to some fine sand, light olive-gray, green tint, non-calcareous.....	109	129.5
Sandy silt to silty sand, very fine to a little fine sand, olive gray, some consolidation, non-calcareous, occasional rootlets.....	129.5	137
Same, well consolidated.....	137	150

* Record based on field log and microscopic examination of samples.

67-B-47 (Cont'd)

Sand, slightly silty, very fine to medium with a trace of coarse sand, very light brown-gray, slight consolidation.....	150	155
Same, highly calcareous, a few rootlets; very hard 159.5-160.5.....	155	160.5
Silt, very sandy, very fine to fine with some medium sand, light olive gray, non-calcareous.....	160.5	164.5
Sandstone, very fine to medium sand, in part silty, light brown gray.....	164.5	181
Sand, very fine to fine with a little medium sand, very light brown-gray, some slight consolidation; a thin diatomaceous zone 189-190.....	181	190.5
Silty sandstone, very fine to fine with a little medium sand, light olive gray, some siliceous cementation.....	190.5	197
Sandstone, very fine to fine sand, whitish gray, in part with olive tint, highly calcareous, some hard zones.....	197	206
Sand, very fine to fine with some medium sand, very light brown-gray, some calcareous cementation, a few rootlets.....	206	221
Silty sandstone, in part sandy siltstone, very fine to some fine and medium sand, light gray-green, some calcareous areas.....	221	225
Silt, sandy (very fine sand) to in part clayey, light green-gray, slightly to moderately calcareous 230-237, with light tan-gray, dense, limy nodular zones 232.5-237.....	225	237
Sand, slightly silty, very fine to fine with a little medium sand, very light brown-gray, more silty, slightly consolidated 270-277.....	237	277
Sandstone, very fine to fine with some medium sand, light olive-gray, highly calcareous, hard.....	277	278.5
Sand, very fine to fine with some medium sand, very light brown-gray, dark speckling, slight consolidation.....	278.5	292.5
Sandstone, silty, very fine to fine sand, white, in part marly, very hard.....	292.5	295.2
Sand, very fine to medium, very light brown-gray, dark speckling, slight consolidation.....	295.2	300
Sandstone, silty, very fine to fine sand, light olive-gray, moderately calcareous; a little medium sand and highly calcareous 304.5-310.....	300	310
Silty clay, whitish gray, slight green tint, slightly to moderately calcareous, with thin hard limy layers.....	310	319
Sand, slightly silty, very fine to fine with a little medium sand, very light brown-gray; calcareous zone 327.9-328.4.....	319	335
Marl, very slightly sandy to clayey, white.....	335	348
Clay, very light gray, some yellow limonitic staining, moderately calcareous.....	348	352

67-B-47 (Cont'd)

Cretaceous System:

Clay shale, medium dark gray, moderately calcareous, very thin ironstone layers, traces of aragonite.....	352	370
		Total Depth

TEST HOLE 66-B-47
(Profile Line C-D)

LOCATION: 11 feet south and 9¼ feet west of the northeast corner of Sec. 29, T. 10 N., R. 13 W.
ELEVATION: 2050 feet (Altimeter)
DEPTH TO WATER: 31.7 feet.
RECORD:

DESCRIPTION	DEPTH IN FEET FROM	TO
Quaternary System, 52.5 feet:		
"Peorian" formation, 32.5 feet:		
Soil: silt, dark brown-gray	0	2
Same, moderately clayey, medium dark brown-gray	2	3.5
Silt, medium buff-gray; slightly lighter in color 5-6.5	3.5	6.5
Soil: silt, slightly clayey, medium brown-gray	6.5	7
Silt, slightly clayey, light gray, buff-tint	7	8
Silt, very light buff-gray, a few limonitic flecks and rootlets, a few limy nodules; a few gastropods 15-20	8	25
Silt, light green-gray, some medium brown-gray, slightly carbonaceous to peaty; slightly sandy 30-32.5	25	32.5
Grand Island formation, 20 feet:		
Sand, medium to very coarse with some fine gravel, brown-gray with pinkish, some dark metamorphics	32.5	35
Sand and gravel, medium sand to fine gravel with some medium gravel, brown-gray with pinkish and some dark metamorphics; a little iron staining 35-45	35	50
Gravel, fine to medium with a little coarse gravel and much very coarse sand, color as above	50	52.5
Tertiary System, 212.5 feet:		
Calcareous sandstone to sandy limestone, fine to medium sand, whitish gray, brittle, some crystalline structure	52.5	52.7
Sandy silt, very fine to some fine sand, brown-tan, slight gray tint, non-calcareous; slight consolidation 60-68	52.7	68
Silty sandstone, very fine sand, light brown tan, with a thin volcanic ash seam	68	71.5
Silt, in part slightly sandy, very fine to fine sand, whitish gray, non-calcareous	71.5	85
Sandstone, very fine to fine sand, whitish gray, a few rootlets	85	85.5
Sand and gravel, fine sand to fine gravel, light brown-gray with pinkish, occasional silt layers and with silty clay granules, whitish gray	85.5	100
Silty sandstone, very fine to fine with some medium sand, whitish to light olive gray, very calcareous to in part marly 102.5-130, a few rootlets; very hard 130-137.5	100	137.5
Sandy silt, very fine to fine sand, very light yellow-gray, moderately calcareous	137.5	140

66-B-47 (Cont'd)

Silty sandstone, very fine to fine with some medium sand, olive to green-gray, poorly consolidated....	140	151
Calcareous sandstone to impure limestone, white.....	151	153.5
Sandstone, very fine to fine sand, light gray, highly calcareous, a few rootlets.....	153.5	158
Sandy silt, very fine sand, very light olive-gray, non-calcareous.....	158	165
Sand, slightly silty, very fine to medium sand, light gray, in part consolidated.....	165	169
Sandstone, very fine to medium sand, very light brown-gray, highly calcareous, a few rootlets.....	169	183.5
Silty sand to sandy silt, very fine sand, light green-gray, a few silt granules.....	183.5	190
Sand, fine to medium, light brown-gray; silty and gray-green 195-196.5, very fine to fine sand.....	190	196.5
Sandstone, very fine to medium sand, very light brown-gray, poorly consolidated; very little medium sand 200-212.5.....	196.5	212
Silty sandstone, very fine to some fine sand, light green-gray; hard and moderately calcareous 214-216.....	212	216
Sandstone, very fine to medium sand, very light brown-gray, in part lime cemented.....	216	220
Sandstone, very fine to fine with some medium sand, very light gray, highly calcareous, a few rootlets; in part silty 230-240.....	220	240
Same, very silty, slightly finer texture.....	240	249
Silty clay, very slightly sandy, whitish gray, highly calcareous.....	249	252
Clay, very light to whitish gray, much yellow limonitic staining, highly calcareous, blocky, many aragonite fragments.....	252	261
Clay, light to light medium gray, moderately to highly calcareous.....	261	265
Cretaceous System:		
Clay shale, medium dark gray, moderately calcareous grading to slightly calcareous 275-280.....	265	280
		Total Depth

TEST HOLE 65-B-47
(Profile Line C-D)

LOCATION: 11 feet south and 75 feet west of the northeast corner of Sec. 4, T. 9 N., R. 13 W.
ELEVATION: 2035.6 feet (Altimeter)
DEPTH TO WATER: Hole caved in at 13.9 feet.
RECORD:

DESCRIPTION	DEPTH IN FEET FROM	TO
Quaternary System, 48.5 feet:		
"Peorian" formation, 12 feet:		
Soil: silt, very dark brown-gray.....	0	2
Silt, moderately clayey, medium brown-gray.....	2	4
Same, very slightly sandy, very fine sand, light medium brown-gray.....	4	6
Soil: silt, slightly clayey to very slightly sandy, very fine to fine sand, dark brown-gray, some limy concretions.....	6	7
Silt, very slightly sandy, very fine to fine sand, very light brown-gray, highly calcareous.....	7	8.7
Silt, moderately sandy, very fine sand, light gray, slight greenish tint, moderately calcareous, with limy nodules.....	8.7	10
Same, slightly sandy with dense hard limy nodules....	10	12
Grand Island formation (?), 36.5 feet:		
Sand, very fine to coarse (much medium sand), light brown-gray, many dark silicates, some quartz and a little feldspar, some reworked Ogallala.....	12	16
Same, fine to very coarse sand, some fine gravel.....	16	20
Sand and gravel, fine sand to medium gravel, color as above.....	20	30
Same, mostly coarse sand to medium gravel.....	30	40
Gravel, fine to coarse, some coarse to very coarse sand, color as above.....	40	48.5
Tertiary System, 179.5 feet:		
Silt, light buff-gray; some yellow-brown 48.5-50; very slightly sandy 50-52.5.....	48.5	52.5
Silt, slightly to moderately sandy, very fine to fine sand, light tan-gray, slightly to moderately calcareous, a few limy nodules.....	52.5	64.5
Sand, very fine to very coarse with some fine gravel, tan-gray with pinkish; thin silty layers 75-84.5..	64.5	84.5
Sandstone, very fine to medium sand with some coarse sand, whitish gray with a slight brown tint, diatomaceous cement (?), non-calcareous, some rootlets.....	84.5	89.5
Sandstone, very fine to medium sand, whitish gray, highly calcareous, a few rootlets.....	89.5	98.5
Silty sand, very fine to medium sand, light gray, slight green tint.....	98.5	110
Sand, very fine to fine, very light buff-gray.....	110	115
Sand to sandstone, very silty, very fine to fine with some medium sand, light green-gray.....	115	120
Sandy silt to siltstone, very fine sand, light green-gray, a few rootlets, non-calcareous.....	120	127

65-B-47 (Cont'd)

Silty sand, very fine to medium sand, light green-gray.....	127	134.5
Sandstone, very fine to fine sand, light gray with a greenish to brownish tint, non-calcareous, a few rootlets.....	134.5	150
Sand, very fine to medium, very light brown-gray, slight consolidation, a few rootlets.....	150	169
Silt, slightly sandy, whitish gray, in part marly....	169	174.5
Sand, very fine to medium, very light brown-gray.....	174.5	177.5
Sandstone, in part silty (with some marly silty clay, whitish gray, slightly green tint.....	177.5	180
Sandstone, very silty, very fine to fine sand, light olive-gray, moderately calcareous; slightly silty with some medium sand 190-198.5.....	180	198.5
Clay, whitish gray, some limonitic staining, a little aragonite, moderately to highly calcareous; moderate limonitic staining 215-227.5, some light to light medium gray 220-227.5.....	198.5	227.5
Cretaceous System:		
Clay shale, medium dark gray, moderately to highly calcareous, a few limonitic concretionary fragments.....	227.5	240
		Total Depth

TEST HOLE 64-B-47
(Profile Line C-D)

LOCATION: 77 feet north and 6 feet west of the southeast corner of Sec. 10, T. 9 N., R. 13 W.
ELEVATION: 2032.5 feet (Altimeter)
DEPTH TO WATER: 12.2 feet.
RECORD:

DESCRIPTION	DEPTH IN FEET FROM	TO
Quaternary System, 60 feet:		
"Peorian" formation, 5 feet:		
Soil: silt, slightly sandy, very fine sand, dark brown-gray	0	1
Same, slightly clayey	1	2
Same, moderately clayey, medium brown-gray	2	3
Same, slightly lighter in color, buff tint	3	4
Silt, slightly sandy, principally very fine sand with some imbedded fine to very coarse sand, light brown-gray, a few limy nodules	4	5
Todd Valley (?) and younger, 25 feet:		
Sand and gravel, fine sand to fine gravel, some medium gravel, light brown-gray, much pinkish	5	9
Silt, slightly sandy to clayey, very fine to very coarse sand, light buff-gray	9	10
Sand and gravel, fine sand to medium gravel with a little coarse gravel, brown-gray with much pinkish	10	15
Gravel, fine to medium with some coarse gravel and much sand, medium to very coarse, brown-gray with much pinkish and a few dark grains	15	30
Grand Island formation (?), 30 feet:		
Sand and gravel, medium sand to fine gravel with much medium to coarse gravel, brown-gray to pinkish	30	40
Gravel, fine to medium (much coarse gravel 40-50) with much sand, medium to very coarse, brown-gray to pinkish	40	60
Tertiary System, 124 feet:		
Silt, slightly clayey, light buff-gray, some iron staining in upper part	60	71
Same, tan tint, highly calcareous; dense limy nodules 75-80; in part consolidated and marly 80.5-87.5	71	87.5
Silt, very fine sandy, brown-tan	87.5	90
Siltstone, very sandy, very fine sand, light brown-gray	90	97.5
Sandy silt, very fine sandy, light brown-gray	97.5	99.5
Sand, fine to very coarse with some fine gravel, very light brown-gray	99.5	115.5
Silty sand to sandstone, very fine to fine with some medium sand, light gray with a slight green tint, in part calcareous	115.5	125

64-B-47 (Cont'd)

Sandy silt to silty sand, very fine sand, very light gray	125	130
Silty sandstone, very fine to fine sand, light olive-gray, non-calcareous, many rootlets	130	134
Sandy silt, very fine to fine sand, in part clayey, light green-gray	134	137
Sand, very fine to coarse with some very coarse sand, light brown-gray; many silty clay granules, brown-gray, green tint	137	159
Silty clay, whitish gray, non-calcareous	159	160
Clay, whitish gray to light gray, some yellowish limonitic staining, moderately calcareous, some aragonite	160	184
Cretaceous System:		
Clay shale, medium gray, moderately calcareous, thin ironstone layer at 188.5	184	190
		Total Depth

TEST HOLE 63-B-47
(Profile Line C-D)

LOCATION: 2 feet south and 130 feet west of the northeast corner of Sec. 26, T. 9 N., R. 13 W.
ELEVATION: 2025.3 feet (Altimeter)
DEPTH TO WATER: 4.7 feet.
RECORD:

DESCRIPTION	DEPTH IN FEET FROM	TO
Quaternary System, 47.5 feet:		
Todd Valley (?) and younger, 47.5 feet:		
Soil: silt, some imbedded sand, dark brown-gray.....	0	1
Silt, slightly sandy, light medium brown-gray.....	1	1.5
Soil: silt moderately sandy, very fine to coarse sand, dark brown-gray to black.....	1.5	2.5
Silty sand to sandy silt, very fine to fine with some medium sand, light buff-gray.....	2.5	3.5
Silty sand to sandy silt, very fine to fine with a little medium sand, light medium gray, micaceous, some carbonaceous material.....	3.5	4
Sand and gravel, fine sand to fine gravel with some medium gravel, light brown-gray with a little pinkish; slight iron staining 5.5-10.....	4	10
Sand and gravel, medium sand to medium gravel (a little coarse gravel 25-40, much fine to coarse gravel 40-47.5), brown-gray with considerable pinkish and reddish; a few dark grains 20-47.5....	10	47.5
Tertiary System, 125.5 feet:		
Silt, slightly sandy, very fine to fine sand, light buff to tan-gray; a little iron staining 47.5-50; very slightly calcareous.....	47.5	60
Siltstone, moderately sandy, very fine to fine sand, light tan-gray with a brown tint, a few siliceous rootlets.....	60	63.5
Marl, very slightly sandy, white, soft, some thin consolidated zones 65-70.5.....	63.5	70.5
Calcareous clay, very light gray, slight green tint; a little marly sandstone, very fine to fine sand..	70.5	72
Sandy siltstone to silty sandstone, very fine to fine sand, light olive-gray, non-calcareous.....	72	73.5
Silty sandstone, very fine to fine with some medium sand, light olive-gray, slight brown tint; moderately calcareous, a few rootlets; light brown-gray, highly calcareous 100-106.....	73.5	106
Calcareous sandstone, very fine to fine with some medium sand, white.....	106	110
Sandstone, very fine to fine with a little medium sand, very light gray, olive tint, moderately to highly calcareous 110-114, slightly calcareous 114-126.....	110	126
Same, green-gray, moderately calcareous; silty 126-130.....	126	130

63-B-47 (Cont'd)

Calcareous sandstone, moderately silty, very fine to fine sand, whitish gray, slight olive tint.....	130	135
Silty sandstone, very fine to fine sand, whitish gray, in part marly.....	135	138
Clay, whitish gray, slight limonitic staining, highly calcareous; many aragonite fragments 144-146.5.....	140	146.5
Clay, very light gray to buff-gray, moderate to highly limonitic stained, highly calcareous.....	146.5	155
Same, slightly calcareous, some medium gray limonitic speckled, a little aragonite and with a trace of yellow bentonitic clay.....	155	173
Cretaceous System:		
Clay shale, dark gray, non-calcareous.....	173	190
		Total Depth

TEST HOLE 62-B-47
(Profile Line C-D)

LOCATION: 9 feet west of the center of the east line of Sec. 1, T. 8 N., R. 13 W.
ELEVATION: 2019.3 feet (Altimeter)
DEPTH TO WATER: 5.5 feet.
RECORD:

DESCRIPTION	DEPTH IN FEET FROM	TO
Quaternary System, 103.5 feet:		
Road fill: sandy and gravelly silt, dark brown-gray	0	1
Todd Valley and younger, 21 feet:		
Sand, very fine to coarse with a little fine to medium gravel, tan-gray with pinkish	1	4.3
Soil: silty sand, fine to coarse sand with imbedded gravel, dark brown-gray	4.3	4.8
Silt, clayey to slightly sandy, light-gray	4.8	6
Soil: silty sand and gravel, fine sand to fine gravel, dark brown-gray with a few small gastropods	6	6.5
Sand and gravel, fine sand to fine with a little medium gravel, brown-gray to pinkish	6.5	10
Same, fine sand to medium gravel	10	22
Sappa formation, 5 feet:		
Sandy silt and silty sand, very fine to coarse sand, light gray and brown-gray	22	27
Grand Island formation, 33 feet:		
Sand and gravel, fine sand to fine gravel, very light brown-gray with a little pinkish, much quartz, a few dark grains	27	35
Same, only a little gravel, larger percentage medium to coarse sand; slightly silty 43.5-44	35	50
Sand and gravel, fine sand to fine with a little medium gravel, light brown-gray, some pinkish, much quartz	50	60
Holdrege formation (?), 43.5 feet:		
Sand and gravel, fine sand to medium gravel, light brown-gray with some pinkish and a few dark grains	60	75
Same, slightly coarser texture, less fine sand	75	90
Same, larger percentage fine to medium sand	90	103.5
Tertiary System, 75.5 feet:		
Silt, slightly clayey, light brown-gray, non-calcareous; very slightly sandy (very fine to fine sand) 105-109.5	103.5	109.5
Silt, slightly sandy, very fine to fine sand, light gray with a little brown-tan clayey silt	109.5	115
Silt, light gray, slightly brown tint, in part slightly calcareous; tan-gray 130-145	115	145
Silt, slightly sandy, very fine to fine sand, light medium tan-gray, occasional limy rootlet	145	152
Silty sandstone, very fine to fine sand, light gray, moderately calcareous, many limy rootlets	152	154

62-B-47 (Cont'd)

Reworked zone of rounded clay granules, light gray, limonitic stained, occasional hard limonitic granule.....	154	157.5
Sandstone, very fine to fine sand, light gray, highly calcareous with rootlets.....	157.5	160
Clay, light gray, limonitic stained, a little yellowish bentonitic clay and a few aragonite fragments.....	160	165
Clay, light gray 165-170, medium gray 170-179.....	165	179
Cretaceous System:		
Clay shale, dark gray, non-calcareous.....	179	190
	Total Depth	

TEST HOLE 60-B-47
(Profile Line C-D)

LOCATION: 15 feet south and 124 feet east of the northwest corner of Sec. 19, T. 8 N., R. 12 W.
ELEVATION: 2027.5 feet (Altimeter)
DEPTH TO WATER: 23.5 feet.
RECORD:

DESCRIPTION	DEPTH IN FEET FROM	TO
Quaternary System, 147.5 feet:		
Dune Sand, 2 feet:		
Soil: sandy silt, very fine to fine with some medium sand, very dark brown-gray.....	0	0.8
Sand, slightly silty, very fine to fine with some medium sand, light brown-gray.....	0.8	1.5
Sandy silt, very fine with some fine sand, light brownish buff.....	1.5	2
Todd Valley formation, 28 feet:		
Sand, slightly silty, very fine to medium with a little coarse sand, buff-gray.....	2	3
Same, scattered very coarse sand to medium gravel....	3	4
Sand, very fine to very coarse sand with a little fine to medium gravel, light buff-gray with a little pinkish.....	4	10
Same, less fine, no medium gravel.....	10	15
Sand, slightly silty, very fine to coarse with a little very coarse sand to medium gravel.....	15	30
Sappa formation, 4.5 feet:		
Sandy silt, very fine to fine with a little medium sand, buff-gray, some limonitic staining.....	30	34.5
Grand Island formation, 65.5 feet:		
Sand, very fine to very coarse, very light brown-gray, interval grades slightly coarser textured; much iron staining 47-52.....	34.5	52
Sand and gravel, fine sand to fine gravel (a little medium gravel 55-62.5), brown-gray, moderate iron staining; thin silt 62.5-63.....	52	63
Sand and gravel, medium sand to medium gravel, light brown-gray with some pinkish.....	63	90
Same, slightly iron stained, a little coarse gravel, a few large sandy to clayey silt granules.....	90	100
Holdrege formation, 47.5 feet:		
Sand and gravel, fine sand to medium gravel, light brown-gray with some pinkish.....	100	121
Silt, clayey to in part sandy, light olive gray, slight limonitic staining.....	121	122.5
Sand and gravel, fine sand to fine with some medium gravel, very light brown-gray, much quartz, grades very slightly coarser texture.....	122.5	147.5
Tertiary System, 65.5 feet:		
Silt, light gray and light tan-gray, non-calcareous..	147.5	150
Same, light brown-tan, moderately calcareous, a few limy nodules.....	150	157

60-B-47 (Cont'd)

Same, tan to whitish gray, in part marly.....	157	160.5
Marly sandstone, very fine to fine sand, whitish gray, slight buff tint; in part diatomaceous 164-169.....	160.5	169
Calcareous silty sandstone, very fine to fine sand, whitish gray, very slight buff tint, a few rootlets.....	169	177
Sandstone, very fine with some fine sand, light olive-gray, non-calcareous.....	177	180
Calcareous sandstone, very fine with some fine sand, whitish gray, olive tint, a few rootlets.....	180	185
Same with a siliceous nodular zone (in part diatomaceous), 187-188 and with some volcanic ash 188-189.5.....	185	189.5
Sandy siltstone, very fine sand, whitish to light olive gray, highly calcareous.....	189.5	193.5
Silty sandstone, very fine sand, light olive gray; a thin hard limy layer 193.5-193.7.....	193.5	196
Sand, fine to very coarse with some fine to medium gravel, light olive gray, much aragonite and rounded limy grains.....	196	206
Clay, light gray, much yellowish buff limonitic staining.....	206	213
Cretaceous System:		
Clay shale, dark gray to black, some thin concretionary ironstone layers.....	213	230
		Total Depth

TEST HOLE 59-B-47
(Profile Line C-D)

LOCATION: 143 feet north and 9 feet west of the southeast corner of Sec. 36, T. 8 N., R. 15 W.
ELEVATION: 2062.1 feet (Altimeter)
DEPTH TO WATER: 64.7 feet.
RECORD:

DESCRIPTION	DEPTH IN FEET FROM	TO
Quaternary System, 257.5 feet:		
"Peorian" formation, 16.5 feet:		
Soil: silt, slightly sandy, very fine to fine sand, medium dark brown-gray	0	2
Silt, slightly clayey, buff-gray, brown tint	2	5
Silt, buff-gray, very few limonitic flecks; slight tan tint 15-16.5	5	16.5
Todd Valley formation, 23.5 feet:		
Soil: slightly clayey to moderately sandy silt, very fine to medium sand, dark brown	16.5	20.5
Sand, very fine to coarse (some very coarse sand 30-35), brown-tan 20.5-25, tan-gray 25-35	20.5	35
Same, large percentage very fine to medium sand; slightly silty 37.5-39, a few soft dark iron concretions	35	40
Loveland or Sappa formation (?), 33.5 feet:		
Sandy silt to silty sand, principally very fine sand, light brownish tan, gray tint	40	46
Sandy silt, very fine to fine with some medium sand, light gray	46	48
Sand, very fine to coarse (a little very coarse sand 53-70), yellowish brown iron stained 48-53, very light buff-gray, 53-70	48	70
Silt, moderately sandy, very fine with a little fine to medium sand, light gray to yellowish gray, moderate limonitic staining	70	73.5
Sappa formation, 19.5 feet:		
Soil: moderately to very sandy silt, very fine to medium with a little coarse sand, medium dark brown-gray	73.5	77.5
Silt, moderately clayey to moderately sandy, very fine to fine with a little medium sand, light gray, slight bluish green tint, very slight limonitic staining	77.5	80
Same, moderately to very sandy, very light bluish gray	80	84.5
Sand, very slightly silty, very fine to coarse with a little very coarse sand, very light gray	84.5	88
Silt, slightly clayey to very sandy, very fine to medium with a little coarse to very coarse sand, very light green-gray	88	93
Grand Island formation, 37 feet:		
Sand, very fine to very coarse with some fine gravel, very light gray	93	100

59-B-47 (Cont'd)

Same, some medium gravel	100	108
Gravel, fine to medium with some sand, light brown-gray with pink and green	108	110
Sand and gravel, fine sand to medium gravel, light brown-gray with pink and green	110	122.5
Gravel, fine to medium, some sand, brown-gray with pink and some dark grains	122.5	130
Fullerton or Holdrege formation, 10.5 feet:		
Sand, very slightly silty, very fine to very coarse sand with a little fine gravel, light gray, some clay granules, light green-gray	130	140.5
Holdrege formation, 117 feet:		
Sand and gravel, fine sand to medium gravel, light brown-gray with pinkish and some dark grains; coarser textured 180-185	140.5	190
Sandy silt to silty sand, principally very fine to fine sand, light gray-green	190	193
Sand, fine to very coarse with much fine and a little medium gravel, light brown-gray with pink and dark grains	193	208
Sandy silt, principally very fine to fine sand, dark gray, some brown-gray and light yellow-gray	208	210
Sand, fine to very coarse with a little fine gravel, light brown-gray with a little pink	210	220.5
Sand and gravel, medium to very coarse sand with fine gravel, light brown-gray, many dark grains, some pink	220.5	230
Sand, fine to very coarse with a little fine gravel, light brown-gray with pinkish and dark grains, interval grades finer in texture; a few buff-gray clay granules 240-247.5	230	257.5
Tertiary System, 80.5 feet:		
Silt, slightly clayey, in part very fine sandy, medium gray, numerous small gastropod or pelecypod fragments, trace of carbonaceous material	257.5	260
Clay, slightly silty, medium dark to dark gray; more silty 270-275	260	275
Sand, very fine to medium grained, light medium gray with much dark speckling	275	280
Same, fine to coarse sand with fine gravel, rodent tooth, claw, and bone fragments	280	290.5
Silt, light buff-gray, moderately calcareous, some white nodular limy fragments	290.5	301
Same, slight tan tint, some white calcareous mottling.	301	305
Same, light brown-tan, slightly sandy, no limy nodules	305	310.5
Same, slightly consolidated	310.5	312.5
Silt, slightly clayey, light brown-tan with a grayish tint, moderately to highly calcareous	312.5	320
Same with occasional aragonite and rounded limy fragments	320	327

59-B-47 (Cont'd)

Sand and gravel, fine sand to medium gravel, principally reworked limy and limonitic grains.....	327	330.5
Silty clay, yellowish gray, slightly calcareous.....	330.5	335
Silt, buff-brown, granular, moderately calcareous....	335	338
Cretaceous System:		
Clay shale, dark gray, non-calcareous.....	338	350
	Total Depth	

TEST HOLE 58-B-47
(Profile Line C-D)

LOCATION: 111 feet north and 32 feet west of the southeast corner of Sec. 13, T. 7 N., R. 13 W.
ELEVATION: 2056.7 feet (Altimeter)
DEPTH TO WATER: 79.5 feet.
RECORD:

DESCRIPTION	DEPTH IN FEET FROM	TO
Quaternary System, 310 feet:		
"Peorian" formation, 17.5 feet:		
Silt, slightly sandy, very fine sand, medium brown-gray	0	2
Soil: silt, very slightly sandy, very fine sand, dark brown-gray	2	2.5
Same, medium brown-gray	2.5	3
Silt, slightly clayey, light buff-gray, a few limy nodules and a few gastropods	3	8
Same, slightly sandy, very fine to fine sand	8	10
Silt, slightly clayey to slightly very fine sandy, very light buff-gray, a few limonitic flecks; slight tan tint 16.5-17.5	10	17.5
Todd Valley formation, 28 feet:		
Soil: sandy silt, very fine to medium sand, dark brown with slight reddish to grayish tint; drilled slightly slower 21-27	17.5	27
Same, slightly more sandy, a little coarse sand, light brown to buff-gray	27	28.5
Sand, fine to coarse with a little very coarse sand, very light buff-gray, sub angular to well rounded	28.5	40
Sand, very fine to coarse, in part silty, very light buff-gray	40	45.5
Loveland or Sappa formation (?), 22.5 feet:		
Silt, moderately sandy, very fine to medium sand, reddish tan	45.5	46.5
Soil: slightly sandy silt, very fine to medium sand, dark brown	46.5	48
Silt, clayey to slightly sandy, very fine to medium sand, light gray, some calcareous mottling, a very few limonitic flecks	48	51.5
Same, moderately to very sandy, light brown-gray	51.5	54
Sandy silt to silty sand, very fine to medium sand, light brown-gray with yellowish brown limonitic staining	54	57
Sand, very slightly silty to coarse with a very little very coarse sand, very light brown-gray, sub angular to well rounded	57	68
Sappa formation, 18 feet:		
Sandy silt, very fine to medium sand, light brown-gray with many limonitic flecks	68	79
Same, fine to coarse with a little very coarse sand..	79	86

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Grand Island formation, 54 feet:		
Sand, very fine to very coarse, very light brown-gray, sub angular to well rounded	86	100
Same, a little fine gravel	100	105
Sand and gravel, medium sand to medium gravel, a little coarse gravel 110-120, very little fine gravel 105-110, brown-gray with much pinkish	105	125.5
Sand, very fine to very coarse with considerable fine to medium gravel, brown-gray with pinkish	125.5	130
Gravel, fine to medium with a little coarse gravel and much coarse to very coarse sand, light brown-gray with pinkish and green	130	140
Holdrege formation, 170 feet:		
Sand and gravel, medium sand to medium gravel with scattered coarse gravel, brown-gray with pinkish and green	140	201
Silty clay, gray-green	201	203
Sand and gravel, fine sand to fine with some medium gravel, brown-gray with much pinkish and some greenish grains	203	220
Sand, fine to very coarse with some fine gravel, very light brown-gray	220	240
Same, a little fine gravel and a little very fine sand	240	310
Tertiary System, 140 (+) feet:		
Silt, clayey, medium gray, (dark grayish green when wet), slightly calcareous	310	316
Same, in part very fine sandy, very light medium gray (light bluish green when wet), highly calcareous	316	320
Same, slightly clayey, moderately calcareous	320	326
Silt, slightly clayey to very fine sandy, light brown-tan, grayish tint, in part slightly calcareous	326	362.5
Sand, very fine to fine with a little coarse sand, very light brown-gray	362.5	368.5
Silt, slightly sandy, very fine to fine sand, light brown-tan, gray tint, some white calcareous silt and dense limy nodular fragments	368.5	380
Silt, slightly to moderately sandy, very fine to fine sand, light brown-tan, gray tint, a little reworked material, limy and limonitic grains, 395-403	380	403
Silt, slightly clayey to moderately sandy, light gray with rounded chalk grains	403	410
Same, many chalk, limonitic and thin shell fragments.	410	420
Silt, moderately sandy, very fine with some fine and medium sand, brown-tan, slight reddish tint, a few chalk and limonitic grains	420	431
Clayey silt, a little imbedded sand, medium gray, moderately calcareous	431	435
Same, medium dark gray	435	450
		Total Depth

TEST HOLE 57-B-47
(Profile Line C-D)

LOCATION: 8 feet south and 166 feet east of the northwest corner of Sec. 6, T. 6 N., R. 12 W.
ELEVATION: 2031.4 feet (Altimeter)
DEPTH TO WATER: Hole caved in at 67.7 feet.
RECORD:

DESCRIPTION	DEPTH IN FEET FROM	TO
Quaternary System, 251 feet:		
Road fill and soil; silt, dark brown and medium brown-gray	0	3
"Peorian" formation, 7 (+) feet:		
Silt, very light buff-gray, a few limy nodules; a few gastropods 3-7.5	3	10
Todd Valley formation, 50 feet:		
Soil: very silty sand, dark brown, very fine to coarse sand	10	15
Sand, very fine to coarse, light tan-gray, brown tint	15	27.5
Sandy silt, very fine to medium sand, light buff-gray, some limonitic staining, a few gastropod fragments	27.5	29.5
Sand, fine to coarse with a little very fine and very coarse sand, very light buff-gray	29.5	60
Sappa formation, 10 feet:		
Silty sand with some interbedded sandy silt, very fine to coarse with some coarse sand, brown-tan to tan-gray	60	70
Grand Island formation, 61 feet:		
Sand, very fine to very coarse, light tan-gray	70	84.5
Sand, coarse to very coarse with some medium sand and fine gravel, light brown gray with pinkish, much rusty iron staining	84.5	90
Sand and gravel, medium sand to fine gravel; a little fine sand and medium gravel 93-110	90	110
Sand, fine to very coarse, some fine gravel, very light brown-gray, some pinkish, many clay granules, light green-gray	110	116
Sand and gravel, medium sand to medium gravel, light brown-gray with some pinkish, a few clay granules.	116	120
Sand and gravel, fine sand to fine gravel, light brown-gray with some pinkish	120	131
Fullerton formation, 4.5 feet:		
Silt, slightly clayey to very sandy, very fine to medium sand, green-gray, brown tint	131	135.5
Fullerton or Holdrege formation, 4.5 feet:		
Sand and gravel, coarse sand to fine gravel with some medium gravel, brown-gray with pinkish and some dark grains	135.5	140
Holdrege formation, 111 feet:		
Sand and gravel, medium sand to fine gravel, grading coarser, very light brown gray with some pinkish..	140	156

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Gravel, fine to medium with much medium to very coarse sand, very light brown-gray, some pinkish	156	170
Sand, medium to very coarse with some fine to medium gravel, light brown-gray with some pinkish	170	176
Gravel, fine to medium with some sand, light brown gray with pinkish; sandy silt layers 176-176.5 and 179.5-180.5	176	180.5
Sand and gravel, medium sand to fine gravel, light brown-gray with pinkish	180.5	190
Sand, medium to very coarse with some fine gravel, very light brown-gray	190	205
Same, much fine gravel, some green-gray silt granules	205	210
Sand, very fine to very coarse sand with a little fine and scattered medium gravel, grading slightly coarser, very light brown-gray	210	251
Tertiary System, 68.5 feet:		
Silt, moderately sandy, principally very fine sand, light buff-gray with some white calcareous mottling and a few hard limy nodular fragments	251	260.5
Silty sand, very fine to fine with some medium sand, light brown-gray; very silty 265-270, slightly silty 270-275	260.5	275
Silt, in part clayey, light buff to tan-gray, slightly calcareous, a few yellow limonitic nodules	275	280
Clay, in part silty, light buff to yellow-gray, a little light gray, highly weathered, slightly calcareous	280	290
Clay, light gray, non-calcareous, many selenite crystals, slight weathering; less limonitic staining and fewer selenite crystals 310-319.5; a few dark shale fragments	290	319.5
Cretaceous System:		
Clay shale, dark gray, non-calcareous	319.5	330
		Total Depth

TEST HOLE 56-B-47
(Profile Line C-D)

LOCATION: 84 feet south and 40 feet east of the northeast corner of Sec. 19, T. 6 N., R. 12 W.
ELEVATION: 2020.6 feet (Altimeter)
DEPTH TO WATER: 31.6 feet (Perched water level).
RECORD:

DESCRIPTION	DEPTH IN FEET FROM	TO
Quaternary System, 255 feet:		
"Peorian" formation, 7.5 feet:		
Soil: moderately sandy silt, very fine to fine sand, dark brown-gray	0	0.5
Silt, slightly sandy, very fine to fine sand, buff-gray	0.5	1
Silt, slightly clayey to very slightly sandy, very fine sand, light buff-gray with yellowish limonitic tint; slight tan tint 5.5-7.5	1	7.5
Todd Valley formation, 26.5 feet:		
Soil: sandy silt, very fine to medium with a little coarse sand, brown, slight reddish tint	7.5	9
Sand, very slightly silty, very fine to coarse sand with a little very coarse sand and fine gravel, light tan-brown, gray tint	9	15
Same, light brown-gray	15	20
Sand, very fine to coarse sand with a little very coarse sand, light brown-gray with a thin very fine sandy silt layer, light gray	20	25
Sand, very fine to coarse, very light buff-gray	25	34
Sappa formation, 32 feet:		
Silt, slightly clayey to slightly sandy, very fine sand, light brown-gray, slight limonitic staining	34	35.5
Silt, moderately clayey to moderately sandy, very fine sand, light gray with a green tint; drilled slowly	35.5	38
Silt, slightly clayey to slightly sandy, very fine sand, light gray with a slight green tint	38	40
Same, very sandy, very fine to fine with some medium sand	40	45
Same, very little fine to medium sand, a little limonitic staining; slightly clayey 47.5-50	45	50
Silt, very sandy, very fine to fine with some medium sand, light brown-gray	50	52
Sand, very slightly silty, very fine to medium with some coarse sand, very light brown-gray	52	60
Silt, moderately to very sandy, very fine to fine sand, medium brown-tan	60	66
Grand Island formation, 57 feet:		
Sand, very slightly silty, very fine to coarse with some very coarse sand, slightly coarser 70-77, tan-gray	66	77

56-B-47 (Cont'd)

Same, silty and marly.....	77	78
Gravel, fine to medium with some coarse gravel with much coarse to very coarse sand and very little fine to medium sand, brown-gray with pinkish, a little iron staining.....	75	123
Fullerton formation, 12 feet:		
Sand, moderately silty in part, very fine to very coarse sand with a little fine gravel, tan-gray, brown tint.....	123	125
Sand, very slightly silty, very fine to very coarse sand with a very little fine gravel, light brown-gray.....	125	130
Same, slightly silty, tan-gray with brown tint.....	130	135
Holdrege formation, 120 feet:		
Sand and gravel, medium sand to medium gravel, light brown-gray, much pinkish; a little coarse gravel 155-160.....	135	160
Sand and gravel, medium sand to fine gravel with some medium gravel, light brown-gray with pinkish and dark grains.....	160	170
Same, much fine to medium gravel 170-180.....	170	185
Clay, silty to slightly sandy, light brown-gray, drilled slowly.....	185	188
Sand and gravel, fine sand to medium gravel, light brown-gray with pinkish, a few dark grains.....	188	220
Sand, fine to very coarse with fine gravel, light brown gray with pinkish.....	220	230
Same, sand, fine to very coarse with a little fine gravel.....	230	255
Tertiary System, 97 feet:		
Silt, slightly sandy, principally very fine sand, very light brown-gray, in part consolidated, highly calcareous, a little marly material.....	255	260
Silt, moderately sandy, principally very fine sand, light tan-gray, moderately to highly calcareous, with intermittent thin hard limy zones.....	260	265
Silt, slightly very fine sandy, very light brown-gray, moderately calcareous.....	265	270
Silt, slightly clayey, light brown tan, some light gray calcareous silt.....	270	275
Silt, slightly clayey to slightly sandy, light brown-tan, moderately calcareous.....	275	283
Sand, fine to coarse, light brown-gray.....	283	290
Silt, slightly sandy, light brown-tan, slightly to moderately calcareous; slightly clayey 295-300....	290	302
Sand, slightly silty, very fine to coarse sand, light brown-gray.....	302	305
Silt, slightly sandy, fine to very coarse sand, light brown-tan, moderately calcareous with white limy nodules.....	305	313
Sand, very fine to coarse, light brown-gray.....	313	317.5
Clayey silt, buff to tan-gray, moderately calcareous.....	317.5	318.5

56-B-47 (Cont'd)

Sand, very fine to coarse, light brown-gray; interbedded sandy silt, 320-325.....	318.5	325
Sand, in part silty, fine to coarse, light brown-gray.....	325	341
Gravel, fine to course with some sand, brown-gray, much reworked material, aragonite, ironstone, and chalk; principally chalky limestone grains 350-352.....	341	352
Cretaceous System:		
Chalky limestone, whitish to yellowish gray.....	352	352.5
Chalky silty shale, medium gray, moderately speckled.	352.5	360
		Total Depth

TEST HOLE 55-B-47
(Profile Lines C-D and J-K)

LOCATION: 240 feet north and 8 feet east of the northwest corner of Sec. 6, T. 5 N., R. 12 W.
ELEVATION: 2010.7 feet (Altimeter)
DEPTH TO WATER: 4.4 feet (Perched water level)
RECORD:

DESCRIPTION	DEPTH IN FEET FROM	TO
Quaternary System, 220 feet:		
Dune Sand, 1 foot:		
Soil: silty sand, very fine to fine with some medium sand, medium brown-gray	0	0.5
Sand, very fine to fine with a little medium sand, light brown-gray	0.5	1
Todd Valley formation, 26 feet:		
Soil: moderately silty sand, very fine to fine with some medium sand, dark brown-gray	1	2
Sand, moderately silty, very fine to fine with some medium sand, medium brown-gray	2	3
Sand, slightly silty, very fine to medium with some coarse sand, light brown-gray, in part limonitic stained	3	7
Sand, slightly to moderately silty, very fine to medium with a little coarse sand, very light buff-gray, some iron staining	7	10
Same, slightly silty	10	27
Sappa formation, 23 feet:		
Silt, moderately clayey to very slightly sandy, very fine to fine sand, light brown-tan, gray tint	27	30
Same, more clayey and slightly to moderately sandy; drilled very slowly 33-40	30	40
Same, less clayey, very light brown-gray	40	49
Same, moderately silty, very fine to coarse sand, light brown-tan, gray tint	49	50
Grand Island formation, 27.5 feet:		
Sand, very fine to medium with some coarse sand, very light brown gray	50	77.5
Fullerton formation, 31.5 feet:		
Sand, in part very silty, very fine to fine with some medium sand, in part limonitic stained, drilled slower 77.5-79	77.5	80
Sandy silt, very fine to medium sand, light gray, some iron staining	80	83.5
Sand, very fine to coarse with a little very coarse sand, very light buff-gray; very slightly silty 83.5-90 and 100-104	83.5	104
Sand, moderately silty, very fine to very coarse sand, light brownish tan	104	109
Holdrege formation, 111 feet:		
Sand and gravel, fine sand to fine gravel, some medium gravel 120-130, light brown-gray with pinkish	109	150

55-B-47 (Cont'd)

Gravel, fine to medium with much fine to very coarse sand, light brown-gray with pinkish.....	150	160
Sand and gravel, fine sand to medium gravel, light brown-gray with pinkish.....	160	170
Gravel, fine to medium (a little coarse gravel 175-190), with much fine to very coarse sand, interval grades coarser to 185 then finer to 200, light brown-gray with pinkish.....	170	200
Sand and gravel, fine sand to medium gravel, light brown-gray with pinkish.....	200	220
Tertiary System, 38 feet:		
Silt, slightly clayey to slightly sandy, very fine sand, light gray-green, slightly calcareous.....	220	223
Silt, slightly clayey to very slightly sandy, very light brownish tan, gray tint, moderately calcareous.....	223	225
Same, slightly sandy, very fine to medium sand, light brown-gray, highly calcareous.....	225	237
Silt and silty clay, light brown gray, some rounded clay granules, light gray, weathered, a few limonitic granules, non-calcareous.....	237	241
Clay, medium gray, some weathering, non-calcareous...	241	250
Same, lighter gray, many selenite crystals.....	250	258
Cretaceous System:		
Clay shale, medium dark gray, slightly calcareous to 265, moderately calcareous 265-270.....	258	270
	Total Depth	

TEST HOLE 54-B-47
(Profile Line C-D)

LOCATION: 53 feet south and 39 feet west of the northeast corner of Sec. 24, T. 5 N., R. 13 W.
ELEVATION: 2055.9 feet (Altimeter).
DEPTH TO WATER: 103.6 feet.
RECORD:

DESCRIPTION	DEPTH IN FEET FROM	TO
Quaternary System, 199 feet:		
"Peorian" formation, 20.5 feet:		
Soil: silt, dark brown-gray	0	0.5
Silt, very slightly sandy, very fine to medium sand, light brownish tan, gray tint	0.5	1
Same, buff-gray, tan tint, a few limonitic flecks	1	3
Silt, slightly clayey, buff-gray, yellow to tan tint, with some limonitic staining and with a few limy nodules	3	20.5
Loveland formation, 19.5 feet:		
Soil: silt, moderately to very sandy, very fine to fine with some medium sand, medium reddish brown	20.5	24.5
Silt, slightly clayey to moderately sandy, very fine to fine sand, reddish tan	24.5	30
Silt, moderately sandy, very fine to fine sand, reddish to brown tan with a thin light gray non-calcareous layer 39.5-40	30	40
Sappa formation (?), 30 feet:		
Silt, slightly sandy, very fine with some fine sand, brown-tan, gray tint	40	50
Same, more sandy 52-54, very fine to fine sand	50	55
Same, moderately sandy 55-58, very sandy 58-60, very fine to fine with a little medium sand	55	60
Sand, moderately silty, very fine to medium sand, tan-gray	60	65
Same, in part very silty	65	70
Sappa formation, 61 feet:		
Sandy silt, very fine to fine with a little medium sand, light brown-tan	70	83
Silt, moderately sandy, very fine to fine sand, light brown-tan with gray tint	83	90
Same, very sandy, a little medium sand, reddish tan 100-110	90	110
Same, light tan-gray	110	120
Same, more sandy, a little coarse sand	120	125
Grand Island formation, 6 feet:		
Sand, moderately silty, very fine to medium with some coarse sand, light tan-gray	125	131
Fullerton formation, 37 feet:		
Silt, very sandy, very fine to medium with a little coarse sand, light medium brown-gray; slightly coarser texture and with a greenish tint 140-142.5	131	142.5

54-B-47 (Cont'd)

Sand, moderately silty, very fine to very coarse sand with a little fine gravel 150-155, very light brown-gray.....	142.5	155
Sandy silt to silty sand, very fine to very coarse sand with a little fine gravel, buff-gray with much limonitic staining.....	155	168
Holdrege formation, 31 feet:		
Sand and gravel, very fine sand to medium gravel (much very coarse sand to fine gravel), light brown-gray with pinkish.....	168	199
Tertiary System, 16 (+) feet:		
Silt, slightly clayey, light green-gray.....	199	200
Silt, in part sandy to gravelly, very light tannish gray, in part marly.....	200	206
Clay, yellowish brown, trace of light gray, non-calcareous.....	206	215
Clay, light gray, a little medium gray, some weathering, a few selenite crystals, non-calcareous.....	215	240
		Total Depth

TEST HOLE 53-B-47
(Profile Line C-D)

LOCATION: 13 feet north and approximately 700 feet west of the southeast corner of Sec. 36, T. 5 N., R. 13 W.
ELEVATION: 2099.1 feet (Altimeter)
RECORD:

DESCRIPTION	DEPTH IN FEET FROM	TO
Quaternary System, 219 feet (?):		
"Peorian" formation, 14.5 feet:		
Soil: silt, slightly clayey, medium brown-gray.....	0	0.5
Silt, moderately clayey, buff-gray.....	0.5	3.5
Silt, slightly clayey, light buff-gray, a few limy nodules; slight tan tint 12.5-14.5.....	3.5	14.5
Loveland formation, 62.5 feet:		
Soil: silt, very slightly clayey to slightly sandy, very fine to fine sand, dark reddish brown.....	14.5	21
Silt, moderately sandy, brownish tan.....	21	25
Silt, slightly clayey to slightly sandy, light brown-tan, gray tint.....	25	35
Silt, moderately sandy, very fine with a little fine sand, light brown-tan to tan-gray, with a highly calcareous zone 67-69.....	35	70
Sandy silt, very fine to medium with a little coarse sand, light brown-tan.....	70	77
Sappa formation (?), 37.5 feet:		
Silt, moderately to very sandy, very fine to medium sand, brown-tan; sandy lime concretions 77-80 and 95-100, moderately calcareous 77-85.....	77	100
Sand, slightly silty, very fine to coarse sand, light tan to buff-gray.....	100	114.5
*Sappa formation (?), 81 feet:		
Marl, moderately sandy, very fine to medium sand, white, hard 114.5-117, very hard 117-120.....	114.5	120
Ashy marl, whitish gray (Pearlette?), very hard.....	120	124
Silty sand, very fine to medium sand, marly and in part siliceous, whitish gray, slight olive tint, very hard 124-125 and 130.5-132.5.....	124	132.5
Sandy marl, very fine to medium sand, white, moderately hard.....	132.5	138
Sandy silt, very fine to medium sand, olive gray, moderately calcareous.....	138	140
Same, slightly more sandy, in part indurated, slightly calcareous.....	140	145
Sandy silt to silty sand, very fine to medium sand, grading more sandy and slightly coarser texture, very light olive gray, some slight consolidation, very slightly calcareous.....	145	158

* The interval 114.5-219 feet, provisionally correlated as Pleistocene, may be Tertiary.

53-B-47 (Cont'd)

Grand Island formation (?), 5 feet:		
Sand, slightly silty, very fine to coarse sand, light buff-gray	158	163
Fullerton formation (?), 32 feet:		
Silty sand, very fine to medium sand, whitish gray, marly	163	165.5
Clay, silty to slightly sandy, red-tan and green-gray with rounded limy fragments	165.5	170
Silt, slightly clayey to very sandy, whitish to olive gray, in part marly	170	175
Clay, silty to very sandy, very fine to coarse sand, in part reworked material, tan-gray	175	180
Sand, silty to coarse sand, very light brown-gray, with Bicrbia seed and some reworked Ogallala limy fragments	180	185
Sand, slightly silty, very fine to very coarse sand, very light brown-gray, some reworked limy material	185	190
Silt, moderately sandy with some interbedded sand, very fine to very coarse sand with a little fine to medium gravel, light brown-gray, some calcareous mottling	190	195
Holdrege formation (?), 24 feet:		
Sand, very fine to very coarse with a very little fine gravel, light brown gray with pinkish and a little light green	195	219
Tertiary System, 7.5 feet:		
Silt, very sandy to slightly clayey, yellowish brown, a few rounded limy and limonitic granules	219	220
Silt, clayey to slightly very fine sandy, yellow brown; moderately sandy to gravelly 224.5-226.5	220	226.5
Cretaceous System:		
Clay shale, black, non-calcareous, occasional thin ironstone layers	226.5	240
		Total Depth

TEST HOLE 52-B-47
(Profile Line C-D)

LOCATION: 67 feet north and 11 feet east of the southwest corner of Sec. 18, T. 4 N., R. 12 W.
ELEVATION: 2002.8 feet (Altimeter)
DEPTH IN FEET: 72.5 feet.
RECORD:

DESCRIPTION	DEPTH IN FEET FROM	TO
Quaternary System, 168 feet:		
Ditch fill: silt, light brown-gray.....	0	2
"Peorian" formation, 8 (+) feet:		
Soil: silt, dark brown-gray.....	2	3
Silt, slightly clayey, medium brown-gray.....	3	4.5
Same, light brown-gray.....	4.5	8
Loveland formation, 10.5 feet:		
Silt, slightly very fine sandy, brown-tan, gray tint, a few dark iron concretions.....	8	10
Silt, slightly clayey to slightly very fine sandy, brown-tan to tan-gray, slight pinkish tint.....	10	18.5
Sappa formation, 51.5 feet:		
Silt, moderately clayey to slightly very fine sandy, light gray, slight brown-tan tint.....	18.5	20
Clayey silt, slightly very fine sandy, light gray, slight brown-tan tint, drilled more slowly.....	20	24.5
Silt, slightly clayey to slightly sandy, very fine with a trace of fine sand, brown-tan, gray tint...	24.5	30
Silt, very slightly clayey to slightly sandy, very fine to a little fine sand, brown tan, gray tint..	30	40
Silt, slightly clayey to slightly sandy, very fine to a little fine sand, brown-tan; more grayish and moderately calcareous 55-60.....	40	60
Silt, moderately sandy, very fine to medium sand, light brown-tan, gray tint.....	60	70
Grand Island formation, 18.5 feet:		
Sand, slightly silty, very fine to medium with a little coarse sand, light brown-gray with dark speckling.....	70	85
*Fullerton (?) formation, 37 feet:		
Silt, moderately sandy, very fine to medium with a little coarse sand, brown-gray, slight tan tint, in part indurated and marly.....	85	90
Sand, slightly silty, very fine to coarse sand, very light brown-gray.....	90	97
Sandy silt, very fine to medium with a little coarse sand, marly.....	97	100
Sand, slightly silty, very fine to coarse sand, light brown-gray.....	100	109

* The interval 85-168, provisionally correlated as Pleistocene, may be Tertiary.

52-B-47 (Cont'd)

Sandy silt to silty sand, interbedded whitish gray to light brown-gray, in part marly and indurated, hard zones 101-102 and 103-103.2.....	109	115
Silt, moderately sandy, very fine to medium sand, very light brown-gray with a little green-gray....	115	119
Sand, with some sandy silt, very fine to coarse sand, light brown-gray.....	119	122
Holdrege (?) formation, 46 feet:		
Sand, very fine to very coarse sand, light brown-gray, very slightly silty.....	122	125
Sand and gravel, fine sand to fine with some medium gravel, grading very slightly coarser textured, light brown-gray with pink and greenish tints.....	125	168
Cretaceous System:		
Clay shale, yellow brown.....	168	169.5
Clay shale, dark gray, very slightly calcareous.....	169.5	180
	Total Depth	

TEST HOLE 51-B-47
(Profile Line C-D)

LOCATION: 40 feet north and 18 feet east of the southwest corner of Sec. 31, T. 4 N., R. 12 W.
ELEVATION: 2069.6 feet (Altimeter)
DEPTH TO WATER: 157.2 feet.
RECORD:

DESCRIPTION	DEPTH IN FEET FROM	TO
Quaternary System, 190 feet:		
"Peorian" formation, 19.5 feet:		
Soil: silt, very dark brown-gray	0	1
Clayey silt, medium dark brown gray 1-2, medium buff-gray, 2-2.5, slight yellowish tint 2.5-3.5	1	3.5
Clayey silt, buff-gray, yellow tint, granular texture, a few small limy nodules	3.5	5
Silt, light buff-gray, yellow tint	5	19.5
Loveland formation, 40.5 feet:		
Soil: slightly clayey to slightly very fine sandy, light reddish tan	24.5	30
Same, buff-tan	30	35
Same, slightly less sandy	35	40
Silt, slightly clayey to slightly sandy (very fine with a little fine sand), buff-gray, tan tint; white calcareous mottling 45-55	40	60
Sappa formation (?), 20 feet:		
Silt, slightly clayey to slightly very fine sandy, buff to tan-gray; slightly more sandy 70-80	60	80
Sappa formation, 51 feet:		
Silt, slightly clayey to slightly very fine sandy, brownish tan	80	108
Silty clay, slightly sandy, very fine to medium sand, light gray, slight brown tint, drilled very slowly	108	120
Sandy silt, very fine to very coarse sand with a trace of fine gravel, grading sandier and coarser textured, light gray	120	131
Grand Island formation, 39 feet:		
Sand and gravel, fine sand to medium gravel, grading coarser textured; light brown-gray with pinkish	131	170
Holdrege formation, 20 feet:		
Sand and gravel, fine sand to fine gravel, brown-gray with pinkish, drilled slower and more quietly than sand and gravel above	170	173
Sand and gravel, fine sand to medium gravel, slightly finer texture 180-188, brown-gray, much pinkish; a few light green silt and clay granules 188-190	173	190
Cretaceous System:		
Clay shale, very dark gray to black, slightly calcareous	190	200
	Total Depth	

TEST HOLE 50-B-47
(Profile Line C-D)

LOCATION: 10 feet north and 43 feet west of southeast corner of Sec. 13, T. 3 N., R. 13 W.
ELEVATION: 1973 feet (Altimeter)
DEPTH TO WATER: 103 feet.
RECORD:

DESCRIPTION	DEPTH IN FEET FROM	TO
Quaternary System, 172.5 feet:		
"Peorian" formation, 8 feet:		
Soil: slightly clayey silt, light brown-gray.....	0	1
Silt, light buff-gray, slight tan tint 7-8, a few soft limy nodules, a very few small gastropods....	1	8
Sappa formation, 26 feet:		
Silt, coarse textured, slightly very fine sandy, tan-gray, reddish tint.....	8	9
Silt, coarse textured, slightly very fine to fine sandy, light gray with some interbedded tan-gray 13.5-15, a few limy nodules 9-11, a few dark iron concretions, drilled slowly.....	9	15
Same, slightly more sandy, very fine to medium sand..	15	19
Silt, very sandy grading more sandy, very fine to medium with some coarse sand, brown-tan, gray tint.....	19	34
Grand Island formation, 81 feet:		
Sand, fine to medium with a little coarse sand and scattered gravel, very light brown-gray.....	34	40
Sand, fine to coarse with a little fine to medium gravel, very light brown-gray.....	40	50
Gravel, fine to coarse with much medium to very coarse sand, light brown-gray to pinkish.....	50	67.5
Sand, medium to very coarse with a little fine to medium gravel, light brown-gray with pinkish, drilled more slowly and with less chatter.....	67.5	71
Gravel, fine to coarse with much medium to very coarse sand, brown-gray to pinkish.....	71	90
Sand and gravel, medium sand to medium gravel, brown-gray to pinkish, a few dark grains.....	90	115
Holdrege formation, 57.5 feet:		
Sand and gravel, fine sand to medium gravel, brown-gray to pinkish, a few dark grains.....	115	150
Sand, fine to very coarse with some fine to medium gravel, light brown-gray with pinkish.....	150	155
Same with very fine sandy silt layers 157-157.2 and 158-159, light gray.....	155	160
Sand and gravel, fine sand to medium gravel, brown-gray to pinkish.....	160	172.5
Tertiary System, 58.5 feet:		
Silt, slightly very fine sandy, light tan-gray, slightly to moderately calcareous.....	172.5	190
Silt, coarse textured, slightly very fine sandy, moderately calcareous, some slight consolidation, occasional imbedded chalk fragments.....	190	223.5

50-B-47 (Cont'd)

Sand, fine to very coarse with fine gravel, very light gray, rounded to sub angular.....	223.5	231
Cretaceous System:		
Chalky shale, medium gray, silty, highly speckled....	231	250
	Total Depth	

RECORDS OF TEST HOLES ALONG PROFILE
LINE E-F, SEVEN MILES SOUTHEAST OF KEARNEY
THROUGH MINDEN TO THREE MILES NORTH OF FRANKLIN;
BASED ON FIELD LOGS SUPPLEMENTED WITH
MICROSCOPIC EXAMINATION OF SAMPLES

TEST HOLE 73-B-47
(Profile Line E-F)

LOCATION: About 330 feet south and 43 feet west of the northeast corner of Sec. 24, T. 8 N., R. 15 W.
ELEVATION: 2093.5 feet (Instrument)
DEPTH TO WATER: 1.7 feet
RECORD:

DESCRIPTION	DEPTH IN FEET FROM	TO
Quaternary System, 165 feet:		
Post Iowan, 15 feet:		
Soil: slightly silty sand, very fine to very coarse sand with a very little fine to medium gravel, medium brown-gray.....	0	0.7
Sand, very fine to medium sand with a very little coarse sand to medium gravel, light brown-gray, much polish.....	0.7	0.9
Sand and gravel, medium sand to medium gravel (about 70% gravel), light brown-gray with some pink feldspar, high polish, some dark iron-manganese staining to 1.7, highly stained 1.7-1.8.	0.9	1.8
Sand and gravel, medium sand to fine gravel (much very coarse sand), very light gray, principally quartz with a few dark grains, highly polished; some medium gravel 8-10 with a thin dark stained zone at 8; slightly less polish 10-15 with a thin silty clay layer, yellow-brown at 15.....	1.8	15
Todd Valley formation (?), 25 feet:		
Sand and gravel, fine sand to fine gravel, with a little medium gravel, very light gray, much quartz with moderate polish and moderate yellow iron staining; highly iron stained 18.5-20 with a thin clayey layer at 18.5; about 40% gravel 15-20 and about 55% gravel below 20 with medium gravel and a little coarse gravel.....	15	29
Gravel, fine to medium with some coarse gravel and coarse to very coarse sand (about 80% gravel), light brownish gray, a little pink feldspar, slight polish.....	29	40
Grand Island formation, 29 feet:		
Sand and gravel, medium sand to fine gravel with a little medium gravel, very light brownish gray, much quartz, some pink feldspar, slight polish, grades from about 30% gravel 40-45 to 60% gravel 55-60, slightly finer texture below 60; a few dark metamorphics below 45.....	40	69

73-B-47 (Cont'd)

Fullerton formation, 22 feet:		
Silt, slightly clayey to slightly sandy, very fine with a trace of medium sand, light brown-gray, yellow tint.....	69	70
Silt, moderately sandy, very fine to fine sand, pale brownish gray, moderately to very calcareous, some soft white calcareous areas.....	70	77.5
Sand and gravel, fine sand to fine gravel, very light brownish gray, some pink feldspar.....	77.5	81
Silt, moderately clayey, a few imbedded very fine to fine sand grains, very pale brown, slightly calcareous; silty clay below 85, in part non-calcareous.....	81	91
Holdrege formation, 74 feet:		
Sand and gravel, medium sand to fine gravel with a trace of medium gravel, much coarse to very coarse sand (about 30% gravel), light brownish gray, some pink feldspar; thin pale brown silt at 98.5.....	91	109.5
Silt, slight clayey to moderately sandy 109.5-112, very sandy with some interbedded sand and gravel 112-118, principally very fine to medium sandy, very pale brown.....	109.5	118
Sand and gravel, fine sand to fine gravel with some medium gravel, very light brown-gray, slightly silty with a very silty zone 120-122.....	118	124
Sand, fine to very coarse with fine gravel and a trace of medium gravel, principally quartz.....	124	128
Sand, very fine to coarse, a very little very coarse sand and fine gravel, principally quartz with a little dark speckling, moderate rounding and frosting, slightly calcareous; no fine gravel below 145.....	128	165
Tertiary System, 72 feet:		
Silty clay, light medium gray, highly calcareous; yellowish brown 165-167.5.....	165	170
Silty clay, light brownish gray, very calcareous.....	170	179.5
Sand, slightly silty, very fine to medium sand, mostly quartz with slight dark speckling, moderate rounding and frosting, very slightly calcareous; with large flat rounded whitish gray chalk gravel grains 195-200 and with a few small pelecypod fragments; very little frosting, much polish 200-204.....	179.5	204
Clay, very light gray, yellow tint with much weathering, highly calcareous; moderately calcareous 207-220; a little very light medium gray below 215.....	204	237
Cretaceous System:		
Clay shale, medium gray, highly calcareous.....	237	260
		Total Depth

TEST HOLE 72-B-47
(Profile Line E-F)

LOCATION: 108 feet north and 7 feet east of the southwest corner of Sec. 19, T. 8 N., R. 14 W.
ELEVATION: 2096.1 feet (Instrument)
DEPTH TO WATER: 5.5 feet.
RECORD:

DESCRIPTION	DEPTH IN FEET FROM	TO
Quaternary System, 143 feet:		
Post Iowan, 24.5 feet:		
Soil: moderately silty sand, very fine to fine sand with scattered coarser sand and gravel grains, very dark brown-gray.....	0	0.8
Sand, very fine to coarse with a little very coarse sand and fine gravel, light brown-gray, very slightly silty, highly polished; very silty to slightly clayey, 2-2.5, yellow-brown.....	0.8	2.5
Sand and gravel, medium sand to fine gravel and with some medium gravel (much very coarse sand and fine gravel), very light brownish gray with much pinkish feldspar, highly polished, slight yellow iron staining 2.5-7 and with much very dark iron-manganese staining 7-10.....	2.5	10
Gravel, fine to medium with some coarse gravel and a little sand (about 85-90% gravel), quartz and feldspars, much pinkish; some very dark staining 10-20.....	10	24.5
Todd Valley formation (?), 23.5 feet:		
Soil: moderately clayey to moderately sandy silt, medium grayish brown with a little slightly clayey silt, very light gray.....	24.5	25.2
Gravel, fine to coarse with some sand, very light gray, much quartz with some pink feldspar, about 75% gravel; very little coarse gravel 30-48.....	25.2	48
Sappa formation, 13 feet:		
Sandy silt, principally very fine sand, light gray, much yellow iron staining in upper part.....	48	51
Sand and gravel, coarse sand to medium gravel, yellowish brown iron stained, some yellow-brown clay.....	51	58
Clay, silty to in part sandy, very fine to medium sand, yellowish brown.....	58	61
Grand Island formation, 46 feet:		
Sand and gravel, medium sand to medium gravel, light brownish gray, some pink feldspar, moderate yellowish iron staining, 50-60% gravel.....	61	70
Sand and gravel, fine sand to fine gravel and with some medium gravel and a trace of coarse gravel, very light brownish gray, a little pinkish and light colored feldspars, moderate polish, 45-50% gravel.....	70	90
Same, about 80% gravel.....	90	107

72-B-47 (Cont'd)

Holdrege formation, 36 feet:		
Sand and gravel, fine to very coarse sand with some fine to medium gravel, very light brownish gray, mostly very light colored quartz and felspathic grains, a little pink feldspar; silty and clayey 111.5-113 and with thin zones 113-115.5, yellowish brown.....	107	115.5
Sand and gravel, medium sand to medium gravel (about 50% gravel), light brownish gray, mostly light colored grains, a little pinkish feldspar, slight iron staining.....	115.5	123
Silt, very fine sandy, light medium gray.....	123	127.5
Sand and gravel, fine sand to fine gravel with a little medium to coarse gravel (about 50% gravel), very light brownish gray, principally light colored grains with a little pink feldspar.....	127.5	140
Sand, fine to very coarse with scattered gravel grains, whitish gray, principally quartz, moderate rounding, high polish.....	140	143
Tertiary System, 74 feet:		
Clayey silt, pale brown, some imbedded very fine to fine sand; moderately calcareous 143-150, very calcareous and less clayey 150-153.....	143	153
Silt, pale brownish gray, moderately calcareous; coarse textured 165-188.5; moderately clayey 170-178.5 with a clayey silt 178.5-180; limy nodular zone at 167 and with some white calcareous areas 170-175.....	153	180
Silt to siltstone, coarse textured, very pale brown, highly calcareous.....	180	186
Sand (?), very fine to coarse, very light brown-gray, sub angular to some rounding, some polish...	186	187
Silt to siltstone, coarse textured, very pale brown, very calcareous.....	187	199
Sand, fine to very coarse with some fine gravel, mostly quartz with some light greenish yellow feldspar, sub angular, a few limonite and bone fragments.....	199	209.5
Clay, grayish white, yellow tint, highly calcareous, much mottled brownish yellow below 210.....	209.5	217
Cretaceous System:		
Clay shale, medium gray, very calcareous.....	217	220
		Total Depth

2096
111.5
1985

*TEST HOLE 74-B-47
(Profile Line E-F)

LOCATION: 6 feet north and 86 feet east of the southwest corner of Sec. 31, T. 8 N., R. 14 W.
ELEVATION: 2110.8 feet (Instrument)
DEPTH TO WATER: 17 feet.
RECORD:

DESCRIPTION	DEPTH IN FEET FROM	TO
Quaternary System, 175 feet:		
Dune Sand, 2.5 feet:		
Soil: silty sand, very fine to fine with a little medium sand, dark brownish gray, moderate frosting.....	0	1
Sand, moderately silty, very fine to fine with some medium sand, light brown, moderate frosting.....	1	2
Sandy silt to silty sand, very fine with some fine sand, light yellowish brown.....	2	2.5
Post Iowan, 41.5 feet:		
Silt, moderately clayey to slightly sandy, very fine to fine sand, light buff to brown-gray, non-calcareous.....	2.5	4.5
Soil: silty clay, dark brown-gray.....	4.5	5
Sand, very fine to medium with a trace of coarse sand, very light brownish gray, moderate rounding and frosting; very fine to coarse with a trace of very coarse sand 8-10.....	5	10
Sand and gravel, fine sand to medium gravel, very light brownish gray with pinkish feldspars, some frosting and with some polish, poorly sorted about 30% gravel 10-15; 50% gravel 15-20.....	10	20
Sand, very fine to coarse with some very coarse sand to medium gravel, very light brownish gray with some pinkish feldspar, moderate rounding and frosting and with moderate polish, very poorly sorted; about 15-20% gravel 25-30; about 30% gravel 30-38; about 55% gravel 38-44 with a few silty clay granules, yellow-brown.....	20	44
Todd Valley formation (?), 26 feet:		
Sand and gravel, medium sand to medium gravel with a little coarse gravel, very light brownish gray, some pinkish feldspar with a few dark metamorphics, about 45-50% gravel; thin very sandy silt zones at 44, at 47 and from 49-50, very fine to fine sandy; very slight iron staining 60-70.....	44	70
Sappa formation, 7 feet:		
Soil: clayey to very sandy silt, very fine to coarse sand, very dark brown-gray.....	70	74

* Description of samples 180.5-280 feet from field log only.

74-B-47 (Cont'd)

Clay, silty to moderately sandy, very fine to coarse sand, yellow-brown, some darker mottling.....	74	75
Silt, moderately clayey to moderately sandy, very fine to fine with some medium sand, very light gray, some iron staining in upper part.....	75	77
Grand Island formation, 63 feet:		
Sand and gravel, fine sand to fine gravel, and with some medium gravel, very light brownish gray, mostly quartz.....	77	80
Gravel, fine to medium with some coarse gravel and coarse to very coarse sand, very light brownish gray, some pink feldspar and a few dark metamorphics; about 80% gravel 80-90; about 65-75% gravel 90-125, and about 85% gravel 125-140.....	80	140
Holdrege formation, 35 feet:		
Sand and gravel, coarse sand to medium gravel, very light brownish gray with a little pink feldspar and a few dark metamorphics, 50-70% gravel.....	140	175
Tertiary System, 90 feet:		
Silt, coarse textured, moderately clayey, very light buff-gray with yellow tint.....	175	185
Silt, slightly clayey to in part very fine sandy, medium brownish gray; more brownish 189.5-200.....	185	200
Sandy silt, very fine to fine sandy, very light brownish gray; medium brown-gray 211-224; occasional limy nodules 224-236.5.....	200	236.5
Clay, very light gray with much yellow staining, moderately to highly calcareous, some aragonite in part replaced by limonite; very light medium gray 245-255; blocky texture 255-265.....	236.5	265
Cretaceous System:		
Clay shale, dark gray to black, moderately calcareous 265-270 grading to slightly calcareous 275-280....	265	280
	Total Depth	

TEST HOLE 75-B-47
(Profile Line E-F)

LOCATION: 9 feet north and 93 feet east of the southwest corner of Sec. 18, T. 7 N., R. 14 W.
ELEVATION: 2162.6 feet (Instrument)
DEPTH TO WATER: 69.6 feet.
RECORD:

DESCRIPTION	DEPTH IN FEET FROM	TO
Quaternary System, 236 feet:		
Road fill: sandy silt, very fine with a little fine sand, brown with a little dark grayish brown.....	0	2.5
"Peorian" formation, 34 (4) feet:		
Soil: slightly clayey to slightly sandy (very fine sand) silt, dark brown-gray.....	2.5	4
Silt, moderately clayey, slightly very fine sandy, pale brown, non-calcareous.....	4	5
Silt, coarse textured, slightly clayey, very light buff gray to pale yellow, very slightly calcareous.....	5	8
Silt, coarse textured, very light buff-gray to pale yellow, slightly calcareous, a few small limy nodules.....	8	10
Same, very slightly calcareous, no limy nodules, slightly finer texture; slightly lighter in color below 15; non-calcareous below 20; a few small gastropods 25-30.....	10	30
Silt, fine to coarse textured, slightly clayey, buff-gray to very pale brown, non-calcareous.....	30	34
Todd Valley formation, 66 feet:		
Soil: moderately sandy silt, very fine to fine with a little medium to coarse sand, brown.....	34	36
Sand, very slightly silty, fine to coarse sand (much medium to coarse), brown, principally quartz, much rounding, moderate frosting in the coarser grains, much less frosting in medium sand grains, grains show some polish; not silty below 40, very light brownish gray; very slight iron staining; trace of very coarse sand below 45.....	36	57
Sand, very fine to coarse (much medium sand), very light buff-gray, principally quartz, trace of pink feldspar, a few white grains, much rounding and frosting; whitish gray below 60; much medium to coarse sand 60-65 with a trace of very coarse sand 65-80; much very fine to medium sand 70-80 with a thin buff gray very fine sandy silt at 80, slightly iron stained; fine to coarse sand 80-90 with a few iron stained grains 85-90; fine to very coarse sand with a little fine gravel 90-100.....	57	100

75-B-47 (Cont'd)

Loveland formation (?), 16 feet:		
Sand, very fine to medium with a little coarse sand, very light buff-gray, principally quartz sand, very little pink feldspar, much rounding and frosting, interval grades slightly coarser textured with a little very coarse sand 110-116.....	100	116
Grand Island formation, 52 feet:		
Sand and gravel, fine sand to medium gravel (30% gravel), light brownish gray, much pink feldspar, moderate rounding and frosting, some polish, slightly iron stained.....	116	120
Sand and gravel, medium sand to medium gravel (60-70% gravel), light brown-gray with much pink feldspar, grains show some polish.....	120	130
Sand and gravel, fine sand to medium gravel (50% gravel), very light brownish gray with much pink feldspar and a few dark metamorphics, grains with more polish than above; less pink feldspar and more quartz below 135.....	130	147
Sand, fine to very coarse with some fine to medium gravel, whitish gray, principally quartz with a little pink feldspar, grains exhibit much polish; less coarse sand and very little gravel below 150.....	147	156.5
Sand and gravel, fine sand to medium gravel (30-40% gravel), very light brownish gray, some pink feldspar and a few dark metamorphics.....	156.5	163.5
Silt, very light buff-gray with a yellow tint, some iron staining.....	163.5	164
Sand and gravel, fine sand to medium gravel, very light brownish gray, some pink feldspar.....	164	168
Fullerton formation, 2 feet:		
Sandy silt, very fine to fine sand, light gray, slight green tint.....	168	170
Holdrege formation, 66 feet:		
Sand, very fine to very coarse with a little fine and a trace of medium gravel, principally quartz, much polish.....	170	175
Sand and gravel, fine sand to fine gravel with a trade of medium gravel, very light brownish gray, very little pinkish; interval grades from about 25% gravel to 40% gravel, trace of yellow-brown sandy silt 190-196.....	175	196
Gravel (?), fine to medium with some medium to very coarse sand, light brownish gray with much pink feldspar, possibly sample too coarse, used hydraulic pressure to drill.....	196	200
Sand and gravel, fine sand to fine gravel with a little medium gravel, very light brownish gray, some pink feldspar and a few dark metamorphics, slight iron staining, 30-35% gravel, drilled with hydraulic pressure.....	200	223

75-B-47 (Cont'd)

Sand, very fine to medium with some coarse sand, whitish gray, mostly quartz, slight dark speckling, moderate rounding, high polish; no coarse sand below 230; with sandy silt layers, very light greenish gray about 232.5-233 and at 234.....	223	236
Tertiary System, 52 or 64 feet:		
Silt, very fine sandy, very light gray, moderately to very calcareous, a few thin shell and small bone (rodent?) fragments; very slightly sandy and moderately clayey below 240.5.....	236	245
Silt, coarse textured, slightly clayey, very pale brown, slightly to moderately calcareous; slightly very fine sandy, moderately calcareous 250-260; a little fine to medium sand, very calcareous below 260, moderately sandy 265-271....	247.5	271
Clay, whitish gray, some yellow-brown iron staining, very calcareous, occasional thin hard zones (ironstone and aragonite).....	271	288
Cretaceous System (?):		
Clay shale, medium gray, moderately calcareous, some slight brownish weathering.....	288	300
Cretaceous System:		
Clay shale, dark gray, non-calcareous.....	300	310
		Total Depth

*TEST HOLE 76-B-47
(Profile Line E-F)

LOCATION: 10 feet south and 163 feet west of the northeast corner of Sec. 1, T. 6 N., R. 15 W.
ELEVATION: 2160.2 feet (Instrument)
DEPTH TO WATER: Hole caved in at 66.9 feet.
RECORD:

DESCRIPTION	DEPTH IN FEET FROM	TO
Quaternary System, 231 feet:		
Road fill: clayey silt, and silt, dark and light brown-gray.....	0	0.5
"Peorian" formation, 25 feet:		
Soil: slightly clayey silt, dark brown-gray.....	0.5	2
Silty clay, light medium brown-gray.....	2	2.3
Silt, moderately clayey, light gray.....	2.3	3
Silt, slightly clayey, very light gray, buff tint, a few limonitic flecks, moderately calcareous.....	3	5
Silt, slightly to moderately clayey, very light buff-gray, slight yellow tint, a few limonitic flecks and nodules, non-calcareous.....	5	11
Clayey silt, very light buff-gray, very slight yellow tint, non-calcareous; less clayey with a few limonitic flecks below 13.....	11	22
Clayey silt, very light gray, slight buff tint; less clayey with a few limonitic flecks 23.5-25...	22	25
Todd Valley formation, 40 feet:		
Soil: very slightly clayey to moderately sandy silt, very fine to medium with a trace of coarse sand, light medium brown-gray; sandy silt to silty sand 30-33.....	25	33
Sandy silt to silty sand, very fine to medium sand, very light brownish gray.....	33	35
Sand, very fine to coarse with some very coarse sand, whitish gray, principally quartz, trace of pink feldspar, some white grains, much rounding, nearly complete frosting; very fine to coarse sand (much fine to medium sand) below 55, slightly less frosting; a thin light gray silty clay layer at 56.....	35	65
Loveland formation (?), 35.5 feet:		
Sand, very fine to medium with some coarse sand, very light gray, pale brown tint; weathered; much quartz with 10-20% pink feldspar, much rounding and frosting; very fine to coarse sand 80-90 with much iron staining 67-90; trace of very coarse sand 90-100.5 with a little iron staining, a thin sandy silt layer, very pale brown, pink tint in interval 90-95.....	65	100.5
Sappa formation, 17.5 feet:		
Silt, coarse textured, moderately very fine sandy, pale brown, grayish tint, trace of imbedded fine to medium sand; very sandy 110-118, very fine to fine with a little medium sand and with traces of coarse sand to fine gravel	100.5	118

* Description of samples 180-370 feet from field log only.

76-B-47 (Cont'd)

Grand Island formation, 30 feet:		
Sand and gravel, fine sand to medium gravel, light brownish gray, many dark metamorphics, some pink feldspar.....	118	130
Sand and gravel, fine sand to fine gravel with a little medium gravel, light brownish gray with many dark grains, some pink feldspar; a thin light bluish gray silt layer 133-133.2.....	130	135
Gravel, fine to medium with a little coarse gravel, some medium to very coarse sand, many dark grains, very little pink feldspar.....	135	148
Fullerton formation, 3.5 feet:		
Clayey silt, in part very fine sandy, very light greenish gray.....	148	151.5
Holdrege formation, 79.5 feet:		
Sand and gravel, medium sand to medium gravel, very light gray, much quartz, a few dark grains and pink feldspar.....	151.5	160
Same, much pink feldspar, very poorly sorted, very compact 165-170.....	160	170
Sand and gravel, fine sand to fine gravel with some medium gravel, light brownish gray, a few dark grains, much pink feldspar, very compact, drilled with hydraulic pressure 170-190 and 205-210.....	170	221
Sandy silt, very fine sandy, light bluish gray with a dark brownish gray zone in lower part.....	221	223.5
Sand, very fine to very coarse with some fine gravel, very light gray with pinkish and light green grains.....	223.5	231
Tertiary System, 115 feet:		
Silt, in part sandy, light bluish to greenish gray, slightly to moderately calcareous.....	231	233
Silt, slightly clayey to in part very fine sandy, very pale brownish gray, moderately calcareous, some thin hard nodular limy layers 233-235.....	233	240
Silt, slightly very fine sandy, very pale brownish gray, highly calcareous, a few rootlets 245-250.5.	240	250.5
Silt, slightly very fine sandy, light medium gray, moderately calcareous.....	250.5	270
Sandy silt, very fine to fine sandy, medium brownish gray, slightly calcareous; very light gray to light buff-gray below 273, some hard limy nodular fragments 273-280.....	270	307.5
Silt, very light brownish gray, moderately calcareous.	307.5	325
Sand, fine to coarse, light brownish gray with some light green grains and with rounded greenish silt grains and siliceous rootlet fragments.....	325	330
Sand and gravel, fine sand to fine gravel with a little medium gravel, light brown-gray with much greenish, much reworked material, silty clay granules, aragonite, limonitic and limy fragments; slightly coarser texture below 355.....	330	346

76-B-47 (Cont'd)

Cretaceous System:

Clay shale, dark gray, moderately calcareous, some slight yellowish brown weathered shale.....	346	348.5
Clay shale, light medium gray, highly calcareous.....	348.5	358.8
Clay shale, dark gray, slightly calcareous.....	358.8	370
		Total Depth

*TEST HOLE 77-B-47
(Profile Line E-F)

LOCATION: 10 feet north and 246 feet west of the southeast corner of Sec. 13, T. 6 N., R. 15 W.
ELEVATION: 2180.7 feet (Instrument)
DEPTH TO WATER: 103.3 feet.
RECORD:

DESCRIPTION	DEPTH IN FEET FROM	TO
Quaternary System, 134.5 feet:		
Road fill: very fine sandy silt, dark brown-gray....	0	3
"Peorian" formation, 29 feet:		
Silt, moderately clayey, light medium grayish brown, some imbedded very fine sand; light brown-gray, very slightly calcareous 4-6.5.....	3	6.5
Soil: slightly to moderately clayey silt, very dark brown-gray, very slightly calcareous.....	6.5	8
Silt, slightly clayey, very light gray, buff tint, non-calcareous; coarser textured silt 10-16.....	8	16
Silt, slightly clayey, very light gray, a few limonitic flecks and rootlets; coarser textured, slight yellow tint, many limonitic flecks 26.5-29.	16	29
Todd Valley formation, 40 feet:		
Sand, very fine to very coarse, whitish gray, principally quartz, trace of pink feldspar, much very fine to coarse below 45, less frosting below 55 with some clear grains (samples probably too coarse, mud was thickened because of water loss in "Peorian").....	29	69
Loveland formation, 43 feet:		
Silt, moderately sandy, very fine to fine with a little medium sand, very pale brown, red tint, a few limonitic flecks; very sandy 80-82.....	69	82
Sand, very fine to medium with a little coarse sand, whitish gray, much quartz, trace of pink feldspar, much rounding, moderate frosting, some clear grains; slightly more coarse sand 90-93.....	82	93
Sandy silt, very fine to medium sand, very light gray to very pale brownish gray, many limonitic flecks.....	93	98
Sand, very fine to medium with some coarse sand, whitish gray, principally quartz, trace of pink feldspar, much rounding, moderate frosting, some clear grains; very fine to coarse sand below 105; a little silty sand and a few limonitic nodules 105-110.....	98	112
Sappa formation, 19 feet:		
Silt, coarse textured, slightly very fine sandy, very light yellowish gray, some limonitic staining.....	112	118.5

* Description of samples 157-310 feet from field log only.

77-B-47 (Cont'd)

Sand, fine to very coarse, very light brownish gray, much quartz with a little pink feldspar, much rounding, moderate frosting	118.5	126.5
Soil (?): very slightly clayey to moderately sandy silt, very fine to fine with a little medium sand, medium brown-gray	126.5	131
Grand Island formation, 3.5 feet:		
Sand, very fine to coarse with some very coarse sand, very light brownish gray, much quartz with a little pink feldspar, moderate rounding and frosting	131	134.5
Tertiary System, 160 feet:		
Sandstone, silty to in part clayey, very fine to fine with a little medium sand, light grayish green, some marly zones and some dense hard limy nodular zones, white to in part with a green tint.	134.5	140
Sandy silt, very fine to fine sand, grayish white, very calcareous to marly, some consolidation, a few rootlets	140	144.5
Silty sandstone, very fine to fine with a little medium sand, grayish white, very calcareous, a few rootlets; less consolidation, slight green tint 151-157	144.5	157
Calcareous sandy siltstone, whitish gray, hard	157	159
Sandstone, very fine to fine sand, whitish gray, very calcareous	159	169
Silt, slightly very fine sandy, light green, non-calcareous	169	175
Sandy silt, very fine to fine sand, light grayish green; less sandy, finer texture 190-195	175	195
Silty sandstone, very fine to fine sand, light brownish green, some non-calcareous white rootlet material	195	200
Sandstone, very fine to fine sand, green, some non-calcareous rootlet material	200	222.5
Silt, slightly clayey interbedded with very sandy silt, fine to very coarse sand, olive gray	222.5	230
Sand, fine to very coarse, trace of gravel, very light gray, a thin light green clayey silt 237-238	230	240
Sand, very fine to medium with some coarse sand, very light gray, some grayish green rounded silt granules	240	255
Silt, slightly sandy to in part slightly clayey, light grayish green, a thin hard limy layer at 259	255	260
Silt, light grayish green, very slightly calcareous	260	267
Clay, whitish gray, very calcareous, a little aragonite, a thin yellow-brown barite (?) layer 269.5-269.9	267	270
Clay, very light gray with yellowish limonitic staining, moderately calcareous, blocky structure; some aragonite and limy granules; some light to medium gray clay below 280	270	294.5

77-B-47 (Cont'd)

Cretaceous System:

Clay shale, medium dark gray, moderately calcareous; dark gray 305-310..... 294.5 310

Total Depth

*TEST HOLE 78-B-47
(Profile Line E-F and J-K)

LOCATION: 6 feet south and 115 feet east of the northwest corner of Sec. 6, T. 5 N., R. 14 W.
ELEVATION: 2186.6 feet (Instrument)
DEPTH TO WATER: 120.9 feet.
RECORD:

DESCRIPTION	DEPTH IN FEET FROM	TO
Quaternary System, 289 feet:		
Road fill: silt, medium dark brown-gray.....	0	1
"Peorian" formation, 29.5(+) feet:		
Soil: slightly clayey silt, a little imbedded very fine to fine sand, medium grayish brown.....	1	5
Soil: slightly clayey silt, medium brown-gray, very slightly calcareous.....	5	6
Silt, very slightly clayey, light medium buff-gray, moderately calcareous, a few limy nodules and limonitic rootlets; light buff-gray, slight yellow tint 8-9.....	6	9
Silt, very light buff-gray, very slight yellow tint, moderately calcareous, a few limonitic flecks, a few small limy nodular rootlets 10-29.5; slightly finer texture, slightly calcareous, a few small gastropods 17-24.5; very slightly clayey 24.5-29.5.....	9	29.5
Todd Valley formation, 18.5 feet:		
Soil (?): moderately sandy silt, very fine to fine with a little medium sand, light brown-gray, non-calcareous.....	29.5	30
Sand, fine to coarse with a little very coarse sand (much medium to coarse sand), mostly quartz sand with some white grains, well rounded and frosted..	30	36
Sand, moderately silty, some sandy silt zones, very fine to fine with some medium and a little coarse sand, very light buff-gray.....	36	40
Sand, very fine to coarse, mostly quartz with some white grains, well rounded and frosted.....	40	48
Loveland formation (?), 7 feet:		
Soil: moderately sandy silt, very fine to fine with a little medium sand, medium grayish brown, a few limonitic flecks.....	48	50
Sandy silt and silty sand, interbedded, very fine to coarse sand, very light buff-gray, slight yellow tint, mostly quartz, a little pink feldspar.....	50	55
Loveland formation, 79 feet:		
Silt, slightly clayey to moderately sandy, very fine sand, light buff gray, slight brown to yellow tint.....	55	60
Same, very pale brown, yellow tint, a few limonitic flecks.....	60	65

* Description of samples 205-340 feet from field log only.

78-B-47 (Cont'd)

Same, very pale brownish yellow.....	65	70
Same, some fine with a trace of medium sand; pale brownish yellow 75-78.....	70	78
Silt, moderately clayey, mottled light gray and very pale brownish yellow, much yellow-brown limonitic flecking; moderately sandy 79.5-80.....	78	80
Sand, very fine to coarse, principally quartz, trace of pink feldspar, much rounding and frosting, a few clear grains; very fine to medium with a little coarse sand 85-98, less frosting; much iron staining 85-85.5.....	80	98
Silt, very sandy, very fine to medium, brownish yellow with a little light gray, highly iron stained.....	98	99.5
Sand, very fine to medium with a little coarse sand, whitish gray, slight brown tint, mostly quartz with a little pink feldspar; a few soft limonitic concretions 110-115, in part silty 120-125.....	99.5	134
Sappa formation, 8 feet:		
Silt, slightly clayey to slightly sandy (very fine with some fine sand), light grayish green; moderately calcareous with some white calcareous areas 137-142; more sandy 140-142.....	134	142
Grand Island formation, 15.5 feet:		
Sand, very fine to medium, mostly quartz, much rounding, mostly frosted.....	142	157.5
Fullerton formation, 15 feet:		
Silt, very sandy, very fine to fine sand, very light greenish gray.....	157.5	160
Silt, slightly clayey to very sandy (very fine sand); principally a fine to coarse silt 165-172.5; slight brown tint 170-172.5.....	160	172.5
Holdrege formation, 116.5 feet:		
Sand, very silty, very fine to medium sand with a little coarse sand to fine gravel, very light brownish gray, thin calcareous zone at top.....	172.5	179
Sand and gravel, coarse sand to medium gravel, quartz with many dark metamorphics, some pink feldspar; slightly finer texture 185-200, very compact.....	179	200
Same, medium sand to fine gravel with a little medium gravel, slightly coarser 215-220.....	200	220
Same, very little medium gravel, fewer dark grains, very compact, drilled with hydraulic pressure.....	220	243
Sand, fine to very coarse with some fine gravel, light brownish gray with many light greenish grains, some pink; a few very fine sandy silt layers 243-255, light green.....	243	267.5
Silt, very fine to fine sandy, yellowish gray to light green.....	267.5	269
Sand and gravel, fine sand to fine gravel with a little medium gravel, light brownish gray with some pink and greenish grains; very little gravel 280-289; used hydraulic pressure 285-289.....	269	289

78-B-47 (Cont'd)

Tertiary System, 42.5 feet:		
Silt, slightly clayey, reddish brown, blocky texture; some thin white limestone "layers," dark speckled 300-302.5.....	289	302.5
Sand, very fine to medium with some coarse sand; light brownish gray.....	302.5	310
Sand, fine to medium with a little coarse sand (much medium sand), very light brown; more coarse, a little very coarse sand 315-320 with a reworked zone of dark green clay 319.7-319.9....	310	320
Sand, fine to very coarse with some fine gravel, light brownish gray with much light greenish and a little pinkish, some green clay granules....	320	330.2
Clay, very light gray, some limonitic staining.....	330.2	331.5
Cretaceous System:		
Clay shale, dark gray, non-calcareous.....	331.5	335
Same, in part yellowish brown, grading from non- to slightly calcareous.....	335	337.5
Clay shale, medium gray, moderately calcareous.....	337.5	340
	Total Depth	

*TEST HOLE 79-B-47
(Profile Line E-F)

LOCATION: 11 feet south and 246 feet east of the northwest corner of Sec. 19, T. 5 N., R. 14 W.
ELEVATION: 2166.8 feet (Instrument)
DEPTH TO WATER: 119.2 feet
RECORD:

DESCRIPTION	DEPTH IN FEET FROM	TO
Quaternary System, 200.5 feet:		
"Peorian" formation, 20 feet:		
Soil: moderately clayey silt, grayish brown.....	0	0.8
Clayey silt, light gray, a few limonitic flecks, non-calcareous, moderately clayey 2-20; very light buff-gray, moderate limonitic flecking; very pale brownish gray 15.5-20.....	0.8	20
Todd Valley formation, 22.5 feet:		
Soil: moderately to very slightly sandy silt, very fine to fine sand, pale brown.....	20	21.5
Silty sand, very fine to fine, some medium sand, pale brownish gray, principally quartz sand; very light brownish gray, some coarse sand 25-42.5, moderately silty 25-30, slightly silty 30-35, very silty 35-42.5, a few limonitic nodules 30-42.5.....	21.5	42.5
Loveland formation, 21.5 feet:		
Silt, medium to very coarse grained, slightly very fine sandy, pinkish yellow, a few limonitic flecks, non-calcareous.....	42.5	47
Same, moderately clayey, very pale brown.....	47	50
Silt, slightly clayey, very pale brownish yellow with limonitic flecks and rootlets; very pale brown, more clayey, some imbedded very fine to fine sand 60-63.5.....	50	63.5
Sappa formation, 55 feet:		
Soil, silty to slightly sandy clay, medium brown, slight pink tint, some light brown-gray.....	63.5	65
Silt, clayey to sandy, principally very fine sand, light gray, slight green tint; less clayey with a yellowish to very pale brown tint 68.5-75.....	65	75
Silt, very fine sandy, some imbedded fine sand, very pale brownish yellow; moderately sandy, very fine to medium sand 80-82.5.....	75	82.5
Sand, very fine to medium, trace of coarse sand, much quartz, much rounding, moderate frosting.....	82.5	92.5
Sandy silt, very fine with some fine and a little medium sand, very light buff gray, a few limonitic flecks.....	92.5	98.5
Sand, slightly silty, very fine to fine with some medium sand, principally quartz.....	98.5	100

* Description of samples 200.5-330 feet from field log only.

79-B-47 (Cont'd)

Silt, coarse textured, moderately sandy, very fine with some fine sand, very light yellowish gray, a few limonitic flecks; very light buff-gray, much limonitic staining 105-118.5, less sandy 105-110, more sandy with some fine to medium sand 110-118.5, slightly clayey 116-118.5.....	100	118.5
Grand Island formation, 19.5 feet:		
Sand slightly silty, very fine to medium with a little coarse sand, mostly quartz, much frosting..	118.5	120
Sand, very fine to coarse, trace of very coarse, mostly quartz; some very coarse sand 125-130; finer textured, no very coarse sand 130-138.....	120	138
Fullerton formation, 32 feet:		
Silt, coarse textured, moderately sandy, very fine with some fine sand, very slight gray, slight yellow tint.....,	138	141
Same, principally a coarse textured silt, in part slightly clayey, whitish gray, pale yellow tint...	141	145
Silt, slightly clayey to very fine sandy, very light gray with much yellowish brown iron staining.....	145	150
Sandy silt, very fine to fine with some medium sand, very pale brownish yellow, much iron staining; pale brownish yellow 155-162 with some coarse sand; a little very coarse sand and fine gravel 160-162.....	150	162
Silt, slightly sandy, very fine to fine sand, very pale brown-gray.....	162	164.5
Silt, slightly clayey, interbedded light green-gray and very pale brown.....	164.5	170
Holdrege formation, 30.5 feet:		
Sand, very fine to medium with some coarse sand, very light brownish gray, some slight yellowish iron staining, grains show some weathering.....	170	178
Sand, fine to very coarse with considerable fine to medium gravel, light brownish gray, some pink feldspars.....	178	190
Sand and gravel, fine sand to fine, some medium gravel, light brownish gray with much pinkish feldspar, some weathered grains.....	190	200.5
Tertiary System, 110.5 feet:		
Silt, very fine sandy, grayish green.....	200.5	205
Silt, slightly sandy, very fine to fine sand, light grayish green; very pale brown 208-210 with thin hard limy layers at 208 and 209.....	205	210
Sand, in part silty, fine to coarse sand, light brownish gray.....	210	212.5
Silt, moderately clayey, very pale brown, thin gravel zone (?) 213.5-214.....	212.5	214
Silt, moderately clayey, buff-gray, slightly calcareous with thin limy layers 219-220.....	214	220
Clayey silt, pale brown, moderately calcareous, thin limy layers 221.5-222 and at 222.5; less clayey and slightly sandy 230-239.5.....	220	239.5

79-B-47 (Cont'd)

Silt, dark reddish brown with thin hard limy layer at 242.5	239.5	242.5
Silt, slightly clayey, pale brown, slightly calcareous; lighter color 245-250, highly calcareous 247-250	242.5	250
Silt, moderately sandy, pale brown, slightly calcareous with some soft whitish calcareous zones and with hard limy nodular layers at 256.5 and at 258	250	260
Sandy silt, very pale brown, highly calcareous, some consolidation, a few rootlets	260	266.5
Sandy silt, light greenish gray; clayey 266.5-267.5	266.5	270
Marl with interbedded sandy silt, white	270	273.5
Silt, very fine to fine sandy, light greenish gray	273.5	280
Sandy silt, very fine sandy, very light gray grading to light greenish gray, non-calcareous, slight consolidation	280	287
Sand, fine to coarse, light brown-gray, many greenish grains	287	290
Sand, fine to very coarse with fine gravel, light brownish gray with much light green, some green silty clay granules	290	300
Same, finer texture with a few grayish green silt layers	300	309
Silt, slightly sandy to slightly clayey, light greenish gray	309	311
Cretaceous System:		
Clay shale, dark gray to black, non-calcareous, occasional thin hard limonitic zones	311	330
		Total Depth

*TEST HOLE 80-B-47
(Profile Line E-F)

LOCATION: 17 feet south and 40 feet east of the northwest corner of Sec. 6, T. 4 N., R. 14 W.
ELEVATION: 2184.8 feet (Instrument)
DEPTH TO WATER: 161.4 feet.
RECORD:

DESCRIPTION	DEPTH IN FEET FROM	TO
Quaternary System, 228 feet:		
"Peorian" formation, 11 feet:		
Soil, silty sand, very fine to fine with some medium sand, medium brown-gray.....	0	0.5
Silt, very light buff-gray, coarse silt, trace of very fine sand, very slightly calcareous, gastropod fragment 0.5-5; slight brownish tint 7.5-11.....	0.5	11
Todd Valley formation, 46 feet:		
Sand, slightly silty, very fine to coarse sand, light yellowish brown, principally quartz sand, moderate rounding and frosting, some weathering and iron staining; well frosted 15-57 grading lighter in color; not silty 20-50; less coarse sand 25-40; very fine to medium sand 40-57.....	11	57
Loveland formation, 15.5 feet:		
Silt, very sandy, very fine with some fine and a little medium sand, light yellowish brown.....	57	60
Same, slightly more medium sand, reddish brown; slightly more sandy 68-70; some medium, a little coarse with a trace of very coarse sand, yellow tint 70-72.5.....	60	72.5
Sappa formation, 77 feet:		
Silt, very fine sandy, pale yellow-brown, reddish tint; a little fine, trace of medium sand 75-80; slightly clayey 78-80; drilled more slowly from 72.5, still more slowly 78-80.....	72.5	80
Sandy silt, very fine to fine with some medium sand, brownish yellow; slightly to moderately calcareous 85-92, a few limy nodules.....	80	92
Sand, very fine to medium, very pale brownish gray, slight yellow tint, quartz sand with slight dark speckling, moderate frosting and rounding; whitish gray 105-118.5.....	92	118.5
Silt, clayey to moderately sandy, very fine to medium sand, light gray, slight green tint, occasional limonitic flecks.....	118.5	120
Silt, slightly clayey to coarse textured, slightly very fine sandy, light gray, a few limonitic flecks; more sandy 125-145.5; slightly more iron staining 130-145.5.....	120	145.5
Same, moderately sandy, very fine to fine with some medium sand, trace of coarse sand.....	145.5	149.5

* Description of samples 228-350 feet from field log only.

80-B-47 (Cont'd)

Grand Island formation, 66.5 feet:		
Sand, fine to coarse, principally quartz sand, much rounding and frosting, many yellow iron stained grains	149.5	156
Sand, fine to coarse with a little very coarse sand and fine gravel, principally quartz with some pink feldspar in larger grain sizes, much frosting.	156	160
Sand and gravel, fine sand to fine gravel (25% gravel), much quartz, some light colored and pink feldspars, trace of dark metamorphics, much frosting, some polish; slightly finer texture 165-170	160	170
Same, medium sand to fine, some medium gravel, much very coarse sand (40% gravel), slight iron staining	170	180
Sand, fine to very coarse, a little gravel, quartz, some feldspar, a few metamorphics, moderate iron staining; weathered (?), some crumbly grains	180	184
Sand and gravel, medium sand to fine, some medium gravel (25-40% gravel), quartz and pink feldspars, slight iron staining, some polish, slight evidence of weathering 184-187; a few metamorphics 197-216; less gravel 210-216	184	216
Holdrege formation, 12 feet:		
Sand, fine to coarse with scattered very coarse sand and gravel, mostly quartz, moderate frosting; slightly more gravel 220-225	216	225
Sand, very fine to medium with some coarse sand, mostly quartz, much frosting	225	228
Tertiary System, 112.5 feet:		
Silt, light brownish gray, slightly calcareous, hard limy zone 229.5-229.8	228	230
Same, slightly clayey with sand zones 232.5-233, 245.5-245, and 236.5-238.5, thin hard limy layer at 239	230	240
Silt, brown, slightly calcareous; moderately clayey and lighter in color 246-249 with hard limestone layers intermittently 237-239, 250-251.7 and 252.5-253; moderately calcareous 249-259.5	240	259.5
Clayey silt, medium gray, moderately calcareous with light gray highly calcareous zones 265-276	259.5	276
Silt, light brown-gray, highly calcareous with occasional slightly sandy limy layers	276	280
Clayey silt, light brown-gray, moderately to highly calcareous	280	290
Same, medium gray, brown tint, non-calcareous	290	297
Silt, slightly sandy, light brownish gray, slightly to moderately calcareous; slightly calcareous 300-316; thin sand and fine gravelly zone 312.5-313	297	316
Sand, very light brownish gray, very fine to medium sand	316	320

80-B-47 (Cont'd)

Silt (?), with impure limy beds, soft, some rootlets.....	320	327
Silt (?), very light gray with thin hard zone 327-327.1.....	327	330.5
Sand, fine to very coarse, very light gray, much light greenish, many sub angular grains.....	330.5	340.5
Cretaceous System:		
Clay shale, black, non-calcareous, very thin hard limonitic zone at 346.5.....	340.5	350 Total Depth

TEST HOLE 81-B-47
(Profile Line E-F)

LOCATION: 9 feet north and 50 feet west of the southeast corner of Sec. 13, T. 4 N., R. 15 W.
ELEVATION: 2139.2 feet (Instrument)
DEPTH TO WATER: 133.2 feet.
RECORD:

DESCRIPTION	DEPTH IN FEET FROM	TO
Quaternary System, 186.5 feet:		
Dune Sand, 4.5 feet:		
Sand, very fine to medium with some coarse sand, slightly silty, medium brownish gray; light buff gray, brown tint 2-2.5.....	0	2.5
Same, very fine to coarse sand, light buff-gray, much rounding and frosting.....	2.5	4.5
"Peorian" formation, 2.5 feet:		
Silt, slightly to moderately sandy, very fine with some fine and medium sand, light buff-gray, very slightly calcareous.....	4.5	7
Todd Valley formation, 11.5 feet:		
Sand, very slightly silty, very fine to medium with some coarse sand, very pale brownish gray, much rounding and frosting; lighter in color 10-18.5.....	7	18.5
Loveland formation, 42.5 feet:		
Soil: silt, slightly clayey to moderately sandy, very fine to fine with some medium sand, medium dark brown-gray, very slight reddish tint, very slightly calcareous.....	18.5	22.5
Sand, slightly silty, very fine to medium with a little coarse sand, very pale brown, much rounding and frosting.....	22.5	24
Sand, very fine to medium, much fine sand, very pale brownish gray, occasional thin silty layers; a little coarse sand 30-32.....	24	32
Sandy silt, very fine with some fine sand, reddish brown, yellow tint, very slight iron staining, very slightly calcareous.....	32	40
Sandy silt to silty sand, very fine to medium sand, light reddish brown, pink tint; very fine to medium with some coarse sand 50-58.....	45	58
Silt, slightly sandy, very fine to some fine with a little medium sand, light reddish brown.....	58	61
Sappa formation, 43.5 feet:		
Soil: slightly clayey to moderately sandy silt, very fine to medium sand, medium gray, brown tint.	61	63.5
Silt, moderately clayey to slightly sandy, light gray, slight olive to light brown tint, slightly calcareous; less clayey 65-70; very fine to medium sand 70-72.....	63.5	72

81-B-47 (Cont'd)

Silt, slightly to moderately sandy, very fine with a little fine to medium sand, very pale brown, gray tint, some limonitic flecking; moderately sandy, very fine to medium sand 80-85; very light buff gray 85-88.....	72	88
Sand, very fine to medium with some coarse sand, whitish to very light buff gray, principally quartz, moderate rounding and frosting.....	88	102.5
Silt, moderately to very sandy, fine to medium with some coarse sand, very light buff gray.....	102.5	104.5
Grand Island formation, 55.5 feet or (+):		
Sand, very fine to coarse, very light buff-gray, principally quartz, moderate rounding and frosting.	104.5	109.5
Silt, moderately to very sandy, fine to coarse sand, scattered very coarse sand and gravel grains, very light buff-gray, slight limonitic staining.....	109.5	111
Sand, very fine to very coarse with some fine gravel, light buff gray, a little pink feldspar; a thin clayey to sandy silt layer, whitish gray, slightly limonitic staining, about 120.....	111	120
Sand and gravel, fine sand to fine gravel with some medium gravel, light brownish gray, some pinkish, slight iron staining, about 40% gravel...	120	140
Same, moderate iron staining, 50 to 70% gravel; thin silt layer 147-148, light yellowish gray.....	140	160
Grand Island formation (?), 15 feet:		
Sand, fine to very coarse with some fine to medium gravel, light brownish gray, 10-20% gravel, a few silty clay granules 160-165.....	160	175
Fullerton formation (?), 8 feet:		
Sandy silt, very fine with some fine and a little medium sand, very pale brown, slightly calcareous, hard limy nodule at 182.....	175	183
Holdrege formation (?), 3.5 feet:		
Sand and gravel, fine sand to fine gravel with some medium gravel, light brownish gray.....	183	186.5
Tertiary System, 66.5 feet:		
Silt, very slightly sandy, pale to very pale brown, moderately to very calcareous, occasional hard limy nodular zones.....	186.5	211
Sandstone, silty and marly, very fine to fine with some medium sand, white, well consolidated, in part siliceous cementation.....	211	217
Silt, slightly to moderately sandy, very fine to fine sand, white, very calcareous, well consolidated.....	217	219
Sand, very fine to medium, whitish gray, principally quartz.....	219	222.5
Sand, very fine to fine with a little medium sand, very light buff-gray; sandy silt layer 235-237.5, very light gray, slightly calcareous.....	232	247

81-B-47 (Cont'd)

Clay, light gray with some medium gray and a few medium dark gray fragments, slight iron staining, non-calcareous.....	247	253
Cretaceous System:		
Clay shale, dark gray, non-calcareous; slightly calcareous 260-270, a few ironstone fragments; trace of bentonitic clay 260-265.....	253	270
	Total Depth	

*TEST HOLE 82-B-47
(Profile Line E-F)

LOCATION: 58 feet north and 51 feet west of the southeast corner of Sec. 36, T. 4 N., R. 15 W.
ELEVATION: 2126.96 (Instrument)
DEPTH TO WATER: Hole caved in at 156.3 feet.
RECORD:

DESCRIPTION	DEPTH IN FEET FROM	TO
Quaternary System, 194 feet:		
"Peorian" formation, 23.5 feet:		
Soil: slightly clayey to slightly sandy silt, medium brown-gray.....	0	0.5
Same, very sandy, very fine to medium with a little coarse sand.....	0.5	2
Soil: silt, medium brown-gray.....	2	3
Silt, slightly clayey, light medium brown-gray; slightly lighter in color, buff tint, very slightly calcareous 4-5.....	3	5
Silt, coarse textured, very light buff-gray, slight yellow tint, very slightly calcareous; slightly lighter color 10-20; slightly coarser texture 15-20.....	5	20
Same, finer texture, very slightly clayey.....	20	23.5
Todd Valley formation, 10.5 feet:		
Soil: moderately sandy silt, very fine to medium sand, light medium brown-gray; very sandy 25.5-30.....	23.5	30
Sand, slightly silty, very fine to fine sand, yellowish brown, highly iron stained.....	30	34
Loveland formation, 26 feet:		
Soil: moderately sandy silt, very fine sand, medium gray, slight brown tint.....	34	39.5
Sand, very silty, very fine to medium with a little coarse sand, light reddish brown; less silty, very fine to coarse sand, 45-47.....	39.5	47
Silt, very sandy, very fine to medium with some coarse sand, light reddish brown.....	47	50
Sand, in part silty, very fine to coarse sand, very pale brown.....	50	56
Same, moderately silty, very fine to medium with a little coarse sand.....	56	60
Sappa formation, 42.5 feet:		
Silt, moderately sandy, very fine to medium sand, reddish brown; a little coarse sand 67-73.5; very sandy 67-70.....	60	73.5
Clayey to slightly sandy silt, very light gray; less clayey, slightly more sandy 75-80.....	73.5	80
Silt, moderately to very sandy, very fine to fine with some medium sand, very light gray.....	80	83
Sand, very fine to medium with a little coarse sand, very light buff-gray.....	83	90.5

* Description of samples 130-270 feet from field log only.

82-B-47 (Cont'd)

Silt, very sandy, very fine to fine a little medium sand, very light buff-gray; moderately sandy, very fine to fine sand, 95-99.....	90.5	99
Sand, moderately silty, very fine to fine with some medium sand, very light buff gray.....	99	101
Silt, very sandy, very fine to fine, some coarser grains, very light gray, in part with a pale brown tint.....	101	102.5
Grand Island formation, 91.5 feet:		
Sand, very fine to coarse, scattered very coarse sand and fine gravel, very light brownish gray....	102.5	110
Same, some very coarse sand and fine gravel; a little medium gravel 115-120.....	110	120
Sand, fine to very coarse, some fine gravel, considerable coarse to very coarse sand, light brownish gray; a little medium gravel 125-130.....	120	130
Sand and gravel, medium sand to medium gravel, light brownish gray with some pink feldspar; slightly finer texture 140-150, drilled with hydraulic pressure 136-150, some iron staining and iron cement (?).....	130	150
Sand and gravel, fine sand to fine some medium gravel, light brownish gray with some pink feldspar, some iron staining, drilled with hydraulic pressure; slightly coarser 175-194.....	150	194
Tertiary System, 66.5 feet:		
Clayey silt, brown 194-195, very light brownish gray 195-209, principally non-calcareous with thin hard limy zones at 197.5, 200.5 and 201.5....	194	209
Sandy silt, white to very light brown-gray, in part very calcareous.....	209	215.5
Sand, fine to coarse, considerable medium sand, principally quartz sand.....	215.5	220
Sand, very fine to medium, very light brownish gray; some coarse sand 226-227, limonitic stained.....	220	227
Sand, very fine to medium, very light brownish gray, some interbedded silty zones.....	227	234
Sand, fine to very coarse with fine gravel, much quartz with much light green; thin light gray silt layers 237-240, and with very hard brownish green siliceous (?) clay layers at 237.5, 242-242.5 and 246-248, used hydraulic pressure.....	234	248
Silt, light gray, non-calcareous.....	248	249.5
Sand, fine to very coarse, some fine gravel, much quartz with much light green; thin silt layer 256.5-257.....	249.5	259
Silty clay, light yellowish gray grading into light gray.....	259	260.5
Cretaceous System:		
Clay shale, black, non-calcareous with a thin hard limonitic zone at 265.5 and a very calcareous slightly silty zone from 267-267.7.....	260.5	270
		Total Depth

*TEST HOLE 83-B-47
(Profile Line E-F)

LOCATION: 8 feet south and 104 feet west of the northeast corner of Sec. 24, T. 3 N., R. 15 W.
ELEVATION: 2123.1 feet (Instrument)
DEPTH TO WATER: 167.6 feet.
RECORD:

DESCRIPTION	DEPTH IN FEET FROM	TO
Quaternary System, 243.5 or 313 feet:		
"Peorian" formation, 8 feet:		
Soil: sandy silt, very fine to fine with some medium sand, medium dark brown-gray.....	0	2.5
Silt, slightly clayey to slightly sandy (very fine sand), light brown-gray, buff tint.....	2.5	4
Silt, very slightly sandy (very fine sand), very light buff-gray, moderately calcareous, a few small limy nodules; moderately sandy, slight brown tint 7-8.....	4	8
Todd Valley formation, 22 feet:		
Soil: very sandy silt, very fine to fine with a little medium sand, medium brown-gray, a few limy rootlets.....	8	10
Sand, very slightly silty, very fine to fine with a little medium sand, light brown, gray tint; a few sandy lime concretions and rootlets 20.5-26.5.	10	26.5
Sandy silt, very fine sandy, light buff-gray, some yellow-orange, limonitic staining.....	26.5	30
Loveland formation, 32 feet:		
Soil: slightly clayey to slightly sandy silt (very fine sandy), pale brown, gray tint, trace of limonitic staining.....	30	33.5
Silt, moderately sandy, very fine to fine with a little medium to coarse sand, reddish yellow with mottled pale brown, some limonitic staining; very sandy 35-38.....	33.5	38
Silty sand, very fine to coarse sand, a little coarse sand, light brown to reddish yellow, some dark iron-manganese concretions.....	38	39.5
Sand, very fine to coarse, light buff-gray with yellow tint, a little pink feldspar.....	39.5	48
Sandy silt to silty sand, very fine to coarse sand, light reddish brown; more sandy 50-57.....	48	57
Sand, fine to coarse, much medium sand, light buff-gray.....	57	62
Sappa formation, 58.5 feet:		
Sandy silt, very fine to fine sand, very pale brown..	62	65
Silt, moderately sandy, very fine with some fine sand, light buff-gray, very pale brown tint; some interbedded very sandy silt to silty sand (very fine to fine sand) 70-77.5.....	65	80

* Description of samples 125-330 feet from field log only.

83-B-47 (Cont'd)

Sandy silt, very fine to fine with a little medium sand, pale brown; more sandy 85-90; gray tint 85-95.5	80	95.5
Sand, very fine to medium, some coarse sand, light buff-gray	95.5	99
Silt, slightly clayey to very slightly sandy (very fine sand), very light brownish gray	99	103
Silt, very sandy, very fine to medium sand, pale brown, in part with a gray tint; more sandy with a little coarse sand 110-115 grading to a silty sand with some coarse and a little very coarse sand 115-120.5	103	120.5
Grand Island formation, 79.5 feet:		
Sand and gravel, fine sand to medium gravel, brownish gray with much pinkish feldspar, slight to moderate iron staining 120.5-150, 160-170 and 180-200; thin silt layer 185-190	120.5	200
Holdrege formation, 43.5 feet:		
Sand and gravel, fine sand to fine gravel, light brownish gray with much pinkish feldspar, drilled more slowly; a little medium gravel 205-210	200	210
Same, fine sand to medium gravel, several very hard zones, used hydraulic pressure 225-233; thin clayey silt, light gray 232.5-233; slightly coarser 233-243.5	210	243.5
Early Pleistocene (or) Tertiary, 69.5 feet:		
Clayey silt, light gray, non-calcareous; less clayey and with a few soft limy nodules 245-250, slight brown tint	243.5	250
Silt, very slightly clayey, very light brownish gray	250	259.5
Sand, fine to very coarse with fine gravel, brownish gray with pinkish feldspar	259.5	263
Silt, light brownish gray, moderately calcareous	263	270
Same, in part sandy and with some light greenish gray clayey silt	270	276
Silt, very fine sandy, pale brown with a thin hard limy zone at 276	276	280
Sand, fine to very coarse, light brownish gray, slightly silty	280	283
Silty sand, fine to very coarse, pale brown, in part calcareous	283	292
Sand, fine to coarse, light brownish gray with some pinkish feldspar	292	300
Same, some fine gravel with some silt and some rounded sandstone granules, light brownish gray with some pink feldspars; some medium gravel 305-313	300	313
Cretaceous System:		
Chalk, white to pale yellow	313	315.5
Chalky shale, light medium gray	315.5	330
	Total Depth	

TEST HOLE 84-B-47
(Profile Line B-F)

LOCATION: 8 feet south and 222 feet west of the northeast corner of Sec. 1, T. 2 N., R. 15 W.
ELEVATION: 2107.8 feet (Instrument)
DEPTH TO WATER: Hole caved in at 162.9 feet.
RECORD:

DESCRIPTION	DEPTH IN FEET FROM	TO
Quaternary System, 238.5 or 297.2 feet:		
"Peorian" formation, 14.8 feet:		
Soil: silt, very dark brown-gray; slightly clayey 1-2.5	0	2.5
Clayey silt, medium brown-gray; light brown-gray, buff tint 3-4.5	2.5	4.5
Silt, slightly clayey, light buff-gray	4.5	7.5
Silt, light buff-gray, a few limy nodules 7.5-10; slight brown tint 12-14.8	7.5	14.8
Loveland formation, 53.2 feet:		
Soil, moderately sandy silt, very fine to fine with some medium sand, medium reddish brown; very sandy, a little coarse sand 18-20	14.8	20
Sand, very slightly silty, very fine to coarse sand light brown, slight reddish tint; less coarse sand 25-33	20	33
Sandy silt, very fine to medium with a little coarse sand, reddish brown	33	34.5
Sand, very fine to coarse with trace of very coarse sand, light brown, slight reddish tint; slightly silty, gray tint 40-47.5	34.5	47.5
Sand, very fine to fine, trace of medium sand, light brown, gray tint; very fine to medium with a little coarse sand 53-66	47.5	68
Sappa formation, 37 feet:		
Silt, very sandy (very fine sand), light brownish gray, much yellowish limonitic staining; very slightly clayey 71-77.5; less sandy 75-77.5	68	77.5
Silt, moderately sandy (very fine sand), light gray, slight brown tint; light brown-gray with much yellow-brown limonitic staining 80-82	77.5	82
Sand, moderately silty, very fine to medium, some coarse sand, light medium brown-gray	82	83.5
Clayey silt, slightly sandy (very fine to medium sand), light reddish brown	83.5	85.5
Silty sand, very fine to coarse sand, medium reddish brown	85.5	87.5
Sandy silt, very fine to medium with some coarse sand, light reddish brown	87.5	89.5
Sand, very fine to medium with some coarse and with a trace of very coarse sand, very light brownish gray; slightly more coarse to very coarse sand 95-100	89.5	100

84-B-47 (Cont'd)

Sand, very fine to medium with a little coarse sand to fine gravel, very light brownish gray; silty 103.5-105	100	105
Island formation, 110 feet:		
Sand, very fine to coarse with a little very coarse sand and fine gravel, very light brownish gray; thin silt layer at 108; slightly finer texture 110-115.5, used hydraulic pressure to drill	105	115.5
Silt, very fine sandy, light brown-gray, yellow limonitic staining	115.5	116
Sand, very fine to coarse, some very coarse sand and fine gravel, light brownish gray with some pink feldspars, used hydraulic pressure	116	120
Sand and gravel, fine sand to medium gravel, brownish gray with much pinkish feldspar and a little iron staining, approximately 30% gravel	120	125
Same, 50-60% gravel, thin light greenish gray silt layer 127-127.5	125	130
Sand and gravel, medium sand to medium gravel (60-70% gravel), brownish gray, much pinkish feldspar and some iron staining; drilled with hydraulic pressure; slightly coarser 140-147.5	130	147.5
Clayey silt, light gray, slight yellow tint	147.5	150
Sand and gravel, medium sand to medium gravel, brownish gray with pink feldspar, a few dark grains, used hydraulic pressure entire interval, approximately 50% gravel to 190, 35-40% gravel to 215; thin silt layer at 206; some iron staining 206-215	150	215
Holdrege formation, 235 feet:		
Sand and gravel, fine sand to fine gravel (approximately 20% gravel), brownish gray with pinkish feldspar and some dark grains, slight iron staining, used some hydraulic pressure; 50% gravel 235-238.5	215	238.5
Early Pleistocene (or) Tertiary, 58.7 feet:		
Silt, clayey to slightly sandy, medium gray, brownish tint, a little iron staining in the upper part	238.5	240
Silt, slightly clayey to slightly sandy (very fine sand) light brown-gray, moderately calcareous; slight reddish tint in part, 247-251	240	251
Sand, medium to very coarse with some fine gravel, brownish gray with much pink feldspar	251	263
Silt, slightly clayey to in part moderately sandy, very fine to fine sandy, light medium brown-gray, slightly micaceous	253	258
Sand, very fine to coarse, light brownish gray	258	262.5
Silt, whitish gray, moderately calcareous; very light gray, slightly calcareous 268-272	262.5	272
Sand, fine to very coarse, trace of fine gravel, brownish gray with much pinkish feldspar; slightly coarser 275-280	272	280

84-B-47 (Cont'd)

Sand and gravel, medium sand to fine gravel with a little medium gravel, brownish gray, much pinkish feldspar.....	280	297.2
Cretaceous System:		
Chalk, light yellowish gray.....	297.2	299
Chalky shale, medium gray, some speckling; light medium gray 303-310.....	299	310
	Total Depth	

*TEST HOLE 85-B-47
(Profile Line E-F)

LOCATION: 16 feet north and 87 feet east of the southwest corner of Sec. 7, T. 2 N., R. 14 W.
ELEVATION: 2046.2 feet (Instrument)
DEPTH TO WATER: 107.0 feet.
RECORD:

DESCRIPTION	DEPTH IN FEET FROM	TO
Quaternary System, 180 feet:		
Loveland formation, 25 feet:		
Sandy silt to silty sand, very fine to coarse sand, medium reddish brown.....	0	0.5
Silt, slightly clayey to moderately sandy, very fine to fine with some medium sand, light reddish brown.....	0.5	4.5
Sandy silt to silty sand, very fine to medium with some coarse sand, medium reddish brown.....	4.5	6
Silt, slightly clayey to moderately sandy, very fine to fine with some medium sand, medium reddish brown.....	6	8
Sandy silt, very fine to fine with some medium sand, medium reddish brown.....	8	10
Sand, very slightly silty, very fine to coarse sand, very light reddish brown.....	10	18
Sandy silt, very fine to fine sand, light reddish brown.....	18	19.5
Silty sand, very fine to fine with some medium sand, light reddish brown.....	19.5	25
Sappa formation (?), 35 feet:		
Sandy silt, very fine to fine sandy, light reddish brown to reddish yellow; less sandy, very slightly clayey 28-30.....	25	30
Silt, slightly to moderately sandy, very fine sand, very light reddish brown to reddish yellow, a few limy nodules 35-50; only slightly sandy, some white limy areas 40-45; a little fine sand 45-50.....	30	50
Silt, moderately sandy, very fine to fine with a little medium sand, light reddish yellow, a few white limy areas; very fine to coarse sandy, some inbedded fine to medium gravel 55-60.....	50	60
Grand Island formation, 81 feet:		
Sand and gravel, fine sand to fine gravel, light brown-gray with much pinkish feldspar; some dark grains 65-70 with some iron staining.....	60	70
Sand and gravel, fine sand to medium gravel, brown-gray with much pinkish feldspar, some dark grains; a little coarse gravel 80-90; thin iron cemented zone at 106.....	70	106

* Description of samples 65-190 feet from field log only.

85-B-47 (Cont'd)

Sand and gravel, fine sand to medium gravel, light brown-gray with pinkish and yellow; slightly more sand 120-141; some consolidation 134.5-141, drilled with hydraulic pressure.....	106	141
Fullerton formation (?), 17 feet:		
Silty clay, very light greenish gray.....	141	143.5
Sand, fine to very coarse, some gravel (?), very light brownish gray.....	143.5	154.5
Clay, slightly silty, very light greenish gray, some darker gray mottling.....	154.5	158
Holdrege formation, 22 feet:		
Sand, fine to very coarse with some fine and a little medium gravel, light brown-gray with pinkish and some light greenish; slightly coarser with some cementation 163-180, used hydraulic pressure.....	158	180
Cretaceous System:		
Chalk, pale yellow to yellowish white.....	180	182.5
Chalky shale, medium gray 182.5-184, light medium gray with moderate white speckling 184-186; dark gray 186-190.....	182.5	190
	Total Depth	

RECORDS OF TEST HOLES ALONG PROFILE
LINE G-H, SEVEN MILES SOUTHWEST OF KEARNEY
TO FIVE MILES NORTHWEST OF HAPONEE; BASED
ON FIELD LOGS SUPPLEMENTED WITH MICROSCOPIC
EXAMINATION OF SAMPLES

*TEST HOLE 68-B-47

LOCATION: 20 feet south and 17 feet west of the northeast corner of Sec. 25, T. 8 N., R. 17 W.
ELEVATION: 2179.7 feet (Instrument)
DEPTH TO WATER: 6.5 feet.
RECORD:

DESCRIPTION	DEPTH IN FEET FROM	TO
Quaternary System, 52 feet:		
Post Todd Valley, 17 feet:		
Soil: silty sand, very fine to medium sand with some coarse sand and imbedded gravel grains, dark grayish brown; medium grayish brown 0.5-1.5..	0	1.5
Sand, fine to coarse with a trace of very coarse sand and fine gravel (much coarse sand), principally quartz, some frosting with a little polish..	1.5	3
Sand, fine to very coarse with some fine gravel and with a little medium and coarse gravel, much quartz and some pink feldspar, some frosting, much polish, a little iron staining.....	3	5
Sand, medium to very coarse with some fine gravel, much quartz with a little pink feldspar and dark metamorphics, much polish; about 30% gravel 10-17.....	5	17
Todd Valley formation (?),23 feet:		
Sand and gravel, medium sand to medium gravel, much quartz with some pink feldspar, much brownish black iron-manganese staining, 50-80% gravel; less iron staining below 25, much polish.....	17	40
Grand Island formation, 12 feet:		
Sand and gravel, medium sand to fine gravel with some medium gravel, much quartz sand with a little pink feldspar, much polish, 30-50% gravel.....	40	52
Tertiary System, 265.5 feet:		
Silt, slightly clayey to very fine sandy, yellowish brown, limonitic stained in upper part.....	52	54
Clayey silt, light greenish gray, highly calcareous 54-55.5, moderately calcareous 55.5-57.....	54	57
Silt, moderately clayey to very fine sandy, brown, slightly calcareous.....	57	60
Silt, slightly clayey to very fine sandy, light brown, moderately calcareous with intermittent hard limy nodular zones.....	60	65

* Description of samples from 52-330 feet from field log only.

68-B-47 (Cont'd)

Sandy siltstone, dark brownish tan; a thin clayey very fine sandy silt layer 68-70.....	65	74
Silty sandstone, very fine sand, light greenish gray, highly calcareous, many rootlets; non-calcareous below 80 but with thin hard limy zones 81-81.2, at 83 and at 85.....	74	88
Sandstone, very fine to fine sand, yellowish gray, highly calcareous, very hard zone 94.5-96.....	88	96
Silt and sandy silt, light greenish gray, in part calcareous and in part consolidated; more sandy below 105.....	96	108
Sandstone, fine textured, whitish to very pale brownish gray, very calcareous, some white non-calcareous rootlets; a thin reddish brown zone 114-115.....	108	119
Sandstone, very fine to medium sand, very light greenish gray, non-calcareous, a few rootlets; interbedded very pale brownish gray below 124.....	119	137.5
Sandstone, very fine to fine sand, whitish to very pale brownish gray, highly calcareous, a few rootlets.....	137.5	141
Sandy silt and sandstone, greenish gray and pale brown.....	141	143
Siltstone, light medium gray, highly calcareous.....	143	145
Silty sandstone, very fine to medium sand, light yellowish gray, highly calcareous, a few rootlets.	145	160
Sandstone, very fine to fine sand, light greenish gray; less consolidation and very fine to medium sand below 170.....	160	178
Silt, veryfine sandy, light gray; with a thin sandstone layer and a light gray silty clay layer in interval 180.5-184.....	178	184
Sand, very fine to medium with some coarse sand, very light brownish gray.....	184	190
Sandstone, very fine to fine sand, yellowish to very light brownish gray, highly calcareous, a few rootlets; Biorbia seed in interval 205-210..	190	220
Marl, interbedded with calcareous sandstone, white and light yellowish gray.....	220	226
Sandy silt, light greenish gray, some limy zones.....	226	230
Sandy silt to silty sand, very fine to medium sand, light brownish gray, slight green tint; some consolidation 238-262.5.....	230	273
Silty clay, very light greenish gray with some interbedded pale brown, non-calcareous; less clayey and some consolidation below 275.....	273	281.5
Silt, very fine to fine sandy, light greenish gray and some pale brown.....	281.5	288
Silty sand, veryfine to medium with some coarse sand, light greenish gray.....	288	292.5
Silt, clayey and in part very fine sandy, light greenish gray, non-calcareous.....	292.5	302

68-B-47 (Cont'd)

Silt, very fine sandy, light greenish gray; slightly clayey below 310.....	302	317.5
Cretaceous System:		
Clay shale, medium dark gray, slightly calcareous; soft black iron concretions at contact; moderately calcareous below 320.....	317.5	330
		Total Depth

TEST HOLE 10-31*
(Profile Line G-H)

LOCATION: NE 1/4 of SE 1/4, Sec. 1, T. 7 N., R. 17 W.
ELEVATION: 2183 feet.
DEPTH TO WATER: 19.4 feet.
RECORD:

DESCRIPTION	DEPTH IN FEET FROM	TO
Quaternary System, 85 feet:		
Todd Valley formation, 19 feet:		
Sand, very fine dune sand, gray, well rounded, frosted surfaces, mostly quartz.....	0	19
Todd Valley formation (?), 31 feet:		
Sand and gravel, granitic materials, coarse and fine, bedded; some gravel but mostly medium-textured sand.....	19	50
Grand Island formation, 23 feet:		
Gravel, clean, fine to fairly coarse.....	50	73
Holdrege formation, 12 feet:		
Gravel, clean, fine; contains some sand and fragments of "limy grit".....	73	80
Sand, gray, rounded, quartz.....	80	85
Tertiary System, 37 (+) feet:		
Clay, greenish gray; contains much silt and fine sand, limy grit fragments and slightly calcareous, soft (reworked Ogallala).....	85	105
Grit, calcareous, grayish green, friable, silty and sandy, leached of most of its calcium carbonate (Ogallala).....	105	122
	Total Depth	

* Sample description from Geological Survey Water-Supply Paper 779: Geology and Ground-Water Resources of South-Central Nebraska by Lugn, A. L. and Wenzel, L. K., Section on Character and Thickness of the Pleistocene Water-Bearing Materials in the Platte Valley by A. L. Lugn, p. 74. The classification was made by the writer of this report.

*TEST HOLE 39-B-47
(Profile Line G-H)

LOCATION: 91 feet south and 28 feet west of the northeast corner of Sec. 24, T. 7 N., R. 17 W.
ELEVATION: 2226.9 feet (Instrument)
DEPTH TO WATER: 60.9 feet.
RECORD:

DESCRIPTION	DEPTH IN FEET FROM	TO
Quaternary System, 141 feet:		
"Peorian" formation, 34 feet:		
Soil: slightly clayey to slightly sandy silt, very fine to fine sandy, dark brownish gray.....	0	1
Silt, light brownish gray, yellow tint, very slightly calcareous.....	1	2
Silt, light buff-gray, slightly to moderately calcareous, many gastropods; slightly calcareous and fewer gastropods below 15.....	2	20
Silt, buff-gray to pale yellowish brown, non-calcareous.....	20	26
Soil: slightly to moderately sandy silt, very fine to medium sandy, light medium brownish gray, yellow tint.....	26	27.5
Sand, slightly silty, very fine to coarse sand, light brownish gray.....	27.5	34
Todd Valley formation, 28 feet:		
Soil; sandy silt, very fine to medium sand, in part slightly clayey, medium grayish brown.....	34	38.5
Sand, very fine to medium with a little coarse sand, light brownish gray, principally quartz.....	38.5	40
Sand, fine to medium with a little very fine and coarse sand, principally quartz with a very little pink feldspar; very fine to medium with a little coarse sand 45-50.....	40	50
Sand, very fine to coarse with some very coarse sand, principally quartz with a little pink feldspar; slightly coarser texture 55-62.....	50	62
Sappa formation (?), 8.5 feet:		
Sand, silty to slightly clayey, very fine to medium sand with much imbedded coarse sand and fine gravel, light yellowish brown, some limonitic staining, very slightly calcareous.....	62	70.5
Grand Island formation, 49.5 feet:		
Sand, fine to very coarse with a little fine gravel, quartz and some pink feldspar, some iron staining; grades coarser textured with some medium gravel below 75.....	70.5	90
Sand and gravel, medium sand to medium gravel with a little coarse gravel, quartz with some pink feldspar; much gravel below 110.....	90	120

* Description of samples 75-360 feet from field log only.

39-B-47 (Cont'd)

Holdrege formation, 19 feet:		
Sand and gravel, medium sand to medium gravel, quartz and some feldspar, pink and light colored grains..	120	141
Tertiary System, 196 feet:		
Silt, slightly clayey to very fine sandy, light tannish gray, very slightly calcareous, thin dark grayish green layer at top, 141-142; thin calcareous zones at 148.5, 150-151 and at 177.5-177.6; less clayey below 155; a few rootlets 170-175 and many rootlets below 175.....	141	190
Silt, coarse textured to very fine sandy, pale brown, very slightly calcareous, some thin hard limy layers; moderately to highly calcareous 215-220.....	190	220
Silty sandstone, very fine to fine sand, pale brown 220-221, light greenish gray 221-222.....	220	222
Clayey silt, light grayish green; reddish brown, blocky texture 223-228, some dark speckled white limy nodular zones.....	222	228
Sandstone, fine textured, light brownish gray with a greenish tint, with some rootlets; in part calcareous 235-240; becoming silty and darker with thin limy zones 240-245.....	228	245
Silty clay, reddish brown, non-calcareous but with occasional thin limy layers; interbedded (?) with greenish gray clay below 264.5.....	245	288.5
Sandstone, fine textured, light yellowish to greenish gray, moderately calcareous.....	288.5	300
Sand to sandstone, very fine to medium sand, light greenish gray; finer textured below 310.....	300	320
Sand, fine to medium with a little coarse sand, light brownish gray with some light green; slightly coarser texture below 325 with some sandstone and bright green silt fragments near base.....	320	337
Cretaceous System:		
Clay shale, medium gray, moderately to highly calcareous; with a thin light gray limonitic stained clay at top; medium dark gray below 340 with thin limonitic zones at 347 and at 353...	337	360
		Total Depth

*TEST HOLE 40-B-47
(Profile Line G-H)

LOCATION: 98 feet north and 8 feet west of the southeast corner of Sec. 36, T. 7 N., R. 17 W.
ELEVATION: 2220.5 feet (Instrument)
DEPTH TO WATER: Hole caved in at 57.5 feet
RECORD:

DESCRIPTION	DEPTH IN FEET FROM	TO
Quaternary System, 132 feet:		
"Peorian" formation, 27 feet:		
Soil: silt, dark brownish gray.....	0	2
Silt, moderately clayey, medium grayish brown.....	2	3
Silt, very light buff-gray, moderately calcareous, a few small limy nodules.....	3	6
Silt, light buff-gray, very slightly calcareous, a few limonitic flecks.....	6	9
Silt, light brownish yellow with some mottled very light gray, much limonitic staining, slightly calcareous.....	9	13
Silt, very light buff-gray, very slightly calcareous; yellowish tint with some limonitic flecking 15-20, slightly calcareous.....	13	20
Silt, light buff-gray, non-calcareous.....	20	27
Todd Valley formation, 63 feet:		
Soil: slightly clayey silt, medium gray, moderately calcareous, a few small gastropods.....	27	31
Soil: slightly clayey to slightly sandy silt, very fine to medium sandy, medium dark grayish brown, moderately calcareous, a few small gastropods.....	31	33
Silt, slightly clayey to moderately sandy, very fine to fine with some medium sand, light brown with a slight yellow tint, slightly calcareous, a few small gastropod fragments.....	33	37.5
Sand, very fine to medium with some coarse sand, principally quartz; very fine to coarse with a trace of very coarse sand below 40.....	37.5	60
Sand, very fine to coarse, principally quartz; trace of light yellow gray silt 60-66.5; some very coarse sand 70-85; fine to very coarse sand 85-90, a little pinkish feldspar, little iron staining.....	60	90
Grand Island formation, 30 feet:		
Sand, very fine to coarse, much quartz, in part silty.....	90	94
Sand and gravel, medium sand to fine gravel with some medium gravel, quartz with some feldspar, some iron staining.....	94	100

* Description of samples, 132-340 feet from field log only.

40-B-47 (Cont'd)

Gravel, fine to medium with some coarse gravel and with some coarse to very coarse sand, brownish gray with quartz and some feldspar and a few dark grains; some coarse gravel below 105.....	100	120
Holdrege formation, 12 feet:		
Sand and gravel, medium sand to fine gravel with some medium gravel, quartz with some feldspars; slightly coarser texture below 126.....	120	132
Tertiary System, 193 feet:		
Silty sandstone, very fine sand, medium brownish gray.....	132	144
Sand, fine to very coarse with some fine gravel, light grayish green.....	144	152
Siltstone, white, very calcareous.....	152	154
Sand, very fine to fine with some medium sand, light brownish gray, some consolidation.....	154	162
Limestone, slightly sandy, whitish gray.....	162	164
Sandstone, very fine to fine with a little medium sand, brownish gray, a few rootlets 164-177.....	164	182
Silt, light brownish and whitish gray, interbedded...	182	184
Sandstone, fine textured, whitish to very light gray, in part with a greenish tint, some hard calcareous zones, some rootlets.....	184	224.5
Silty sand to sandy silt, light greenish gray, several hard thin limy zones.....	224.5	241.5
Clay and silty clay, reddish tan, blocky texture; interbedded with some greenish gray 245-250 and with some light gray slightly calcareous clay below 265; a few very thin hard limy nodules or layers 245-270.....	241.5	288
Silt to siltstone, light greenish gray.....	268	314.5
Clay, light gray, much yellowish weathering and limonitic staining, moderately calcareous.....	314.5	325
Cretaceous System:		
Clay shale, medium gray, moderately to highly calcareous, a few aragonite fragments; thin limonitic layers below 330.....	325	340
		Total Depth

*TEST HOLE 41-B-47
(Profile Line G-H)

LOCATION: 116 feet north and 10 feet west of the southeast corner of Sec. 13, T. 6 N., R. 17 W.
ELEVATION: 2216.6 feet (Instrument)
DEPTH TO WATER: Hole caved in at 65.2 feet.
RECORD:

DESCRIPTION	DEPTH IN FEET FROM	TO
Quaternary System; 174.5 feet:		
Road fill: slightly clayey silt, dark brownish gray.	0	1
"Peorian" formation, 30.5 feet:		
Soil: silt, very dark brownish gray.....	1	3.5
Silt, moderately clayey, medium grayish brown, very slightly calcareous.....	3.5	5
Silt, slightly clayey, light brownish gray with a few yellow limonitic flecks, moderately calcareous.	5	7.5
Silt, light buff to yellowish gray with a few limonitic flecks and soft nodules, moderately calcareous.....	7.5	10
Silt, very light buff-gray, moderately calcareous; many limonitic flecks and soft nodules 15-17.5; less calcareous below 20.....	10	27
Silt, very slightly clayey, very pale brown, non-calcareous; slightly darker 27-28.....	27	30.5
Todd Valley formation, 38 feet:		
Soil: slightly clayey silt, brown with a little dark grayish brown, non-calcareous; medium grayish brown with a yellowish tint 32-33.5, much imbedded fine to very coarse sand.....	30.5	33.5
Sandy silt, very fine to fine sandy, light brownish gray with a yellowish tint, very slightly calcareous.....	33.5	40
Sandy silt to silty sand, very fine to medium sand, light brownish gray with a slightly yellowish tint.....	40	45
Silty sand, very fine to coarse sand with a trace of very coarse sand, very pale yellowish brown.....	45	50
Sand, slightly silty, veryfine to medium with some coarse sand, very light brownish gray, principally quartz, much rounding and frosting; very fine to coarse with a little very coarse sand below 55; some silty zones 64.5-68.5.....	50	68.5
Sappa formation, 17 feet:		
Silt, slightly clayey to slightly sandy, very fine to fine sandy, very pale brown, very slightly calcareous.....	68.5	70
Silt, slightly clayey to very sandy, very fine to medium sandy, very pale brown; some imbedded coarse sand and gravel 75-80.....	70	80
Silt, very sandy, principally very fine to fine sandy, some imbedded coarser sand and fine to coarse gravel.....	80	85.5

* Description of samples 100-340 feet from field log only.

41-B-47 (Cont'd)

Grand Island formation, 52.5 feet:		
Sand and gravel, fine sand to fine gravel, brownish gray, some iron staining.....	85.5	90
Sand and gravel, fine sand to medium gravel, light brownish gray; much gravel with a little coarse gravel below 100, much pinkish; some iron staining and slightly finer texture below 130 with a yellowish brown clayey silt layer 137-138.....	90	138
Holdrege formation, 36.5 feet:		
Sand, fine to very coarse with a little fine to medium gravel, light brownish gray with a yellowish tint.....	138	150
Sand and gravel, medium sand to medium gravel with a little coarse gravel, light brownish gray with a yellowish tint.....	150	164
Sand, fine to coarse with some very coarse sand and fine gravel, light brownish gray.....	164	174.5
Tertiary System, 152.5 feet:		
Silt, slightly clayey, light brownish gray; more clayey and moderately calcareous 182-185 with a very few rootlets.....	174.5	185
Sandy silt, fine textured, light brownish gray.....	185	190
Silt, very fine sandy to clayey, brownish gray, thin limy nodular layers at 193.5 and at 196.5; more brownish 195-200.....	190	200
Silt, brownish gray, thin hard zones 200-200.5 and 209.8-210.....	200	210
Silt to siltstone, brownish gray, a few rootlets, with a thin limy layer at 214.5.....	210	215
Silt, coarse textured to very fine sandy, light greenish gray.....	215	220
Silt, brownish gray, slightly calcareous, thin limy layers at 220.5 and at 221; slightly sandy with a few rootlets 224-229.....	220	229
Sand, fine to very coarse and fine gravel, light brownish gray.....	229	235
Clay, light brownish tan with much white limestone, dark speckled.....	235	240.5
Clayey silt, light reddish tan, blocky texture, several thin hard limy layers; some greenish clay 255-260.....	240.5	260
Clayey silt, reddish brown; a soft brown sandstone layer 260-261, very fine to fine grained.....	260	269
Sandstone, very fine to medium grained, light brownish tan, poorly consolidated.....	269	276
Limestone, silty to sandy, white.....	276	278
Silt, slightly clayey to very fine sandy, light greenish gray, slightly calcareous; some hard limy zones 285-290.....	278	290
Clay, light gray, highly calcareous.....	290	292
Silt, very fine to fine sandy, light greenish gray, moderately calcareous with hard more calcareous zones 295-300.....	292	300

41-B-47 (Cont'd)

Silt, very fine sandy interbedded with clay, both light greenish gray and moderately calcareous.....	300	321.5
Silty sand, light greenish gray, slightly calcareous.	321.5	327
Cretaceous System:		
Clay shale, light medium gray, moderately calcareous; dark gray below 330.....	327	340
		Total Depth

*TEST HOLE 42-B-47
(Profile Lines G-K and J-K)

LOCATION: 22 feet south and 49 feet east of the northwest corner of Sec. 6, T. 5 N., R. 16 W.
ELEVATION: 2215.3 feet (Instrument)
DEPTH TO WATER: 75.3 feet.
RECORD:

DESCRIPTION	DEPTH IN FEET FROM	TO
Quaternary System, 168 feet:		
"Peorian" formation, 30 feet:		
Soil: silt, slightly very fine to fine sandy, dark brownish gray.....	0	1.5
Silt, moderately clayey to slightly very fine sandy, medium grayish brown.....	1.5	3
Silt, slightly clayey, light brownish gray, moderately calcareous.....	3	4
Silt, light buff-gray, moderately to very calcareous, a few limonitic flecks and soft limonitic nodules.	4	8
Silt, moderately clayey, light buff to yellowish gray with limonitic flecks and staining, moderately to very calcareous; finer textured, very light buff-gray with very little limonitic staining below 15, moderately calcareous.....	8	30
Todd Valley formation, 61 feet:		
Soil (?): clayey silt, light brownish gray, slightly to moderately calcareous; slightly sandy below 32.5.....	30	35
Sandy silt, very slightly clayey, very fine sandy with some fine sand, light gray with a slight brown tint.....	35	40
Sand, slightly silty, very fine to coarse sand, principally quartz sand, much rounding and frosting; a little silty clay 45-50 and 55-60; some very coarse sand below 55.....	40	60
Sand, very fine to coarse with a little very coarse sand, principally quartz, much rounding and frosting.....	60	75
Sand, very fine to medium grained, principally quartz, much rounding and frosting, light brownish gray; very slightly silty 75-80.....	75	91
Sappa formation, 13.5 feet:		
Sandy silt, very fine to fine sandy with some imbedded medium sand, light yellowish brown, some limonitic flecks; brownish yellow below 95, very slightly clayey; slightly more sandy below 101, moderately to very calcareous with much white calcareous mottling.....	91	104.5
Grand Island formation, 25.5 feet:		
Sand and gravel, medium sand to fine gravel with some medium gravel, light brown-gray, quartz with some pink feldspar, grades slightly coarser below 115, medium sand to medium gravel...	104.5	130

* Description of samples 150-280 from field log only.

42-B-47 (Cont'd)

Holdrege formation, 38 feet:		
Sand, medium to very coarse with fine gravel, brownish gray, slight yellowish tint.....	130	150
Sand and gravel, medium sand to medium gravel, brownish gray; a little coarse gravel 150-160.....	150	168
Tertiary System, 101 feet:		
Silt, slightly clayey, brownish tan with a reddish tint.....	168	177
Calcareous sandstone, fine textured, white.....	177	178
Silt, light greenish gray.....	178	180.5
Diatomaceous earth, white, in part limy and consolidated.....	180.5	183
Silt to siltstone, light greenish gray, a few rootlets; in part sandy 185-190 with a thin hard limy layer at 186.5.....	183	190
Silt, very fine sandy, light greenish gray, a little reddish tan; in part consolidated below 194.5.....	190	198
Silty sandstone, fine textured, light greenish gray.....	198	200
Silty sand, very fine to fine sand, light greenish gray; some consolidation below 205.....	200	210
Sandy siltstone, very fine to fine sandy, greenish gray; hard calcareous zone 222-222.5.....	210	226
Volcanic ash, silty to slightly sandy, light medium gray.....	226	228
Sandy silt, very fine to fine sand, light greenish gray, some consolidation.....	228	241
Calcareous sandstone, fine textured, whitish gray....	241	248
Silty sand, very fine to fine with a little medium sand, light greenish gray, moderately calcareous..	248	252.5
Clay, very light gray, much yellowish limonitic staining, moderately to highly calcareous, some limonite and limonitic replaced aragonite below 255.....	252.5	269
Cretaceous System:		
Clay shale, light medium gray grading into medium dark gray, moderately calcareous.....	269	280
		Total Depth

*TEST HOLE 43-B-47
(Profile Line G-H)

LOCATION: 15 feet south and 92 feet east of the northwest corner of Sec. 19, T. 5 N., R. 16 W.
ELEVATION: 2220.8 feet (Instrument)
DEPTH TO WATER: Hole caved in at 108.5 feet.
RECORD:

DESCRIPTION	DEPTH IN FEET FROM	TO
Quaternary System, 144 feet:		
"Peorian" formation, 26 feet:		
Soil: silt, slightly to moderately clayey, very dark brownish gray.....	0	2
Clayey silt, medium grayish brown, non-calcareous....	2	3
Silt, slightly to moderately clayey, buff-gray, very slightly calcareous, a few limonitic flecks and soft nodules.....	3	4.5
Silt, very light buff-gray, moderately calcareous; a few limonitic flecks and soft nodules 4.5-8 and a few limonitic rootlets 8-10; less calcareous below 10.....	4.5	21
Silt, slightly very fine to fine sandy, light brownish gray, non-calcareous; a darker soil (?) zone 21-22.....	21	26
Todd Valley formation, 32 feet:		
Soil: slightly clayey to moderately sandy silt, very fine to medium sandy, medium dark grayish brown, very slightly calcareous; very sandy with a little coarse sand 30-35, non-calcareous.....	26	35
Sand, very slightly silty, very fine to coarse sand, light brownish gray, mostly quartz, much rounding and frosting; a little very coarse sand 40-45, not silty; slightly finer texture and very slightly silty below 45.....	35	55
Sand, slightly silty, very fine to medium sand with a little coarse sand, very light brownish gray, mostly quartz with much frosting.....	55	58
Loveland formation, 10 feet:		
Silt, moderately clayey to very fine sandy, very light yellowish brown, non-calcareous, a few limonitic flecks.....	58	60
Sand, very slightly silty, very fine to medium with some coarse sand, principally quartz; some silty zones and with a little very coarse sand 65-68, in part iron stained.....	60	68
Sappa formation, 17 feet:		
Silt, slightly very fine to fine sandy, light brownish gray, some limonitic staining, non-calcareous.....	68	70
Sandy silt, very fine to medium sandy, light gray....	70	73

* Description of samples 115-350 feet from field log only.

43-B-47 (Cont'd)

Sand, very fine to medium with some coarse sand, light buff-gray, mostly quartz; very fine to coarse with a little very coarse sand below 75....	73	81.5
Sandy silt, grading to silty sand, very fine to fine with some medium sand, light yellowish gray, slight iron staining.....	81.5	85
Grand Island formation, 59 feet:		
Sand, very fine to medium with a little coarse sand, principally quartz; some coarse and trace of very coarse sand below 90; silty 86-89.5 and 93-95.....	85	95
Sand, fine to coarse with a trace of very coarse sand, principally quartz.....	95	100
Sand, very fine to medium with some coarse sand, principally quartz; scattered very coarse sand to gravel grains below 105.....	100	109
Sand and gravel, fine sand to fine gravel with a little medium gravel, light brownish gray with some pink feldspar and a few dark grains, some yellowish iron staining in upper few feet; fine sand to medium gravel below 115 and with a larger percentage of gravel below 130.....	109	144
Tertiary System, 134 feet:		
Clayey silt, light greenish gray, highly iron stained.....	144	145
Silt, moderately clayey, light brownish tan; slight reddish tint 150-155; interbedded light gray below 165; thin limy layer at 149 and 159-159.2.....	145	160
Silt, brownish tan, a few rootlets; thin limy zone at 165.5.....	160	170
Silt to siltstone, dark brownish tan, with a thin limy layer.....	170	174
Silt, brownish tan.....	174	180
Silty sand, fine textured, light greenish gray.....	180	184
Calcareous sandstone, white, fine textured.....	184	185
Silty sand, slightly clayey, light brownish gray; a soft limy layer 185-185.5 and with thin hard limy layers below 185.5.....	185	190
Silt, slightly clayey to slightly sandy, grayish brown.....	190	193.5
Sandy silt to silty sand, grayish brown.....	193.5	199
Sandy silt, whitish gray, in part with a greenish tint, moderately to highly calcareous with a thin hard layer 200-260.2.....	199	200
Silt, coarse textured to very fine sandy, grayish brown.....	200	207
Sand, slightly silty, very fine to medium with a little coarse and very coarse sand; grades slightly coarser to a very fine to very coarse sand below 220; with light greenish gray rounded silty clay granules below 215.....	207	229

43-B-47 (Cont'd)

Sand, very fine to medium grained, light brownish gray; some coarse to very coarse sand below 240...	229	253
Sand, medium to very coarse with fine gravel, light greenish gray with silty clay granules; more gravel below 261 and with a clayey silt 263-265, grayish brown.....	253	265
Siltstone, sandy, light brownish gray.....	265	268.5
Sand, medium to very coarse, greenish gray.....	268.5	276
Clay, light gray, some limonitic staining, highly calcareous.....	276	278
Cretaceous System:		
Clay shale, medium dark gray grading into dark gray, moderately calcareous, a little yellowish brown weathered shale.....	278	280
Clay shale, dark gray, moderately calcareous; some bentonite 280-285; a little aragonite and with thin hard limonitic zones 285-292.....	280	292
Clay shale, dark gray, non-calcareous; a little bentonite 292-295; in part slightly calcareous 315-320.....	292	341.5
Clay shale, light medium gray, highly calcareous.....	341.5	350
		Total Depth

*TEST HOLE 44-B-47
(Profile Line G-H)

LOCATION: 118 feet south and 6 feet west of the northeast corner of Sec. 1, T. 4 N., R. 17 W.
ELEVATION: 2263.14 feet (Instrument)
DEPTH TO WATER: 144.4 feet (?) (This water level seems to be about 30 feet too high in relationship to the adjacent holes)

RECORD:

DESCRIPTION	DEPTH IN FEET FROM	TO
Quaternary System, 201 feet:		
"Peorian" formation, 31.5 feet:		
Road fill and soil: silt, dark brownish gray.....	0	1.5
Silt, moderately clayey, light brownish gray.....	1.5	3.5
Silt, slightly to moderately clayey, buff to very pale brownish gray, slightly calcareous.....	3.5	6
Soil: moderately clayey silt, medium dark brownish gray, very slightly calcareous.....	6	7.5
Silt, moderately clayey, very pale brownish gray, very slightly calcareous; very light buff-gray with a yellowish tint 8-10, a few limy nodules....	7.5	10
Silt, very slightly clayey, very light buff-gray with a yellowish tint, non-calcareous; finer textured below 26, very pale brown tint.....	10	31.5
Todd Valley formation, 28.5 feet:		
Soil: moderately clayey to slightly sandy silt, very fine to medium sandy, pale brownish gray.....	31.5	34.5
Sand, slightly silty, very fine to medium with a little coarse sand, pale brownish gray, much rounding and frosting; slightly more coarse sand 40-45.....	34.5	45
Sand, slightly silty, very fine to fine with some medium sand, light gray with a pale brownish tint, much rounding and frosting.....	45	50
Loveland formation, 56 feet:		
Sandy silt, very fine to fine sandy, very pale brown.....	50	55
Silt, moderately sandy, very fine sandy, very pale brown.....	55	60
Silt, slightly clayey to moderately sandy, very fine sandy with imbedded fine to medium sand, very pale brown with a pinkish tint, a few limy nodules; very slightly sandy below 66 with many limy nodules.....	60	76.5
Sand, slightly silty, very fine to coarse sand, very light brownish gray, much rounding and frosting.....	76.5	84.5
Silt, slightly clayey to moderately sandy, very fine to fine sandy, very pale brown; very sandy 87-88 and light grayish brown, soil-like....	84.5	88

* Description of samples 201-360 feet from field log only.

44-B-47 (Cont'd)

Sand, slightly silty, very fine to coarse sand, pale brownish gray, much rounding and frosting; less coarse sand below 90	88	94.5
Sandy silt, very fine to fine sandy, very light gray with limonitic flecks; slightly clayey with some medium sand below 97, pale yellowish gray	94.5	102
Sand, moderately silty, very fine to medium sand, very pale brownish gray, much rounding and frosting	102	106
Sappa formation, 34 feet:		
Clayey to slightly sandy silt, very fine to fine sandy with some imbedded medium sand, very light gray with some limonitic staining	106	108
Sand, slightly silty, very fine to medium sand, very pale brownish gray, much rounding and frosting; some coarse sand below 110 with a little very coarse sand below 115	108	117
Silt, slightly clayey to very sandy, very fine to medium sandy with some coarse sand, very pale brownish gray with much brownish yellow iron staining	117	118.5
Silt, clayey to very fine sandy, very pale brown, some brownish yellow staining	118.5	120
Silt, moderately clayey, very pale brown with a yellowish tint; very slightly sandy (very fine to fine sand) below 125	120	129.5
Sandy silt, very fine to fine sandy with a little medium to coarse sand, pale brownish yellow; sandy silt to silty sand below 135, traces of very coarse sand and fine gravel	129.5	140
Grand Island formation, 61 feet:		
Sand, slightly silty, very fine to coarse sand with scattered very coarse sand and gravel grains, very light brownish gray; some very coarse sand and a little fine gravel below 145 and with a few rounded and flattened brownish yellow clay granules below 150; much very coarse sand and fine gravel below 155	140	162
Sand and gravel, medium sand to medium gravel, brownish gray with some pink feldspar, slight iron staining, about 50% gravel; about 30% gravel 170-175 and about 75% gravel 190-201	162	201
Tertiary System, 146 feet:		
Silty clay, yellowish brown, iron stained	201	202
Silty clay, brownish tan; thin hard limy layers at 205.5 and 211.5	202	217.5
Silt, greenish gray; some hard limy zones 220-222	217.5	222
Sand, fine to very coarse with some fine gravel, light brownish gray	222	238
Sandstone and siltstone, whitish gray with a little greenish gray, very calcareous; thin hard limestone layers at 238 and 240	238	249.5

44-B-47 (Cont'd)

Limestone, whitish to very light yellowish gray.....	249.5	252
Silt, whitish gray, very calcareous with thin hard limy zones.....	252	260
Silt, slightly clayey to very fine sandy, light greenish gray, several hard limy zones.....	260	281
Clay, silty to very fine sandy, light gray; thin limy zones at 282 and 283.5.....	281	295
Sand, fine to coarse, moderately calcareous.....	295	297
Sandy to silty limestone, very pale brown.....	297	302
Clay, silty to very fine sandy, light tannish brown, some interbedded impure limestone layers...	302	310
Silty clay, light brownish gray.....	310	326.5
Clay, light gray with some yellowish limonitic staining, moderately calcareous; grades to light medium gray below 330.....	326.5	347
Cretaceous System:		
Clay shale, dark gray, very slightly calcareous.....	347	360
		Total Depth

*TEST HOLE 45-B-47
(Profile Line G-H)

LOCATION: 121 feet south and 6 feet west of the northeast corner of Sec. 24, T. 4 N., R. 17 W.
ELEVATION: 2244.95 feet (Instrument)
DEPTH TO WATER: 179.7 feet.
RECORD:

DESCRIPTION	DEPTH IN FEET FROM	TO
Quaternary System, 198 feet:		
"Peorian" formation, 20 feet:		
Soil with some road fill; slightly clayey silt, dark brownish gray; clayey silt 2-2.5, medium dark brownish gray.....	0	2.5
Silt, moderately clayey, light medium brownish gray..	2.5	3
Silt, slightly clayey, light buff gray with a yellowish tint, slightly calcareous.....	3	4
Silt, light yellowish gray, moderately calcareous, a few gastropods; a few limonitic flecks below 7; less calcareous and some very coarse silt below 9.....	4	15
Silt, light yellowish gray with a slight pale brownish tint, non-calcareous, trace of imbedded very fine and fine sand.....	15	18.5
Silt, slightly sandy, very fine to fine sandy, very pale brown, non-calcareous.....	18.5	20
Todd Valley formation, 7.5 feet:		
Soil: slightly clayey to very sandy, very fine to fine sandy with some medium and a trace of coarse sand, brown.....	20	23
Sand, very fine to coarse (much medium sand), pale brownish gray, well rounded mostly frosted grains.....	23	27.5
Loveland formation, 65 feet:		
Sandy silt, very fine to fine sandy, very pale brown, non-calcareous; slightly clayey below 30, some medium and with a trace of coarse sand, pinkish yellow.....	27.5	37
Silt, slightly clayey to moderately sandy, very fine to fine sandy with a little medium sand, pinkish yellow with a gray tint, moderately to very calcareous with a few limy nodules; less sandy 37-40.....	37	40
Sandy silt to silty sand, very fine to fine with a little medium sand, very pale brownish yellow, moderately calcareous.....	40	43
Sand, moderately silty, very fine to medium with some coarse sand, pale brownish gray, well rounded and mostly frosted grains; more silty below 50, light brownish yellow.....	43	55

* Description of samples 200-340 feet from field log only.

45-B-47 (Cont'd)

Sand, very fine to medium with some coarse sand, very pale brownish gray with a yellowish tint, well rounded and mostly frosted grains; slightly silty 55-60; very light yellowish gray below 60; slightly coarser texture below 65..	55	70
Silt, moderately very fine sandy, very pale brown with a yellowish tint, non-calcareous; a little imbedded medium to coarse sand below 80.....	70	87
Sand, slightly silty, very fine to coarse with some very coarse sand, pale brownish gray.....	87	92.5
Sappa formation, 37.5 feet:		
Silt, slightly clayey to moderately sandy, very fine to fine sandy with a trace of medium sand, very pale brown with a few limonitic flecks, non-calcareous.....	92.5	98
Silty clay with some clayey to moderately sandy silt, very fine to fine sandy with some medium sand, very light gray with aslight greenish tint..	98	100
Clayey to sandy silt, very fine to fine sandy with some medium sand, very light gray with a slight brownish tint; very sandy below 106.5 with a little coarse sand.....	100	111
Sandy silt, very fine to fine sandy with some medium sand, very light gray with much brownish yellow limonitic staining; light brownish yellow below 115 with a few rusty limonitic flecks.....	111	120
Silty sand with some sandy silt, very fine to fine with some medium sand, light brownish yellow.....	120	130
Grand Island formation, 64 feet:		
Sand, very fine to coarse, pale brownish gray, much quartz, much rounding and frosting; very slightly silty below 135 with some very coarse sand and fine gravel; a few flattened and rounded brownish yellow clay granules below 140...	130	150
Sand and gravel, fine sand to fine gravel with some medium gravel, light brownish gray with some pink feldspar; 30-40% gravel 150-165; 20% gravel 165-175; 30 to 40% gravel below 175 with some yellowish iron staining.....	150	194
Holdrege formation (?), 4 feet:		
Sand, fine to coarse, principally quartz, drilled slowly.....	194	198
Tertiary System, 128 feet:		
Sandy silt, very fine to fine sandy, very light greenish gray with a hard calcareous consolidated zone 198-198.5.....	198	200
Sandy silt, very fine to fine sandy, very light greenish gray, highly calcareous, some consolidation.....	200	203
Sandy silt to silty sand, very fine to fine sand, light greenish gray, some thin hard limy layers...	203	210

45-B-47 (Cont'd)

Sandy silt, light greenish gray; light brownish gray below 215; very sandy below 220, some coarser sand	210	226
Sand, fine to very coarse with some fine gravel, much quarts with a few greenish grains	226	231
Clay, reddish tan with thin hard limy layers 231-231.2 and 236-236.5; grading sandy below 237	231	241
Sandstone, fine textured, light brownish gray, moderately calcareous; well consolidated and very calcareous 243-247	241	251
Clayey to sandy silt, very fine to fine sandy, light greenish gray	251	255
Silty sandstone, fine textured, light brownish tan, poorly consolidated	255	258
Sandy silt, fine textured, light greenish gray; less sandy below 263 with some calcareous zones below 267	258	270
Silty sand, very fine to fine with some medium sand, light greenish gray	270	280
Silt, slightly clayey to slightly sandy, light greenish gray	280	286
Sand, slightly silty, very fine to medium with a little coarse to very coarse sand, light brownish gray with a little light green	286	291
Silt, slightly clayey to very fine sandy, light brownish gray with a greenish tint	291	293
Sand, slightly silty, very fine to medium grained, light brownish gray	293	302
Silt, slightly clayey to very fine sandy, light greenish gray	302	306
Sand, fine to very coarse with some fine gravel, light brownish gray with some pink grains, some silty zones	306	310
Clay, silty to very fine sandy, very light greenish gray	310	320
Sand and gravel, fine sand to fine gravel with a very little medium gravel, light brownish gray with some pink and light green grains	320	323
Clay, whitish gray, slight limonitic staining, very calcareous	323	326
Cretaceous System:		
Clay shale, medium gray, very calcareous	326	335
Clay shale, medium dark gray, moderately calcareous	335	340
	Total Depth	

TEST HOLE 46-B-47
(Profile Line G-H)

LOCATION: 123 feet south and 8 feet west of the northeast corner of Sec. 1, T. 3 N., R. 17 W.
ELEVATION: 2268.3 feet (Instrument)
DEPTH TO WATER: Hole caved in at 226.5 feet.
RECORD:

DESCRIPTION	DEPTH IN FEET FROM	TO
Quaternary System, 269.5 feet:		
"Peorian" formation, 23 feet:		
Soil, silt, dark brownish gray	0	1
Silt, moderately clayey, light yellowish brown, non-calcareous	1	3
Silt, slightly clayey, light buff-gray, very slightly calcareous	3	5
Silt, light buff-gray, moderately calcareous, many limy nodular rootlets	5	7.5
Silt, light buff-gray, slightly calcareous, a few gastropods	7.5	17
Silt, very light buff-gray, moderately calcareous; slightly clayey 20-22 and less calcareous	17	22
Silt, slightly clayey, very pale brown, slightly calcareous	22	23
Loveland formation, 116.5 feet:		
Soil: slightly clayey to slightly sandy, very fine to medium sandy, dark brown, non-calcareous; moderately sandy below 25	23	30
Silt, moderately sandy, very fine sandy with some fine sand, light reddish yellow; a little medium sand below 35; very slightly clayey 40-43	30	43
Silt, very sandy, very fine to medium sand, yellow with a reddish tint; less sandy 45-50 with a trace of coarse sand; very pale brown 50-55	43	55
Sand, very silty, very fine to medium with a trace of coarse sand, very pale brown; a little siliceous rootlet material below 60	55	73
Silt, moderately to very sandy, very fine to fine sandy, yellow with a slight brown tint; very slightly clayey 77-80	73	80
Silt, very fine sandy, very pale brownish yellow; slightly reddish tint below 85; a little imbedded fine to medium sand below 90; moderately calcareous 95-100	80	100
Sandy silt, very fine to medium sandy, pale brownish yellow, moderately to very calcareous	100	106
Sand, very silty, very fine to medium with some coarse sand, pale brown	106	110
Sand, slightly silty, very fine to very coarse sand, very pale brownish gray; less silty below 120	110	127
Sand, slightly silty, very fine to coarse sand, very pale brownish gray	127	139.5

46-B-47 (Cont'd)

Sappa formation, 30.5 feet:		
Sandy silt, very fine to fine sandy with some medium sand, very pale brownish yellow; more yellowish below 145.....	139.5	155
Silty sand, very fine to medium with a little coarse and very coarse sand, pale brownish yellow.	155	170
Grand Island formation, 48 feet:		
Sand, slightly silty, very fine to medium with a trace of coarse sand, very pale brownish yellow; more silty 175-180 with scattered coarse sand to fine gravel grains, a few yellowish brown clay granules.....	170	180
Sand, slightly silty, very fine to medium with some coarse and a little very coarse sand, very light brownish gray, principally quartz; slightly coarser 185-189.....	180	189
Sand and gravel, fine sand to medium gravel, quartz with some pink feldspar and a few dark grains, about 50% gravel.....	189	200
Gravel, fine to medium with a little coarse gravel and with some coarse to very coarse sand, quartz with much pink feldspar and a few dark grains; some dark iron-manganese staining and slight cementation 210-218.....	200	218
Holdrege formation, 51.5 feet:		
Sand and gravel, fine sand to medium gravel, quartz with some pink feldspar, light brownish gray with a yellowish tint (weathered), some crumbly feldspathic grains, about 50% gravel, grades slightly coarser to 250; slightly finer texture below 250 (used hydraulic pressure to drill 218-269.5).....	218	269.5
Tertiary System (?), 10.5 feet:		
Silt, slightly clayey to slightly sandy, very fine sandy with rare coarser grains, brownish yellow, non-calcareous.....	269.5	275
Sand, slightly silty, very fine to coarse with some very coarse sand, very light brownish gray, a few rounded limy sandstone grains.....	275	280
Tertiary System, 67.5 feet:		
Sandstone, slightly silty, very fine to medium sand, very light brownish to whitish gray, moderately calcareous.....	280	284
Silty sandstone, very fine to fine with some medium sand, white, highly calcareous to in part marly.....	284	288
Sand, very fine to coarse with a little very coarse sand, very light brownish gray, principally quartz, some calcareous cementation, a few rounded, light brownish gray clay granules; no cementation below 300, more coarse sand.....	288	300

46-B-47 (Cont'd)

Sand, fine to coarse with some very coarse sand and fine gravel, much quartz, very little feldspathic material, some light greenish grains; much coarse sand to fine gravel below 310.....	300	335
Sand and gravel, medium sand to fine gravel with a very little medium gravel (much very coarse sand and fine gravel), much quartz with some pinkish feldspar and a few greenish and dark grains.....	335	344.5
Clay, light gray to yellowish gray, moderate limonitic staining, moderately calcareous.....	344.5	347.5
Cretaceous System:		
Clay shale, moderately silty, medium dark gray, moderately to very calcareous; medium gray below 355 with a thin dense ironstone layer at 357.....	347.5	360
		Total Depth

TEST HOLE 47-B-47
(Profile Line G-H)

LOCATION: 67 feet south and 168 feet west of the northeast corner of Sec. 24, T. 3 N., R. 17 W.
ELEVATION: 2145.99 feet (Instrument)
DEPTH TO WATER: Hole caved in at 122 feet.
RECORD:

DESCRIPTION	DEPTH IN FEET FROM	TO
Quaternary System, 198.5 feet:		
"Peorian" formation, 3 feet:		
Soil: moderately silty sand, very fine to medium sand, light yellowish brown.....	0	0.5
Soil: very sandy silt, very fine to fine sandy with some medium sand, medium grayish brown; slightly clayey 2-3 and dark brownish gray.....	0.5	3
Loveland formation (?), 10 feet:		
Sand, slightly silty, very fine to medium sand, light brownish gray, moderate rounding and frosting.....	3	5
Sand, very fine to coarse with rare very coarse sand, very pale brownish gray, moderate rounding and frosting; some large rusty iron cemented sand nodules 8-10.....	5	13
Loveland formation, 33 feet:		
Silt, very fine sandy, very pale brown with a yellowish tint, non-calcareous; less sandy 20-28; slightly clayey 25-28.....	13	28
Sandy silt, very fine to medium sandy, very pale brown with a yellowish tint.....	28	30
Sandy silt to silty sand, very fine to medium sand with a little coarse and a trace of very coarse sand, very pale brown.....	30	35
Sand, very silty, very fine to medium with a trace of coarse sand, very pale brownish yellow; more silty below 40.....	35	46
Sappa formation, 28.5 feet:		
Clay, whitish gray with a very slight greenish tint, in part silty and becoming slightly sandy in lower part, non-calcareous.....	46	49.5
Clay, silty to sandy, very fine to fine sandy with some medium and coarse sand, whitish gray with a slight greenish tint; grades to very sandy.....	49.5	54.5
Sand, very fine to medium with a little coarse sand, mostly quartz with some white grains, mostly rounded and frosted grains.....	54.5	64
Silt, slightly clayey to very sandy, very fine to fine sandy with some medium sand, very pale brownish gray, some limonitic staining.....	64	68
Clay, silty to in part moderately sandy, very fine to fine sandy with some imbedded coarser grains, very light greenish gray, in part very calcareous.	68	70

47-B-47 (Cont'd)

Silt, clayey to moderately sandy, very fine to fine sandy with some imbedded medium to coarse sand, whitish gray with a slight brownish tint, a few limonitic flecks, very calcareous.....	70	74.5
Grand Island formation, 65.5 feet:		
Sand and gravel, fine sand to medium gravel, much quartz with some pink feldspar, 50-70% gravel; a little coarse gravel 80-95.....	74.5	140
Holdrege formation, 58.5 feet:		
Sand and gravel, fine sand to fine gravel with a very little medium gravel, quartz with some pink feldspar, 25-30% gravel.....	140	160
Sand and gravel, medium sand to medium gravel, quartz with much pink feldspar, 70% gravel 160-170, 60% gravel 170-180 and about 50% gravel below 180.....	160	198.5
Tertiary System, 37.5 feet:		
Clayey silt, very light gray, some yellowish limonitic staining.....	198.5	199
Silty sand to sandy silt, very fine sand, brownish yellow; moderately calcareous below 207.....	199	207.5
Silt, moderately clayey to slightly very fine sandy, very pale brownish gray, moderately calcareous; yellowish tint below 210; not clayey 215-221 and moderately sandy, very fine to fine sand.....	207.5	221
Sand, fine to very coarse with fine gravel, much quartz.....	221	231
Clay, light yellowish brown and yellowish gray, slightly calcareous.....	231	236
Cretaceous System:		
Clay shale, dark gray, very calcareous; medium gray below 240.....	236	250
		Total Depth

TEST HOLE 48-B-47
(Profile Line G-H)

LOCATION: 6 feet south and 80 feet west of the northeast corner of Sec. 1, T.2 N., R. 17 W.
ELEVATION: 2129.52 feet (Instrument)
DEPTH TO WATER: 127.6 feet
RECORD:

DESCRIPTION	DEPTH IN FEET FROM	TO
Quaternary System, 256 feet:		
"Peorian" formation, 20 feet:		
Soil: very fine sandy silt, dark brownish gray.....	0	1
Silt, moderately clayey, light grayish brown, slightly calcareous.....	1	2
Silt, coarse textured, light buff-gray with a yellowish tint, slightly calcareous 2-5; moderately calcareous 5-8 with a few gastropods and limy rootlets.....	2	8
Silt, medium textured, light buff-gray with a yellowish tint, very slightly calcareous; slightly calcareous 10-15.....	8	20
Loveland formation, 43.5 feet:		
Soil: silt, very slightly clayey, some imbedded very fine to fine sand, medium brown, non-calcareous.....	20	24.5
Silt, very slightly clayey to slightly sandy, very fine to fine sand, very pale brown.....	24.5	28.5
Silt, moderately to very sandy, very fine to fine sandy with some medium and a very little coarse sand, very pale brown; more sandy 30-34 and very calcareous, some white limy areas.....	28.5	34
Silt, slightly sandy, very fine with a little fine sand, very pale brown, slightly calcareous; moderately sandy below 36.5 and moderately calcareous.....	34	42
Silt, moderately to very sandy, very fine to fine sandy with a little medium to coarse sand, very pale brown, slightly calcareous; less sandy and finer textured 44-50 with a few large dense white limy nodules.....	42	58
Silty sand to sandy silt, very fine to fine with a little medium to coarse sand, very pale brown slightly calcareous and with a few limy nodules; slightly coarser texture 60-63.5.....	58	63.5
Loveland formation (?), 12.5 feet:		
Sandy silt, very fine to medium sandy with some coarse and a little very coarse sand, very pale brownish gray, very calcareous, many white limy areas and in part marly; sandy silt to silty sand below 70, slightly coarser texture.....	63.5	76
Grand Island formation, 57.5 feet:		
Sand, very fine to coarse with rare very coarse sand, mostly quartz, much rounding and frosting...	76	80

48-B-47 (Cont'd)

Sand and gravel, medium sand to medium gravel, much quartz with some pink feldspar, about 70% gravel...	80	90
Sand and gravel, fine sand to medium gravel, much quartz with some pink feldspar, 25% gravel 90-95 grading to 45% gravel below 100 and 60-70% gravel below 110; a very sandy to slightly clayey silt layer 121-123, light brown, in part calcareous and with a thin silt layer 133-133.5.....	90	133.5
Holdrege formation, 122.5 feet:		
Sand, very fine to coarse with a little very coarse sand and fine gravel, principally quartz.....	133.5	146
Sand and gravel, coarse sand to medium gravel, quartz with some pink feldspar, about 50-60% gravel, grades slightly finer in texture.....	146	173
Clay, silty to very slightly sandy, brown, some iron staining at top.....	173	177
Sand and gravel, coarse sand to medium gravel, quartz with much pink and reddish feldspar, about 60% gravel.....	177	199.5
Silt, moderately sandy, principally very fine sand, light gray.....	199.5	201
Sand and gravel, medium sand to fine gravel with some medium gravel, quartz with much pink feldspar, slight weathering, 50% gravel 201-205 and 65% gravel 205-209.....	201	209
Clayey to slightly sandy silt, principally very fine sandy, light brownish gray with a slight reddish tint at top.....	209	211
Sand, fine to very coarse, some fine gravel, quartz with much feldspar.....	211	214
Silt, slightly sandy, very fine to medium sand, light gray with a slight brownish tint.....	214	220
Sand, slightly silty, fine to very coarse sand with a little fine gravel, quartz with some feldspar.....	220	230
Sand, very fine to medium with some coarse sand and a little very coarse sand, much quartz; silt layer 232.5-233.5; coarser texture below 233.5....	230	235
Sand and gravel, fine sand to fine gravel, quartz with some pink feldspar; less very coarse sand and fine gravel below 240.....	235	250
Sand and gravel, fine sand to medium gravel, quartz with much pink feldspar, 75% very coarse sand to medium gravel.....	250	256
Tertiary System, 16.5 feet:		
Sandy silt, very fine to fine sandy with some coarser grains, light brownish gray.....	256	260
Sand, very fine to very coarse, principally quartz, some light greenish yellow silicates, no pink feldspar, occasional limonitic granule, some very silty zones; some fine gravel 271-272.5.	260	272.5

48-B-47 (Cont'd)

Cretaceous System:		
Clay shale, very dark gray, non-calcareous.....	272.5	276
Clay shale, slightly silty, medium dark gray, moderately calcareous.....	276	280
Chalky silty shale, light medium gray, very calcareous, slight whitish speckling; moderate speckling below 285; slightly lighter in color below 290.....	280	300
	Total Depth	

TEST HOLE 49-B-47
(Profile Line G-H)

LOCATION: 9 feet south and approximately 1650 feet east of the northwest corner of Sec. 19, T. 2 N., R. 16 W.
ELEVATION: 1959.07 feet (Instrument)
DEPTH TO WATER: 8.95 feet.
RECORD:

DESCRIPTION	DEPTH IN FEET FROM	TO
Quaternary System, 38 feet:		
Late Pleistocene, 38 feet:		
Silty sand and gravel, fine sand to medium gravel, dark brownish gray.....	0	1
Sand and gravel, medium sand to medium gravel with a little coarse gravel, quartz with some feldspar, some rounding and high polish, about 35% gravel, poorly sorted.....	1	6
Sand, medium to very coarse with a little fine gravel, mostly quartz with some feldspar, some rounding and high polish.....	6	10
Gravel, fine to medium with some medium to very coarse sand, quartz with some feldspar, much pinkish and with a few grains of red quartz sandstone, moderate to high polish.....	10	15.5
Clay, light grayish green, some rounded grains, probably a clay pebbly zone.....	15.5	16.5
Gravel, fine to medium with some very fine to very coarse sand, very poorly sorted, quartz and feldspar (sand is nearly all quartz), some polish, common rounded silt and clay granules, whitish gray to light greenish gray.....	16.5	20
Sand, fine to very coarse with some fine to medium gravel, quartz with a little pink feldspar, many rounded clay granules.....	20	24.5
Sand and gravel, fine sand to fine gravel with some medium gravel, principally all light colored grains, quartz and feldspar with some light yellow and light green, some polish, many clay granules, whitish and light greenish gray; one large yellowish brown sandstone grain 24.5-30.....	24.5	38
Tertiary System, 2.5 feet:		
Clay, light medium gray, non-calcareous.....	38	40.5
Cretaceous System:		
Clay shale, very dark gray, slightly silty, non-calcareous; trace of aragonite and pyrite 50-55, a few brownish streaks.....	40.5	55
Clay shale, very dark gray, slightly silty, in part very slightly calcareous, several light bluish gray bentonitic clay layers.....	55	60
Clay shale, very dark gray, slightly silty, in part very slightly calcareous, a little aragonite.....	60	78

49-B-47 (Cont'd)

Clay shale, medium dark gray, very calcareous, no speckling.....	78	80
Chalky silty shale, medium gray, slight to moderate white speckling; more speckling and a little light and medium bluish gray bentonitic clay 85-90.....	80	90
Chalky silty shale, light and light medium gray, highly speckled, a little aragonite; very chalky below 105; a little light green pyritic clay 110-115.....	90	120
	Total Depth	

RECORDS OF TEST HOLES ALONG PROFILE LINE J-K, NINE MILES WEST OF HOLDREGE THROUGH AYR TO THREE MILES NORTHWEST OF FAIRFIELD; BASED ON FIELD LOGS SUPPLEMENTED BY MICROSCOPIC EXAMINATION OF SAMPLES

(Records of test holes 42-B-47, 78-B-47, 55-B-47, and 22-B-47 which appear along this profile line have been included with their respective north-south profile lines on the preceding pages.)

*TEST HOLE 29-B-48

LOCATION: 12 feet south and 60 feet east of the northwest corner of Sec. 1, T. 5 N., R. 20 W.
ELEVATION: 2436.6 feet (Altimeter)
DEPTH TO WATER: Hole caved in at 212.4 feet.
RECORD:

DESCRIPTION	DEPTH IN FEET FROM	TO
Quaternary System, 285 feet:		
"Peorian" formation, 27.5 feet:		
Soil: silt, very slightly sandy, very fine to fine sand, dark brownish gray.....	0	2
Silt, moderately clayey, dark grayish brown; medium grayish brown 3-3.5.....	2	3.5
Silt, very light buff-gray, fine textured silt, slightly to moderately calcareous, a few gastropods; very pale brownish yellow below 5 and moderately calcareous, many gastropods to 15 with a few 15-20 and more 20-25.....	3.5	25
Silt, slightly clayey, very pale brown, non-calcareous.....	25	27.5
Loveland formation, 99.5 feet:		
Soil: silt, brown, non-calcareous; moderately clayey 30-32.5 and grayish brown.....	27.5	32.5
Silt, coarse textured, moderately clayey with a little imbedded very fine and fine sand, light yellowish brown; very pale brown with a pinkish tint 35-40, slightly calcareous.....	32.5	40
Silt, fine to coarse textured , slightly clayey with a little imbedded very fine to fine sand, very pale brown, slightly to moderately calcareous with a few limy nodules; not clayey below 45 and moderately calcareous; slightly lighter color and very calcareous below 60.....	40	70
Sandy silt, very fine to fine sandy with a little medium sand, pale brown with a reddish tint, moderately calcareous.....	70	75
Sand, moderately silty, very fine to medium with a little coarse sand, pale brown, slightly calcareous, moderate rounding and much frosting; more silty 80-82.5.....	75	82.5

*Description of samples 350-475 feet from field log only.

29-B-48 (Cont'd)

Sand, fine to coarse with some very coarse sand, and with a little silt and very fine sand, principally quartz with a little pink feldspar, slight brownish weathered color, much rounding and nearly complete frosting.....	82.5	99
Sandy silt, very fine to coarse sandy, very pale brown, moderately calcareous.....	99	101.5
Sand, very fine to coarse, principally quartz, much rounding and moderate frosting with some polished grains.....	101.5	109
Silt, coarse textured, slightly very fine to fine sandy, pale brown, moderately calcareous, a few rootlets.....	109	112
Sand, very fine to medium with some coarse sand, much rounding and moderate frosting with many polished and clear grains.....	112	127
Sappa formation, 67 feet:		
Silt, coarse textured, slightly very fine to fine sandy, yellowish brown, very slightly calcareous..	127	130
Silt, very fine sandy, yellowish brown, very slightly calcareous; a few dense limy concretions 135-140.....	130	140
Silt, fine to coarse textured, pale brown with a yellowish tint, very slightly calcareous.....	140	142.5
Siltstone, slightly very fine sandy with a trace of fine sand, very light brownish gray, very calcareous, in part marly and well indurated; less sandy and slightly calcareous below 145.....	142.5	149
Silt, fine to coarse textured, pale brown, non-calcareous; slightly clayey 152.8-155 and below 165; yellowish tint below 155; slightly sandy below 175, very fine sandy 175-180 and very fine to medium sandy 180-185.....	149	185
Silt, moderately sandy, very fine to fine sand with some medium sand, very pale brown, in part very calcareous and indurated; more medium sand 190-194, pale brown and slightly calcareous, slight induration.....	185	194
Grand Island formation, 46 feet:		
Sand, very fine to very coarse sand with a little fine gravel, principally quartz with a little light colored and pink feldspar, some rounding and frosting with a few polished grains.....	194	200
Sand and gravel, medium sand to fine gravel with some medium gravel, quartz with some pink feldspars, (35% gravel).....	200	205
Sand, fine to very coarse with a little fine to medium gravel, quartz with some feldspar, some rounding and frosting with moderate polish, (15% gravel).....	205	210

29-B-48 (Cont'd)

Sand and gravel, medium sand to medium gravel, quartz and feldspar, some dark iron staining (50% gravel); no iron staining and much polish below 220.....	210	240
Holdrege formation (?), 45 feet:		
Sand, fine to very coarse with some fine gravel, much quartz, moderate rounding and frosting with a little polish; 15-20% gravel below 245.....	240	250
Sand and gravel, medium sand to medium gravel, quartz and feldspar, slight yellowish weathered color, 40% gravel to 255 with about 50-70% gravel below 255.....	250	285
Tertiary System, 190 (+) feet:		
Silt, slightly clayey, pale brown, moderately calcareous; grading sandy below 290, very fine to medium sandy, some white calcareous areas and some induration.....	285	297
Sand, fine to very coarse with a trace of fine gravel, much quartz with a little pink feldspar, much polish.....	297	300
Sandstone, very fine to medium with a little coarse sand, white, very calcareous with a few rootlets..	300	306
Sand, fine to very coarse, much quartz with some feldspar, some rounding, much polish; very little very coarse sand below 310.....	306	322
Marl, slightly very fine to fine sandy, white.....	322	323
Sandy silt to silty sand, very fine to fine with some medium sand, pale yellowish gray, in part calcareous.....	323	326
Sand, fine to very coarse with a little very coarse sand, much quartz, some rounding, high polish.....	326	331
Sandstone, very fine to fine with a little medium sand, whitish to pale yellowish gray, very calcareous.....	331	334
Silt, moderately sandy (very fine sand), whitish gray, in part marly.....	334	335
Silty sand to sandy silt, very fine to fine sand, pale yellow with a slight greenish tint, principally non-calcareous; consolidated below 342.5..	335	345
Sandstone, very fine to fine sand, in part silty and clayey, pale yellow with a greenish tint.....	345	350
Clayey silt, light brownish gray, non-calcareous; some brown mottling 354.5-360.5; light greenish gray below 360.5 and moderately to highly calcareous, occasional thin hard limy nodular zones; sandy below 365.....	350	370.5
Sand, fine to very coarse with a little fine gravel, mostly quartz with some pink and light green grains.....	370.5	376
Sandy silt, very light gray with a slight brownish tint, moderately calcareous, many limy nodular fragments, highly calcareous below 390.....	376	400

29-B-48 (Cont'd)

Clayey silt, brownish tan, moderately calcareous.....	400	410
Calcareous sandstone to sandy limestone, whitish gray with pinkish tint.....	410	416
Silt, slightly clayey to slightly sandy, light greenish gray, slightly calcareous; some pinkish limy layers below 420; very sandy below 426.....	416	430
Sandstone with some interbedded sandy silt, light greenish gray, non-calcareous.....	430	434
Clayey to slightly sandy silt, reddish brown, slightly calcareous.....	434	445
Sand, very fine to very coarse, light brownish gray; with fine gravel below 460.....	445	467
Slightly silty clay, very light gray, moderately to highly calcareous.....	467	471.5
Clay, very light gray with some yellowish limonitic staining, highly calcareous.....	471.5	475
	Total Depth	

TEST HOLE 26-A-48
(Profile Line J-K)

LOCATION: 120 feet south of and 14 feet east of the northwest corner of Sec. 3, T. 5 N., R. 18 W.
ELEVATION: 2305.97 feet (Instrument)
DEPTH TO WATER: 129.3 feet.
RECORD:

DESCRIPTION	DEPTH IN FEET FROM	TO
Quaternary System, 184 feet:		
"Pecrian" formation, 27 feet:		
Soil: moderately clayey silt, dark brownish gray; slightly lighter in color 2-2.5.....	0	2.5
Silt, slightly clayey, light brownish gray, slightly calcareous with a few limy nodules.....	2.5	4.5
Silt, coarse textured, very pale yellowish gray, slightly calcareous, a few limonitic flecks, a few gastropods; less yellowish below 10 and non-calcareous below 15.....	4.5	20
Silt, fine to coarse textured, very light buff-gray with a yellowish tint, slightly calcareous,..	20	27
Loveland formation, 71 feet:		
Soil: slightly clayey to slightly sandy silt, grayish brown with a slight reddish tint, very fine to medium sandy.....	27	30
Silt, very fine sandy, yellowish brown; slightly sandy below 35; moderately sandy below 40, very fine to coarse sandy, slight reddish tint.....	30	46
Sand, very fine to medium, very pale brown, well rounded, much frosting, principally quartz with a little pink feldspar and a few dark grains, weathered; a little coarse sand below 50 and with less yellowish weathering.....	46	60
Clayey silt, a little imbedded very fine to medium sand, pale brownish gray with a pinkish tint.....	60	65
Silt, moderately clayey to slightly very fine to fine sandy, yellowish brown with a slight reddish tint.....	65	68
Sand, very fine to medium, yellowish brown, much rounding with moderate frosting, principally quartz.....	68	70
Silty sand to sandy silt, very fine to medium with a very little coarse sand, yellowish brown with a reddish tint; less silty below 75.....	70	80
Sand, very fine to medium, light yellowish brown, principally quartz, moderate rounding and frosting; less weathering below 85; some coarse sand below 95.....	80	98
Sappa formation, 16.5 feet:		
Silt, moderately clayey, yellowish red, coarse textured silt; very light gray 104.5-105.5.....	98	105.5
Sand, very fine to medium, principally quartz sand, slightly yellow tint, moderate rounding and frosting.....	105.5	113.5

26-A-48 (Cont'd)

Silt, slightly clayey to very sandy, very fine to medium sandy with a little coarse sand, very light gray with a slight yellow tint.....	113.5	114.5
Grand Island formation, 55.5 feet:		
Sand, fine to medium with some coarse sand, principally quartz, much rounding and frosting; fine to coarse sand below 120, nearly all frosted.....	114.5	125
Sand, very fine to fine with some medium sand, principally quartz, much rounding and mostly all grains frosted; some coarse sand below 130....	125	135
Sand, very fine to very coarse, principally quartz sand, moderate rounding and frosting with some polished grains.....	135	150
Sand and gravel, medium sand to medium gravel, quartz with much pink and light colored feldspars and a few dark grains, 40% gravel to 160, about 55% gravel below 160 with a little coarse gravel below 165.....	150	170
Holdrege formation (?), 14 feet:		
Sand, fine to very coarse with some fine to coarse gravel, quartz with some feldspar, 15-20% gravel..	170	184
Tertiary System, 139 feet:		
Sand, very fine to medium, principally quartz, well rounded, very little frosting, some lime cementation.....	184	193
Sandstone, very fine to medium sand, slightly silty, light brownish gray, non-calcareous, some white non-calcareous rootlets; less cementation with a little coarse sand below 195.....	193	200
Sand, very fine to medium, light brownish gray, slight cementation.....	200	245
Sand, fine to very coarse, much quartz, moderate rounding and polish; grades slightly coarser texture.....	245	270
Sand and gravel, fine sand to fine gravel with a little medium gravel, much quartz with a little pinkish feldspar, moderate rounding and polish....	270	290
Sand, fine to medium, quartz, sub-angular with some rounding, high polish.....	290	303.5
Silty clay, yellow with some white and yellowish brown mottling, highly calcareous; some aragonite and chalky grains below 305; principally whitish and very pale yellowish gray below 310; more clayey below 315.....	303.5	323
Cretaceous System:		
Silty clay shale, medium gray, moderately to highly calcareous; slightly more silty below 335.....	323	340
		Total Depth

*TEST HOLE 106-B-47
(Profile Line J-K)

LOCATION: 442 feet south and 32 feet east of the northwest corner of Sec. 6, T. 5 N., R. 8 W.
ELEVATION: 1829.91 feet (Instrument)
DEPTH TO WATER: 83.6 feet.
RECORD:

DESCRIPTION	DEPTH IN FEET FROM	TO
Quaternary System, 242.5 feet:		
"Peorian" formation, 18 feet:		
Soil: slightly clayey silt, dark brownish gray; moderately clayey and medium grayish brown 1-2....	0	2
Clayey silt, pale brown, yellow tint.....	2	3.5
Silt, slightly clayey, light buff-gray with a slight yellowish tint, fine to medium textured silt, non-calcareous; a few small limy nodules below 5; slight brownish tint, no limy nodules 16.5-18.....	3.5	18
Loveland formation, 9 feet:		
Soil: slightly to moderately clayey silt, dark grayish brown.....	18	21
Clayey silt, brown, traces of imbedded very fine to medium sand; light brown with a reddish tint below 23.....	21	27
Sappa formation, 16 feet:		
Clayey to slightly sandy silt, very fine to medium sandy, light gray and pale brown with a thin dark grayish brown soil zone at top; some white calcareous mottling 29.5-30.....	27	30
Silt, slightly clayey to moderately sand, very fine to fine sandy with a little medium sand, pale brown with a slight reddish tint, slightly to moderately calcareous with some limy nodules and a few rootlets.....	30	33
Marly clayey silt, some imbedded very fine to medium sand, whitish gray.....	33	36
Clayey silt to silty clay, very light gray, moderately to highly calcareous with some white calcareous mottling; a little imbedded very fine to fine sand 40-42.5; light brownish gray 41.5-43, moderately sandy 42.5-43.....	36	43
Grand Island formation, 50.5 feet:		
Sand and gravel, medium sand to fine gravel with some medium gravel, quartz with much pink feldspar, moderate polish, about 40% gravel; less feldspar below 45; medium sand to medium gravel below 50 with a little greenish gray silt in interval 50-55.....	43	63
Sandy silt, very fine to medium sandy, pale brown....	63	66

* Description of samples 40-330 feet from field log only.

106-B-47 (Cont'd)

Silt, clayey to slightly sandy, grading to moderately sandy, very light gray with a slight greenish tint.....	66	69
Sand, fine to very coarse with some fine gravel, moderate rounding and frosting with very few polished grains; about 25% gravel 75-80.....	69	80
Sand and gravel, fine sand to fine gravel with some medium gravel, much quartz with some feldspar, some rounding and frosting but with moderate polish; 35-40% gravel to 90 with about 80% gravel 90-93.5.....	80	93.5
Fullerton formation, 14.5 feet:		
Silt, coarse textured, slightly to moderately clayey with a trace of imbedded very fine to medium sand, light brown; slightly more imbedded sand below 95 and much white secondary lime.....	93.5	99
Silt, coarse textured, slightly clayey to moderately sandy, very fine to medium sand, light brown, some secondary lime.....	99	108
Holdrege formation, 134.5 feet:		
Sand and gravel, medium sand to fine gravel with a little medium gravel, much quartz with some feldspar, some polish.....	108	122
Sandy silt, very fine to fine sandy with some medium sand, slightly clayey, light brown; some secondary lime below 125.....	122	130
Sand and gravel, medium sand to medium gravel, quartz with much pink feldspar, about 50% gravel; thin silty zones at 141 and 146.....	130	150
Sand, fine to very coarse with some fine gravel, quartz with some feldspar; light greenish gray silt layer 170-171.....	150	180
Sand and gravel, fine sand to fine gravel, quartz with some feldspar; some medium gravel below 190..	180	200
Sand and gravel, medium sand to medium gravel, quartz with some feldspar; slightly finer texture. below 215.....	200	220
Sand, fine to very coarse with some fine gravel, quartz with some feldspar.....	220	230
Sand, fine to coarse with a little very coarse sand and fine gravel, principally quartz.....	230	242.5
Tertiary System, 79 feet:		
Silt, very light brownish gray, non-calcareous; medium gray 245.5-248, light gray 248-260.5; slightly calcareous below 255.....	242.5	260.5
Silt, medium brownish gray, granular texture, thin hard limy layer at 263.....	260.5	263
Silt, very slightly clayey, light brownish gray, slightly calcareous; more brownish 275-280; a few limy nodular fragments 285-290.....	263	293
Clayey silt, light brownish gray, slightly calcareous.....	293	310.5

106-D-47 (Cont'd)

Sand and gravel, many rounded Cretaceous chalk grains.....	310.5	321.5
Cretaceous System:		
Chalky shale, light medium gray grading into medium gray.....	321.5	325
Chalky shale, medium to medium dark gray.....	325	330
	. Total Depth	

*TEST HOLE 32-B-49
(Profile Line J-K)

LOCATION: 97 feet south and 37 feet east of the northwest corner of Sec. 31, T. 6 N., R. 6 W.
ELEVATION: 1768.1 feet (Altimeter)
DEPTH TO WATER: 86.7 feet.
RECORD:

DESCRIPTION	DEPTH IN FEET FROM	TO
Quaternary System, 273.5 feet:		
"Peorian" formation, 18 feet:		
Soil; very slightly clayey silt, dark brownish gray; moderately clayey 1-2.5, medium grayish brown 2-2.5.....	0	2.5
Clayey silt, light brownish gray with a yellowish tint, non-calcareous.....	2.5	3.5
Silt, moderately clayey, light buff-gray.....	3.5	4.5
Silt, fine textured, light buff-gray with a slight yellowish tint, very slightly calcareous; a few dense limy nodules 10-15; non-calcareous 15-18....	4.5	18
Loveland formation, 13.5 feet:		
Soil: moderately clayey silt, trace of imbedded very fine to medium sand, dark grayish brown; more clayey, less grayish 21.5-22.5.....	18	22.5
Silt, moderately clayey to very slightly sandy, very fine to medium sandy, light brown with a slight reddish tint; moderately sandy below 26.5..	22.5	31.5
Sappa formation, 18.5 feet:		
Soil: silt, moderately clayey to slightly sandy, very fine to fine sandy, dark grayish brown.....	31.5	31.7
Clayey silt, trace of imbedded very fine to fine sand, light brown with a slight reddish tint.....	31.7	34
Clayey silt, some imbedded very fine to coarse sand, pale brown.....	34	35
Silt, moderately clayey to slightly sandy, very fine to fine sandy with some medium to coarse imbedded sand, pale brown; moderately sandy 37-41; slight pinkish tint 41-42.5.....	35	42.5
Silt, slightly clayey to moderately sandy, very fine to medium sandy with a little coarse sand, pale brown with a pinkish tint; very sandy 47-50 with a trace of very coafse sand.....	42.5	50
Grand Island formation, 73.5 feet:		
Silty sand with some interbedded sandy silt, very fine to coarse with a little very coarse sand, pale brown with a pinkish tint, mostly frosted grains; silty sand below 57, pale brown.....	50	60
Sand, very fine to coarse with some very coarse sand and a trace of fine gravel, principally quartz, some rounding and frosting with much polish; 10% fine gravel 63.5-65 and about 25% gravel 65-67, fine with a little medium gravel,,,.	60	67

* Description of samples 180-490 from field log only.

32-B-49 (Cont'd)

Clay, very light gray.....	67	67.5
Sand, very fine to coarse sand with a little very coarse sand and fine gravel, principally quartz, much polish.....	67.5	72.5
Sand and gravel, fine sand to fine gravel with some medium gravel, much quartz with some light colored feldspar, moderate polish; about 45% gravel 72.5-75; medium sand to medium gravel 75-81 with about 60% gravel, some dark iron staining.....	72.5	81
Silt, moderately clayey to moderately sandy, very fine to medium sandy with some imbedded coarser grains, very light brownish gray with some yellowish limonitic mottling; very light gray with a slight greenish tint below 83.....	81	86.5
Sand and gravel, fine sand to fine gravel, principally quartz with very little feldspar, moderate polish, about 25% gravel; some medium gravel below 90 with some rounded light gray clay granules.....	86.5	94.5
Sand and gravel, fine sand to medium gravel, much quartz with some light colored feldspar, about 50% gravel; moderate rusty brown iron staining below 115.....	94.5	123.5
Fullerton formation, 11.5 feet:		
Silt, moderately to very sandy, very fine to medium sandy, light yellow-brown; pale brown below 125 with less medium sand, some white limy nodules; in part moderately clayey below 130; very sandy 134-135.....	123.5	135
Holdrege formation, 138.5 feet:		
Silty sand, very fine to very coarse sand with a trace of fine gravel, light brownish gray.....	135	140
Sand, slightly silty, very fine to very coarse sand, principally quartz, moderate rounding and frosting, some polished grains; not silty below 145, moderate polish, a little fine gravel.....	140	150
Sand and gravel, fine sand to fine gravel, much quartz with a little light colored feldspar, some rounding and frosting with many polished grains.....	150	156.5
Sand, fine to coarse with a little very coarse sand, principally quarts with a little light colored feldspar, some rounding and frosting with many polished grains; slightly more very coarse sand below 159; a little fine gravel 175-180 and a little fine to medium gravel 190-200; fine to very coarse sand 200-210.....	156.5	210
Sand and gravel, fine sand to fine gravel, principally quartz with a little light colored feldspar; a little medium gravel below 220 grading slightly coarser texture, more feldspar.....	210	245
Sand, fine to coarse with a little very coarse sand, much quartz; occasional light brown rounded silt granules below 260 with many of them below 270....	245	273.5

32-B-49 (Cont'd)

Tertiary System, 192.5 feet:		
Silt, very fine sandy, light brownish tan, moderately calcareous; medium gray below 286, slightly less calcareous; occasional limy nodular fragments below 290.....	273.5	300
Silt, light medium gray, slightly calcareous; a few small pelecypod fragments 300-305, many pelecypod fragments 305-310 and with a few rootlets.....	300	310
Silt, very fine sandy, light medium brownish gray, slightly calcareous.....	310	316
Silt, light brownish gray with a little greenish silt, slight consolidation, slightly calcareous..	316	320
Silt, very sandy (very fine sand), light medium gray, slightly to moderately calcareous, shell fragment.....	320	324
Siltstone, very fine sandy, brownish gray, granular texture, moderately calcareous.....	324	330
Silty sand, very fine to fine with a little medium sand, brownish gray, slightly calcareous.....	330	338.5
Silt, very fine sandy, light gray, moderately to very calcareous, a thin hard limy layer at the top.....	338.5	340
Siltstone, medium dark gray, slightly calcareous, granular texture.....	340	344
Silt, slightly clayey to very fine sandy, light medium gray with a brownish tint, non-calcareous.	344	361.5
Silty sand, very fine sand, light medium gray with a brownish tint, slightly calcareous.....	361.5	380
Silt, very sandy (very fine sand), medium gray, moderately calcareous.....	380	384
Sand, slightly silty, very fine to medium sand, light medium gray, slightly calcareous.....	384	390
Silt, slightly clayey, medium gray, very calcareous; whitish gray and more calcareous 395-400; very light brownish gray 400-410.....	390	410
Silt, very fine sandy, light brownish gray, moderately calcareous; light medium gray below 420....	410	430
Sand, very fine to coarse, light greenish gray, very calcareous, many limy fragments.....	430	438.5
Clayey silt, medium greenish gray, very calcareous..	438.5	440
Clay, medium gray, slightly to moderately calcareous.....	440	445
Sandy silt, medium dark gray, trace of carbonaceous material, slightly to moderately calcareous.....	445	454.5
Sand, medium to very coarse, dark gray with some greenish grains, slightly calcareous.....	454.5	466
Cretaceous System:		
Silty clay shale, dark gray, moderately to very calcareous; very calcareous below 475; very silty below 480 with several thin hard layers.....	466	490
	Total Depth	

Test Hole 66-B-47

Depth in Feet	PER CENT										
	Coarse Gravel	Medium Gravel	Fine Gravel	Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Silt and Clay	Acid Soluble	Hygro-scopic Moisture
0 - 2				0.2	0.25	0.2	0.25	2.0	9.71	Wet Sieved	
2 - 3.5					0.1	0.1	0.1	1.2	98.5	"	"
3.5- 5					0.05	0.05	0.1	0.9	98.9	"	"
5 - 6.5						0.05	0.05	0.55	99.35	"	"
6.5- 7					0.05	0.05	0.00	1.05	98.85	"	"
7 - 8					0.05	0.05	0.00	1.15	98.70	"	"
8 - 10							0.05	1.90	98.05	"	"
10 - 15							0.10	2.30	97.60	"	"
15 - 20							0.15	1.65	98.20	"	"
20 - 25				0.05	0.10	0.10	0.10	1.05	98.6	"	"
25 - 30						0.25	0.10	0.50	99.15	"	"
30 - 32.5				0.15	1.1	1.85	1.90	2.25	92.75	"	"
32.5- 35		1.7	17.3	25.2	31.6	20.7	2.5	0.4	0.6	Washed Samples	
35 - 39		8.5	29.2	31.7	20.3	9.9	0.2	0.2	0.0	& Dry Sieved	
39 - 45		8.4	38.8	32.7	14.45	4.9	0.6	0.1	0.05	"	"
45 - 50		7.2	32.3	34.6	18.0	6.7	0.9	0.1	0.2	"	"
50 - 52.5	4.8	15.5	48.6	23.6	5.4	1.3	0.4	0.2	0.2	"	"

TABLE 2

Test Hole 65-B-47

Depth in Feet	PER CENT										
	Coarse Gravel	Medium Gravel	Fine Gravel	Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Silt and Clay	Acid Soluble	Hygro-scopic Moisture
12 - 16			0.2	3.2	28.0	57.1	11.0	0.4	0.1	Washed samples	
16 - 20		0.9	12.2	16.0	33.1	32.2	4.7	0.4	0.5	& Dry Sieved	
20 - 25		11.2	23.0	20.3	23.5	16.7	4.4	0.7	0.2	"	"
25 - 30		9.8	21.0	15.8	23.6	23.3	5.6	0.7	0.2	"	"
30 - 35		18.4	29.7	26.0	15.5	7.1	2.8	0.4	0.1	"	"
35 - 40		17.5	27.5	25.7	17.1	9.0	2.7	0.4	0.1	"	"
40 - 48.5	14.7	26.4	29.4	19.1	7.9	2.2	0.3	0.0	0.0	"	"

TABLE 2 (Cont'd)

Test Hole 64-B-47

Depth in Feet	PER CENT										
	Coarse Gravel	Medium Gravel	Fine Gravel	Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Silt and Clay	Acid Soluble	Hygro-scopic Moisture
5 - 9		7.9	17.1	30.3	24.2	15.4	4.2	0.5	0.4	Washed	samples
9 - 10*				4.0	6.2	5.6	3.6	3.0	77.6	& Dry	Sieved
10 - 15	4.1	12.9	25.3	24.7	19.1	9.2	3.8	0.4	0.5	"	"
15 - 20	9.4	26.2	25.5	16.2	12.5	5.9	3.4	0.7	0.2	"	"
20 - 25	7.7	25.8	25.9	18.4	13.7	6.5	1.3	0.3	0.4	"	"
25 - 30	7.0	25.9	25.4	18.5	13.5	7.5	1.8	0.3	0.1	"	"
30 - 35	5.2	9.0	21.8	29.7	22.1	9.6	2.1	0.3	0.2	"	"
35 - 40	6.2	13.5	20.5	26.3	21.0	9.8	2.2	0.4	0.1	"	"
40 - 45	15.3	27.0	20.5	18.3	12.6	5.0	1.0	0.2	0.1	"	"
45 - 50	15.5	19.8	20.2	18.5	14.8	8.1	2.5	0.4	0.2	"	"
50 - 55	3.9	21.9	37.4	23.7	8.8	3.1	0.7	0.3	0.3	"	"
55 - 60	3.9	13.9	37.5	27.5	11.7	4.2	0.9	0.3	0.1	"	"

* Wet sieved sample.

TABLE 2 (Cont'd)

Test Hole 63-B-47

Depth in Feet	PER CENT										
	Coarse Gravel	Medium Gravel	Fine Gravel	Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Silt and Clay	Acid Soluble	Hygro-scopic Moisture
3.5- 4			0.3	1.0	2.5	5.5	10.5	18.4	50.0	Wet Sieved	
4 - 5.5		0.4	7.2	22.5	36.7	28.2	4.6	0.3	0.1	Washed samples	
5.5- 10		1.4	15.0	34.3	30.4	14.3	3.1	1.1	0.4	& Dry Sieved	
10 - 15		14.4	31.35	26.5	18.0	7.2	2.3	0.2	0.05	"	"
15 - 20		14.9	29.1	27.05	17.5	8.1	3.0	0.3	0.05	"	"
20 - 25		17.7	26.55	27.4	18.4	7.2	2.5	0.2	0.05	"	"
25 - 30	5.4	20.3	25.4	25.0	16.6	5.8	1.25	0.15	0.1	"	"
30 - 35	4.6	15.7	30.3	27.6	14.9	5.4	1.2	0.2	0.1	"	"
35 - 40	2.5	14.1	35.2	29.0	13.6	4.2	1.1	0.15	0.15	"	"
40 - 47.5	17.8	21.9	24.45	18.4	11.9	4.4	1.0	0.1	0.05	"	"

TABLE 2 (Cont'd)

Test Hole 62-B-47

Depth in Feet	PER CENT										
	Coarse Gravel	Medium Gravel	Fine Gravel	Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Silt and Clay	Acid Soluble	Hygro-scopic Moisture
6 - 6.5		6.6	25.4	28.0	15.4	8.6	5.8	1.6	8.6	Wet Sieved	
6.5- 10		4.3	21.4	32.3	26.0	11.5	3.9	0.5	0.1	Washed samples	
10 - 15	2.6	11.4	21.3	22.8	22.7	11.7	6.2	1.2	0.2	& Dry Sieved	
15 - 22	0.9	14.2	23.8	22.1	20.7	11.9	5.4	0.9	0.1	"	"
22 - 27			0.6	2.8	5.2	7.6	15.8	19.6	48.4	Wet Sieved	
27 - 30		1.1	15.5	22.9	27.1	20.4	10.1	2.5	0.4	Washed samples	
30 - 35		1.1	20.0	24.9	25.5	19.1	7.7	1.4	0.3	& Dry Sieved	
35 - 40		0.1	8.2	19.3	33.2	25.2	10.9	2.7	0.4	"	"
40 - 44			6.1	16.8	26.3	28.0	17.5	4.5	0.8	"	2
44 - 50		0.7	10.7	32.5	30.8	13.8	8.7	3.1	0.5	"	"
50 - 55		4.1	24.9	28.2	21.4	13.3	6.0	1.7	0.4	"	"
55 - 60		4.2	25.7	29.6	22.7	12.2	4.3	1.1	0.2	"	"
60 - 65		10.4	26.4	20.6	19.2	15.7	6.3	1.2	0.2	"	"
65 - 70		15.6	29.2	18.2	17.8	12.5	5.5	1.0	0.2	"	"
70 - 75		11.7	29.2	26.6	16.5	9.8	5.1	0.9	0.2	"	"
75 - 80	0.6	18.1	30.0	27.0	15.6	6.3	1.8	0.5	0.1	"	"
80 - 85	0.7	13.9	30.8	31.0	13.7	6.5	2.5	0.7	0.2	"	"
85 - 90		11.5	25.2	32.4	18.3	8.3	3.5	0.7	0.1	"	"
90 - 95		10.7	26.5	22.1	16.4	13.2	7.8	3.0	0.3	"	"
95 - 100		11.9	29.2	24.6	16.6	10.8	5.6	1.0	0.3	"	"
100 - 103.5		11.6	18.8	32.1	22.6	10.0	3.4	1.1	0.4	"	"

TABLE 2 (Cont'd)

Test Hole 61-B-47

Depth in Feet	PER CENT										
	Coarse Gravel	Medium Gravel	Fine Gravel	Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Silt and Clay	Acid Soluble	Hygro-scopic Moisture
5 - 6	1.5	7.6	23.5	21.6	8.0	25.8	9.1	2.2	0.7	Washed Samples	
6 - 10	5.9	18.7	23.7	24.4	15.6	7.6	3.4	0.5	0.2	& Dry Sieved	
10 - 15	9.5	11.8	21.0	25.8	22.0	7.9	1.4	0.4	0.2	"	"
15 - 20	2.6	13.5	19.3	29.8	24.1	8.4	1.7	0.4	0.2	"	"
20 - 22		17.9	31.1	18.8	11.8	10.7	7.5	1.8	0.4	"	"
22 - 24				1.8	2.6	6.0	9.2	19.0	61.4	Wet Sieved	
24 - 28	1.2	2.4	5.9	23.2	39.9	18.9	5.0	2.3	1.2	Washed Samples	
28 - 35	22.7	15.4	13.6	13.9	16.7	10.9	5.1	1.5	0.2	& Dry Sieved	
35 - 40	14.9	12.1	12.3	16.9	21.5	13.9	5.8	2.0	0.6	"	"
40 - 45	2.3	9.9	14.2	21.2	22.9	18.9	8.8	1.5	0.3	"	"
45 - 50	3.2	6.5	14.7	26.0	24.4	16.5	7.2	1.3	0.2	"	"
50 - 56		17.8	25.5	22.5	19.0	10.0	4.3	0.6	0.3	"	"
56 - 60	3.6	27.2	33.9	19.1	8.5	3.1	1.2	1.0	2.4	"	"
60 - 65		15.8	30.0	24.0	16.3	9.3	3.4	0.8	0.4	"	"
65 - 70	3.0	28.1	32.5	19.5	10.8	4.5	1.2	0.2	0.2	"	"
70 - 75		15.3	31.3	25.5	17.0	8.2	2.1	0.4	0.2	"	"
75 - 80	1.7	13.5	32.8	25.4	16.4	7.6	2.1	0.2	0.3	"	"
80 - 85	3.6	15.5	26.2	22.6	17.9	10.5	2.9	0.6	0.2	"	"
85 - 90	3.7	12.4	22.7	22.9	20.8	12.9	3.7	0.7	0.2	"	"
90 - 95	5.0	22.9	20.2	16.2	18.4	12.6	3.9	0.5	0.3	"	"
95 - 100	1.7	22.2	20.8	15.2	18.3	15.2	5.4	1.1	0.1	"	"
100 - 103.5	1.3	11.6	13.4	18.4	27.7	19.8	6.1	1.4	0.3	"	"

TABLE 22 (Cont'd)

Test Hole 60-B-47

Depth in Feet	PER CENT										
	Coarse Gravel	Medium Gravel	Fine Gravel	Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Silt and Clay	Acid Soluble	Hygro-scopic Moisture
2 - 3			1.4	1.6	7.2	26.4	32.6	22.8	8.0	Wet Sieved	
3 - 4		3.2	2.4	3.0	15.6	43.0	21.0	10.4	1.4	"	"
4 - 5	3.2	4.6	5.8	11.8	26.2	35.0	11.0	2.0	0.4	"	"
5 - 10		6.1	12.9	16.0	26.6	26.7	9.1	2.3	0.3	Washed Samples	
10 - 15		0.4	5.2	10.3	32.1	36.7	13.3	1.7	0.3	& Dry Sieved	
15 - 20		4.6	4.2	6.2	17.0	30.2	25.4	7.0	5.4	Wet Sieved	
20 - 25		0.8	2.0	2.0	13.8	34.2	32.8	9.2	5.2	"	"
25 - 30	3.2	4.0	0.4	1.0	11.2	32.0	30.8	11.0	6.4	"	"
30 - 34.5			0.1	0.7	2.2	6.4	14.2	20.2	56.2	"	"
34.5- 41				1.5	14.1	38.0	33.6	10.8	2.0	Washed Samples	
41 - 47		0.1	0.1	7.5	26.3	37.5	20.1	6.8	1.6	& Dry Sieved	
47 - 50		0.1	1.0	11.1	43.7	30.9	8.7	3.6	0.9	"	"
50 - 52			0.5	15.7	40.1	32.1	9.6	1.7	0.3	"	"
52 - 55		1.0	17.0	25.9	25.4	21.7	6.8	1.9	0.3	"	"
55 - 62.5		8.4	24.6	20.4	22.2	18.0	5.3	0.85	0.25	"	"
62.5- 63			1.8	4.4	4.4	4.4	5.0	14.2	65.8	Wet Sieved	
63 - 70		16.5	25.8	24.1	21.4	9.6	2.1	0.4	0.1	Washed Samples	
70 - 75		19.3	31.8	26.0	14.3	6.3	1.7	0.4	0.2	& Dry Sieved	
75 - 80		12.5	28.3	24.8	19.5	10.6	3.3	0.7	0.3	"	"
80 - 85		17.6	31.2	30.0	12.6	6.2	1.6	0.5	0.3	"	"
85 - 90		24.0	30.7	23.0	13.2	6.5	1.7	0.5	0.3	"	"
90 - 95	3.6	20.1	18.9	23.4	19.1	10.6	3.3	0.6	0.4	"	"
95 - 100	9.6	24.1	23.0	22.4	14.6	5.1	0.9	0.2	0.1	"	"
100 - 105	4.6	8.3	12.2	23.4	29.5	13.4	7.1	1.2	0.3	"	"
105 - 110	4.7	21.1	19.7	20.5	21.6	7.7	3.8	0.8	0.1	"	"
110 - 115	2.0	21.1	23.9	21.4	15.1	10.7	4.5	1.0	0.3	"	"
115 - 121	2.0	22.2	28.0	20.4	13.9	8.8	3.4	1.1	0.2	"	"
121 - 122.5		0.2	2.6	3.8	5.4	6.8	7.4	7.0	66.8	Wet Sieved	

TABLE 2 (Cont'd)

Test Hole 60-B-47 Cont'd

Depth in Feet	PER CENT										
	Coarse Gravel	Medium Gravel	Fine Gravel	Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Silt and Clay	Acid Soluble	Hygro-scopic Moisture
122.5- 125		4.7	28.1	29.8	20.2	11.4	4.5	0.9	0.4	Washed	Sample
125 - 130		8.4	27.8	26.9	21.5	10.4	3.9	0.8	0.3	& Dry	Sieved
130 - 135		9.7	26.8	28.7	20.9	10.1	2.9	0.7	0.2	"	"
135 - 140		7.4	30.9	27.6	19.9	9.8	3.5	0.65	0.25	"	"
140 - 147.5		12.8	31.7	31.9	14.5	5.7	2.4	0.7	0.3	"	"

TABLE 2 (Cont'd)

Test Hole 59-B-47

Depth in Feet	PER CENT										
	Coarse Gravel	Medium Gravel	Fine Gravel	Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Silt and Clay	Acid Soluble	Hygro-scopic Moisture
16.5- 20.5					0.6	6.6	15.8	8.0	69.0	Wet Sieved	
20.5- 25				1.4	25.6	44.6	21.2	4.0	3.2	"	"
25 - 30				1.0	15.8	43.8	33.2	4.4	1.8	"	"
30 - 35				6.0	39.4	35.0	15.4	2.0	2.2	"	"
35 - 40				7.0	14.2	37.3	28.1	12.2	1.2	"	"
40 - 45					0.6	1.0	8.2	41.8	48.4	"	"
45 - 48				0.2	0.4	5.0	12.4	20.8	61.2	"	"
48 - 53				0.6	15.2	38.6	29.2	12.0	4.4	"	"
53 - 60				3.8	31.6	39.0	20.2	4.4	1.0	"	"
60 - 65				2.2	23.3	43.7	24.6	5.0	1.2	"	"
65 - 70				3.0	22.6	40.6	25.4	7.0	1.6	"	"
70 - 73.5				1.0	2.2	3.2	4.6	10.6	78.4	"	"
73.5- 77.5				0.2	2.0	6.4	11.2	13.8	66.4	"	"
77.5- 80					0.6	2.4	6.0	15.8	75.2	"	"
80 - 84.5					0.8	3.8	9.4	19.2	66.8	"	"
84.5- 88				5.0	29.2	39.8	18.4	4.6	3.0	"	"
88 - 93			0.6	1.6	1.2	3.2	7.8	19.2	66.6	"	"
93 - 100			0.1	14.6	31.4	29.0	19.1	5.0	0.8	Washed Samples	
100 - 105		0.4	12.3	28.5	29.2	14.4	9.4	4.9	0.9	& Dry Sieved	
105 - 108		1.5	19.8	35.3	27.3	10.9	3.2	1.3	0.7	"	"
108 - 110		22.7	55.2	15.8	3.5	1.0	0.9	0.7	0.2	"	"
110 - 115		5.0	21.6	27.5	28.6	14.3	2.1	0.6	0.4	"	"
115 - 120		8.2	26.9	24.5	24.2	12.6	2.5	0.7	0.4	"	"
120 - 122.5		16.6	28.3	30.9	10.7	5.8	5.2	2.0	0.5	"	"
122.5- 130	1.1	38.5	39.8	11.4	2.5	1.7	3.4	1.4	0.2	"	"
130 - 135		0.2	4.4	11.7	24.0	27.2	21.0	8.2	3.3	"	"
135 - 140.5		0.7	4.3	10.2	27.9	29.6	18.0	6.5	2.8	"	"
140.5- 145		3.1	11.2	30.2	32.9	16.4	4.4	1.4	0.4	"	"
145 - 149		6.5	18.2	27.4	32.2	11.6	3.0	0.8	0.3	"	"

TABLE 2 (Cont'd)

Test Hole 59-B-47 Cont'd

Depth in Feet	PER CENT										
	Coarse Gravel	Medium Gravel	Fine Gravel	Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Silt and Clay	Acid Soluble	Hygro-scopic Moisture
149 - 155		6.5	16.3	23.5	29.6	18.0	4.1	1.7	0.3	Washed Samples	
155 - 160	2.5	11.5	18.1	18.9	27.1	16.7	3.8	1.2	0.2	& Dry Sieved	
160 - 165		9.4	21.6	31.1	24.3	10.0	2.3	0.7	0.6	"	"
165 - 170		14.2	18.6	24.6	28.7	12.1	1.4	0.2	0.2	"	"
170 - 175		12.7	19.4	23.6	26.1	14.3	2.6	0.9	0.4	"	"
175 - 180	1.7	13.1	18.1	24.8	25.7	13.2	2.4	0.7	0.3	"	"
180 - 185		13.7	39.5	23.2	12.5	7.6	2.6	0.6	0.3	"	"
185 - 190		4.6	27.1	23.4	21.2	15.6	5.6	2.1	0.4	"	"
190 - 193			2.0	3.7	5.3	8.7	13.7	17.4	49.2	Wet Sieved	
193 - 200		5.2	11.0	27.0	30.5	18.6	4.9	2.0	0.8	Washed Samples	
200 - 208		3.7	21.6	34.4	25.1	11.1	2.7	1.0	0.4	& Dry Sieved	
208 - 210				0.3	3.0	9.3	14.0	18.0	55.4	Wet Sieved	
210 - 215			4.8	34.0	38.6	17.7	3.9	0.7	0.3	Washed Samples	
215 - 220.5		0.2	4.1	24.9	43.2	21.2	5.2	0.8	0.4	& Dry Sieved	
220.5- 225		0.5	18.9	40.0	27.1	9.0	3.0	1.3	0.2	"	"
225 - 230		1.7	22.9	35.3	29.5	8.0	1.9	0.5	0.2	"	"
230 - 235		0.5	8.8	30.4	34.7	20.0	4.4	0.7	0.5	"	"
235 - 240		0.4	11.3	26.1	36.0	20.3	4.6	0.9	0.4	"	"
240 - 245		0.1	7.5	18.9	32.0	29.9	9.2	1.9	0.5	"	"
245 - 250		0.3	5.7	18.5	37.3	27.8	7.9	2.0	0.5	"	"
250 - 257.5		0.2	2.8	6.1	30.4	43.1	12.9	3.7	0.8	"	"

TABLE 2 (Cont'd)

Test Hole 58-B-47

Depth in Feet	PER CENT										
	Coarse Gravel	Medium Gravel	Fine Gravel	Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Silt and Clay	Acid Soluble	Hygro-scopic Moisture
17.5- 20					1.2	10.4	18.2	12.3	58.0	Wet Sieved	
20 - 25					2.0	12.8	20.8	12.8	51.6	"	"
25 - 27					2.4	14.0	23.0	12.2	48.4	"	"
27 - 28.5					4.2	15.8	19.8	11.4	48.8	"	"
28.5- 35				5.5	36.1	44.9	11.6	0.9	1.0	Washed Samples	
35 - 40				4.4	39.2	47.2	9.0	0.2	0.0	& Dry Sieved	
40 - 45.5				0.8	13.8	42.6	33.3	4.3	5.2	"	"
45.5- 46.5				0.1	1.5	6.8	14.4	14.4	2.8	Wet Sieved	
46.5- 48					0.2	2.6	8.0	14.0	75.2	"	"
48 - 50						2.0	5.0	5.2	87.8	"	"
50 - 51.5						1.6	8.2	8.4	81.8	"	"
51.5- 54					0.2	5.0	16.0	13.6	65.2	"	"
54 - 57					1.2	9.2	23.8	20.2	45.6	"	"
57 - 60				0.5	12.2	35.2	37.5	8.8	5.8	Washed Samples	
60 - 65				2.7	23.1	29.3	35.0	7.9	2.0	& Dry Sieved	
65 - 68				2.9	18.6	35.4	32.4	7.4	3.3	"	"
68 - 70					0.4	2.8	9.4	29.6	57.8	Wet Sieved	
75 - 79					0.2	1.8	8.2	38.0	51.8	"	"
79 - 86			0.2	3.0	5.4	13.0	15.6	8.0	54.8	"	"
86 - 90				6.7	41.1	32.0	15.1	3.4	1.7	Washed Samples	
90 - 95			0.6	14.8	30.4	31.9	17.2	4.1	1.0	& Dry Sieved	
95 - 100			0.9	16.7	33.8	30.1	14.9	2.7	0.9	"	"
100 - 105		1.0	7.2	19.4	20.3	27.3	19.0	4.3	1.5	"	"
105 - 110		1.2	18.1	35.0	26.2	11.7	5.5	1.4	0.9	"	"
110 - 115	4.1	10.3	31.6	34.1	14.9	4.1	0.5	0.3	0.1	"	"
115 - 120	3.4	15.9	32.2	30.6	14.0	3.0	0.7	0.15	0.05	"	"
120 - 125.5		12.1	28.9	21.2	16.9	12.1	7.0	1.4	0.4	"	"
125.5- 130	1.0	8.8	8.4	18.1	26.3	21.7	12.3	2.3	1.1	"	"
130 - 135	2.7	23.9	31.6	26.4	11.4	3.0	0.85	0.1	0.05	"	"

TABLE 2 (Cont'd)

Test Hole 58-B-47 Cont'd

Depth in Feet	PER CENT										
	Coarse Gravel	Medium Gravel	Fine Gravel	Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Silt and Clay	Acid Soluble	Hygro-scopic Moisture
135 - 140	4.4	21.9	37.8	21.9	9.2	2.6	1.3	0.6	0.3	Washed samples	
140 - 145		8.0	24.4	32.6	21.1	10.8	2.6	0.3	0.2	& Dry Sieved	
145 - 150	1.4	13.2	31.2	25.65	16.1	9.5	2.6	0.2	0.15	"	"
150 - 155	1.5	19.0	32.9	23.2	10.8	9.0	2.7	0.6	0.3	"	"
155 - 160	2.0	28.7	35.0	18.6	8.0	5.0	1.8	0.6	0.3	"	"
160 - 165	1.6	22.2	32.3	24.3	12.5	4.8	1.6	0.4	0.3	"	"
165 - 170	5.7	26.2	35.0	18.1	9.1	4.1	1.3	0.3	0.2	"	"
170 - 175	1.9	29.5	32.0	22.8	7.7	3.8	1.5	0.5	0.3	"	"
175 - 180	1.5	23.8	30.9	25.2	10.3	4.6	2.4	1.0	0.3	"	"
180 - 185	1.8	14.6	31.7	27.6	12.7	7.1	3.2	1.0	0.3	"	"
185 - 190	0.7	24.9	34.2	24.4	10.4	3.5	1.1	0.4	0.4	"	"
190 - 195	1.7	27.2	33.6	23.9	9.6	2.8	0.7	0.3	0.2	"	"
195 - 201	3.5	28.7	27.2	20.6	10.6	5.3	2.9	0.8	0.4	"	"
201 - 203			1.0	7.4	11.0	9.1	5.1	3.2	63.2	Wet Sieved	
203 - 210		8.7	18.9	27.7	23.2	13.3	6.1	1.6	0.5	Washed Samples	
210 - 215		8.8	30.5	29.4	16.6	8.9	3.7	1.3	0.8	& Dry Sieved	
215 - 220		13.2	27.9	25.6	17.4	10.1	4.0	1.3	0.5	"	"
220 - 225		0.7	13.4	24.9	29.3	22.6	7.4	1.4	0.3	"	"
225 - 230		2.6	15.5	26.7	27.4	20.3	6.2	1.0	0.3	"	"
230 - 235		1.0	9.0	20.6	32.8	26.2	8.3	1.6	0.5	"	"
235 - 240		2.5	14.5	20.4	30.1	23.9	6.8	1.3	0.5	"	"
240 - 247		1.2	6.8	17.1	34.0	30.4	8.4	1.6	0.5	"	"
247 - 250		1.3	3.2	11.8	35.9	34.2	10.7	2.0	0.9	"	"
250 - 257		0.1	0.5	8.5	36.1	38.5	13.2	2.4	0.7	"	"
257 - 260		0.05	0.65	8.7	36.3	37.7	12.5	2.8	1.3	"	"
260 - 265			3.1	9.3	26.0	36.9	18.3	4.8	1.6	"	"
265 - 270		0.2	2.9	11.6	30.7	36.8	14.0	2.8	1.0	"	"
270 - 275		0.2	7.7	15.6	26.1	33.3	13.7	2.7	0.9	"	"

TABLE 2 (Cont'd)

Test Hole 58-B-47 Cont'd

Depth in Feet	PER CENT										
	Coarse Gravel	Medium Gravel	Fine Gravel	Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Silt and Clay	Acid Soluble	Hygro-scopic Moisture
275 - 280		0.1	4.0	13.4	25.6	36.1	16.9	3.1	0.8	Washed Samples	
280 - 285		1.4	4.3	9.0	26.8	39.8	16.0	2.3	0.4	& Dry Sieved	
285 - 290		1.0	9.5	20.8	23.9	28.6	12.8	2.4	1.0	"	"
290 - 295		2.7	11.2	22.0	24.8	27.6	10.0	1.2	0.5	"	"
295 - 300		0.9	4.7	13.7	28.7	37.8	12.7	1.2	0.3	"	"
300 - 305		0.3	2.2	12.2	26.1	37.9	17.1	3.0	1.2	"	"
305 - 310				7.1	18.5	45.0	24.5	3.9	1.0	"	"

TABLE 2 (Cont'd)

Test Hole 57-B-47

Depth in Feet	PER CENT										
	Coarse Gravel	Medium Gravel	Fine Gravel	Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Silt and Clay	Acid Soluble	Hygro-scopic Moisture
10 - 15				1.2	15.8	23.6	17.4	3.2	38.8	Wet sieved	
15 - 20				2.4	38.7	44.1	11.3	0.9	2.6	Washed samples	
20 - 27.5				2.1	31.8	47.3	15.7	2.0	1.1	& dry sieved	
27.5- 29.5				0.8	4.4	10.6	17.4	18.6	48.2	Wet Sieved	
29.5- 35				5.8	35.2	37.8	17.6	2.7	0.9	Washed samples	
35 - 40				3.7	30.8	41.4	20.2	3.1	0.8	& Dry Sieved	
40 - 45				3.1	33.8	41.8	18.6	2.5	0.2	"	"
45 - 50				6.7	35.3	39.0	16.7	2.0	0.3	"	"
50 - 55				2.3	28.3	44.3	21.4	3.4	0.4	"	"
55 - 60				11.0	28.1	26.1	25.7	7.1	2.0	"	"
60 - 65			0.2	10.2	31.8	24.6	12.8	5.6	14.8	Wet Sieved	
65 - 70			0.2	13.6	37.4	24.6	10.6	3.8	9.8	"	"
70 - 75			0.1	6.7	37.9	37.3	13.4	3.0	1.6	Washed Samples	
75 - 80			0.1	7.3	34.3	37.5	14.8	3.4	2.6	& Dry Sieved	
80 - 84.5				6.8	35.9	39.2	15.6	2.0	0.5	"	"
84.5- 90			8.1	44.7	33.5	10.1	2.4	0.5	0.7	"	"
90 - 93		0.6	45.4	28.5	14.8	7.7	2.4	0.4	0.2	"	"
93 - 100		5.6	28.1	33.5	21.1	8.3	2.0	0.6	0.8	"	"
100 - 105		2.2	33.5	30.3	18.2	11.2	3.4	0.9	0.3	"	"
105 - 110		4.3	35.3	31.6	16.0	8.9	2.8	0.6	0.5	"	"
110 - 116		1.6	10.0	29.9	35.5	15.2	5.6	1.4	0.8	"	"
116 - 120		14.0	31.2	30.2	14.1	6.7	2.4	0.8	0.6	"	"
120 - 125		2.0	20.5	38.5	24.5	10.2	3.2	0.7	0.4	"	"
125 - 131		2.7	25.1	36.0	21.9	3.5	9.7	0.7	0.4	"	"
131 - 135.5			0.4	11.4	12.8	19.2	19.6	9.0	27.6	Wet Sieved	
135.5- 140		8.2	25.1	45.6	12.0	5.4	2.5	0.7	0.5	Washed samples	
140 - 145		1.6	4.3	40.4	32.8	15.3	4.5	0.8	0.3	& Dry Sieved	
145 - 150		1.4	20.3	36.6	24.2	12.8	3.8	0.6	0.3	"	"

Test Hole 57-B-47 Cont'd

Depth in Feet	PER CENT										
	Coarse Gravel	Medium Gravel	Fine Gravel	Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Silt and Clay	Acid Soluble	Hygro-scopic Moisture
150 - 156		9.5	31.2	36.0	15.1	5.3	2.0	0.5	0.4	Washed	samples
156 - 160		25.4	39.3	18.7	9.1	4.3	2.1	0.6	0.5	& Dry	Sieved
160 - 165		21.8	35.7	20.8	13.1	6.2	1.7	0.4	0.3	"	"
165 - 170		34.2	28.4	17.2	11.6	6.0	1.9	0.4	0.3	"	"
170 - 176		5.7	9.4	30.1	34.9	15.6	3.3	0.7	0.3	"	"
176 - 180.5		10.2	56.5	18.1	6.6	4.1	1.8	0.9	1.8	"	"
180.5- 185		2.2	24.0	30.7	22.3	14.7	4.3	1.1	0.7	"	"
185 - 190		2.5	23.4	31.4	21.8	15.3	4.2	0.8	0.6	"	"
190 - 195		5.5	14.4	12.8	26.9	28.2	9.4	2.0	0.8	"	"
195 - 200		3.6	10.1	14.6	28.4	30.8	9.7	2.0	0.8	"	"
200 - 205		1.2	7.3	20.2	30.9	29.9	8.6	1.3	0.6	"	"
205 - 210		2.4	26.8	14.3	18.0	27.9	8.8	1.3	0.5	"	"
210 - 215		2.5	5.3	6.8	17.4	42.6	20.2	3.8	1.4	"	"
215 - 220		2.0	4.9	5.8	18.9	43.6	19.8	3.7	1.3	"	"
220 - 225		1.9	13.1	14.1	14.9	32.5	19.0	3.3	1.2	"	"
225 - 230		1.2	9.3	8.0	19.2	39.7	18.1	3.3	1.2	"	"
230 - 235		6.4	13.2	18.4	19.4	27.3	12.3	2.3	0.7	"	"
235 - 240		3.8	10.3	21.1	21.3	28.2	12.5	2.2	0.6	"	"
240 - 245		3.2	5.1	15.4	21.0	35.4	16.5	8.7	0.7	"	"
245 - 251		3.3	13.8	26.6	18.4	24.2	11.1	2.0	0.6	"	"

TABLE 2 (Cont'd)

TABLE 2 (Cont'd)

Test Hole 56-B-47

Depth in Feet	PER CENT										
	Coarse Gravel	Medium Gravel	Fine Gravel	Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Silt and Clay	Acid Soluble	Hygroscopic Moisture
7.5 - 9				0.3	2.9	11.6	19.7	6.4	59.1	Wet Sieved	
9 - 15		0.2	2.2	3.7	18.4	37.1	31.2	3.8	3.4	Unwashed sample	
15 - 20			3.1	5.4	20.0	35.8	26.0	4.3	5.4	& Dry Sieved	
20 - 25			0.5	2.6	16.2	37.0	31.2	8.0	4.5	"	"
25 - 30				0.4	10.5	51.2	32.0	4.2	1.7	"	"
30 - 34				0.1	7.0	42.5	39.9	6.5	4.0	"	"
34 - 35.5					0.4	3.3	12.0	16.2	68.1	Wet Sieved	
35.5 - 38						1.4	4.6	24.6	69.4	"	"
38 - 40						1.6	5.8	8.6	84.0	"	"
40 - 45					0.8	9.6	13.0	18.2	58.4	"	"
45 - 50					0.6	2.2	7.4	24.2	65.6	"	"
50 - 52					0.8	6.6	12.8	27.4	53.4	"	"
52 - 55				0.3	7.6	42.6	35.9	9.4	4.2	Unwashed sample	
55 - 60				1.6	18.2	47.7	26.0	3.8	2.7	& Dry Sieved	
60 - 66					0.4	2.2	9.6	21.0	66.8	Wet Sieved	
66 - 70				4.6	29.1	34.1	17.1	9.7	5.4	Unwashed sample	
70 - 77			1.5	12.3	27.2	33.0	13.4	7.3	5.3	& Dry Sieved	
77 - 80	Not run (mixed sample)										
80 - 85	6.5	25.6	24.3	17.9	8.5	5.1	3.4	2.8	5.9	Unwashed sample	
85 - 90	18.0	36.5	26.2	11.9	3.5	1.5	1.0	0.6	0.8	& Dry Sieved	
90 - 95	9.6	26.5	31.0	19.8	8.3	2.7	0.7	0.5	0.9	"	"
95 - 100	6.9	26.3	32.7	21.9	8.2	2.3	0.5	0.4	0.8	"	"
100 - 105	3.9	22.2	29.5	26.0	11.0	4.4	1.5	0.7	0.8	"	"
105 - 110	7.2	24.7	28.2	24.1	9.5	3.7	1.2	0.6	0.8	"	"
110 - 115	13.6	28.7	27.0	18.3	7.3	2.9	1.0	0.5	0.7	"	"
115 - 120	12.8	26.3	27.8	19.4	7.5	3.6	1.3	0.5	0.8	"	"
120 - 123	4.3	28.4	31.0	18.8	9.7	4.5	2.0	0.7	0.6	"	"

Test Hole 56-B-47, Cont'd

Depth in Feet	PER CENT										
	Coarse Gravel	Medium Gravel	Fine Gravel	Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Silt and Clay	Acid Soluble	Hygroscopic Moisture
123 - 125		1.1	9.5	24.3	13.0	10.0	11.0	11.4	19.7	Unwashed sample	
125 - 130		1.2	3.6	21.7	40.0	19.4	7.4	3.3	3.4	& Dry Sieved	
130 - 135		0.7	3.7	18.2	32.4	22.4	10.9	4.6	7.1	"	"
135 - 140	1.0	23.0	24.5	19.3	15.8	10.4	3.8	1.2	1.0	"	"
140 - 145	1.9	27.0	30.6	20.8	11.3	5.4	1.7	0.6	0.7	"	"
145 - 150	1.1	17.4	34.0	24.8	13.6	5.9	1.7	0.7	0.8	"	"
150 - 155	0.8	21.5	34.4	22.2	10.5	6.7	2.3	0.8	0.8	"	"
155 - 160	4.8	24.3	29.0	21.6	10.3	6.4	1.9	0.7	1.0	"	"
160 - 165		11.6	21.7	25.6	20.6	14.4	4.2	1.1	0.8	"	"
165 - 170	1.1	12.3	26.2	26.9	18.5	10.7	2.9	0.7	0.7	"	"
170 - 175	1.1	15.3	30.4	22.3	14.8	10.8	3.6	0.9	0.8	"	"
175 - 180	1.6	22.5	33.3	22.0	10.9	6.5	1.9	0.6	0.7	"	"
180 - 185		9.4	28.0	27.6	18.4	11.5	3.6	0.9	0.6	"	"
185 - 188				2.1	10.2	9.1	7.6	6.5	64.5	Wet Sieved &	
188 - 195	1.3	19.2	29.5	20.2	14.1	10.6	4.2	0.7	0.2	Washed Samples	
195 - 200	1.1	22.2	33.0	20.5	12.1	8.0	2.6	0.4	0.1	& Dry Sieved	
200 - 205		13.8	31.1	23.8	15.6	11.4	3.7	0.5	0.1	"	"
205 - 210	0.2	17.8	31.2	22.5	13.4	10.3	3.6	0.8	0.2	"	"
210 - 215		7.2	26.4	28.9	19.3	12.5	4.1	1.0	0.6	"	"
215 - 220		11.3	29.3	25.5	17.0	11.8	3.8	1.0	0.3	"	"
220 - 225		1.9	21.1	34.1	21.5	14.2	5.5	1.3	0.4	"	"
225 - 230		3.0	24.2	35.3	18.8	12.2	4.8	1.2	0.5	"	"
230 - 235		1.0	12.5	35.4	25.3	17.1	6.5	1.6	0.6	"	"
235 - 240		0.9	14.1	34.8	25.6	16.5	5.7	1.6	0.8	"	"
240 - 245		3.0	10.3	23.6	28.8	22.6	8.7	2.1	0.9	"	"
245 - 250		2.3	14.1	27.0	28.0	19.2	7.1	1.5	2.8	"	"
250 - 255		0.6	7.0	24.4	28.8	24.8	10.8	2.3	1.3	"	"

Test Hole 55-B-47

Depth in Feet	PER CENT										
	Coarse Gravel	Medium Gravel	Fine Gravel	Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Silt and Clay	Acid Soluble	Hygro-scopic Moisture
2 - 7				0.7	9.2	20.2	55.5	9.4	5.1	Unwashed samples	
7 - 10				0.3	4.9	38.25	32.45	11.2	12.9	& Dry Sieved	
10 - 15				0.1	6.3	52.9	30.7	5.9	4.1	"	"
15 - 20				0.2	8.9	50.2	27.1	6.5	7.1	"	"
20 - 27				0.2	5.6	50.1	33.7	7.1	3.3	"	"
27 - 30					0.4	1.0	4.2	13.2	81.2	Wet Sieved	
30 - 33				0.2	1.0	3.6	8.0	18.0	69.2	"	"
33 - 36.5					0.6	2.6	6.7	13.2	76.9	"	"
36.5- 40					0.4	1.4	4.8	14.8	78.6	"	"
40 - 45					0.2	1.0	3.0	11.0	84.8	"	"
45 - 49					0.4	1.8	5.2	10.7	81.9	"	"
49 - 50				0.3	13.0	29.6	24.0	9.1	24.0	Unwashed samples	
50 - 55				0.3	9.9	46.1	36.4	6.3	1.0	& Dry Sieved	
55 - 60				0.4	10.9	45.2	36.1	6.0	1.4	"	"
60 - 65				0.3	8.6	40.1	42.7	6.9	1.4	"	"
65 - 70				0.2	8.1	43.75	40.95	6.0	1.0	"	"
70 - 77.5				1.4	13.0	38.25	39.65	6.3	1.4	"	"
77.5- 80				1.2	7.4	23.0	44.2	15.6	8.6	"	"
80 - 83.5						7.1	19.8	28.3	44.8	"	"
83.5- 90				2.7	19.7	34.2	32.7	7.4	3.4	"	"
90 - 95				2.8	25.9	34.2	28.2	7.1	1.8	"	"
95 - 100				2.8	25.3	33.1	28.6	8.6	1.7	"	"
100 - 104				2.2	16.2	31.15	34.85	12.5	3.1	"	"
104 - 109	*			5.7	13.9	19.3	22.1	16.9	22.1	"	"
109 - 115		0.9	12.9	26.2	32.8	19.4	5.4	1.3	1.1	"	"
115 - 120		1.2	18.8	29.4	27.0	15.8	5.1	1.3	1.4	"	"
120 - 125		6.8	21.0	23.8	27.6	17.1	3.0	0.3	0.4	"	"
125 - 130		5.5	20.7	24.55	27.65	17.7	3.2	0.3	0.4	"	"

* Includes some sand from sample below

TABLE 2 (Cont'd)

Test Hole 55-B-47 Cont'd

Depth in Feet	PER CENT										
	Coarse Gravel	Medium Gravel	Fine Gravel	Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Silt and Clay	Acid Soluble	Hygro-scopic Moisture
130 - 135		4.4	12.9	21.9	35.4	19.9	4.3	0.6	0.6	Unwashed	Sample
135 - 140		11.2	13.6	20.5	31.7	18.3	3.8	0.5	0.4	& Dry Sieved	
140 - 145		1.5	23.4	36.7	25.7	9.7	2.1	0.5	0.3	"	"
145 - 150		2.5	27.6	36.7	22.8	8.0	1.7	0.4	0.3	"	"
150 - 155		19.8	32.2	24.1	13.3	7.5	2.5	0.5	0.2	"	"
155 - 160		26.4	32.0	22.6	11.5	5.3	1.8	0.3	0.1	"	"
160 - 165	1.6	21.0	22.8	19.4	18.3	13.5	2.8	0.3	0.2	"	"
165 - 170		27.0	32.2	15.6	12.6	9.9	2.1	0.2	0.4	"	"
170 - 175		24.5	40.0	22.6	8.7	3.2	0.8	0.1	0.1	"	"
175 - 180	4.6	31.0	36.6	17.1	7.0	2.6	0.7	0.2	0.2	"	"
180 - 185	4.8	36.7	32.1	14.9	6.3	3.7	1.1	0.2	0.2	"	"
185 - 190	3.3	31.4	35.5	18.0	6.4	3.2	1.5	0.3	0.4	"	"
190 - 195		32.4	32.8	19.7	8.8	4.1	1.5	0.4	0.3	"	"
195 - 200		21.3	38.4	23.6	9.8	4.9	1.5	0.3	0.2	"	"
200 - 205		19.0	30.6	21.9	14.8	9.5	3.1	0.7	0.4	"	"
205 - 210		9.6	31.8	28.5	17.3	9.5	2.5	0.5	0.3	"	"
210 - 215		13.3	22.8	18.4	20.1	17.8	7.1	1.0	0.5	"	"
215 - 220		14.6	23.7	19.5	18.9	16.1	5.8	0.9	0.5	"	"

TABLE 2 (Cont'd)

Test Hole 54-B-47

Depth in Feet	PER CENT										
	Coarse Gravel	Medium Gravel	Fine Gravel	Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Silt and Clay	Acid Soluble	Hygroscopic Moisture
0 - 0.5					0.1	0.3	0.4	1.3	97.9	1.88	2.02
0.5- 1				0.1	1.6	2.1	2.3	2.5	91.4	1.89	1.98
1 - 3				0.2	0.3	1.1	1.6	2.0	94.8	2.22	2.75
3 - 5					0.2	0.4	0.1	1.4	98.4	4.90	3.26
5 - 10							0.1	1.1	98.8	2.18	2.63
10 - 17.5							0.1	1.0	98.9	1.93	2.60
17.5- 20.5						0.4	1.2	2.4	96.0	1.97	2.49
20.5- 24.5					0.8	4.4	16.8	16.0	62.0	1.6	1.95
24.5- 30					0.4	1.0	3.8	12.0	82.8	1.49	2.26
30 - 35					0.8	1.2	5.2	14.4	78.4	1.49	1.98
35 - 40				0.4	0.4	1.0	4.2	12.4	81.6	1.63	1.54
40 - 45				0.2	0.2	0.4	2.2	6.8	90.2	1.88	2.05
45 - 50				0.2	0.2	0.2	2.6	10.8	86.0	1.74	2.00
50 - 55				0.2	0.2	1.4	4.8	12.6	80.8	1.36	1.90
55 - 60				0.2	0.4	3.4	12.2	12.8	71.0	1.42	1.63
60 - 65				0.2	1.8	17.4	30.0	21.2	29.4	0.54	0.67
65 - 70				0.2	0.6	8.6	21.0	25.2	44.4	0.85	1.26
70 - 75				0.1	0.2	2.1	12.2	25.0	60.4	1.32	1.21
75 - 83					0.2	2.2	14.0	27.6	56.0	1.24	1.32
83 - 90						0.4	4.0	13.6	82.0	1.38	1.51
90 - 95					0.2	2.0	11.4	22.8	63.6	1.36	1.66
95 - 100					0.2	2.0	12.0	22.0	63.8	1.42	1.56
100 - 105					0.2	2.0	10.8	24.0	63.0	1.16	1.58
105 - 110					0.2	3.4	18.0	24.4	54.0	1.10	1.85
110 - 115					0.4	3.0	12.4	19.4	64.8	1.47	1.91
115 - 120					0.3	2.3	5.4	12.8	79.2	1.69	1.96
120 - 125				0.1	2.1	9.0	16.6	13.2	59.0	1.28	1.49
125 - 131				0.6	4.0	13.0	30.8	20.6	31.0	0.65	0.86

TABLE 2 (Cont'd)

Test Hole 54-B-47 Cont'd

Depth in Feet	PER CENT										
	Coarse Gravel	Medium Gravel	Fine Gravel	Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Silt and Clay	Acid Soluble	Hygro-scopic Moisture
131 - 135				0.4	2.0	8.8	19.6	12.8	56.4	1.02	1.59
135 - 140				0.3	1.5	7.0	15.2	12.8	63.2	1.50	1.52
140 - 142.5				0.6	3.8	8.6	16.2	15.6	55.2	1.14	1.87
142.5- 150		0.2		8.2	17.4	19.6	23.6	12.2	18.8	0.56	0.71
150 - 155		0.2	2.0	7.8	17.8	16.6	21.6	14.4	19.6	0.66	0.63
155 - 160			0.3	0.9	2.2	6.6	13.0	24.0	53.0	1.10	1.77
160 - 165		0.2	2.8	2.4	4.8	12.0	19.4	16.0	42.4	0.67	1.56
165 - 168			1.8	2.6	4.8	12.6	20.0	15.6	42.6	0.69	1.62
168 - 175		6.7	28.5	30.1	17.0	6.3	6.7	3.4	1.3	Washed Samples	
175 - 180		8.8	34.7	28.1	13.1	5.2	5.7	2.9	1.5	& Dry Sieved	
180 - 185		6.1	29.4	28.6	16.9	7.9	6.9	3.5	0.9	"	"
185 - 190		5.2	30.8	31.0	15.4	6.7	6.0	3.3	1.6	"	"
190 - 195		10.0	22.7	22.5	17.2	9.9	10.1	5.4	2.2	"	"
195 - 199	0.9	17.6	31.1	20.5	10.7	6.7	7.8	3.6	1.1	"	"

TABLE 2 (Cont'd)

Test Hole 53-B-47

Depth in Feet	PER CENT										
	Coarse Gravel	Medium Gravel	Fine Gravel	Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Silt and Clay	Acid Soluble	Hygroscopic Moisture
0 - 0.5					0.1	0.05	0.1	1.2	98.6	2.43	3.50
0.5- 3.5						0.05		0.95	99.0	3.18	3.69
3.5- 5							0.05	1.1	98.95	8.27	3.20
5 - 10								1.0	99.0	1.76	3.20
10 - 12.5						0.05	0.05	1.2	98.7	1.73	2.96
12.5- 14.5						0.1	0.3	2.3	97.3	1.67	3.15
14.5- 21					0.1	0.6	4.4	14.8	80.1	2.17	2.26
21 - 25					0.05	0.15	4.1	21.1	74.6	1.40	2.75
25 - 30						0.1	1.2	9.5	89.2	1.68	3.31
30 - 35					0.05	0.05	1.3	12.6	86.0	1.52	2.70
35 - 40						0.2	2.1	16.1	81.6	1.63	3.08
40 - 42.5						0.3	2.0	10.0	87.6	13.7	3.10
42.5- 45						0.2	2.6	13.6	83.6	4.38	3.23
45 - 50					0.1	0.2	2.3	16.9	80.5	2.76	2.77
50 - 55					0.1	0.4	2.8	21.7	75.0	1.79	2.56
55 - 60						0.3	2.3	19.2	78.2	2.13	2.29
60 - 65						0.9	3.5	15.7	79.9	1.48	2.70
65 - 70					0.4	1.7	6.5	15.4	76.0	2.85	2.95
70 - 77				0.2	2.4	7.3	15.6	19.7	54.8	2.39	2.22
77 - 80					0.4	3.4	13.5	20.0	62.7	4.35	2.40
80 - 85				0.1	0.1	1.5	8.8	23.2	66.2	4.93	2.47
85 - 90					0.2	1.7	8.4	23.5	66.2	2.40	2.48
90 - 95					0.6	5.4	12.6	19.4	62.0	2.45	2.12
95 - 100					0.8	8.1	17.4	20.0	53.7	2.43	2.11
100 - 105				0.5	13.1	41.7	26.7	10.3	7.7	0.78	0.52
105 - 110				0.5	11.0	44.1	29.0	9.9	5.5	1.45	0.50
110 - 114.5				0.2	5.6	36.9	38.2	11.8	7.3	0.70	0.42
114.5- 117				0.1	1.2	9.0	16.0	12.4	61.3	45.82	1.57
117 - 120					0.3	4.4	11.0	16.7	67.6	49.62	1.73

TABLE 2 (Cont'd)

Test Hole 53-B-47 Cont'd

Depth in Feet	PER CENT										
	Coarse Gravel	Medium Gravel	Fine Gravel	Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Silt and Clay	Acid Soluble	Hygroscopic Moisture
120 - 124					1.3	5.5	10.1	9.9	73.2	46.40	1.37
124 - 125					0.2	5.5	9.6	28.6	56.1	48.46	1.45
125 - 130.5					0.6	11.3	32.2	25.0	30.9	17.98	0.86
130.5- 132.5					0.2	12.8	30.1	27.7	29.2	55.68	0.82
132.5- 135					0.6	7.4	17.1	21.0	53.9	36.35	1.41
135 - 138				0.1	0.8	7.6	19.9	19.6	52.0	16.17	1.37
138 - 140				0.1	0.7	10.0	25.9	19.5	43.8	7.17	1.17
140 - 145				0.3	1.1	9.7	28.6	19.2	41.1	3.27	1.11
145 - 150			0.1	0.3	0.7	10.7	44.9	17.4	25.9	2.47	0.75
150 - 155				0.6	3.7	26.6	38.2	14.3	16.6	1.91	0.59
155 - 160			0.1	2.6	9.2	35.4	35.9	10.3	6.5	1.19	0.43
160 - 163			0.3	2.0	10.6	48.3	26.6	6.4	5.8	0.90	0.42
163 - 165.5			0.2	0.2	1.5	12.8	24.1	18.5	42.7	35.63	1.15
165.5- 170				0.1	0.7	5.4	8.7	5.8	79.3	41.06	2.04
170 - 175				0.1	1.2	12.5	24.8	15.3	46.1	33.66	1.22
175 - 180			0.2	1.8	6.1	18.1	13.8	9.8	50.2	5.66	1.32
180 - 185			0.1	1.9	14.2	31.4	21.2	11.4	19.8	1.33	0.63
185 - 190			1.0	11.0	27.8	28.1	17.4	8.7	6.0	1.70	0.42
190 - 195		0.1	7.4	13.6	18.6	16.9	12.9	10.7	19.8	3.05	0.63
195 - 200			2.0	9.5	24.9	36.9	12.6	4.2	9.9	Wet Sieved	
200 - 205			1.6	7.8	22.4	42.8	17.4	4.9	3.1	"	"
205 - 210			1.7	9.0	22.1	40.8	17.2	5.4	3.8	"	"
210 - 215		0.4	2.1	7.5	13.7	37.1	25.9	7.3	6.0	"	"
215 - 219			2.9	11.8	16.7	36.4	22.1	6.4	3.7	"	"

TABLE 2 (Cont'd)

Test Hole 52-B-47

Depth in Feet	PER CENT										
	Coarse Gravel	Medium Gravel	Fine Gravel	Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Silt and Clay	Acid Soluble	Hygro-scopic Moisture
0 - 2			0.3	0.4	0.3	0.4	0.6	2.7	95.3	2.20	2.36
2 - 3				0.1	0.1	0.2	0.4	2.0	97.2	1.82	1.89
3 - 4.5					0.1	0.1	0.1	1.4	98.3	2.14	2.84
4.5- 8						0.1	0.3	2.7	96.9	1.11	2.78
8 - 10				0.1	0.1	0.1	0.9	14.4	84.4	2.88	2.67
10 - 14				0.1	0.1	0.1	0.5	7.2	92.1	2.98	2.56
14 - 18.5					0.05	0.1	0.5	7.5	91.9	1.56	2.65
18.5- 20						0.1	1.0	10.9	88.0	1.84	2.94
20 - 24.5						0.1	0.7	9.0	90.2	1.75	2.95
24.5- 30						0.3	1.5	12.3	85.9	1.72	2.51
30 - 35					0.1	0.1	1.4	15.8	82.6	1.72	2.07
35 - 40					0.1	0.1	1.2	13.1	85.5	1.53	1.98
40 - 45					0.1	0.2	2.0	9.5	88.2	1.16	1.92
45 - 50					0.1	0.2	1.7	10.2	87.8	1.84	2.01
50 - 55					0.1	0.3	2.3	10.9	86.4	1.72	2.27
55 - 60					0.1	0.3	2.1	10.4	87.1	5.83	2.25
60 - 65					0.1	1.8	8.6	19.0	70.5	3.28	1.90
65 - 70					0.1	3.5	11.6	18.4	66.4	3.56	1.51
70 - 75				0.1	2.8	37.8	39.5	7.5	12.3	1.40	0.50
75 - 80				0.1	2.0	32.9	53.2	7.6	4.2	0.28	0.44
80 - 85			0.1	0.2	1.4	17.0	53.0	16.2	12.1	1.00	0.54
85 - 90				0.3	1.6	5.5	16.2	16.4	60.0	9.42	1.49
90 - 97			0.1	0.7	9.1	20.0	36.5	17.2	16.4	2.35	0.69
97 - 100				0.1	2.3	4.7	16.3	28.6	48.0	26.2	1.00
100 - 105				0.6	12.7	26.8	32.7	17.3	9.9	1.00	0.44
105 - 109				0.6	13.6	23.2	30.2	20.6	11.8	0.72	0.46
109 - 115				0.4	2.3	10.7	21.7	21.5	43.4	12.20	1.11
115 - 119				0.2	0.8	4.8	12.0	13.5	68.7	10.90	1.39

TABLE 2 (Cont'd)

Test Hole 52-B-47 Cont'd

Depth in Feet	PER CENT										
	Coarse Gravel	Medium Gravel	Fine Gravel	Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Silt and Clay	Acid Soluble	Hygro-scopic Moisture
119 - 122				0.5	9.4	28.4	28.5	12.4	20.8	2.30	0.48
122 - 125		0.1	1.0	5.5	24.0	42.1	16.5	4.9	5.9	0.62	0.42
125 - 130	1.3	2.1	11.7	28.1	33.6	16.8	3.8	1.5	1.1	Washed samples & Dry sieved	
130 - 135		3.7	14.3	27.4	31.8	17.6	3.4	1.1	0.7	"	"
135 - 140		3.7	20.2	28.8	28.1	14.1	3.2	1.1	0.8	"	"
140 - 145		9.1	20.8	28.4	27.2	12.4	1.5	0.3	0.3	"	"
145 - 150		8.2	17.6	25.3	29.6	14.8	2.4	0.8	1.3	"	"
150 - 155		4.0	16.9	29.1	32.6	14.5	2.2	0.4	0.3	"	"
155 - 160		6.5	23.4	26.9	28.6	11.9	1.8	0.5	0.4	"	"
160 - 165		10.4	28.1	26.4	21.4	11.3	1.8	0.3	0.3	"	"
165 - 168		8.2	25.4	24.1	24.0	14.6	2.7	0.5	0.5	"	"

TABLE 2 (Cont'd)

Test Hole 51-B-47

Depth in Feet	PER CENT										
	Coarse Gravel	Medium Gravel	Fine Gravel	Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Silt and Clay	Acid Soluble	Hygro-scopic Moisture
0 - 1						0.1	0.3	2.2	97.8	0.84	2.67
1 - 2						0.1	0.1	1.0	98.8	1.62	2.64
2 - 2.5						0.1	0.2	1.3	98.7	1.91	2.45
2.5- 3.5							0.1	1.3	98.7	1.99	2.45
3.5- 5						0.1	0.1	1.1	98.7	3.57	2.67
5 - 10							0.1	1.2	98.7	2.82	2.48
10 - 15						0.1		1.2	98.7	1.95	2.43
15 - 19.5				0.05		0.05		1.1	98.8	1.86	2.43
19.5- 24.5						0.05	1.2	7.9	90.85	2.05	2.28
24.5- 30						0.1	1.3	11.4	87.2	1.79	2.10
30 - 35							1.1	12.8	86.1	2.20	1.99
35 - 40							0.5	6.7	92.8	1.85	2.50
40 - 45							1.4	14.2	84.4	1.62	2.42
45 - 50						0.1	0.9	11.7	87.3	7.65	2.35
50 - 55						0.1	2.3	13.7	83.9	8.20	2.28
55 - 60						0.2	3.1	18.1	78.6	4.28	2.20
60 - 65					0.05	0.1	0.8	8.6	90.5	3.91	2.68
65 - 70						0.1	0.6	77.3	92.0	3.56	2.52
70 - 75						0.05	1.0	12.35	86.6	4.22	2.23
75 - 80						0.1	1.4	14.4	84.1	2.92	2.10
80 - 85						0.2	1.3	11.0	87.5	1.59	2.59
85 - 90							1.2	11.3	87.5	1.22	2.70
90 - 95						0.2	1.7	15.8	82.3	4.73	2.32
95 - 100						0.2	1.0	8.9	89.9	2.56	2.58
100 - 105						0.2	1.1	8.4	90.3	2.36	2.66
105 - 108						0.5	1.5	8.1	89.9	1.92	2.65
108 - 110					0.2	1.7	5.3	7.4	85.4	1.68	3.10

TABLE 2 (Cont'd)

Test Hole 51-B-47, Cont'd

Depth in Feet	PER CENT										
	Coarse Gravel	Medium Gravel	Fine Gravel	Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Silt and Clay	Acid Soluble	Hygro-scopic Moisture
110 - 115				0.1	0.2	3.6	10.2	6.6	79.3	1.46	2.78
115 - 120					0.1	1.4	4.3	4.5	89.7	2.15	2.77
120 - 123				0.2	0.3	2.5	9.4	11.7	75.9	1.48	2.30
123 - 126.5			0.7	1.8	3.8	9.7	14.8	14.5	54.7	1.48	1.40
126.5 - 131		0.4	2.3	5.0	12.0	20.2	16.8	12.5	30.8	0.57	1.23
131 - 135		1.1	10.9	21.5	26.6	25.2	8.7	2.6	3.4	Washed samples	
135 - 140		2.0	14.1	24.0	31.0	19.3	5.4	2.1	2.1	& Dry sieved	
140 - 145		1.9	18.0	35.2	24.5	14.1	4.8	1.0	0.5	"	"
145 - 150		3.4	22.9	28.9	23.9	7.5	2.0	0.7	0.7	"	"
150 - 155		1.9	23.5	35.6	25.8	9.6	2.1	0.8	0.7	"	"
155 - 160		6.2	34.6	31.2	19.4	6.0	1.5	0.5	0.6	"	"
160 - 166		2.0	32.0	31.4	18.6	10.6	3.6	1.1	0.7	"	"
166 - 170		19.3	34.2	19.4	13.4	7.9	2.8	1.4	1.6	"	"
170 - 173		0.9	9.7	26.2	34.2	20.5	5.4	1.6	1.5	"	"
173 - 180		13.4	31.6	24.3	18.1	9.0	2.3	0.7	0.6	"	"
180 - 185		4.5	21.2	29.1	25.7	13.9	3.6	1.1	0.9	"	"
185 - 188		5.5	14.9	28.9	28.0	15.5	4.6	1.5	1.1	"	"
188 - 190		15.3	34.0	31.0	9.2	4.8	1.6	1.2	2.9	"	"

TABLE 2 (Cont'd)

Test Hole 50-B-47

Depth in Feet	PER CENT										
	Coarse Gravel	Medium Gravel	Fine Gravel	Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Silt and Clay	Acid Soluble	Hygroscopic Moisture
0 - 1							0.1	1.3	98.6	2.75	3.64
1 - 5					0.1	0.1	0.05	0.85	98.9	4.72	3.40
5 - 7					0.1	0.05	0.1	1.7	98.0	1.99	3.23
7 - 8					0.05	0.1	0.15	1.8	97.9	1.97	3.25
8 - 9						0.2	0.8	6.6	92.4	1.86	3.15
9 - 11				0.05	0.25	0.7	1.9	6.9	90.2	2.93	3.61
11 - 13.5					0.1	0.6	2.1	7.2	90.0	1.12	3.65
13.5- 15					0.1	0.7	1.9	7.6	89.7	1.06	4.02
15 - 19					0.1	0.05	7.2	9.6	83.05	1.25	3.70
19 - 25					0.3	6.6	20.0	12.0	61.1	0.93	2.76
25 - 30				0.2	0.8	8.8	4.5	32.7	53.0	0.66	2.46
30 - 34			0.3	0.5	1.3	8.2	25.4	27.0	37.3	0.53	2.37
34 - 40		0.6	1.1	4.3	15.4	49.7	22.7	4.9	1.3	Washed samples&	
40 - 45	0.6	1.4	8.4	17.7	31.7	30.1	8.0	1.5	0.6	Dry sieved	
45 - 50	0.9	4.4	11.1	16.3	28.6	31.8	5.7	0.8	0.4	"	"
50 - 55	6.1	17.0	30.7	25.5	15.3	4.2	0.6	0.2	0.4	"	"
55 - 60	3.0	22.4	25.7	27.7	15.7	4.5	0.7	0.2	0.1	"	"
60 - 67.5	5.5	24.7	30.8	20.0	12.2	5.3	1.1	0.3	0.1	"	"
67.5- 71		4.6	11.7	37.3	32.5	10.6	2.2	0.6	0.5	"	"
71 - 75	3.5	25.2	37.2	23.4	8.1	1.9	0.5	0.1	0.1	"	"
75 - 80	2.4	20.4	35.7	23.5	11.7	3.7	2.3	0.2	0.1	"	"
80 - 85	5.9	23.0	32.1	22.9	11.1	3.6	1.1	0.2	0.1	"	"
85 - 90	11.0	21.4	27.3	21.3	12.8	4.9	0.9	0.2	0.2	"	"
90 - 95		13.5	23.9	23.1	23.0	12.8	2.9	0.5	0.3	"	"
95 - 100	4.0	24.6	25.2	22.2	16.0	6.1	1.5	0.3	0.1	"	"
100 - 105	3.6	15.4	27.6	24.7	16.9	7.7	1.9	0.8	1.4	"	"
105 - 110	5.5	22.0	29.8	20.0	12.6	7.0	1.7	0.6	0.8	"	"

TABLE 2 (Cont'd)

Test Hole 50-B-47, Cont'd

Depth in Feet	PER CENT										
	Coarse Gravel	Medium Gravel	Fine Gravel	Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Silt and Clay	Acid Soluble	Hygro-scopic Moisture
110 - 115	11.5	11.1	24.6	25.2	18.0	7.5	1.5	0.3	0.3	Washed	samples
115 - 120		14.6	23.4	23.9	22.3	12.0	2.9	0.5	0.4	& Dry	sieved
120 - 125		12.2	23.0	21.7	22.7	15.4	4.3	0.5	0.2	"	"
125 - 130		22.3	24.1	18.4	17.6	13.0	3.6	0.5	0.5	"	"
130 - 135		11.3	24.9	24.0	21.2	13.7	4.2	0.5	0.2	"	"
135 - 140		10.1	25.8	23.9	22.1	14.2	3.0	0.5	0.4	"	"
140 - 145		15.9	26.4	21.9	19.7	12.4	3.1	0.4	0.2	"	"
145 - 150		16.0	24.5	22.0	20.4	13.2	3.3	0.4	0.2	"	"
150 - 155		4.5	19.6	19.5	24.8	24.6	6.2	0.7	0.1	"	"
155 - 160		10.9	17.9	17.0	20.8	20.4	6.3	2.5	4.2	"	"
160 - 165	1.6	16.0	33.8	22.7	13.0	8.7	3.2	0.7	0.3	"	"
165 - 170	2.0	25.0	29.5	23.4	10.7	6.4	2.4	0.5	0.1	"	"
170 - 172.5		11.0	38.6	20.3	13.1	11.5	3.8	0.8	0.9	"	"

TABLE 2 (Cont'd)

V.

DISCUSSION

Classification of the Pleistocene Section

The stratigraphic classification of the Pleistocene has been based primarily on advance and retreat of the various ice sheets during this glacial epoch. The succession of deposits in the glaciated areas in north-central United States has been used by most geologists as the standard for Pleistocene chronology. Chronologies and classification for the periglacial areas in the central Great Plains have been prepared by correlating the deposits of the non-glaciated area with those of the glaciated area and based on studies of fossils, stratigraphic succession, and paleophysiography.

The process of integrating the deposits in areas outside of the glaciated region in the central Great Plains with the glacial time scale has been in progress for many years. A buried soil zone which occurs at the top of the Loveland formation has been traced over a wide area in Iowa, South Dakota, Nebraska and Kansas (Lugn, 1935; Schultz and Stout, 1945; Condra, Reed, and Gordon, 1947; and 1950; Frye and Fent, 1947). The Pearlette ash which occurs as a lenticle in the Sappa formation is widely distributed over many of the states in the central Great Plains region and is probably the best horizon marker in the Pleistocene (Condra, Reed, and Gordon, 1947; 1950; Frye, Swineford and Leonard, 1948). An invertebrate molluscan fauna occurring in the Sappa formation and often associated with the ash lenticle has furnished a valuable horizon for correlation between two areas (Frye, Swineford and Leonard, 1948; Leonard, 1950). Lugn (1935; Lugn and Wenzel, 1948), and Condra, Reed, and Gordon (1947; 1950) have demonstrated rather conclusively that the deposits of

the glaciated region inter-finger with those of the non-glaciated region. In the past few years, additional extensive test drilling along the margin of the till border, in the glaciated region, and in the south-central portion of Nebraska have proven without much doubt the inter-fingering relationship of deposits of the two regions (unpublished records and profile sections on file at the Conservation and Survey Division; E. C. Reed, personal interview, 1950).

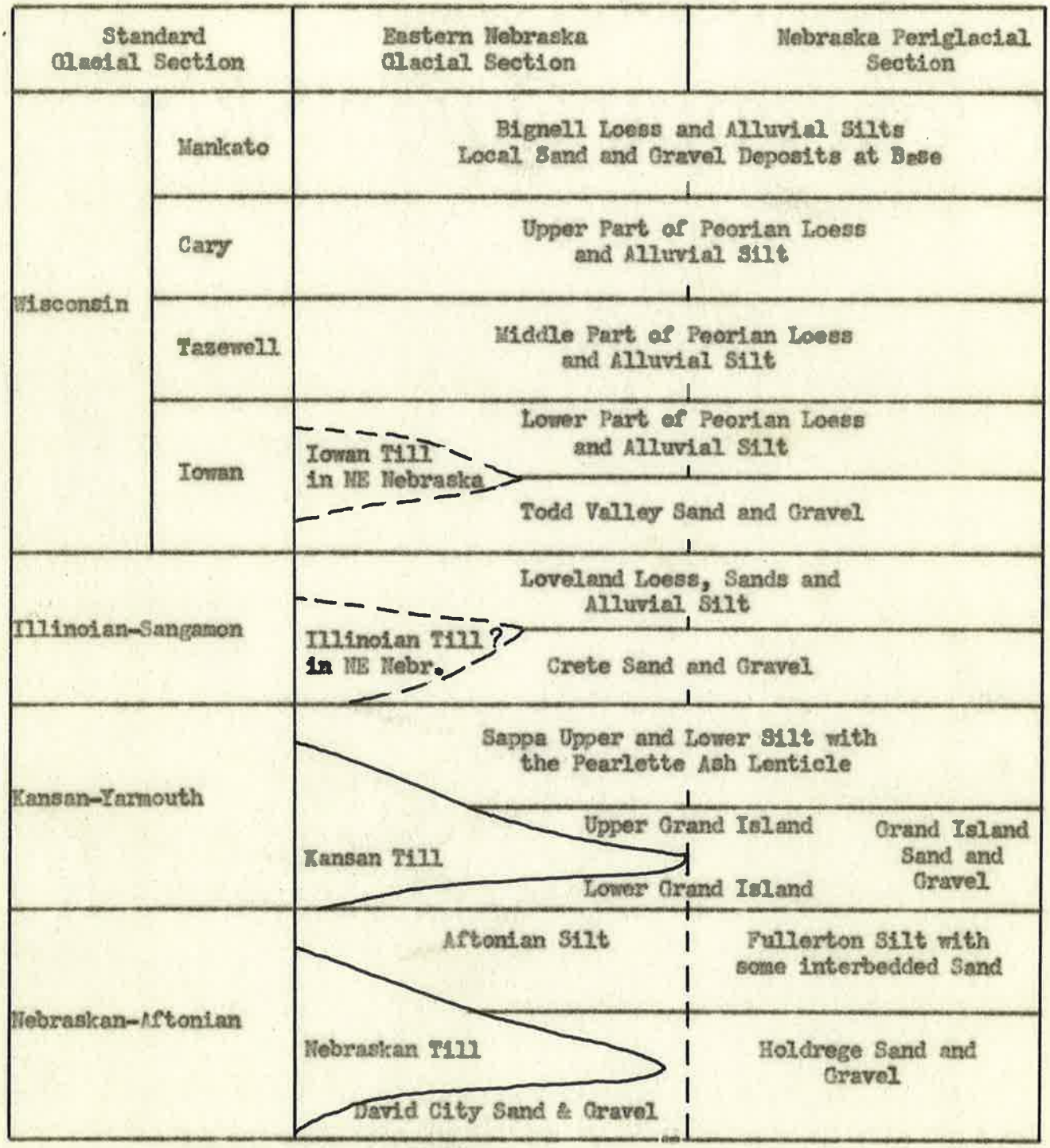
The collection and study of the prolific Pleistocene fauna in Nebraska, principally in the non-glaciated area, has been in progress for many years by Nebraskan paleontologists who have followed precise stratigraphic practices in their work. This work has contributed greatly to developing chronologies and classification in the periglacial area.

The study of the terraces of the Great Plains in relation to the cyclic nature of the Pleistocene and in connection with paleontological work has been in progress for many years by the State Geological Surveys of Nebraska, Kansas, and Iowa, the United States Geological Survey, and the University of Nebraska State Museum and Department of Geology.

The present classification of the Pleistocene for the glaciated and non-glaciated regions has been generally agreed upon. The stratigraphic classification used in this report (Figure 7) is that of the Nebraska Geological Survey (Condra and Reed, 1950).

Figure 7

*STRATIGRAPHIC CLASSIFICATION OF THE PLEISTOCENE SECTION



* After Condra and Reed, 1950.

Lithology of Formations and Geology of Area

The formations encountered in the test holes drilled in the area of this investigation are described in the following pages and these data are interpreted geologically. The descriptions and interpretations represent a summation of the information secured as a result of the various methods of study that have been outlined above. The Pleistocene deposits are reviewed in some detail and a brief discussion is given of the pre-Pleistocene formations drilled. The formations are described chronologically from oldest to youngest. Most of the information contained in this discussion is shown graphically on the geological profile sections and the Pre-Pleistocene and Pre-Grand Island topographic maps. For detailed lithologic descriptions the reader is referred to the test hole records pages 36 to 181.

CRETACEOUS SYSTEM:*

Most of the test holes in the area of this investigation were drilled into formations which are of Cretaceous age. From the easternmost test hole on the east-west profile line (J-K) westward, the Carlile shale, the Niobrara formation, and the Pierre shale are encountered progressively in contact with Cenozoic deposits. Descriptions of the formations of this age are included in the detailed records of the test holes.

The Carlile shale formation underlies the Niobrara formation and is encountered immediately below the Cenozoic formations to the east

* The areal extent of the Cretaceous formations underlying the area of this report was taken from an unpublished pre-Cenozoic topographic and bedrock map of south-central and southeast Nebraska, prepared by E. C. Reed, 1950.

of Adams and Webster counties where the Pierre and Niobrara formations have been removed by post-Cretaceous, pre-Cenozoic erosion. It consists of bluish gray shale with a thin sandy zone in the upper part (Blue Hill member) and a lower zone with chalky limestone layers (Fairport chalk member). It is about 250 to 270 feet thick in this area.

The Niobrara formation underlies the Pierre formation and occurs immediately below the Cenozoic deposits in those parts of Adams, Kearney, Franklin and Webster counties where the Pierre has been removed by post-Cretaceous, pre-Cenozoic erosion. It includes the Smoky Hill chalk member (upper member) consisting of lead-gray chalky shale and shaly chalk and is about 400 to 500 feet thick in this area and the Fort Hayes limestone member (lower member) consisting of gray to yellowish chalky limestone with a thickness of 20 to 40 feet.

The Pierre shale formation underlies deposits of Cenozoic age in Phelps County and all but a small portion of the eastern edge of Kearney County where the Pierre has been eroded in some of the deeper pre-Cenozoic channels, and the Cenozoic formations rest on the Niobrara formation. The Pierre is present under the northern and western parts of Franklin County and in the extreme northwest corner of Webster and the southwest and northwest corners of Adams County. It consists of dark gray to black clay shale, thin layers of bentonite, and some chalky shale zones.

TERTIARY SYSTEM:

Thick intervals of formations of Tertiary age were penetrated in many of the test holes, and strata of this age are present underlying most of the area. The thickness penetrated varied from zero to over two hundred fifty feet. A description of the lithology of the Tertiary

formations encountered in drilling the test holes has been included with the detailed test hole records, but no attempt is made to correlate this material with recognized Tertiary formations. A study was made of the records and samples of certain test holes where questions arose as to the Tertiary-Pleistocene contact.

The Tertiary section encountered in this area is represented principally by the Ogallala formation of Pliocene age and its eastern, fine textured facies, the Seward formation (Condra, Reed, and Gordon, 1947; 1950). The more typical "Ogallala"-type sedimentation (Lugn, 1935) is restricted principally to the area west of the profile line E-F (through the center of Kearney and Phelps Counties). A Tertiary buried hill or ridge, south of the town of Minden on profile line E-F, has the "Ogallala" characteristics of cementation and is predominantly sandy although relatively fine textured. However, the Tertiary immediately to the north and south and at an elevation lower than the interval represented in the "high" is predominantly silty and clayey. The Tertiary materials penetrated under the Platte River Valley and to the north in Buffalo County, on profile line C-D, and in the first two test holes south of the Platte River Valley in Hall County on the easternmost north-south profile line (A-B), also is predominantly sandy and relatively well-cemented. The sections in those two areas are relatively thick and occur in a high undissected topographic position compared with the Tertiary encountered to the south.

The Tertiary interval in the remainder of the area is referred to the Seward facies of the Ogallala formation and consists predominantly of calcareous silts, clayey silts, and siltstones with some marly zones and some interbedded sands. Thin sand and gravel zones are common in the

basal portion and often contain much reworked Cretaceous material.

The Pleistocene - Tertiary boundary was difficult to determine where Tertiary sands and gravels and the basal sands and gravels of the Pleistocene were in contact or separated only by thin silt zones. This situation was encountered in the southern part of the two western profile lines (E-F) and (G-H) and in the area in northern Harlan and southern Phelps counties to which the pre-Pleistocene topographic map was extended (see Figure 8). This difficulty was occasioned by the superposition of an early Pleistocene channel on older Tertiary drainages with sand and gravel fills. The Tertiary - Pleistocene contacts in portions of this area are uncertain at the present time and require a more detailed study. In general, the basal Ogallala sands and gravels in most of the area investigated had lower percentages of pink and red quartz and feldspar grains than the Pleistocene sands and gravels.

The Tertiary in this area includes, locally, a lower clay which varies in thickness from zero to a maximum of about forty feet. It consists principally of whitish gray to a light and medium gray clay, which is characteristically highly weathered and iron stained in the upper few feet. The clay has a blocky structure and it varies in nature from highly calcareous to almost non-calcareous, usually dependent on the calcareous nature of the formation underlying it. The formation rests unconformably on the Pierre and Niobrara formations of Cretaceous age, and there is a distinct disconformity at its top. It appears to thin and disappear to the eastward; it seems to be post-Cretaceous and pre-Ogallala in age and may be equivalent to a part of the Oligocene White River Group. Additional test drilling to the westward is needed to verify this suggestion.

PLEISTOCENE SYSTEM:

Holdrege formation (Lugn, 1935): The basal Pleistocene sands and gravels in the periglacial area have been assigned to the Holdrege formation (Nebraskan in age). They were deposited in stream valleys which were incised into the Tertiary and Cretaceous formations. A contour map of the base of the Pleistocene (See Figure 8) has been prepared to show the major drainage features in existence at the beginning of Holdrege deposition. The map was extended beyond the area specifically studied in the preparation of this report in order to assist in solving certain problems that became apparent in the progress of the investigation. The direction of drainage was determined principally by the slope of the old land surface and the drainage pattern appears to have been greatly influenced by the resistance to erosion of the underlying formations.

Much of the Tertiary in this area was removed by headward erosion from the east prior to early Pleistocene deposition, particularly in the eastern portion of the area. The northern half of Kearney County and essentially all of Adams County is featured by a broad basin-like channel where the basal Pleistocene sands and gravels rest on wide-spread, easily eroded, Tertiary silts. The valley is restricted to a narrower channel in central-northern and in northwestern Kearney County by the upper, coarser textured, and well cemented Tertiary formations which were more resistant to erosion. This channel was deflected and is confined along its southern border by a cemented Tertiary high south of Minden in central Kearney County (See test hole 77-B-47, profile line E-F) and by a Tertiary (?) - Cretaceous ridge which trends southeastward through northern Webster County and eastward.

A buried ridge of Tertiary - Cretaceous bedrock trending eastward

and centered near the Adams - Hall and Hamilton - Clay county lines defines the northern limit of this channel. Late Holdrege deposition overlapped this ridge from a point about in central northern Adams County eastward. Another major buried valley occurs to the north of this buried ridge in Hall County and trends almost due eastward.

The pre-Pleistocene surface of the southern third of Kearney County, and northern half of Franklin is a broad southeastwardly sloping plain with rather narrow and deeply incised channels bounding it to the northeast and southwest. The channel to the north was deflected southeastward by the previously mentioned southeasterly trending Tertiary - Cretaceous ridge. The channel to the southwest was deflected to the east and narrowed considerably by a resistant Pierre shale ridge trending east-west from near the center of the Harlan - Franklin county line and at this point eastward the channel seems to be superimposed on an old Tertiary drainage. This channel was joined by the southeasterly flowing one near the center of Webster County.

Much of the area in northern and northwestern Webster County and eastward is underlain by a Niobrara shale "high" that is probably capped in part with some Seward silts. This area remained above the level of highest Holdrege and Grand Island sand and gravel deposition and prdbably is more or less continuous with the Ogallala high to the northwestward just south of the town of Minden, test hole 77-B-47.

The accuracy of the pre-Pleistocene topographic map is of course dependent on the correctness of the writer's placement of the Pleistocene - Tertiary contact. However, it will take more research and detailed study before a completely satisfactory answer can be found for some of the problems involved. It is possible that the channel which heads northeast of Holdrege and which continues to a point south of Minden (test hole

78-B-47) may actually continue in an easterly direction. Granting the fact that a portion of the section which is classified with the Pleistocene in test hole 53-B-47 (southeast corner of Kearney County) is Tertiary, it is very doubtful that the coarse textured sand and gravel in the hole to the south, 52-B-47, is Tertiary. Features of the channel from test hole 78-B-47 (south of the Tertiary high in central Kearney County) and westward can more easily be carried southeastward through test hole 52-B-47 than eastward into the broader channel in Adams County. It would also seem more probable that the Tertiary "high" at south of Minden would be a part of the distinctive ridge to the southeast rather than an isolated buried hill.

The extent of the channel through the southwest corner of Phelps County, through northeast Harlan and through central Franklin and Webster counties is somewhat more problematical. There are Pliocene gravels in the area bordering and in part co-existent with it, and it is difficult on the basis of the records that are available to successfully differentiate them from the sands and gravels of the basal Pleistocene. The test holes in the channel to the northwest of 48-B-47 (center of Harlan-Franklin county line) contain no significant silt separations and seem rather definitely to be Pleistocene. Thin silts in the lower portion of test hole 48-B-47 do not seem to be significant and the lower gravels are coarser and have more granitic materials in them than do the Pliocene sands and gravels in the test holes to the north. The lower interval of test holes 83 and 84-B-47 (central Franklin County), through which the channel has been contoured, has been called early Pleistocene (?) and contains a silt and sand section about thirty-five feet thick in its upper part and twenty to thirty feet of sand and gravel in the basal

part which can very easily be correlated between the two test holes but not so successfully with the Pliocene intervals in test holes to the north. The sands and gravels of the test holes in the channel eastward are more certainly Pleistocene. It is entirely possible that the course of the pre-Pleistocene channel falls between the two test holes 83 and 84-B-47 and that the interval correlated as Pleistocene in these two test holes is Tertiary.

The Holdrege formation grades in thickness where present from a very few feet (in all but the deeper channels) in the westernmost profile line (G-H) to a maximum of about 200 feet in the easternmost profile line (A-B). It seems doubtful if the original thickness of the Holdrege formation in the westernmost part of the area was ever much greater except in deeper channels.

It is significant that the general gradient of the pre-Pleistocene surface varied from a minimum of about 8 feet per mile to a maximum of over 20 feet per mile while the gradient of the eroded surface on which the Grand Island formation was deposited (See Figure 9) varied from a minimum of about 5 feet per mile to a maximum of about 12 feet per mile. At the end of the deposition of the Holdrege sands and gravels this area was aggraded to a surface that was essentially a plain with a few Tertiary and Cretaceous ridges and hills remaining exposed above the surface of the plain.

While the Holdrege formation is mainly sand and gravel, its textural characteristics are quite complex as might be expected for a deposit of this type which was deposited on an irregular surface, as described above. Main channel areas presumably shifted frequently and quite abruptly resulting in deposits of quite different textures in a relatively short distance. Thin silt deposits occur at different levels

within the formation. There is evidence as shown on the north-south profile line (C-D) in which textural analyses are given and on the east-west profile line (J-K) that the Holdrege formation may be separated into two units. The lower unit is more intricate in its make-up and is generally much finer in texture.

The Holdrege formation in this area consists of inwash material from the west and northwest and is predominantly of quartz and other granitic materials originating from the Rocky Mountains and from reworked Tertiary beds from the plains to the west. Its color is characteristically a very light brownish to pinkish gray, the grains are rather well rounded, and the surfaces generally dull.

Fullerton formation (Lugn, 1935): The Fullerton formation lies between the Holdrege and Grand Island formations and is believed to be late Nebraskan and Aftonian in age by the Nebraska Geological Survey. The origin of this formation is fluvial-eolian (Lugn, 1935, p. 98; Condra, Reed, and Gordon, 1947, p. 19).

In the area of this report the Fullerton formation was not encountered on the westernmost profile line (G-H) and has probably been removed by post-Fullerton, pre-Grand Island erosion. It was encountered as a discontinuous deposit in the rest of the area with a maximum thickness of thirty-five feet. Some of its thickest occurrences are near exposures of bed rock which may have been important local sources of sedimentation, as has been suggested by Lugn (1935, p. 101). In this area the thick occurrences near high bedrock may partially be due to the fact that the exposures of bedrock and the deposits on and around them formed divide areas less accessible to the erosive action of the later streams.

The lithologic character of the formation varies considerably.

Lugn (1935, pp. 100-101) pointed this out as being characteristic of the formation over the widespread area of its occurrence. The silt deposits in this area are generally coarse textured and often quite sandy. Its silty occurrences contain some interbedded sand and in other places it is represented by rather fine textured sand which is in part silty. Streams probably were in existence during the Fullerton time of deposition and in places thin gravelly zones which do not seem to belong to either the Grand Island or the Holdrege formations have been called Fullerton.

The erosion period before the deposition of the Grand Island formation appears to have removed much of the Fullerton formation in this area, notably in the southern part of Franklin County and along the western profile line (C-H). Test hole 79-B-47, south of Minden, on profile line (E-F) has a Fullerton interval thirty-five feet in thickness and in the test hole 80-B-47 immediately to the south, these sediments have been cut out and the Grand Island sands and gravels rest directly on the Holdrege formation. The same situation exists in the northern part of profile E-F in which a thick Fullerton interval was drilled in test hole 73-B-47 and absent in the hole (72-B-47) to the south. Erosion probably proceeded rather rapidly on the Fullerton formation in places until the streams cut into the sand and gravel of the underlying Holdrege formation where erosive ability was retarded.

The color of the formation is quite variable but is generally a very light gray or light brownish gray with some yellowish and greenish tints. There is not much evidence of a distinctive profile of weathering, possibly because this profile may have been eroded. The colors indicate rather poor drainage conditions over much of the area.

Grand Island formation (Lugn, 1935): The Grand Island formation was named by Lugn with the type section at Grand Island, Nebraska, and he considered the formation to be "the inwash - outwash equivalent of the Kansan till and the early Kansan inter-till sands and gravels of eastern Nebraska" (1935, p. 103-104).

The Grand Island formation in the till area has been interpreted by Condra and Reed (1950) as consisting of two sand and gravels of Kansan age, the lower one of which is principally overridden outwash and the upper one of which overlies eroded Kansan till along its western border and occurs in valleys on the eroded Kansan till surface underlying deposits of the Sappa formation. They consider the maximum advance of the Kansan ice as having occurred rather early in Kansan time and as having been followed by partial retreat with accompanying erosion and deposition. The terms "Upper" and "Lower" Grand Island are used for these two sands and gravels where they are separated by Kansan till and the Grand Island formation to the west is believed to correlate with the sequence of Lower Grand Island sand and gravel, Kansan till and Upper Grand Island sand and gravel (Condra and Reed, 1950).

The surface on which the Grand Island formation was deposited has been contoured on top of the underlying formations of Fullerton, Holdrege, or bedrock of Tertiary and Cretaceous age (See figure 9). The course of drainage shifted to a more easterly direction than existed during Holdrege deposition. This shift in drainage may have been the result of a northward shifting of a belt of higher precipitation which accompanied the retreat of the Nebraskan ice sheet in the region north and east of this area.

The area contoured in Kearney, Adams, and northern Franklin and

Webster counties is characterized in the northern half by a broad, flat valley with a shallow gradient of about five to ten feet per mile. The valley broadens from the northwestern corner of Kearney County and divides into two minor channels at a point in north-central Kearney County with one drainage along the southern side and one along the northern side of the main valley. It is in the area of these two drainages where the Fullerton has been removed or at least thinned by erosion.

A broad gently sloping ridge partially covered by the Holdrege sands and gravels, capped by the Fullerton formation in part, and with isolated hills of Tertiary and Cretaceous bedrock exposed at the locations of test holes 77-B-47 south of Minden and test holes 25 and 26-B-49 (in the center of northern Webster County) trends southeasterly through the center of this area. A drainage appears to have headed south of Minden and trended eastward along this ridge and to the north of the Niobrara high in northern Webster County. By the end of Grand Island deposition this ridge was covered with the exception of an area in north-central and in the northwest corner of Webster County. The relatively high flat surface formed by the Fullerton formation in test holes 77, 78, and 79 on the western profile C-H (south-central Kearney County) and in test holes 55, 54, 53, and 52-B-47 in the profile to the east (C-D) was capped only by the sands of late Grand Island deposition.

It appears that most of the Fullerton formation and some of the Holdrege were removed by erosion in the southern portion of this area. A broad valley extends eastward through the area with the main part of the channel trending through central Franklin and Webster counties in about the same position as the earlier pre-Pleistocene drainage. The flanks of the channel to the north slope towards it with a low gradient

in a southeasterly direction. The southern flank was not contoured because of the absence of much of the Grand Island - Holdrege sands and gravels which have been removed in the development of the present Republican River Valley. The flanks were probably somewhat steeper than those to the north. The Republican River parallels this old valley about six miles to the south and a ridge of Cretaceous and Tertiary bedrock with a well developed bluff line borders the southern edge of the Republican River Valley. Lugn has pointed out (Lugn and Wenzel, 1935, p. 35) that only a few feet (or perhaps none) of the Grand Island sand and gravel formation is found south of the Republican River.

It is believed that the pre-Grand Island topographic map is essentially accurate in presenting the general features. It may be subject to considerable revision in detail, particularly in the areas where sands and gravels of the Grand Island formation rest directly on those of the Holdrege formation.

The Grand Island formation maintains a relatively constant thickness of about fifty feet in most of the broad channel in northern Kearney and Adams counties. In the channel to the south in Franklin and Webster counties it thickens from forty to fifty feet on the northern flank to a maximum of about a hundred feet in the main channel

The deposits are essentially valley fill of inwash material originating as did the Holdrege sand and gravels from the mountains and table lands, principally to the westward, and they consist of materials similar to those which make up the Holdrege sands and gravels with the addition of a considerable amount of the Holdrege and possibly Fullerton reworked into them.

The upper part of the Grand Island formation over most of the area where the uneroded upper section is present is usually a sand. This has

been noted by Lugn (1935, p. 104) as a consistent feature of the Grand Island and he considers that it may have been of eolian origin. The material is relatively fine textured and is predominantly quartz with many of the grains well rounded or spherical and the surfaces commonly well frosted suggesting eolian action.

There is stratigraphic evidence to suggest a subdivision of the Grand Island formation into an upper and lower part in the eastern part of the area studied in the preparation of this report. A close examination of the textural analyses logs of the test holes shown on profile (C-D) suggests a division of the Grand Island into two zones (disregarding the upper fine textured zone) on the basis of a gradation from fine textured materials to coarse with another cycle lower in the section of finer textured material again grading to coarse. The evidence is inconclusive. However, on the profile to the east (A-B) in central Adams County and in the eastern portion of the east-west profile (J-K), central Adams and Clay counties, a significant silt break is present in the center of the interval correlated as the Grand Island formation. More significant is the fact that gradations from fine in the upper part to coarse in the lower part occur in the sands and gravels both above and below the silt separation. The silty separation is rather sandy and in part clayey and varies in color from a very light gray to a light brownish gray with some evidence of weathering in the upper three feet of the interval in test hole 106-B-47. Some yellowish brown hydrated iron oxide mottling is present in much of the interval. Its deposition presumably would represent the time of quiescence at the maximum stand of Kansan glaciation in eastern Nebraska. Exposures of the Grand Island formation in the Little Blue River Valley have yielded vertebrate fossil remains which,

according to Dr. C. B. Schultz, Director and Curator of the University of Nebraska State Museum, are late Grand Island forms (1950, personal communication). The formations are depicted as being continuous to and under the Little Blue River Valley in profiles A-B and J-K. The true situation in the valley may vary considerably because of post-Grand Island erosion and fill, and it must be remembered that the topography illustrated was taken from old rather generalized topographic maps.

Kersey (1949) studied a line of test holes south of the Platte River along the Hamilton - Hall county line and extending four miles farther south along the Adams - Clay county line. This line is part of a profile of test holes which extends southward and includes test hole 106-B-47 (on east-west profile section J-K of this report). It is interesting to note that the silt separation in the Grand Island formation in the area of this report, discussed above, seems to correlate northward with a silt zone which Kersey questionably has correlated as the Fullerton formation in the southern half of his profile section. Kersey has correlated a relatively thick sand and gravel interval occurring above the silt as the Grand Island formation, and underlying the silt he has correlated the upper part of a thicker sand and gravel as the Grand Island or Holdrege formation and the lower part as the Holdrege formation.

The surface at the end of Grand Island deposition was essentially a level plain with an eastwardly sloping component of about six to eight feet per mile. Cretaceous - Tertiary bedrock was mantled probably in all of the area with the exception of northwestern Webster County.

Sappa formation (Reed, 1948): The Sappa formation redefined (Upland formation of Lugn, 1935) includes an upper and lower silt with the Pearlette ash lenticle. Condra and Reed (1950) consider this formation as being late

Kansan - Yarmouth in age. The formation is described by Lugn (1935, p. 119-127) as having an aqueous--eolian origin very similar to that of the Fullerton formation, and to have been of Yarmouth age, more or less equivalent to the Kansan gumbotil.

The Sappa formation was deposited on the comparatively level plain, modified by basin-like depressions, which existed at the close of Grand Island deposition. It appears to be conformable with the Grand Island in many places where the contact is transitional. The water table was probably quite near the surface with consequent poor drainage conditions in much of the area during Sappa time.

The thickness of the Sappa varies from a very few feet to a maximum of sixty feet (particularly in the divide area between the two principal Grand Island valleys). Thickness of from eighty to one hundred feet have been correlated as Sappa in some test holes, but it is possible that a portion of older or younger formations have been included in it. The formation is principally silt or sandy silt with common local developments of clay and silty clay. Discontinuous deposits of sand occur at different levels in the Sappa of this area and they are usually fine textured, probably being of both aqueous and eolian origin. The sands contain a large percentage of quartz and are generally well rounded or often spherical with moderate to highly frosted grain surfaces.

The color of the Sappa formation is variable and is dependent to a great extent on the nature of the weathering and soil forming processes which affected the formation during and subsequent to its deposition. Thorp indicates in Condra, Reed, and Gordon (1947, p. 40) that "with good drainage, soils and loess deposits seem to become less yellow and more red with time" and that "with poor drainage, gray and mottled colors increase with time." The color of the Sappa in this area seems to reflect

the configuration of the land surface and the drainage conditions both during and after deposition. Time and some of the other factors affecting the colors and mineral constituents of soil, loess and loess-like deposits such as source of material and climate may be considered as nearly constant. Rate of accumulation, ultimate thickness, and biological activity would be factors which were variable but probably less significant during Sappa deposition and soil formation than was the topographic and drainage environment during weathering and soil formation.

The colors of the Sappa range from a very pale olive or greenish gray to very light gray or pale yellow gray with some yellow-brown mottling in areas where the drainage conditions were poor, to light yellowish brown or yellowish brown where the drainage conditions were good, particularly over the divide areas and on southern slopes through the central part of the area. Pale browns and even some light reddish browns are found in particularly well drained situations or where the strong weathering of the Loveland formation in Late Sangamon time carried down into the Sappa. A dark colored soil development on the Sappa was observed in a few test holes; its absence in many instances appears to be the result of pre-Loveland erosion.

It is difficult to locate the contact between the Sappa and the Loveland formation accurately in some areas because of the similarity in their color in many of the upland test holes as the result of similar soil forming conditions subsequent to deposition or where Loveland weathering has carried into the Sappa. Several intervals were correlated as either Sappa or Loveland principally on the bases of lithologic change and stratigraphic relationship. A volcanic ash which is believed to be the Pearlette on profile line A-B, test hole number 26-B-49 occurs as a

lenticle in reddish Sappa in a particularly well drained situation.

Small concretions of dark brown iron or iron-manganese oxide are common in much of the Sappa, particularly in its more brownish phases. The Sappa appears to be leached of its lime content to a considerable depth, but because it contains a large amount of secondary calcium carbonate in concretionary or even marly zones, as the result of redeposition of calcium carbonate which has been leached from overlying beds by ground water, it is difficult to determine whether the calcium carbonate present is primary or secondary.

A part of the intervals in two test holes, 53-B-47 in northwest Webster County (profile line C-D) and 25,B-49 in north-central Webster County (profile line A-B), have been doubtfully correlated as Sappa. Both test holes are on the buried bed rock ridge which is believed to trend southeastward from the Ogallala buried hill at test hole 77-B-47 south of Minden on profile line E-F to the Cretaceous "high" at test hole 53-B-47 which continues as a high ridge southeastward into Niobrara outcrop areas in Nuckolls County. This interval in both of these test holes is very high in calcium carbonate content (in part over fifty per cent by weight in test hole 53-B-47 on which acid soluble determinations were made) and in part consolidated. The high lime content and consolidation is very similar to that of Ogallala sediments of Pliocene age much farther to the west. However,the relatively high sand content and relatively coarse texture is not characteristic of Pliocene sediments in this area, although, as pointed out in the Tertiary discussion, the Ogallala is relatively coarse-textured under the Platte Valley at the northern ends of these two profile lines and in about the same topographic position. East of profile line A-B along the north half of the Webster - Nuckolls county line the Nebraska Geological Survey (unpublished profile section)

has correlated an interval underlying the Loveland and Sappa formations as being Seward in age. This interval consists principally of silts, siltstones, and clayey silts and is non- to moderately calcareous with occasional thin hard limy nodular zones.

The lime content in the Sappa, Grand Island and Fullerton formations immediately north of test hole 53-B-47 is very low but in the test hole to the south relatively high lime content is found in the lower Sappa and in the interval correlated as the Fullerton formation. This interval with the underlying sand and gravel in the southern hole is believed to be Pleistocene even though the lime content is high, as has been discussed in connection with the Holdrege formation. Lithologic correlations can be carried very successfully from the calcareous section in test hole 53-B-47 and the underlying sand (with some gravel) to the Pleistocene intervals in the test holes immediately to the north and south. The volcanic ash which is also very calcareous in test hole 53-B-47 has been correlated as the Pearlette lenticle of the Sappa. A chain of special circumstances may have resulted in preserving from erosion a Pliocene buried hill at this location with characteristics such as have been described, however it is believed by the writer that this material is more probably Pleistocene in age and that the high calcareous nature of the deposits may be explained as the result of secondary deposition of calcium carbonate from percolating ground water in an essentially silty section over a ground water divide area.

The situation is similar in the calcareous interval in test hole 25-B-49 (profile line A-B). The water table in this test hole is very high, being held up by the silty section over the groundwater divide. The secondary lime content of the Sappa and Lower Loveland above the marly section is also relatively high; the Sappa section in the test hole to the

north (24-B-49) has several secondary lime zones while the test hole to the south (26-B-49) is relatively non-calcareous where the water table is much lower. The marly section is more sandy than in the Sappa sections in the test holes on either side. However, it is believed that the section is more likely Pleistocene than Pliocene.

Crete formation (Condra, Reed, and Gordon, 1947): The Crete formation was first described as a "valley phase" of the Loveland formation by Lugn (1935, p. 128-130) who considered it Illinoian in age.

The Crete formation was named by Condra, Reed, and Gordon (1947, pp. 24 and 25) and is described as a channel fill deposit of sands and gravels distinct from the true valley phase of the Loveland and usually associated with present valleys in the valley bottomlands and lower terraces or as channel remnants along valley side slopes.

The Crete formation has not been recognized as such in the test holes drilled in the area of this investigation. A portion of the sand and gravel correlated as the Todd Valley formation under the Platte Valley may be in part Crete in age. Some of the basal sands in the interval correlated as Loveland may be equivalent to the Crete of eastern Nebraska and valley side deposits of sand and gravel along the Little Blue River may be Crete but do not continue far enough under the adjoining uplands to be penetrated in upland drilling.

Loveland formation (Shimek, 1908): The Loveland formation with its well developed soil is a distinctive deposit recognized over a broad area in Iowa, South Dakota, Nebraska and Kansas, both in the till area and in the Plains region of the non-glaciated area, and it has been widely used as a horizon marker in correlating the glacial and non-glacial deposits.

It has been studied in detail in recent years (Lugn, 1935; 1938; Kay and Graham, 1943; Schultz and Stout, 1945; 1948; Condra, Reed, and Gordon, 1947; Frye and Fent, 1947). It includes a valley phase (distinct from the pre-Loveland Crete formation), colluvial or slope phase, and an upland phase (Condra, Reed, and Gordon, 1947). The age of the Loveland formation in Nebraska is considered by Condra and Reed (1950) and by Lugn (1935, 1938) to be Late Illinoian - Sangamon.

The Loveland formation in the area of this investigation consists of interbedded and seemingly interfingered deposits of loess, loess-like sandy silts and sands. The thickness of the formation varies from thirty to sixty feet with a maximum development of about one hundred ten feet. The Loveland colors are especially strong, ranging from light yellowish brown to pale brown in the lower portions of the formation to reddish yellows and reddish browns in the upper parts. Thin zones of light grays and light yellowish grays were drilled in the lower part of the formation in some test holes. In much of the area it is capped by a dark grayish brown or a dark reddish brown soil which varies from two to three feet in thickness up to a maximum of five feet. The soil profile is maturely developed, as noted by Lugn (1935, p. 141) and the formation has been leached of its lime content for a depth of many feet. Secondary lime in concretionary form is common in the lower part of the formation.

The principal mineral component of the sands is quartz and the grains are often well rounded or spherical with much frosting on the surfaces. In a few test holes, notably 29-B-48, the westernmost test hole on profile line J-K, many of the grains were polished. The sands may be both eolian and fluvial in origin. The sands often show some evidence of weathering and/or iron-staining on close examination, the grains being somewhat yellowish.

Much of the Loveland formation seems to have been removed by post-Loveland erosion in the area south of the Platte River as may be seen by an examination of the profiles. The evidence presented in the profile sections suggests that the Loveland formation thins toward the Platte River Valley from the present Republican and Platte Valley divide area and that there is an increase in sand content toward both valleys. The evidence is inconclusive in view of the amount of erosion that has taken place in post-Loveland time and because of the uncertainty of some of the Sappa - Loveland and the Loveland - Todd Valley contacts. There is a thick silty interval (over 80 feet) of Loveland or possibly Loveland - Sappa on the north side of the Platte River Valley in Buffalo County, test hole 67-B-47 on profile line C-D.

Lugn (1935, p. 80 and 128) has suggested that the pre-Loveland erosion was extensive over much of the state and that the Loveland formation mantled an eroded dissected surface. He points out (1935, p. 138) that the present topography is determined largely by the older buried topography. The evidence in this area supports these observations. The profile sections show that the "Peorian" formation maintains its thickness within a very few feet over the buried topography in local situations and it is likely that the Loveland formation may mantle the underlying formations in much the same manner rather than with the more nearly straight lower contact that has been shown on the profile sections.

The Sappa - Loveland boundary was difficult to determine in many of the test holes drilled. The color of the two formations in their weathered upland phases was often quite similar with only slight differences that might easily be explained by the depth of weathering in the Loveland. Soil zones which originally capped the Sappa were generally removed by

pre-Loveland erosion. Zones of leaching were difficult to determine because of secondary lime accumulation. Subsoils represented by clayey horizons, textural gradations from fine to coarse above a finer textured interval, and stratigraphic relationships were the principal factors used in determining the formational boundaries.

The complex sedimentation of the Loveland in this area makes it difficult to study the genesis of the formation or to correlate zones based on information from localities as widely spaced as the test holes were in this area.

Todd Valley formation (Lugn, 1935): The Todd Valley formation was described and named by Lugn (1935, pp. 155-158) as a valley fill of fine sand including some sand and gravel in the lower part. It was named from Todd Valley in Saunders County, Nebraska, and Lugn considered it as Iowan in age and that the valley was eroded in post-Loveland pre-Peorian time. Lueninghoener (1947, with the approval of Lugn) redefined the formation "to apply only to the uppermost part of the fill, consisting of gray-white fine sands in Todd Valley and to their equivalents in other valleys" (p. 17). Lueninghoener (1947, pp. 24-26) considered the lower sand and gravel under his redefined Todd Valley as Crete in age and that the erosion of Todd Valley, an old Platte channel(Condra, 1903), took place prior to the deposition of the Todd Valley formation. Condra, Reed, and Gordon (1947, p. 30) noted that only the upper part of the Todd Valley formation as named by Lugn is Iowan in age and the lower part is older, the upper part resting on eroded Loveland loess, Crete sands and gravels and older beds.

The Todd Valley formation is well developed and was encountered in the test holes of an extensive portion of the area of this investigation. The Todd Valley formation occurs south of the present Platte Valley and,

at least in part, under it and its maximum thickness is about fifty feet. Prior to the deposition of the Todd Valley formation most of the Loveland formation was removed by erosion in the area bounded to the south by a line passing through southwest Kearney County (test hole 42-B-47, profile line G-H), northeastwardly to central Kearney County (test hole 76-B-47, profile line E-F), southeastwardly to southeastern Kearney County (test hole 55-B-47, profile line C-D), and to north-central Adams County (test hole 16-B-49, profile line A-B). An examination of the records of a north-south profile through central Phelps and Harlan counties nine miles to the west of profile line G-H indicates that the southernmost occurrence of the Todd Valley formation along that line is in a test hole three miles north of Holdrege in Phelps County and three miles north of test hole 26-A-48 (east-west profile line J-K). The Todd Valley formation is found mantling a partially removed Loveland interval in a portion of the area to the south of the area where the Loveland formation was removed by erosion, test holes 43, 44 and 45-B-47 (profile line G-H), test holes 77, 78, 79, 80, 81, 82 and 83-B-47 (profile line E-F) and 17 and 18-B-49 (profile line A-B).

The presence of the sands of the Todd Valley formation so far south of the main channel area in northwestern and central Franklin counties (profile lines G-H and E-F) and the absence of the formation in the southern part of the profile to the east (C-D) along the Franklin - Webster county line and about five miles north indicates the possibility of an early Todd Valley channel trending southeastwardly toward the Republican River drainage in southwestern Kearney and western Franklin counties. It is interesting to note that the slope of the present land surface of the area between test holes 42-B-47 and 78-B-47 in southwestern Kearney County (E-W profile lines J-K) has little easterly component compared with

the general easterly sloping direction of the land surface of the remainder of the profile. The shift in direction of drainage, if the southeasterly drainage actually existed to an easterly direction, may have been the result of a northward shifting of a higher precipitation belt accompanying the retreat of the Iowan ice sheet in the region north and east of this area.

The Todd Valley formation in this area consists principally of quartz sand grains which are usually well rounded to spherical with the surfaces of many of the grains entirely frosted. The frosting and the high percentage of quartz with a considerable amount of whitish grains gives the formation a characteristic very light to whitish gray color. Sand and gravel in this area correlated as the Todd Valley formation and restricted in its occurrence to an older valley underlying the present Platte River Valley may be all or in part Crete in age.

The sands of the Todd Valley formation grade to finer textures upward and are quite silty in the upper part of many of the test holes. Todd Valley sands in test holes 40, 41, and 42-B-47, profile line G-H, along the Kearney - Phelps county line are capped by a loess-like sandy silt, light gray and light brownish gray in color which may correlate with Condra and Reed's (1950) lower part of the Peorian formation which they consider to be Iowan in age. The silt encountered in these three test holes and the sands and silty sands of the upper part of the Todd Valley formation in most of the area is capped by a brown or grayish brown sandy soil which ranges from a few inches up to several feet in thickness. The time necessary to develop this thickness of soil is questionable. The percentage of clay in the soil profile appears to be low. It is possible that this soil now caps eroded Loveland loess in some parts of the area, as is indicated in test hole 54-B-47 (profile line C-D). The soil

developed on the Loveland in this test hole is more sandy, thinner, lighter in color, and the subsoil lacks the clayey development found on the Loveland formation in the test hole three miles south (53-B-47).

The present topography of the surface in portions of the area of the loess mantled plain, particularly in Kearney County, is broadly undulating with the common development of basin-like depressions which in most instances have no outward drainage and which range from a few tens of acres to several hundred acres in areal extent. The nature of the surface has been noted and discussed by Lugn (1935, p. 159) who attributed the depressions to uneven accumulation of loess and other beds on the Grand Island formation. However, test drilling evidence has indicated that the "Peorian" formation maintains its thickness over the buried topography. On the basis of this evidence (although closely spaced tests have not been drilled) the Todd Valley surface as represented in profile line G-H appears to be hummocky such as might be expected from dune topography. The soil zone seems to be persistent on the Todd Valley (and Iowan? loess) surface even in the depressions (test hole 42-B-47) indicating that if eolian action caused the hummocky topography it was before the time of soil formation and probably before the accumulation of loess-like sandy silt above the sand and overlain by the soil.

Further research and study will be necessary before satisfactory answers can be found for the problems presented in the origin and stratigraphic relationship of the Todd Valley formation.

Peorian Loess (Leverett, 1898) of Nebraska (Lugn, 1935): The Peorian loess of Nebraska and of the other upper Mississippi Valley states is widely distributed and has been studied in detail in its exposures for many years. The loesses of Nebraska which were deposited

during the time interval between the Iowan and Mankato substages of the Wisconsin glaciation have been grouped under the term Peorian by the Nebraska Geological Survey (Condra, Reed, and Gordon, 1947; Condra and Reed, 1950). The Bignell Loess was named by Schultz and Stout (1945, p. 241) and they proposed the name Brady soil (1948, p. 570) for the soil zone at the top of the restricted Peorian loess and below the Bignell loess. They consider the Bignell loess (1948, Fig. 2, p. 569) to be Mankato in age. Condra and Reed (1950) consider the Bignell loess as middle to late Mankato in age.

It is difficult to subdivide the post-Iowan loesses of Nebraska because of the absence of the Tazewell, Cary, and Mankato tills and it has been suggested by Condra, Reed, and Gordon (1947, pp. 31-33) that deposits of these ages are represented by nearly continuous loess deposition in the Loess Plain region of the state with alluvial terrace and eolian deposits in the large valleys. Although certain zonal features were noted in the loess interval of post-Iowan age they were too variable and inconclusive to permit regional correlation. A satisfactory zoning of this loess interval would require strategically spaced sampling locations and detailed laboratory studies of its color, texture, and acid soluble nature as related to soil development and profiles of weathering. In this report the loess deposits above the soil developed on the Todd Valley or Loveland formations or their equivalents and younger loess deposits on older formations have been grouped under the term "Peorian" formation.

It has been noted in the discussion of the Todd Valley formation that the "Peorian" formation tends to maintain its thickness within a few feet over the buried pre-"Peorian" topography. The "Peorian" loess in this area varies in thickness from about fifteen to twenty feet in central Adams and north-central Webster counties (profile line A-B) to about twenty-

five to thirty-five feet in western Kearney County. Evidence is inconclusive along the Adams - Kearney lines where dissection by wind and water along the tributaries of the Little Blue River has removed a portion of the loess. Evidence does indicate a slight thickening of loess in the region a few miles south of the Platte River Valley and thinning of the loess over the divide area and toward the Republican River Valley.

The color of the "Peorian" formation in this area ranges from a whitish gray to pale yellow with some light yellowish brown to pale brownish gray coloration common in the upper part. Frequently a zone of light brownish gray to pale brown occurs in the lower one to five feet. Dark brown and yellowish brown mottling of iron oxide is common through much of the interval.

The lime content of the "Peorian" is variable and relatively low even in the unleached horizons. In nearly all instances the lower, slightly darker zone is non-calcareous with no secondary lime accumulation. Small gastropods were found in many of the test hole "Peorian" intervals in the upper and middle parts of the formation.

Thin dark soil horizons were found in the "Peorian" interval in a few of the test holes, but the occurrences were localized. A portion of the upper interval which is correlated as the Todd Valley formation in the northern part of profile line A-B may be "Peorian" in age.

Thin alluvial and eolian loess correlated as "Peorian" in the Platte River Valley in the three western profiles mantles deposits of sands and gravels which seem to be at least in part post-Iowan in age and as noted by Lugn (1935, p. 89) recent alluvium consisting of reworked surface material is present up to a thickness of a few feet in the Platte River Valley.

Dune Sand and Recent Loess: An examination of the soils maps of the counties in the area of this investigation shows that rather extensive areas of dune sand and fine textured sandy loesses occur on the valley slopes, terraces, and bordering uplands of some of the streams in the area. The principal areas are in the Platte Valley, particularly on the southern side, and extending five to seven miles south of the river in Kearney County and two to three miles south in the northwestern corner of Adams County and in Hall County. This material seems to be the result of rather recent wind action reworking the exposed Todd Valley and younger sands and gravels, and the fine textured sediment of silt and sand bars in the river bed.

Another area with extensive dune sand and sandy loess deposits occurs in the dissected area bordering Sand Creek and Cottonwood Creek and their tributaries which have incised into loess of the "Peorian" formation and into sand deposits of the Todd Valley formation. These deposits occur in a narrow strip bordering Sand Creek from about five miles east of Minden to the Kearney - Adams County line. More extensive deposits occur bordering Cottonwood Creek near its head in the upland at the edge of the Platte River Valley near the Kearney - Adams County line and along its course to the south where it enters the Little Blue River in T. 5 N., and R. 11 W. in Adams County. Sand Creek roughly parallels Cottonwood Creek after it enters Adams County and it joins the Little Blue River a few miles south of Cottonwood Creek in the same township and range. An area about two to four miles wide is capped by dune sand and sandy loess deposits bordering the two streams along the western margin of Adams County and extending westward into Kearney County for about three miles along the course of the southern tributary of Sand Creek. It is believed that

these deposits are the results of wind action which has reworked the exposed Todd Valley sand formation.

A smaller area of dune sand and sandy loess occurs bordering the West Branch of Thompson Creek along its course from about one mile north of the Kearney - Franklin county line southward into Franklin County. These deposits were reworked by wind from stream-eroded deposits correlated as being the Todd Valley, Loveland, and Sappa formations into which the stream has incised.

Other less extensive deposits occur along the terraces of some of the other drainages and probably some late loess occurs locally in the upland.

The maximum thickness of the dune sand deposits in the areas mentioned above is questionable. The maximum thickness encountered in the test holes was about two to five feet. This thickness probably is not representative because the test holes drilled in the dune sand areas were located in the more accessible positions which in most instances were on level land adjacent to or in the midst of the dune topography.

Summary and Conclusions Based on Methods of Analyses

Descriptions based on microscopic examination of samples obtained from outcrops or obtained as cuttings or cores by the various drilling methods have long been used as a means of correlating strata of all ages. There are many other methods of laboratory analyses which have been used in the study of outcrop and "deep-well" samples for stratigraphic correlation, some of which may be applied to the subsurface studies of samples obtained by the use of hydraulic rotary test drilling equipment.

The correlation of the Pleistocene formation in the area of this investigation has been based primarily on a study of field log records supplemented by binocular microscopic analyses of test hole samples and this method proved effective and practical in permitting a regional study to be made based on the examination of many samples. Textural analyses supplemented the microscopic examination of samples along one profile (C-D), and this technique was of considerable value as an aid to stratigraphic correlation. Acid soluble percentages were determined for the samples of a portion of profile (C-D); the results of this technique in the area in which it was used were of little value as an aid to correlation.

Stratigraphic position and sequence of deposits were criteria of primary importance in this study. Buried soils, profiles of weathering, and lithologic and textural changes and trends were important criteria used for correlation.

Buried profiles of weathering and buried soils proved to be very useful in determining unconformities, their presence indicating significant intervals of nondeposition with only slight erosion. The presence of buried soils and weathered profiles may be indicated by several kinds of evidence which are the result of environmental conditions during profile

development. Color, the leaching of lime and other mineral constituents, and the resultant downward accumulation of clay compounds, secondary lime and oxidized minerals in lower horizons indicate soil development and weathering profiles. Color is extremely significant in the study of the Pleistocene loesses, silts, and clays and to a lesser extent of the sands and gravels when used in interpretation of soil development and weathering characteristics. Age and environmental conditions during soil development are indicated to a certain extent by the colors of soil and weathered profiles. The effective use of color can be made only by exact color comparisons against standard color charts under controlled lighting conditions.

The removal of $CaCO_3$ from the upper part of buried soil profiles is a common feature and unconformities are evidenced by the presence of leached horizons overlain by calcareous sediments indicating that the underlying material was leached before the overlying material was deposited. This evidence has long been used in determining soil profile development where sampling could be done from surface exposures. Unless a very small sampling interval is used in the collection of samples from test holes drilled by hydraulic rotary equipment horizons of no visual variability in lime content are often combined. Acid soluble determinations may be misleading where the disturbed test hole samples contain both primary and secondary or only secondary lime. The calcareous content and nature of its occurrence can be evaluated by testing the least disturbed portion of the sample in dilute acid, and where much secondary lime is present careful microscopic study is probably more effective in detecting evidences of leaching than an acid soluble determination.

The acid soluble determinations which were made in this study did

not clearly indicate the presence of leached zones. Too few analyses were made to reach any conclusions; the principal purpose of the acid treatment was to remove the lime so that textural comparisons could be made between the calcareous sediments of test holes 52 and 53-B-47 with the test holes to the north and south on profile line C-D, Figure 11. Microscopic examination, however, indicated that laboratory determinations of acid soluble material might be an effective means of zoning the "Peorian" loess. Probably the most representative samples of any that may be obtained by the use of hydraulic rotary test drilling equipment are those of the "Peorian" loess principally because of its proximity to the surface. However, as was pointed out in the discussion of the "Peorian," there seems to be variability in the calcareous nature of the loess, and correlation might be effective only from more closely spaced sampling locations.

The clay content of the upper zone of a soil profile is usually decreased by the downward movement of colloids originally present or formed through the hydrolysis of clay-forming minerals. This colloidal clay is translocated to lower horizons, and its thickness varies with the environmental conditions prevailing during soil development. Clay content may be estimated by microscopic examination although not very satisfactorily. It is believed that clay content determinations might be a useful criterion in the determination of buried soil profile development.

Bleached zones resulting from the leaching of iron and manganese by solution in downward moving groundwater indicate very moist or mesic environmental conditions with good subsurface drainage. The redeposition of oxides of iron and manganese in the form of concretions or mottles in lower horizons results from less saturated conditions or poor subsurface drainage. These characteristics can most readily be determined by a microscopic examination, but it is doubtful if they have much correlative

significance.

The preservation of soil structure in silty and clayey materials in the form of laminations, blockyness, or granularity are sometimes observed in test hole samples and are usually indicative of subsoil development.

Textural analyses based on grain size determination has been utilized for many years as a valuable aid in correlation. The value of this method in analyzing disturbed samples obtained by hydraulic rotary drilling methods has been subjected to doubt. As may be seen in exposures of sands and gravels, the sedimentation is complex with abrupt textural changes in small intervals. Samples, particularly of sands and gravels, obtained by hydraulic rotary test drilling methods must necessarily represent an average texture for the sampled interval which, in the case of test drilling by the Nebraska Geological Survey, is chosen on the basis of lithologic change or in the absence of a discernible change, on the basis of an arbitrarily chosen five-foot interval. The results of the sieve analyses as plotted in graphic form on profile line C-D, figure 11, and of the microscopic analyses as shown graphically in the other profile sections, figures 10, 12, 13 and 14, indicate progressive changes and consistent variation in texture of both the sands and gravels and the finer textured sediments that can be traced from test hole to test hole and were a distinct aid in correlation.

Grain sizes can be determined rapidly by microscopic means. However, progressive grain size variation is so important in indicating the cyclic nature of Pleistocene sedimentation it is believed that a careful laboratory analyses of texture is warranted.

The data presented in Table 2 (textural percentage logs) can be

applied to groundwater studies in this area. Effective size, median diameter, coefficient of sorting, and other important hydrologic properties can be determined for each sample by plotting cumulative curves based on this data. The distribution of the grains and the other properties of texture, which may be obtained from the cumulative curve, are indicative of the mode of deposition of the sediments and might have some significance in correlation. No attempt was made in this study to plot cumulative curves from the textural data.

Properties of sands and gravels, such as grain shape and roundness, and of surface characteristics such as lustre (dull or polished), frosting, and relief (smooth or rough) can be made by microscopic examination. Although time did not permit a detailed study to be made of these characteristics, the study indicated that they had considerable value in correlation and in determining sedimentation history and origin.

The mineralogic composition of the sands and gravels can be described, although inadequately, by the use of a binocular microscope. Mineral composition and heavy-mineral studies have not been used as a technique for detailed correlation of the Pleistocene sands and gravels. A study of this type in the area of this investigation would be complicated by the occurrence of older sediments as reworked material in the make-up of each succeeding younger deposit and by the occurrence of essentially the same kind of minerals (particularly in the deposits of Nebraskan and Kansan ages which probably originated from the same source area), and probably would not be significant.

Fossils of the type which can withstand the action of drilling and which were observed in the microscopic examination were scarce in the Pleistocene formations drilled in the area of this investigation and

were limited almost entirely to the "Peorian" formation. Vertebrate fossils, where they can be recovered and collected from exposures and gravel pits, are of great value, but they are not recoverable in test hole samples.

CONCLUSION

This paper presents the results of extensive test drilling and log and sample study of Pleistocene formations in an area in south-central Nebraska. Tentative correlations of the Pleistocene deposits in this area are stated in the text discussions and indicated in the stratigraphic profile sections. It has been demonstrated that this kind of study based on test drilling is effective in determining the stratigraphic succession in Pleistocene periglacial deposits.

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V. H. Dreeszen

Text Analysis

Nebr. Hall

42 samples

A-16

TEST HOLE # 54-B-47

SAMPLE DEPTH 0-0.5

DATE 4-14-49 4-13-49

TEST BY GRD.

	TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE			48.95			
ACID INSOLUBLE	50.07	50.99	48.03			
ACID SOLUBLE	2.04 / 50.03	2.04 / 48.95	0.92	0.92 / 1.85		1.88%
WET WASH RESIDUE (250 MESH)			1.36			
THROUGH (250 MESH)			46.67			
RO TAP TIME 10	50 gram sample + filter paper		52.04 / 50.99 / 1.05 / 20	air dried over dried	100-110°C, 2 hrs.	
WT. OF SAMPLE 1.36				moisture 2.02%		

SIEVE OPENING IN MM	MESH						
OVER 8	2.5	—					
8 - 4	5	—					
4 - 2	9	—					
2 - 1	16	—					
1 - 0.5	32	0.05	0.05	0.1	0.1	0.1	
0.5 - 0.25	60	0.21	0.16	0.3	0.3	0.4	
0.25 - 0.125	115	0.40	0.19	0.4	0.4	0.8	
.125 - 0.062.5	250	1.01	0.61	1.3	1.3	2.1	
PAN		1.36	0.35	97.9	97.9	100.0	
CUMULATIVE WT.				100			
SIEVE LOSS							
TOTAL							

HOLE # 54-B-47 B-16 DATE 4-14-49

E DEPTH 0.5-1 TEST BY

	TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
TEST SAMPLE			48.66			
INSOLUBLE	50.06	50.98	47.74			
SOLUBLE	2.32 / 47.74	2.32 / 48.66	0.92		0.92 / 48.66	1.89%
WASH RESIDUE (250 MESH)			5.77			
HROUGH (250 MESH)			41.97			
RO TAP TIME 10			52.32 / 50.98 / 1.34			1.98%
WT. OF SAMPLE 5.77						
SIEVE OPENING IN MM / MESH						
OVER 8 / 2.5	—					
8 - 4 / 5	—					
4 - 2 / 9	—					
2 - 1 / 16	0.07		0.07	0.1	0.1	
1 - 0.5 / 32	0.81		0.74	1.6	1.7	
0.5 - 0.25 / 60	1.81		1.00	2.1	3.8	
0.25 - 0.125 / 115	2.93		1.12	2.3	6.1	
.125-0.0625 / 250	4.10		1.17	2.5	8.6	
PAN	5.76	43.64	1.66	91.4	100.0	
CUMULATIVE WT.			(41.98 100.0 / 47.74			
SIEVE LOSS -0.01						
TOTAL						

TEST HOLE # 54-B-47 C 16 DATE 4-14-99

SAMPLE DEPTH 1-3 TEST BY [illegible]

	TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE			48.56			
ACID INSOLUBLE	99.72	50.80	47.48			
ACID SOLUBLE	2.24 / 47.48	2.24 / 48.56	1.08			2.22%
WET WASH RESIDUE (250 MESH)			3.05			
THROUGH (250 MESH)			44.43			
RO TAP TIME 10			52.24 / 50.80 / 1.44			
WT. OF SAMPLE 3.05						2.75% moisture
SIEVE OPENING IN MM / MESH						
OVER 8 / 2.5	—					
8 - 4 / 5	—					
4 - 2 / 9	—					
2 - 1 / 16	0.01		0.01	0.2	0.2	
1 - 0.5 / 32	0.13		0.12	0.3	0.5	
0.5 - 0.25 / 60	0.63		0.50	1.1	1.6	
0.25 - 0.125 / 115	1.41		0.78	1.6	3.2	
.125-0.0625 / 250	2.36		0.95	2.0	5.2	
PAN	3.05	45.12	3.069	94.8	100.0	
CUMULATIVE WT.			44.43 / 47.48	100%		
SIEVE LOSS	0					
TOTAL						

TEST HOLE # 54-B-47 D-16 DATE 4-14-99

SAMPLE DEPTH 3-5 TEST BY [illegible]

	TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE			48.27			
ACID INSOLUBLE	48.20	50.56	45.91			
ACID SOLUBLE	~~2.29~~ 45.91	~~52.27~~ 48.27	2.36			4.90%
WET WASH RESIDUE (250 MESH)			0.99			
THROUGH (250 MESH)			44.92			
RO TAP TIME 10			52.29 / 50.56 / 1.73			3.26% moist
WT. OF SAMPLE 0.99						
SIEVE OPENING IN MM	MESH					
OVER 8	2.5	—				
8 - 4	5	—				
4 - 2	9	—				
2 - 1	16	—				
1 - 0.5	32	0.01	0.01		0.02	0.02
0.5 - 0.25	60	0.03	0.02		0.04	0.06
0.25 - 0.125	115	0.08	0.05		0.11	0.17
.125-0.0625	250	0.73	0.65		1.4	1.6
PAN		0.99	0.26	45.18	98.4	100.0
CUMULATIVE WT.			44.92 / 45.91			
SIEVE LOSS	0					
TOTAL						

TEST HOLE # 54-B-19 F 16 DATE 4-14-99

SAMPLE DEPTH 5-10 TEST BY

	TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE			48.63			
ACID INSOLUBLE	49.65	50.71	47.57			
ACID SOLUBLE	2.08 ~~47.57~~	2.08 ~~48.63~~	1.06			2.18%
WET WASH RESIDUE (250 MESH)			0.85			
THROUGH (250 MESH)			46.72			
RO TAP TIME 10 WT. OF SAMPLE 0.85			50.08 50.71 1.37			2.63% moist
SIEVE OPENING IN MM / MESH						
OVER 8 / 2.5	—					
8 - 4 / 5	—					
4 - 2 / 9	—					
2 - 1 / 16	—					
1 - 0.5 / 32	—					
0.5 - 0.25 / 60	0.01	0.01		~~0.01~~		
0.25 - 0.125 / 115	0.07	0.06		0.1	0.1	
.125 - 0.0[illegible] / 250	0.61	0.54		1.1	1.2	
PAN	0.85	0.24	46.96	98.8	100.0	
CUMULATIVE WT.		46.72 47.57		1000		
SIEVE LOSS	0					
TOTAL						

TEST HOLE # 548-97 F16 DATE 4-14-99

SAMPLE DEPTH 10-17.5 TEST BY [illegible]

	TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE			48.64			
ACID INSOLUBLE	50.03	50.97	47.70			
ACID SOLUBLE	2.33 / 47.70	2.33 / 48.64	0.94			1.93%
WET WASH RESIDUE (250 MESH)			0.73			
THROUGH (250 MESH)			46.97			
RO TAP TIME 10			52.33 / 50.97 / 1.36			2.60% moist
WT. OF SAMPLE 0.73						

SIEVE OPENING IN MM	MESH						
OVER 8	2.5	—					
8 - 4	5	—					
4 - 2	9	—					
2 - 1	16	—					
1 - 0.5	32	—					
0.5 - 0.25	60	0.01		0.01	—		
0.25 - 0.125	115	0.07		0.06	0.1	0.1	
.125-0.0[illegible]5	250	0.57		0.30	1.0	1.1	
PAN		0.73	47.13	0.16	98.9	100.0	
CUMULATIVE WT.				46.97 / 47.70			
SIEVE LOSS	0						
TOTAL							

TEST HOLE # 54-B-47 G16 DATE 4-14-89

SAMPLE DEPTH 175-205 TEST BY [illegible]

	TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE			48.70			
ACID INSOLUBLE	49.99	50.95	47.74			
ACID SOLUBLE	~~2.23~~ 47.74	~~2.23~~ 48.70	0.96			1.99%
WET WASH RESIDUE (250 MESH)			2.31			
THROUGH (250 MESH)			45.43			
RO TAP TIME 10			52.25 / 50.95 / 1.30			2.49% mod
WT. OF SAMPLE 2.31						

SIEVE OPENING IN MM	MESH						
OVER 8	2.5	—					
8 - 4	5	—					
4 - 2	9	—					
2 - 1	16	—					
1 - 0.5	32	—					
0.5 - 0.25	60	0.17	0.17		0.4	0.4	
0.25 - 0.125	115	0.72	0.55		1.2	1.6	
.125-0.0625	250	1.87	1.15		2.4	4.0	
PAN		2.31	0.44	45.87	96.0	100.0	
CUMULATIVE WT.			45.43 / 47.74		100.0		
SIEVE LOSS	0						
TOTAL							

TEST HOLE # 54-B-97 (35) H16 DATE 3-7-99

SAMPLE DEPTH 20.5-24.5 TEST BY DPH.

	TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE			48.98			
ACID INSOLUBLE	50.51	51.28	48.21			
ACID SOLUBLE	2.30 / 48.21	2.30 / 48.90	0.77			1.6%
WET WASH RESIDUE (250 MESH)	199.0	178.0	21.0			
THROUGH (250 MESH)	178.0		29.0			
			50.00			
			52.30			
			51.28			
			1.02			1.95% moist
RO TAP TIME 10 20.05						
WT. OF SAMPLE 21.0						

SIEVE OPENING IN MM	MESH							
OVER 8	2.5		—					
8 - 4	5		—					
4 - 2	9		—					
2 - 1	16		—					
1 - 0.5	32	0.76	178.4	178.0	0.4		0.4	0.8
0.5 - 0.25	60	2.36	180.6		2.2		2.6	5.2
0.25 - 0.125	115	10.84	189.0		8.4		11.0	22.0
.125-0.0625	250	18.79	197.0		8.0		19.0	38.0
PAN		20.05	199.2	31.2	2.2	31.0	50.0	100.0
CUMULATIVE WT.					29.0 / 50.2			
SIEVE LOSS +0.2								
TOTAL								

197.9 / 178.4 / 178.0

Checked after acid treatment 4-14-99

TEST HOLE # 54-B-47 I 16 DATE 3-7-99

SAMPLE DEPTH 24.5-30 TEST BY [illegible]

			TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE					48.82			
ACID INSOLUBLE			50.18	50.00	48.10			
ACID SOLUBLE			2.08 / 48.10	2.08 / 48.82	0.72			1.49%
WET WASH RESIDUE (250 MESH)			192.5	178.0	14.5			
THROUGH (250 MESH)					35.5 / 300			
RO TAP TIME 10		9.55			52.08 / 50.90 / 1.18			2.26% moist
WT. OF SAMPLE 14.5								
SIEVE OPENING IN MM	MESH							
OVER 8	2.5		—					
8 - 4	5	—	—					
4 - 2	9	—	—					
2 - 1	16	—	—					
1 - 0.5	32	0.05	178.2	178.0	0.2		0.2	0.4
0.5 - 0.25	60	0.42	178.7		0.5		0.7	1.4
0.25 - 0.125	115	2.42	180.6		1.9		2.6	5.2
.125-0.0625	250	8.19	186.6		6.0		8.6	17.2
PAN		9.55	192.6	41.5	50.0	41.4	50.0	100.0
CUMULATIVE WT.					35.5 / 50.1			
SIEVE LOSS +0.1			186.6 / 178.2 / 0.4					
TOTAL								

Checked after acid treatment 4-14-99

TEST HOLE # 59-B-47 J-16 DATE 3-7-99

SAMPLE DEPTH 30-35 TEST BY [illegible]

	TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE			48.96			
ACID INSOLUBLE	50.55	51.28	48.23			
ACID SOLUBLE	2.32 45.23	2.32 45.96	0.73			1.49%
WET WASH RESIDUE (250 MESH)	192.3 178	178.0	14.3			
THROUGH (250 MESH)			35.7			
RO TAP TIME 10 11.86			52.32 51.28 1.04			1.98 %
WT. OF SAMPLE 14.3						

SIEVE OPENING IN MM	MESH							
OVER 8	2.5		—					
8 - 4	5		—					
4 - 2	9		—					
2 - 1	16		—					
1 - 0.5	32	0.19	178.4	178.0	0.4		0.4	0.8
0.5 - 0.25	60	0.86	179.0		0.6		1.0	2.0
0.25 - 0.125	115	3.43	181.6		2.6		3.6	7.2
.125-0.0625	250	10.70	188.8		7.2		10.8	21.6
PAN		11.86	192.3	39.2	53.5		50.0	100.0
CUMULATIVE WT.			178.4 192.3		35.7 50.0			
SIEVE LOSS 0								
TOTAL								

a few v. dk. iron concr., small

Checked after acid treatment

TEST HOLE # 54-B-47 A-17 DATE 3-7-47

SAMPLE DEPTH 35-40 TEST BY [illegible]

		TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE				49.19			
ACID INSOLUBLE		50.69	51.49	48.39			
ACID SOLUBLE		2.30 / 48.39	2.30 / 49.19	0.80			1.63%
WET WASH RESIDUE (250 MESH)		190.5	178.0	12.5			
THROUGH (250 MESH)		16.0		37.5			
RO TAP TIME 10				52.310 / 51.49 / 0.81 / 30			1.54% mist
WT. OF SAMPLE 12.5							
SIEVE OPENING IN MM	MESH						
OVER 8	2.5	—					
8 - 4	5	—					
4 - 2	9	—					
2 - 1	16	178.2	178.0	0.2		0.2	0.4
1 - 0.5	32	178.4		0.2		0.4	0.8
0.5 - 0.25	60	178.9		0.5		0.9	1.8
0.25 - 0.125	115	181.0		2.1		3.0	6.0
.125-0.0625	250	187.2		6.2		9.2	18.4
PAN		190.5 / 81.7	40.8	53.3		50.0	100.0
CUMULATIVE WT.				37.5 / 50.0			
SIEVE LOSS 0							
TOTAL							

a few small rock corr.

TEST HOLE # 54-B-47 DATE 3-7-49

SAMPLE DEPTH 40-45 B-17 TEST BY [illegible]

		TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE				48.93			
ACID INSOLUBLE		50.18	51.10	48.01			
ACID SOLUBLE		2.17 48.01	2.17 48.93	0.92			1.88%
WET WASH RESIDUE (250 MESH)		184.4+	178.0	6.4			
THROUGH (250 MESH)		78		43.6 50.0			
RO TAP TIME 10 WT. OF SAMPLE 6.4				52.17 51.10 1.07			2.05% moist
SIEVE OPENING IN MM	MESH						
OVER 8	2.5	—					
8 - 4	5	—					
4 - 2	9	—					
2 - 1	16	178.1	178.0	0.1		0.1	0.2
1 - 0.5	32	178.2		0.1		0.2	0.4
0.5 - 0.25	60	178.4		0.2		0.4	0.8
0.25 - 0.125	115	179.5		1.1		1.5	3.0
.125-0.0625	250	182.9		3.4		4.9	9.8
PAN		184.5	45.2	51.6	45.1	50.0	100.0
CUMULATIVE WT.				43.6 50.1			
SIEVE LOSS +0.1							
TOTAL							

v. few small v. dk. [illegible] coal

TEST HOLE # 54-B-97 C-17 DATE 3-1-99

SAMPLE DEPTH 45-50 TEST BY PH

		TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE				48.95			
ACID INSOLUBLE		50.45	51.30	48.10			
ACID SOLUBLE		~~3.33~~ 48.10	~~2.33~~ 1893	0.65			1.74%
WET WASH RESIDUE (250 MESH)		187.5	178.0	9.5			
THROUGH (250 MESH)		78.0		40.5			
RO TAP TIME 10 WT. OF SAMPLE 9.5				52.35 51.30 1.05 1.05			2.00%
SIEVE OPENING IN MM	MESH						
OVER 8	2.5	—					
8 - 4	5	—					
4 - 2	9	—					
2 - 1	16	178.1	178.0	0.1		0.1	0.2
1 - 0.5	32	178.2		0.1		0.2	0.4
0.5 - 0.25	60	178.3		0.1		0.3	0.6
0.25 - 0.125	115	179.6		1.3		1.6	3.2
.125-0.0625	250	185.0		5.4		7.0	14.0
PAN		187.6	43.1	52.6	43.0	50.0	100.0
CUMULATIVE WT.				105 50.1			
SIEVE LOSS +0.1							
TOTAL							

trace of iron coves

TEST HOLE # 54-B-97 D-17 DATE 3-7-99

SAMPLE DEPTH 50-55 TEST BY DPH

	TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE			49.01			
ACID INSOLUBLE	50.36	51.03	48.34			
ACID SOLUBLE	~~2.02~~ 48.34	~~2.02~~ 49.01	0.67			1.36%
WET WASH RESIDUE (250 MESH)	189.6	178.0	11.6			
THROUGH (250 MESH)	76.0		38.4			
RO TAP TIME 10			52.02 51.03 ~~1.01~~ 0.99			
WT. OF SAMPLE 11.6						1.9%
SIEVE OPENING IN MM / MESH						
OVER 8 / 2.5	—					
8 - 4 / 5	—					
4 - 2 / 9	—					
2 - 1 / 16	178.1	178.0	0.1		0.1	0.2
1 - 0.5 / 32	178.2		0.1		0.2	0.4
0.5 - 0.25 / 60	178.9		0.7		0.9	1.8
0.25 - 0.125 / 115	181.3		2.4		3.3	6.6
.125-0.0625 / 250	187.6		6.3		9.6	19.2
PAN	189.6	40.4	2.0		50.0	100.0
CUMULATIVE WT.			38.4 / 50.0			
SIEVE LOSS 0						
TOTAL _						

v. fine clk. iron stain

TEST HOLE # 54-B-97 E-19 DATE 3-7-99

SAMPLE DEPTH 55-60 TEST BY OFHO

	TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE			49.15			
ACID INSOLUBLE	50.72	51.42	48.45			
ACID SOLUBLE	0.27 ~~48.45~~	2.27 ~~49.15~~	0.70			1.42%
WET WASH RESIDUE (250 MESH)	194.2	178.0	16.2			
THROUGH (250 MESH)	%		33.8			
			50.0 52.27 51.42 ~~0.85~~ 0.85			
RO TAP TIME 10						
WT. OF SAMPLE 16.2						1.63% moist
SIEVE OPENING IN MM / MESH						
OVER 8 / 2.5	—					
8 - 4 / 5	—					
4 - 2 / 9	—					
2 - 1 / 16	178.1	178.0	0.1		0.1	0.2
1 - 0.5 / 32	178.3		0.2		0.3	0.6
0.5 - 0.25 / 60	180.0		1.7		2.0	4.0
0.25 - 0.125 / 115	186.1		6.1		8.1	16.2
.125-0.0625 / 250	192.5		6.4		14.5	29.0
PAN	194.3	35.6	1.8	35.5	50.0	100.0
CUMULATIVE WT.			~~33.8~~ 50.1			
SIEVE LOSS +0.1						
TOTAL						

trace of iron coner.

TEST HOLE # 59-B-47 F-17 DATE 3-7-49

SAMPLE DEPTH 60-65 TEST BY [illegible]

	TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE			49.65			
ACID INSOLUBLE	51.59	51.86	49.38			
ACID SOLUBLE	~~2.21~~ 49.38	~~2.21~~ 49.65	0.27			0.54%
WET WASH RESIDUE (250 MESH)	214.5	178.0	36.5			
THROUGH (250 MESH)	178.0		13.5			
RO TAP TIME 10			5 52.21 51.86 0.35			0.67%
WT. OF SAMPLE 36.5						
SIEVE OPENING IN MM / MESH						
OVER 8 / 2.5	—					
8 - 4 / 5	—					
4 - 2 / 9	—					
2 - 1 / 16	178.1	178.0	0.1		0.1	0.2
1 - 0.5 / 32	179.0		0.9		1.0	2.0
0.5 - 0.25 / 60	187.7		8.7		9.7	19.4
0.25 - 0.125 / 115	~~179.0~~ 202.7		15.0		24.7	49.4
.125-0.0625 / 250	~~202.7~~ 213.3		10.6		35.3	70.6
PAN	214.5	164	51.2		50.0	100.0
CUMULATIVE WT.			213.5 50.0			
SIEVE LOSS 0						
TOTAL						

most amounts of clay even coarse

TEST HOLE # 54-B-47 G-17 DATE 3-7-49

SAMPLE DEPTH 65-70 TEST BY [illegible]

		TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE				49.39			
ACID INSOLUBLE		51.23	51.65	48.92			
ACID SOLUBLE		9.31 / 26.92	23.1 / 49.39	0.42			0.852
WET WASH RESIDUE (250 MESH)		208.3	178.0	30.3			
THROUGH (250 MESH)				19.7			
RO TAP TIME 10 WT. OF SAMPLE 30.3				52.31 51.65 0.66			1.26 % [illegible]
SIEVE OPENING IN MM	MESH						
OVER 8	2.5	—					
8 - 4	5	—					
4 - 2	9	—					
2 - 1	16	178.1	178.0	0.1		0.1	0.2
1 - 0.5	32	178.4		0.3		0.4	0.8
0.5 - 0.25	60	182.7		4.3		4.7	9.4
0.25 - 0.125	115	193.2		10.5		15.2	30.4
.125-0.0625	250	205.8		12.6		27.8	55.6
PAN		208.3	22.2	2.5		50.0	100.0
CUMULATIVE WT.				19.7 50.0			
SIEVE LOSS 0							
TOTAL							

V. occ. [illegible]

TEST HOLE # 54-B-47 H-17 DATE 3-8-49

SAMPLE DEPTH 70-75 TEST BY [illegible]

		TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE				49.37			
ACID INSOLUBLE		50.75	51.40	48.72			
ACID SOLUBLE		2.03 / 48.72	2.03 / 49.37	0.65			1.32%
WET WASH RESIDUE (250 MESH)		200.9	178.0	22.9			
THROUGH (250 MESH)				27.1			
RO TAP TIME 10 WT. OF SAMPLE 22.9				52.03 / 51.40 / 0.63			1.21% moisture
SIEVE OPENING IN MM	MESH						
OVER 8	2.5	—					
8 - 4	5	—					
4 - 2	9	—					
2 - 1	16	178.05	178.0	.05		0.5	0.1
1 - 0.5	32	178.15		0.1		0.15	0.3
0.5 - 0.25	60	179.2		1.05		1.2	2.4
0.25 - 0.125	115	185.3		6.1		7.3	14.6
.125-0.0625	250	197.8		12.5		19.8	39.6
PAN		200.8	30.1	3.0	30.2	50.0	100.0
CUMULATIVE WT.				27.1 / 49.90			
SIEVE LOSS -0.1							
TOTAL							

a few lbs loss [illegible]

TEST HOLE # 54-B-47 I-17 DATE 3-8-99

SAMPLE DEPTH 75-83 TEST BY [illegible]

	TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE			49.31			
ACID INSOLUBLE	50.94	51.55	48.70			
ACID SOLUBLE	2.24 / 49.0	2.24 / 49.31	0.61			1.24%
WET WASH RESIDUE (250 MESH)	202.7	178.0	24.7			
THROUGH (250 MESH)	178.0		25.3			
RO TAP TIME 10			52.24 / 51.55 / 0.69			1.32%
WT. OF SAMPLE 24.7						

SIEVE OPENING IN MM	MESH						
OVER 8	2.5	—					
8 - 4	5	—					
4 - 2	9	—					
2 - 1	16	—					
1 - 0.5	32	178.1	178.0	0.1		0.1	0.2
0.5 - 0.25	60	179.2		1.1		1.2	2.4
0.25 - 0.125	115	186.2		7.0		8.2	16.4
.125-0.0625	250	200.0		13.8		22.0	44.0
PAN		202.7	28.0	52.7		50.0	100.0
CUMULATIVE WT.				25.3 / 50.0			
SIEVE LOSS 0							
TOTAL							

v. few dk iron ores

TEST HOLE # 54-B-47 J-17 DATE 3-8-49

SAMPLE DEPTH 83-90 TEST BY [illegible]

	TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE			49.21			
ACID INSOLUBLE	50.68	51.36	48.53			
ACID SOLUBLE	2.15 / 48.53	2.15 / 49.21	0.68			1.382
WET WASH RESIDUE (250 MESH)	193.5	178.0	15.5			
THROUGH (250 MESH)	78.0		34.5			
RO TAP TIME 10 WT. OF SAMPLE 15.5			52.15 / 51.36 / 0.79			1.51% mud

SIEVE OPENING IN MM	MESH	TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
OVER 8	2.5	—					
8 - 4	5	—					
4 - 2	9	—					
2 - 1	16	—					
1 - 0.5	32	—					
0.5 - 0.25	60	178.2	178.0	0.2		0.2	0.4
0.25 - 0.125	115	180.2		2.0		2.2	4.4
.125-0.0625	250	187.0		6.8		9.0	18.0
PAN		193.5	41.0	6.5		50.0	100.0
CUMULATIVE WT.				34.5 / 50.0			
SIEVE LOSS 0							
TOTAL							

no iron conc.

TEST HOLE # 54-B-49 A-18 DATE 3-8-49

SAMPLE DEPTH 90-95 TEST BY [illegible]

	TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE			49.13			
ACID INSOLUBLE	50.83	51.50	48.46			
ACID SOLUBLE	2.30	2.30	0.67			1.36%
WET WASH RESIDUE (250 MESH)	200.7	178.0	22.7			
THROUGH (250 MESH)	178.0		37.3			
	21.2		1.0			
			52.37			
RO TAP TIME 10			51.50			
			0.87			1.66%
WT. OF SAMPLE 21.7						

SIEVE OPENING IN MM	MESH						
OVER 8	2.5	—					
8 - 4	5	—					
4 - 2	9	—					
2 - 1	16	—					
1 - 0.5	32	178.1	178.0	0.1	.2	0.2	
0.5 - 0.25	60	179.1		1.0	2.0	2.2	
0.25 - 0.125	115	184.8		5.7	11.4	13.6	
.125-0.0625	250	196.2		11.4	22.8	36.4	
PAN		200.7	31.8	54.5	63.6	100.0	
CUMULATIVE WT.		178.0		27.3			
SIEVE LOSS		21.2		30.0			
TOTAL							

acid sol. 4-15-49

no.

TEST HOLE # 54-B-42 B-18 DATE 3-8-49

SAMPLE DEPTH 95-100 TEST BY [illegible]

	TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE			49.18			
ACID INSOLUBLE	50.88	51.58	48.46			
ACID SOLUBLE	2.30 / 48.8	2.40 / 49.18	0.70			1.42%
WET WASH RESIDUE (250 MESH)	200.3	178.0	22.3			
THROUGH (250 MESH)			27.7			
RO TAP TIME 10			52.40 / 51.58 / 0.82			1.56%
WT. OF SAMPLE 223						

SIEVE OPENING IN MM	MESH						
OVER 8	2.5	—					
8 - 4	5	—					
4 - 2	9	—					
2 - 1	16	—					
1 - 0.5	32	178.1	178.0	0.1	0.2	0.2	
0.5 - 0.25	60	179.1		1.0	2.0	2.2	
0.25 - 0.125	115	185.1		6.0	12.0	14.2	
.125-0.0625	250	196.1		11.0	22.0	36.2	
PAN		200.3	31	4.2	63.8	100.0	
CUMULATIVE WT.				27.7 / 50.0			
SIEVE LOSS 0							
TOTAL							

MS

TEST HOLE # 57-8-17 C-18 DATE 3-8-49

SAMPLE DEPTH 100-105 TEST BY RWD

	TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE			49.17			
ACID INSOLUBLE	50.83	51.40	48.60			
ACID SOLUBLE	2.33 / 48.60	2.23 / 51.4	0.57			1.16%
WET WASH RESIDUE (250 MESH)	201.9	176.0	23.9			
THROUGH (250 MESH)			26.1			
RO TAP TIME 10			52.23 / 51.40 / 0.83			1.58%
WT. OF SAMPLE 23.9						

SIEVE OPENING IN MM	MESH						
OVER 8	2.5	—					
8 - 4	5	—					
4 - 2	9	—					
2 - 1	16	—					
1 - 0.5	32	178.1	178.0	0.1	0.2	0.2	
0.5 - 0.25	60	179.1		1.0	2.0	2.2	
0.25 - 0.125	115	184.5		5.4	10.8	13.0	
.125-0.0625	250	196.5		12.0	24.0	37.0	
PAN		202.2 / 16.9	31.5	5.7 / 26.1 / 50.3	63.0	100.0	
CUMULATIVE WT.							
SIEVE LOSS +0.3 ?							
TOTAL							

trace of visible from cores

TEST HOLE # 54-B-97 D-18 DATE 3-8-99

SAMPLE DEPTH 105-110 TEST BY DRH

	TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE			49.03			
ACID INSOLUBLE	50.80	51.34	48.49			
ACID SOLUBLE	2.31 / 203.9	2.31 / 178.0	0.54			1.10%
WET WASH RESIDUE (250 MESH)	203.9	178.0	25.9			
THROUGH (250 MESH)	76		24.1			
RO TAP TIME 10			52.31 / 51.34 / 0.97			1.85% moist
WT. OF SAMPLE 25.9						

SIEVE OPENING IN MM	MESH						
OVER 8	2.5	—					
8 - 4	5	—					
4 - 2	9	—					
2 - 1	16	— 5	178.0				
1 - 0.5	32	178.1		0.1	0.2	0.2	
0.5 - 0.25	60	179.8		1.7	3.4	3.6	
0.25 - 0.125	115	188.8		9.0	18.0	21.6	
.125-0.0625	250	201.0		12.2	24.4	46.0	
PAN		203.9	27.0	52.9	54.0	100.0	
CUMULATIVE WT.			24.1 / 50.0				
SIEVE LOSS 0							
TOTAL							

Several soft brownish iron conc.

TEST HOLE # 54-R-97 E-18 DATE 3-8-99

SAMPLE DEPTH 110-115 TEST BY [illegible]

	TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE			200			
ACID INSOLUBLE	50.51	51.23	48.28			
ACID SOLUBLE	2.33 48.28	2.23 49.23	0.72			1.47%
WET WASH RESIDUE (250 MESH)	198.2	178.0	20.2			
THROUGH (250 MESH)	178.0 200		29.8			
RO TAP TIME 10 WT. OF SAMPLE 20.2			52.23 51.23 1.00			1.91 % moist
SIEVE OPENING IN MM / MESH						
OVER 8 / 2.5	—					
8 - 4 / 5	—					
4 - 2 / 9	—					
2 - 1 / 16	—					
1 - 0.5 / 32	178.2	178.0	0.2	0.4	0.4	
0.5 - 0.25 / 60	179.7		1.5	3.0	3.4	
0.25 - 0.125 / 115	185.9		6.2	12.4	15.8	
.125-0.0625 / 250	195.6		9.7	19.4	35.2	
PAN	198.2	3.24	2.6	5.2	100.0	
CUMULATIVE WT.			24.8 50.0			
SIEVE LOSS 0						
TOTAL						

1 core

TEST HOLE # 54-B-47 F-18 DATE 3-8-49

SAMPLE DEPTH 115-120 TEST BY 0240

	TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE			48.97			
ACID INSOLUBLE	30.52	51.35	48.14			
ACID SOLUBLE	2.38 / 48.4	2.38 / 48.97	0.83			1.69%
WET WASH RESIDUE (250 MESH)	191.7	178.0	13.7			
THROUGH (250 MESH)	178.		36.3			
RO TAP TIME 10			52.38 / 51.35 / 1.03			1.96%
WT. OF SAMPLE 13.7						

SIEVE OPENING IN MM	MESH						
OVER 8	2.5	—					
8 - 4	5	—					
4 - 2	9	—					
2 - 1	16	—					
1 - 0.5	32	178.15	178.0	0.15	0.3	0.3	
0.5 - 0.25	60	179.3		1.15	2.3	2.6	
0.25 - 0.125	115	182.0		2.70	5.4	8.0	
.125-0.0625	250	188.4		6.4	12.8	20.8	
PAN		191.7	39.6	3.3	79.2	100.0	
CUMULATIVE WT.				36.3 / 50.00			
SIEVE LOSS 0							
TOTAL							

more

TEST HOLE # 54-B-97 G-18 DATE 3-8-99

SAMPLE DEPTH 120-125 TEST BY [illegible]

	TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE			49.22			
ACID INSOLUBLE	50.91	51.54	48.59			
ACID SOLUBLE	2.35 / 48.59	2.32 / 49.22	0.63			1.28%
WET WASH RESIDUE (250 MESH)	200.7	178.0	22.7			
THROUGH (250 MESH)	227		27.3			
RO TAP TIME 10			52.32 / 51.54 / 0.78			1.49%
WT. OF SAMPLE 22.7						

SIEVE OPENING IN MM	MESH						
OVER 8	2.5	—					
8 - 4	5	—					
4 - 2	9	—					
2 - 1	16	178.05	178.0	0.05	0.1	0.1	
1 - 0.5	32	179.1		1.05	2.1	2.2	
0.5 - 0.25	60	183.6		4.5	9.0	11.2	
0.25 - 0.125	115	191.9		8.3	16.6	27.8	
.125-0.0625	250	198.5		6.6	13.2	41.0	
PAN		200.7	29.5	2.2	59.0	100.0	
CUMULATIVE WT.		178.0		27.3 / 50.00			
SIEVE LOSS	0						
TOTAL							

A-18-G 18 brownish tan in color

eventually rare

TEST HOLE # 54-8-47 DATE 3-8-49

SAMPLE DEPTH 125-131 H-18 TEST BY [illegible]

		TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE				49.55			
ACID INSOLUBLE		51.60	51.92	49.23			
ACID SOLUBLE		2.37 / 49.23	2.37 / 49.55	0.32			0.65%
WET WASH RESIDUE (250 MESH)		215.4	178.0	37.4			
THROUGH (250 MESH)				12.6			
RO TAP TIME 10 WT. OF SAMPLE 37.4				52.37 51.92 0.45			0.86% moist
SIEVE OPENING IN MM	MESH						
OVER 8	2.5	—					
8 - 4	5	—					
4 - 2	9	—					
2 - 1	16	178.3	176.0	0.3	0.6	0.6	
1 - 0.5	32	180.3		2.0	4.0	4.6	
0.5 - 0.25	60	186.8		6.5	13.0	17.6	
0.25 - 0.125	115	202.2		15.4	30.8	48.4	
.125 - 0.0625	250	212.5		10.3	20.6	69.0	
PAN		215.4		2.9 } 15.5 12.6	31.0	100.0	
CUMULATIVE WT.				50.0			
SIEVE LOSS 0							
TOTAL							

lt. br-gray

[illegible]

TEST HOLE # 54-B-97 I-18 DATE 3-8-99

SAMPLE DEPTH 131-135 TEST BY [illegible]

	TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE			49.17			
ACID INSOLUBLE	50.80	51.30	48.67			
ACID SOLUBLE	2.13 / 48.67	2.13 / 49.17	0.50			1.02%
WET WASH RESIDUE (250 MESH)	201.8	178.0	23.8			
THROUGH (250 MESH)	178.5 / 23.8	3	26.2			
RO TAP TIME 10			52.13 / 51.30 / 0.83			1.59%
WT. OF SAMPLE 23.8						

SIEVE OPENING IN MM	MESH						
OVER 8	2.5	—					
8 - 4	5	—					
4 - 2	9	—					
2 - 1	16	178.2	178.0	0.2	0.4	0.4	
1 - 0.5	32	179.2		1.0	2.0	2.4	
0.5 - 0.25	60	183.6		4.4	8.8	11.2	
0.25 - 0.125	115	193.4		9.8	19.6	30.8	
.125-0.0625	250	199.8		6.4	12.8	43.6	
PAN		201.8 / 178.5	28.2	2.0 / 26.2 / 5.6.0	56.4	100.0	
CUMULATIVE WT.							
SIEVE LOSS 0							
TOTAL							

med. brown gray to med gray
sort. like color
v. few sd. & fine cemented rootlets.

Ro

TEST HOLE # 54-B-97 J-18 DATE 3-8-99

SAMPLE DEPTH 135-140 TEST BY [illegible]

	TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE			99.80			
ACID INSOLUBLE	50.59	51.33	48.46			
ACID SOLUBLE	2.13 / 49.6	2.13 / 50.20	0.74			1.50 %
WET WASH RESIDUE (250 MESH)	198.8	178.0	20.8			
THROUGH (250 MESH)	%		29.2			
RO TAP TIME 10. WT. OF SAMPLE 20.8		d.	52.13 / 51.33 / 0.80			1.52% mdst.
SIEVE OPENING IN MM / MESH						
OVER 8 / 2.5	—					
8 - 4 / 5	—					
4 - 2 / 9	—					
2 - 1 / 16	178.15	178.0	0.15	0.3	0.3	
1 - 0.5 / 32	178.9		0.75	1.5	1.8	
0.5 - 0.25 / 60	182.4		3.5	7.0	8.8	
0.25 - 0.125 / 115	190.0		7.6	15.2	24.0	
.125-0.0625 / 250	196.4		6.4	12.8	36.8	
PAN	198.9	51.6	2.5	63.2	100.0	
CUMULATIVE WT.		229.6	29.2 / 50.0			
SIEVE LOSS +0.1?						
TOTAL						

soil-like color.
sl. darker flash 134-135

do

TEST HOLE # 54-B-47 A-19 DATE 3-8-49

SAMPLE DEPTH 140-142.5 TEST BY [illegible]

		TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE				49.02			
ACID INSOLUBLE		(x) 50.65	51.21	48.46			
ACID SOLUBLE		2.19 / 99.46	2.19 / 100.02	0.56			1.14%
WET WASH RESIDUE (250 MESH)		203.0	178.0	25.0			
THROUGH (250 MESH)				25.0			
RO TAP TIME 10 / WT. OF SAMPLE 25			X	52.19 / 51.21 / 0.98			1.87%
SIEVE OPENING IN MM	MESH						
OVER 8	2.5	—					
8 - 4	5	—					
4 - 2	9	trace					
2 - 1	16	178.3	178.0	0.3	0.6	0.6	
1 - 0.5	32	180.2		1.9	3.8	4.4	
0.5 - 0.25	60	184.5		4.3	8.6	13.0	
0.25 - 0.125	115	192.6		8.1	16.2	29.2	
.125 - 0.0625	250	200.4		7.8	15.6	44.8	
PAN		203.0	27.6	2.6 / 25.0 / 30.0	55.2	100.0	
CUMULATIVE WT.							
SIEVE LOSS 0							
TOTAL							

(x) 4-18-49 X V. Wet day. 4-14-49

Sand v. lt. grey, some stained, a little pkish

TEST HOLE # 54-B-47 B-19 DATE 3-8-99

SAMPLE DEPTH 147.5-150 TEST BY [illegible]

		TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE				49.63			
ACID INSOLUBLE		51.74	52.02	49.35			
ACID SOLUBLE		2.34 / 49.63	2.35 / 49.63	0.28			0.56%
WET WASH RESIDUE (250 MESH)		219.6	178.0	41.6			
THROUGH (250 MESH)		178.0		8.4			
RO TAP TIME 10				52.39 / 22.02 / 0.37			0.71% mist
WT. OF SAMPLE 41.6							
SIEVE OPENING IN MM	MESH						
OVER 8	2.5	—					
8 - 4	5	178.1	178.0	0.1	0.2	0.2	
4 - 2	9	0		0			
2 - 1	16	182.2		4.1	8.2	8.4	
1 - 0.5	32	190.9		8.7	17.4	25.8	
0.5 - 0.25	60	200.7		9.8	19.6	45.4	
0.25 - 0.125	115	212.5		11.8	23.6	69.0	
.125-0.0625	250	218.6		6.1	12.2	81.2	
PAN		219.6	9.7	51.0 / 8.4 / 50.0	18.8	100.0	
CUMULATIVE WT.							
SIEVE LOSS 0							
TOTAL							

sand with gray, some white, w. little pebbles

TEST HOLE # 54-B-49 C-19 DATE 3-9-49

SAMPLE DEPTH 150-155 TEST BY [illegible]

	TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE			49.67			
ACID INSOLUBLE	51.57	51.90	49.34			
ACID SOLUBLE	2.23 / 49.34	2.23 / 49.67	0.33			0.6%
WET WASH RESIDUE (250 MESH)	219.1	178.0	41.1			
THROUGH (250 MESH)	P.O.		8.9			
RO TAP TIME 10			52.23 / 51.90 / 0.33			0.6% moist
WT. OF SAMPLE 41.1						

SIEVE OPENING IN MM	MESH						
OVER 8	2.5	—					
8 - 4	5	178.1	178.0	0.1		0.2	0.2
4 - 2	9	179.1		1.0		2.0	2.2
2 - 1	16	183.0		3.9		7.8	10.0
1 - 0.5	32	191.9		8.9		17.8	27.8
0.5 - 0.25	60	200.2		8.3		16.6	44.4
0.25 - 0.125	115	211.1		10.9	10.8	21.6	66.0
.125-0.0625	250	218.3		7.2		14.4	80.4
PAN		219.2	9.8	10.9 / 8.9		19.6	100.0
CUMULATIVE WT.				50.1			
SIEVE LOSS +0.1							
TOTAL							

[illegible]

TEST HOLE # 54-B-47 D-19 DATE 3-9-99

SAMPLE DEPTH 155-160 TEST BY 9210

	TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE			49.07			
ACID INSOLUBLE	50.90	51.44	48.53			
ACID SOLUBLE	2.39 / 48.53	2.39 / 49.07	0.54			1.10%
WET WASH RESIDUE (250 MESH)	204.1	178.0	26.1			
THROUGH (250 MESH)	178.	26	23.9			
RO TAP TIME 10			1.0 / 52.37 / 51.44 / 0.93			1.77%
WT. OF SAMPLE 26.1						

SIEVE OPENING IN MM	MESH						
OVER 8	2.5	—					
8 - 4	5	—					
4 - 2	9	178.15	178.0	0.15	0.3	0.3	
2 - 1	16	178.6		.75	0.9	1.2	
1 - 0.5	32	179.7		1.1	2.2	3.4	
0.5 - 0.25	60	183.0		3.3	6.6	10.0	
0.25 - 0.125	115	189.5		6.5	13.0	23.0	
.125-0.0625	250	201.5		12.0	24.0	47.0	
PAN		204.2	26.6	2.7	53.0	100.0	
CUMULATIVE WT.				23.9 / 50.0			
SIEVE LOSS +.01							
TOTAL							

dd

TEST HOLE # 54-B-47 E-19 DATE 3-9-49

SAMPLE DEPTH 160-165 TEST BY OHD

	TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE			49.18			
ACID INSOLUBLE	51.20	51.53	48.85			
ACID SOLUBLE	2.33 / 48.85	2.33 / 2.16	0.33			0.67%
WET WASH RESIDUE (250 MESH)	208.4	178.0	30.4			
THROUGH (250 MESH)			19.6			
RO TAP TIME 10			52.35 / 51.53 / 0.82			1.56% moist
WT. OF SAMPLE 30.4						

SIEVE OPENING IN MM	MESH						
OVER 8	2.5	—					
8 - 4	5	178.1	178.0	0.1	0.2	0.2	
4 - 2	9	179.5		1.4	2.8	3.0	
2 - 1	16	180.7		1.2	2.4	5.4	
1 - 0.5	32	183.1		2.4	4.8	10.2	
0.5 - 0.25	60	189.1		6.0	12.0	22.2	
0.25 - 0.125	115	198.8		9.7	19.4	41.6	
.125-0.0625	250	206.8		8.0	16.0	57.6	
PAN		208.5	21.3	21.1	42.4	100.0	
CUMULATIVE WT.				19.6 / 50.1			
SIEVE LOSS 0.1							
TOTAL							

Ro.

TEST HOLE # 54-B-47 DATE 3-9-99

SAMPLE DEPTH 165-168 F-19 TEST BY GPD

	TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE			49.15			
ACID INSOLUBLE	51.03	51.39	48.81			
ACID SOLUBLE	3.22 / 48.1	3.22 / 51.5	0.34			0.69 %
WET WASH RESIDUE (250 MESH)	208.1	178.0	30.1			
THROUGH (250 MESH)			19.9			
			50.0			
RO TAP TIME 10			52.22			
			51.37			1.62 % moist
WT. OF SAMPLE 20.1			0.85			
SIEVE OPENING IN MM / MESH						
OVER 8 / 2.5	—					
8 - 4 / 5	—					
4 - 2 / 9	178.9	178.0	0.9	1.8	1.8	
2 - 1 / 16	180.2		1.3	2.6	4.4	
1 - 0.5 / 32	182.6		2.4	4.8	9.2	
0.5 - 0.25 / 60	188.9		6.3	12.6	21.8	
0.25 - 0.125 / 115	198.9		10.0	20.0	41.8	
.125-0.0625 / 250	206.7		7.8	15.6	57.4	
PAN	208.1	21.3	1.4	42.6	100.0	
CUMULATIVE WT.			19.9 / 50.0			
SIEVE LOSS 0						
TOTAL						

b

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 54-B-47 DATE: 3-9-49

SAMPLE DEPTH: 168-175 TEST MADE BY: JHD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	184.7	178.0	6.7		6.7
4 - 2	9	213.2		28.5		35.2
2 - 1	16	243.3		30.1		65.3
1 - 0.5	32	260.3		17.0		82.3
0.5 - 0.25	60	266.6		6.3		88.6
0.25 - 0.125	115	273.3		6.7		95.3
.125 - 0.0625	250	276.7		3.4		98.7
Pan		278.0		1.3		100.0
				100.0		

Sieve Loss-------- —

REMARKS: 0

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 54-B-47 DATE: 3-9-49

SAMPLE DEPTH: 175-180 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 10 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—		4		
8 - 4	5	186.8	178.0	8.8		8.8
4 - 2	9	221.5		34.7		43.5
2 - 1	16	249.6		28.1		71.6
1 - 0.5	32	262.7		13.1		84.7
0.5 - 0.25	60	267.9		5.2		89.9
0.25 - 0.125	115	273.6		5.7		95.6
.125 - 0.0625	250	276.5		2.9		98.5
Pan		278.0		1.5		100.0
				100.0		

Sieve Loss -------- —

REMARKS: 0

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 54-B-47 DATE: 3-9-99

SAMPLE DEPTH: 180-185 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	184.1	178.0	6.1		6.1
4 - 2	9	213.5		29.4	29.3	35.4
2 - 1	16	242.1		28.6	28.5	63.9
1 - 0.5	32	259.0		16.9		80.8
0.5 - 0.25	60	266.9		7.9		88.7
0.25 - 0.125	115	273.8		6.9		95.6
.125 - 0.0625	250	277.3		3.5		99.1
Pan		278.2		0.9		100.0
				100.0		
Sieve Loss--------						

REMARKS: +0.2

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 54-B-97 DATE: 3-9-99

SAMPLE DEPTH: 185-190 TEST MADE BY: DRD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—		4		
8 - 4	5	183.2	178.0	5.2		5.2
4 - 2	9	213.9		30.7	30.8	36.0
2 - 1	16	244.8		30.9	31.0	67.0
1 - 0.5	32	260.2		15.4		82.4
0.5 - 0.25	60	266.9		6.7		89.1
0.25 - 0.125	115	272.9		6.0		95.1
.125 - 0.0625	250	276.2		3.3		98.4
Pan		277.8		1.6		100.0
				99.8		
Sieve Loss--------				—		

REMARKS: -0.2

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 54-B-47 DATE: 3-9-99

SAMPLE DEPTH: 190-195 TEST MADE BY: ARD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %	
Over 8	2.5			3			
8 - 4	5	188.0	178.0	10.0		10.0	
4 - 2	9	210.7		22.7		32.7	
2 - 1	16	233.2		22.5		55.2	
1 - 0.5	32	250.4		17.2		72.4	
0.5 - 0.25	60	260.3		9.9		82.3	
0.25 - 0.125	115	270.4		10.1		92.4	
.125 - 0.0625	250	295.8		5.4		97.8	
Pan		278.0		2.2		100.0	
				100.0			
Sieve Loss--------							

REMARKS: 0

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 54-B-47 DATE: 3-9-49

SAMPLE DEPTH: 195-199 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	178.9	178.0	0.9		0.9
8 - 4	5	196.5		17.6		18.5
4 - 2	9	227.5		31.0	31.1	49.6
2 - 1	16	247.9		20.4	20.5	70.1
1 - 0.5	32	258.6		10.7	10.7	80.8
0.5 - 0.25	60	265.3		6.7		87.5
0.25 - 0.125	115	273.1		7.8		95.3
.125 - 0.0625	250	276.7		3.6		98.9
Pan		277.8		1.1		100.0
		67		99.8		
Sieve Loss--------						

REMARKS: -0.2

55-B-47 3 of samples

2-7	Wt. retained	Wt. %	Cum %.
5	—	—	—
9	—	—	—
16	1.73	0.7	0.7
32	21.46	9.2	9.9
60	46.87	20.2	30.1
115	129.50	55.5	85.6
250	21.92	9.4	95.0
Pan.	11.92	5.1	100.1
	233.40		

TEST HOLE # 55-B-47

SAMPLE DEPTH 27-30

DATE Febr. 26 '99

TEST BY V.H.D

	TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE	247.4	197.4	50.0			
~~ACID INSOLUBLE~~						
~~ACID SOLUBLE~~						
WET WASH RESIDUE (250 MESH)	211.6	197.2	14.4			
THROUGH (250 MESH)			35.6			
RO TAP TIME 10						
WT. OF SAMPLE 14.4						
SIEVE OPENING IN MM / MESH						
OVER 8 / 2.5	—					
8 - 4 / 5	—					
4 - 2 / 9	—					
2 - 1 / 16	—					
1 - 0.5 / 32	197.4	197.2	0.2	0.4	0.4	
0.5 - 0.25 / 60	197.9		0.5	1.0	1.4	
0.25 - 0.125 / 115	200.0		2.1	4.2	5.6	
.125-0.0625 / 250	206.6		6.6	13.2	18.8	
PAN	211.6		40.6 ~~35.0~~ (35.6)	81.2	100.0	
CUMULATIVE WT.			50.0			
SIEVE LOSS 0						
TOTAL						

TEST HOLE # 55-B-47

SAMPLE DEPTH 30-33

DATE Febr. 28 '49

TEST BY [illegible]

		TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE		274.8	197.4	50.4			
ACID INSOLUBLE							
ACID SOLUBLE							
WET WASH RESIDUE (250 MESH)		221.2	197.2	24.0			
THROUGH (250 MESH)				26.4			
RO TAP TIME 10 WT. OF SAMPLE 24.0							
SIEVE OPENING IN MM	MESH						
OVER 8	2.5	—					
8 - 4	5	—					
4 - 2	9	—					
2 - 1	16	197.3	197.2	0.1	0.2	0.2	
1 - 0.5	32	197.8		0.5	1.0	1.2	
0.5 - 0.25	60	199.6		1.8	3.6	4.8	
0.25 - 0.125	115	203.6		4.0	8.0	12.8	
.125-0.0625	250	212.6	34.6	9.0	18.0	30.8	
PAN		221.1		34.9	69.2	100.0	
CUMULATIVE WT.				(26.4 50.3			
SIEVE LOSS -0.1							
TOTAL							

TEST HOLE # 55-B-47 DATE Febr. 28 '49

SAMPLE DEPTH 33-36.5 TEST BY [illegible]

		TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE		274.8	197.4	50.8			
ACID INSOLUBLE							
ACID SOLUBLE							
WET WASH RESIDUE (250 MESH)		219.4	197.2	22.2			
THROUGH (250 MESH)				28.6			
RO TAP TIME 10 WT. OF SAMPLE 22.2							
SIEVE OPENING IN MM	MESH						
OVER 8	2.5	—					
8 - 4	5	—					
4 - 2	9	—					
2 - 1	16	—					
1 - 0.5	32	197.5	197.2	0.3	0.6	0.6	
0.5 - 0.25	60	198.8		1.3	2.6	3.2	
0.25 - 0.125	115	202.2		3.4	6.7	9.9	
.125-0.0625	250	208.9		6.7	13.2	23.1	
PAN		219.4		39.1 - 0.5	76.9	100.0	
CUMULATIVE WT.				28.6 / 50.8	100.0		
SIEVE LOSS 0							
TOTAL							

TEST HOLE # 55-B-47

SAMPLE DEPTH 36.5-40

DATE Feb. 28 '49

TEST BY [illegible]

	TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE	279.8	192.4	50.4			
ACID ~~INSOLUBLE~~						
ACID ~~SOLUBLE~~						
WET WASH RESIDUE (250 MESH)	217.8	197.2	20.6			
THROUGH (250 MESH)			29.8			

RO TAP TIME 10

WT. OF SAMPLE 20.6

SIEVE OPENING IN MM	MESH	TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
OVER 8	2.5	—					
8 - 4	5	—					
4 - 2	9	—					
2 - 1	16	—					
1 - 0.5	32	197.4	197.2	0.2	0.4	0.4	
0.5 - 0.25	60	198.1		0.7	1.4	1.8	
0.25- 0.125	115	200.5		2.4	4.8	6.6	
.125-0.0625	250	208.0	39.7	7.5	14.8	21.4	
PAN		217.8	39.6	9.8 {29.8	78.6	100.0	
CUMULATIVE WT.				50.4			
SIEVE LOSS	0		14.7				
TOTAL		50.4	75.00	50			

504
R46
2886
4240
4032

TEST HOLE # 55-B-97 DATE Feb. 28 '49

SAMPLE DEPTH 45-49 TEST BY D.R.D.

	TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE	274.8	192.4	50.5			
ACID ~~INSOLUBLE~~						
ACID ~~SOLUBLE~~						
WET WASH RESIDUE (250 MESH)	214.5	197.2	17.3			
THROUGH (250 MESH)			33.2			
			50.5			

RO TAP TIME 10

WT. OF SAMPLE 17.3

SIEVE OPENING IN MM	MESH						
OVER 8	2.5	—					
8 - 4	5	—					
4 - 2	9	—					
2 - 1	16	—					
1 - 0.5	32	192.4	192.2	0.2	0.4	0.4	
0.5 - 0.25	60	198.3		0.9	1.8	2.2	
0.25 - 0.125	115	200.9		2.6	5.2	7.4	
.125-0.0625	250	206.3		5.4	10.7	18.1	
PAN		214.4	41.4	11.3 {8.1 (33.2	81.9	100.0	
CUMULATIVE WT.				50.4	100.0		
SIEVE LOSS 0.1							
TOTAL							

214.4
197.2
17.2

55-B-47

60-65	Wt. Ret.	Wt. %	Cum %	55-60	Wt. Ret.	Wt. %	Cum %
5	—				—		
9	—				—		
16	0.73	0.3	0.3		0.96	0.4	0.4
32	19.04	8.6	8.9		23.41	10.9	11.3
60	89.08	40.1	49.0		97.15	45.2	56.5
115	94.96	42.8	91.7		77.41	36.1	92.6
250	15.40	6.9	98.6		13.08	6.0	98.6
Pan	3.12	1.4	100.0		3.08	1.4	100.0
	222.33	100.0			215.09	100.0	

50-55	wt. Ret.	wt. %	Cum %	49-50	wt. Ret.	wt. %	Cum %
5	—				—		
9	—				—		
16	0.56	0.3	0.3		0.19	0.3	0.3
32	20.00	9.9	10.2		7.11	13.0	13.3
60	92.80	46.1	56.3		16.19	29.6	42.9
115	73.41	36.4	92.7		13.10	24.0	66.9
250	12.69	6.3	99.0		4.95	9.1	76.0
Pan	1.92	1.0	100.0		13.11	24.0	100.0
	201.38	100.0			54.65		

55-8-47

80-83.5	Wt. Rt.	Wt. %	Cum %	77.5-80	Wt. Rt.	Wt. %	Cum %
5	-			-			
9	-			-			
16	-			3.12	1.2		1.2
32	-			18.93	7.4		8.6
60	5.50	7.1	7.1	59.00	23.0+		31.6
115	15.40	19.8	26.9	113.58	44.2		75.8
250	22.10	28.3	55.2	40.00	15.6		91.4
Pan	34.98	44.8	100.0	21.92	8.6+		100.0
	77.98	100.0		256.55	100.0		

70-77.5	Wt. Rt.	Wt. %	Cum %	65-70	Wt. Rt.	Wt. %	Cum %
5	-			-			
9	-			-			
16	3.33	1.4	1.4	0.44	0.2		0.2
32	30.23	13.0	14.4	17.39	8.1		8.3
60	89.57	38.3+	52.7	99.24	43.7		52.0
115	92.34	39.7-	92.4	88.13	40.9-		92.9
250	14.80	6.3	98.7	13.02	6.0		98.9
Pan	3.20	1.4	100.1	2.13	1.0		99.9
	233.47	100.1		215.35	99.9		

55-B-47

3938
28.11
19780

100-104 split. Samp	Wt. Rt	Wt. %	Cum. %	95-100 Split. Samp.	Wt. Rt	Wt. %	Cum %
5	—				—		
9	—				—		
16	4.57	2.2	2.2		5.98	2.7	2.7
32	33.97	16.2	18.4		55.50	25.3	28.0
60	65.87	31.2	49.6		72.50	33.1	61.1
115	73.78	34.9	84.5		62.68	28.5	89.6
250	26.43	12.5	97.0		18.85	8.6	98.2
Pan	6.65	3.1	100.1		3.82	1.7	99.9
	211.27	100			219.33	99.9	

90-95	Wt. Rel.	Wt. %	Cum %	83.5-90	Wt. rel.	Wt. %	Cum %
5	—				—		
9	—				—		
16	10.38	2.8	2.8		8.34	2.7	2.7
32	97.12	25.9	28.7		59.87	19.7	22.4
60	127.89	34.2	62.9		104.16	34.2	56.6
115	105.98	28.2	91.1		99.35	32.7	89.3
250	26.77	7.1	98.2		22.56	7.4	96.7
Pan	6.82	1.8	100.0		10.24	3.4	100.1
	374.96	100.0			304.52	100.1	

55-B-47

120-125	Wt. Ret.	Wt. %	Cum. %	115-120	Wt. Ret.	Wt. %	Cum. %
5	18.77	6.8	6.8	4.24	1.2	1.2	
9	58.27	21.0	27.8	63.96	18.8	20.0	
16	66.13	23.8	51.6	99.72	29.3	49.3	
32	76.49	27.6	79.2	91.39	26.9	76.2	
60	47.61	17.1	96.3	53.84	15.8	92.0	
115	8.23	3.0	99.3	17.52	5.1	97.1	
250	0.75	0.3	99.6	4.57	1.3	98.4	
Pan	1.22	0.4	100.0	4.71	1.4	99.8	
	277.47	100.0		339.95	99.8		

109-115	Wt. Ret.	Wt. %	Cum. %	104-109	Wt. Ret.	Wt. %	Cum. %
5	2.65	0.9	0.9	—			
9	36.99	12.9	13.8	—			
16	74.92	26.2	40.0	8.61	5.7	5.7	
32	94.31	32.9	72.9	21.04	13.9	19.6	
60	55.49	19.4	92.3	29.21	19.3	38.9	
115	15.48	5.4	97.7	33.57	22.1+	61.0	
250	3.65	1.3	99.0	25.57	16.9+	77.9	
Pan	3.09	1.1	100.1	33.61	22.1	100.0	
	286.58	100.1		151.61	100.0		

55-B-47

140-145	Wt. Retained	Wt.%	Cum.%	135-140	Wt. Ret.	Wt.%	Cum.%
5	4.37	1.5	1.5		36.32	11.2	11.2
9	67.82	23.4	24.9		44.15	13.6	24.8
16	105.78	36.6	61.5	61.7	66.41	20.5	45.3
32	74.00	25.7	87.2	87.4	103.28	31.7	77.0
60	28.11	9.7	96.9	97.1	59.53	18.3	95.3
115	5.98	2.1	99.0	99.2	12.22	3.8	99.1
250	1.36	0.5	99.5	99.9	1.77	0.5	99.6
Pan	1.07	0.3	99.8	100.0	1.33	0.4	100.0
	288.49	99.8			325.01	100.0	

130-135	Wt. Ret.	Wt.%	Cum.%	125-130	Wt. Ret.	Wt.%	Cum.%
5	13.56	4.4	4.4		15.58	5.5	5.5
9	39.62	12.9+	17.3		59.04	20.7	26.2
16	67.01	21.9	39.2		70.01	24.6	50.8
32	108.21	35.3	74.5		78.66	27.7	78.5
60	60.81	19.9	94.4		50.37	17.7	96.2
115	13.14	4.3	98.7		8.99	3.2	99.4
250	1.83	0.6	99.3		0.83	0.3	99.7
Pan	1.79	0.6	99.9	Lowhead	1.25	0.4	100.1
	305.97	99.9			284.73	100.1	

55-B47

150-155

	Wt. Retained	Wt. %	Cum %	
5	55.96	19.8	19.8	
9	90.47	32.2	52.0	51.9
16	67.89	24.1	76.1	76.0
32	37.42	13.3	89.4	89.3
60	21.09	7.5	96.9	96.8
115	7.10	2.5	99.4	99.3
250	1.28	0.5	99.9	99.8
Pan	0.71	0.2	100.1	100.0
	281.72	100.1		

145-150

	Wt. Retained	Wt. %	Cum %
5	07.11	2.5	2.5
9	77.18	27.6	30.1
16	102.75	36.7	66.8
32	63.79	22.8	89.6
60	22.32	8.0	97.6
115	4.68	1.7	99.3
250	1.02	0.4	99.7
Pan	0.73	0.3	100.0
	279.58	100.0	

Beam Balance

55-B-47 — 10 min in Rotap

Sample 160-165

	Wt. Retained	Wt. %	Cum %
2½	5.07	1.6	1.6
5	64.77	21.0	22.6
9	70.41	22.8	45.4
16	59.49	19.4	64.8
32	56.16	18.3	83.1
60	41.49	13.5	96.6
115	8.47	2.8	99.4
250	1.05	0.3	99.7
Pan	0.61	0.2	99.9
	307.52	99.9	

Sample 155-160

Wt. retained	Wt. %	Cum %
73.87	26.4	26.4
89.43	32.0	58.4
63.20	22.6	81.0
32.26	11.5	92.5
14.90	5.3	97.8
4.90	1.8	99.6
0.91	0.3	99.9
0.39	0.1	100.0
279.86	100.0	

55-B-47

21 min.

Sample 170-175 — 10 min.

	Wt. Retained	Wt. %	Cum %
5	63.94	24.5	24.50
9	104.15	40.0	64.5
16	58.93	22.6	87.1
32	22.66	8.7	95.8
60	8.27	3.2	99.0
115	2.05	0.8	99.8
250	0.36	0.1	99.9
Pan	0.25	0.1	100.0
	260.61	100.0	

87.99 / 24.05 / 63.94 — 128.20 / 24.05 / 104.15 — 82.98 / 24.05 / 58.93 — 46.71 / 24.05 / 22.66 — 32.32 / 24.05 / 8.27 — 26.10 / 24.05 / 2.05 — 24.41 / 24.05 / 0.36 — 24.30 / 24.05 / 0.25

Sample 165-170

	Wt. retained	Wt. %	Cum %
5	27.4	27.0	27.0
9	32.6	32.2	59.2
16	15.8	15.6	74.8
32	12.8	12.6	87.4
60	10.05	9.9	97.3
115	2.15	2.1	99.4
250	0.2	0.2	99.6
Pan	0.4	0.4	100.0
	101.40	100.0	

57.0 / 27.4 / 32.6 — 72.8 / 57.0 / 15.8 — 87.6 / 72.8 / 12.8 — 30.05 / 20 / 10.05 — 32.2 / 30.05 / 2.15 — 32.4 / 32.2

55-B-47

Sample 180-185		Wt. retained	Wt. %	Vol. Retained	Vol. %	
2.5	4.8	13.13	4.8	5.15	4.7	-0.1
5	41.6	104.24	36.8	40.25	36.6	-0.2
9	73.7	90.86	32.1+	35.25	32.05	-0.05
16	88.6	42.14	14.9	16.20	14.75	-.15
32	94.9	17.76	6.3-	7.00	6.35	+.05
60	98.6	10.60	3.75-	4.2	3.80	+.05
115	99.7	3.22	1.1+	1.4	1.3-	+.2
250	99.9	0.66	0.2+	0.38	0.3	+.1
Pan	100.1	0.47	0.2-	0.27	0.2	0
Totals		283.08	100.1	110.05	100.00	

37.18 128.29 114.91 66.19 41.81 34.65 27.27 24.71 24.32
24.05 24.05 24.05 24.05 24.05 24.05 24.05 24.05 24.05
13.13 104.24 90.86 42.14 17.76 10.60 3.22 .66 .47

95.70 80.65 76.85 11.2 12.6 12.95 13.20
95.15 80.65 80.65 7.0 11.2 12.6 12.93
40.25 45.20 10.20 4.2 1.4 .33 .27
35.05

13.2
24.05
110

Sample 175-180

		Wt. Retained	Wt. %	Vol. Retained	Vol. %	
2.5	4.6	12.93	4.64	5.00	4.64	0
5	35.6	86.47	31.05+	33.40	31.05	0
9	72.2	101.82	36.6	39.4	36.6	0
16	89.3	47.61	17.1	18.35	17.05	0.05
32	96.3	19.46	7.0	7.4	6.9-	-0.1
60	98.9	7.31	2.62	2.95	2.74	+0.12
115	99.6	1.89	0.7-	0.75	0.7-	0
250	99.8	0.49	0.2-	0.2	0.2-	0
Pan	100	0.51	0.2-	0.3	0.3-	+.1
Totals		278.49	100.11	107.75	100.18	

36.98 110.52 125.87 71.66 43.51 31.36 25.94 24.54
24.05 24.05 24.05 24.05 24.05 24.05 24.05 24.05
12.93 86.47 101.82 47.61 19.46 7.31 1.89 .49

24.56
24.06
.51

38.4 77.8 96.15? 10.35 11.1 11.60
5.1 38.4 77.8 7.4 10.35 11.1
33 39.4 18.3 2.95 .75

11.60
96.15
1.55

55-B-47

(2.604)

Sample 190-195

		Cum %	Sp. Gr.	Wt. retained	Wt. %	Vol. Retained	Vol. %	Cum. %
5	(-1)	32.5	2.60	87.55	32.5	33.6	32.5	0
9		65.3	2.64	88.40	32.8	33.6	32.5	-.3
16		85.0		53.18	19.7	20.1	19.4	+.3
32		93.8		23.64	8.8	9.6	9.3	+.5
60		97.9		11.14	4.1	4.2	4.1	0
115		99.4		3.92	1.5	1.7	1.6	+.1
250		99.8		0.99	0.4	0.4	0.4	0
Pan		100.1		0.92	0.3	0.5	0.5	+.2
		Totals		269.74	100.1	103.8	99.9	

111.60 112.45 77.23 47.69 35.19 27.97 25.04 24.97
24.05 24.05 24.05 24.05 24.05 24.05 24.05 24.05
87.55 88.40 53.18 23.64 11.14 3.92 .99 .92

(2.583)

Sample 185-190

		Wt. Retained	Wt. %	Vol. Retained	Vol. %	Cum %
2.5	3.3	8.97	3.3	3.6	3.45	+.15
5	34.6	84.65	31.3	32.6	31.2	-.1
9	70.0	95.57	35.4	36.95	35.4	0
16	88.0	48.61	18.0	18.75	18.0	0
32	94.4	17.35	6.4	6.7	6.4	0
60	97.6	8.72	3.2	3.45	3.3	+.1
115	99.1	3.95	1.5	1.4	1.3	-.2
250	99.4	0.85	0.3	0.25	0.2	-.1
Pan	99.8	1.12	0.4	0.65	0.6	+.2
		269.79	99.8	104.35	99.85	

33.02 108.70 119.62 72.66 41.40 32.77 27.00 24.90 25.17
24.05 24.05 24.05 24.05 24.05 24.05 24.05 24.05 24.05
8.97 84.65 95.57 48.61 17.35 8.72 2.95 .85 1.12

55-B-47. Mass sp.gr. 279.58 / 108.6 = 2.576

Sample #200-205

	Sp.gr.	Wt. retained	Wt. %	Vol. Retained	Vol. %	C. %
5	2.55	52.99	18.9+	20.7-	19.1 +.2	18.9
9	2.60	85.76	30.6	33.0	30.5 +.1	49.5
16	2.605	61.21	21.9-	23.5	21.7 +.2	71.4
32	2.60	41.33	14.8-	15.9	14.6 +.2	86.2
60	2.57	26.60	9.5+	10.4-	9.6 +.1	95.7
115	2.495	8.72	3.1	3.5	3.2 +.1	98.8
250	2.10	1.89	0.7-	0.9	0.8 +.1	99.5
Pan	1.54	1.08	0.4	0.7	0.6 +.2	99.9
		279.58	99.9	108.6	100.1	

270.86
6.93

77.04	109.81	85.26	65.38	50.65	25.94	25.13
24.05	24.05	24.05	24.05	24.05	24.05	24.05
52.99	85.76	61.21	41.33	26.60	1.89	1.08

53.7
20.7
33.0
5 77.2
53.7
23.5
93.1-
77.2
15.9

15.9 14.3
10.4 13.9
3.5 9
15.5
10.8
7

93.1
15.5
108.6

6.97 : 2.8 : X : 2.5

55-B-47 Mass Sp.Gr. 2.604

Sample # 195-200

		Sp.Gr.	Wt. retained	Wt. %	Vol. Retained	Vol. %	
5	21.3	21.31	64.22	21.31	24.9	21.53	+.22
9	59.7	59.70	115.68	38.39	44.3	38.29	-.1
16	83.3	83.31	71.14	23.61	27.2	23.51	-.1
32	93.1	93.12	29.58	9.81	11.3	9.76	-.05
60	98.0	98.00	14.67	4.87	5.6	4.84	-.03
115	99.6	99.61	4.40	1.46	1.7	1.47	+.01
250	99.8	99.80	0.99	0.32	0.4	0.34	+.02
Pan	100.0	99.98	0.64	0.21	0.3	0.26	+.05
			301.32	99.98	115.7	100.00	

88.27	139.73	95.19	53.63	38.72	28.45	25.07	24.69
24.05	24.05	24.05	24.05	24.05	24.05	24.05	24.05
64.22	115.68	71.14	29.58	14.67	4.40	0.99	.64

62.2
24.9
44.3

96.4
69.2
27.2

16.3
11.3
5

18.8
16.9
1.7

17.3
98.4
115.7

Sample #205-210

mass. sp. gr. $\frac{284.03}{109.9}$ = 2.584

Screen opening	Grade size	Wt. retained	Wt. %	Vol. retained	Vol. %	
	9.6	27.14	9.6	10.8	9.8	+.2
	41.4	90.46	31.8	34.8	31.6	-.2
	69.9	81.10	28.5	31.1	28.3	-.2
	87.2	49.18	17.3	18.8	17.1	-.2
	96.7	27.05	9.5	10.6	9.6	+.1
	99.2	6.97	2.5	2.8	2.6	+.1
	99.7	1.30	0.5	0.6	0.5	0
	100.0	0.83	0.3	0.4	0.4	+.1
		284.03	100.0	109.9	99.9	

51.19	114.51	105.15	73.23	51.10	31.02	25.35	24.88
24.05	24.05	24.05	24.05	24.05	24.05	24.05	24.05
27.14	90.46	81.10	49.18	27.05	6.97	1.30	0.83

45.6
10.8
34.8
76.7
45.6
31.1
95.5
76.7
18.8
13.4
10.6
2.8
14.0
14.4

2.584
109.9) 284.03

2.576
108.6) 279.58

2.575
107.6) 277.09

[illegible calculations]

wt of beaker #1 80.37

258.66 − 80.37 = 178.29 198.39 − 80.37 = 118.02

178.29 + 118.02 = 296.31 wt. of sample before seiving

Mass Sp. Gr. 2.57

Sample # 210-215 Wt. of beaker 24.05 5 min

wt. of sample 296.31

Screen opening	Grad. Size Cum %	Wt. retained	Wt. Per Cent	Vol. Retaind	Vol. %
mesh 5	13.3	39.31	13.3	~~15.2~~ 15.2	13.4
9	36.1	67.78	22.8	~~41.5~~ 26.3	
16	54.5	54.71	18.4	~~64.5~~ 23.0	
32	74.6	59.32	20.1	~~85.2~~ 20.7	
60	92.3	52.58	17.7	~~20.2~~ 20.2	
115	98.4	17.90	6.1	~~26.7~~ 6.5	
250	99.4	2.81	1.0	~~27.5~~ 0.8	
Pan	99.9	1.47	0.5	~~28.0~~ 0.5	
Total		295.88	99.90	113.2	

Siev loss 0.63

63.36 − 24.05 = 39.31 91.83 − 24.05 = 67.78 78.76 − 24.05 = 54.71 83.37 − 24.05 = 59.32 76.63 − 24.05 = 52.58 41.95 − 24.05 = 17.90 26.86 − 24.05 = 2.81 25.52 − 24.05 = 1.47

2.65) 52.88 = 2 2.65) 17.90 = 6.8 85.2 + 28.0 = 113.2 113.2) 295.88 = 2.97

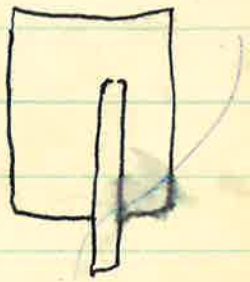
Wt. of Beaker 24. 24.06 gms.

Sample # 215-220 Date

10 min. shaking in B or Tap

Screen opening	Grade Size	Wt. retained	Wt. %	Vol. retained	Vol. %
3.962	14.6	40.77	14.6	14 cc.	13.2
1.981	38.3 38.3	66.18	23.7	25.2	23.7
0.991	57.9	54.69	19.6	20.8	19.6
0.495	76.8	52.82	18.9	21.0	19.7
0.246	92.9	45.09	16.1	18.0	16.9
0.124	98.7	16.34	5.8	6.5	6.1
0.062	99.6	2.55	0.9	0.5	0.5
Pan	100.1	1.30	0.5	0.3	0.3
		277.69	100.1	106.3	100.0

64.83 90.24 78.75 76.88 67.10 90.40 26.61 25.36
24.06 24.06 24.06 24.06 24.06 24.06 24.06 24.06
40.77 66.18 54.69 52.82 43.04 66.34 2.55 1.30



Note water

55-B-47

Permeabilities 70°F

Sample 215-220

$\frac{h}{h_0}$	Seconds	Perm
.5	20.8 21.0 21.1	880
.7	11.0 11.0	873
		875

20.8
21.1
21.0
3 | 62.9
20.97

Sample 210-215

$\frac{h}{h_0}$	Sec.	Perm
.5	19.9, 19.8, 20.2, 20.0	925
.7	~~10.1~~ -10.2 -10.4 -10.4	925
		925

19.9 ~~10.1~~
19.8 10.2
20.2 10.4
20.0 10.4
4 | 79.9 | 40.9
19.9 10.3

Sample 205-210

$\frac{h}{h_0}$	Sec.	Avg.	Perm
0.5	4.4 - 4.4, 4.8, 4.8	4.6	4,000
0.7	— — —		

Sample 200-205

$\frac{h}{h_0}$	Sec.	Avg.	Perm
0.5	11.8, -12.0, 11.6, 12.1, 12.1	11.7	1510

12.1
12.1
11.6
12.0
11.4
5 | 59.2
11.7

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Sample 165-170

	h/ho		avg.	Perm
72°	0.5	8.6, 8.2, 8.2, 8.6 4 (33.6 / 8.4)	8.4	2,170

Sample 160-165

	h/ho		avg.	Perm
72°	0.5	~~20.1, 20.3~~, 21.3, 21.4, 22.0, 21.9 4 (86.6 / 21.)	21.6	860

Sample 155-160

	h/ho	Seconds	avg	Perm
72°	0.5	4.9, 4.8, 5.0	4.9	3,760

Sample 150-155

	h/ho	Seconds	avg	Perm
72°	0.5	7.8, 8.0, 8.1, 7.9 4 (31.8 / 7.95)	7.95	2,280

Sample 145-150

	h/ho		avg	Perm
73°	0.5	4.8, ~~4.8~~, 4.7, 4.6, 4.9 5 (23.8 / 4.7)	4.7	3,900

Sample 140-145

	h/ho		Avg.	Perm.
73°	0.5	11.6, 11.8, 11.7	11.7	1,550

Sample 135-140

	h/ho			
73°	0.5	~~15.0~~, 16.2, 16.2, 16.2	16.2	1,125

Sample 95-100

			Avg	Perm
77°	0.5	132.8		136
	0.7	69		136

Sample 90-95

			Avg	Perm
79°	h/ho			
	0.7	59.8		105
	0.9	26.1		105

Sample 83.5-90

		Seconds	Avg	Perm
79°	0.7	223		43
	0.9	66.2		43

Sample 80-83.5

	0.9	6000 sec	less than one

Sample 77.5-80

	h/ho	Seconds	Permeability
70°	0.9	315, 318	8.8

Sample 70-77.5

			Perm.
70°	h/ho		
	0.7	56.8, 56.8	167
	0.9	16.9, 16.8	

55-B-47

Permeabilities Not corrected for temp.

Depth			Corrected for T		
2-7			2.5	78°	3.2
7-10			2.9	75°	3.5
10-15			12.0	79°	14.5
15-20			98	73°	117
20-27			—	—	—
27-49	silt, silty clay to v.f. sdy.				
49-50	clay to silty clay		—	—	—
50-60			96	73°	114
60-70			175	73°	209
70-77.5			145.	70°	167
77.5-80			7.5	70°	8.8
80-83.5			-1	probably less than 1	
83.5-90			34	79°	43
90-95			85	79°	105
95-100			110	77°	136
100-104			55	78°	70
104-109			-10	76°	below 10
109-120			645	74°	775
120-130			1000	79°	1,205
130-140			880	79°	1,060
140-150			2290	73°	2725
150-160			2565	72°	3,020
160-170			1300	72°	1,515
170-180			6265	72°	7,370
180-190			7970	72°	9,375
190-200			5555	76°	6,860
200-210			2395	70°	2,755
210-220			785	70°	900

2395 785

TEST HOLE # 56-B-42 53 samples DATE 2/25-29

SAMPLE DEPTH 7-9.5 TEST BY [illegible]

	TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE	324.6	178.3	146.3			
~~ACID INSOLUBLE~~	178.3					
~~ACID SOLUBLE~~	146.3					
WET WASH RESIDUE (250 MESH)	268.3	197.4	70.9			
THROUGH (250 MESH)			75.4			

RO TAP
TIME _____

WT. OF SAMPLE 70.9

SIEVE OPENING IN MM	MESH		197.4				
OVER 8	2.5	—					
8 - 4	5	—					
4 - 2	9	—					
2 - 1	16	197.7	197.4	0.3		0.3	0.3
1 - 0.5	32	201.9		4.2		2.9	3.2
0.5 - 0.25	60	218.9		17.0		11.6	14.8
0.25 - 0.125	115	247.8		28.9		19.7	34.5
.125-0.0625	250	257.2		9.4		6.4	40.9
PAN		268.2		86.4	11.0	86.5	59.2	100.0
CUMULATIVE WT.				75.4	146.2		100.10	
SIEVE LOSS	-0.1 gm.							
TOTAL								

268.3
197.4
70.9

268.2
197.4
70.8

TEST HOLE # 56-B-4 DATE 2-25-69

SAMPLE DEPTH 34-35.5 TEST BY [illegible]

	TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE	230.1	178.3	51.8			
ACID INSOLUBLE	178.3 / 51.8					
ACID ~~SOLUBLE~~						
WET WASH RESIDUE (250 MESH)	220.7	197.4	23.3			
THROUGH (250 MESH)			28.5			

RO TAP
TIME 12

WT. OF SAMPLE 23.3

SIEVE OPENING IN MM	MESH						
OVER 8	2.5	—					
8 - 4	5	—					
4 - 2	9	—					
2 - 1	16	—	197.4				
1 - 0.5	32	197.6		0.2	0.4	0.4	
0.5 - 0.25	60	199.3		1.7	3.3	3.7	
0.25 - 0.125	115	205.5		6.2	12.0	15.7	
.125-0.0625	250	213.9		8.4	16.2	31.9	
PAN		220.7	35.3	6.8	68.1	100.0	
CUMULATIVE WT.				28.5 / 51.8	100.0		
SIEVE LOSS	0						
TOTAL							

220.7
197.4
23.3

TEST HOLE # 56-B-47 DATE Feb. 25 '99

SAMPLE DEPTH 35.5-38 TEST BY A.S.T.

	TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE	226.3	178.3	50.0			
ACID ~~INSOLUBLE~~						
~~ACID~~ SOLUBLE						
WET WASH RESIDUE (250 MESH)	219.7	197.4	22.3			
THROUGH (250 MESH)	197.4 +2.3		27.7			

RO TAP
TIME _____

WT. OF SAMPLE 22.3

SIEVE OPENING IN MM	MESH						
OVER 8	2.5	—					
8 - 4	5	—					
4 - 2	9	—					
2 - 1	16	—					
1 - 0.5	32	—					
0.5 - 0.25	60	198.1	197.4	0.7	1.4	1.4	
0.25 - 0.125	115	200.4		2.3	4.6	6.0	
.125-0.0625	250	212.7		12.3	24.6	30.6	
PAN		219.7	34.75	7.0	69.4	100.0	
CUMULATIVE WT.			27.7 50.0				
SIEVE LOSS	6						
TOTAL							

219.7
197.4
22.3

TEST HOLE # 56-B-97 DATE Febr. 25 '49

SAMPLE DEPTH 38-40 TEST BY [illegible]

		TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE		228.2	176.3	50.0			
ACID INSOLUBLE							
ACID SOLUBLE							
WET WASH RESIDUE (250 MESH)		208.7	197.4	11.3			
THROUGH (250 MESH)		197.4		38.7			
RO TAP TIME 12							
WT. OF SAMPLE 11.3							
SIEVE OPENING IN MM	MESH						
OVER 8	2.5	—					
8 - 4	5	—					
4 - 2	9	—					
2 - 1	16	—					
1 - 0.5	32	—	197.4				
0.5 - 0.25	60	198.2		0.8	1.6	1.6	
0.25 - 0.125	115	201.1		2.9	5.8	7.4	
.125-0.0625	250	205.4		4.3	8.6	16.0	
PAN		208.7	420	3.3	84.0	100.0	
CUMULATIVE WT.		205.4		(38.7 / 50.0			
SIEVE LOSS	0						
TOTAL							

208.7
197.4
11.3

TEST HOLE # 36-B-97 DATE Febr 26 '99

SAMPLE DEPTH 40-45 TEST BY ARD

	TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE	228.3	178.3	50.0			
~~ACID INSOLUBLE~~						
~~ACID SOLUBLE~~						
WET WASH RESIDUE (250 MESH)	226.6	197.4	29.2			
THROUGH (250 MESH)			20.8			

RO TAP TIME 12

WT. OF SAMPLE 29.2

SIEVE OPENING IN MM	MESH						
OVER 8	2.5	—					
8 - 4	5	—					
4 - 2	9	—					
2 - 1	16	—					
1 - 0.5	32	197.8	197.4	0.4	0.8	0.8	
0.5 - 0.25	60	202.6		4.8	9.6	10.4	
0.25 - 0.125	115	214.1		11.5	13.0	23.4	
.125-0.0625	250	223.2	24.2	9.1	18.2	41.6	
PAN		226.5	24.1	3.3	48.4/100.0		
CUMULATIVE WT.			(20.8 ~~49.9~~				
SIEVE LOSS	-0.1						
TOTAL							

226.6
197.4
29.2

TEST HOLE # 56-B-47 DATE Feb. 26, 19

SAMPLE DEPTH 45-50 TEST BY J.R.O

	TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE	228.3	178.3	50.0			
ACID INSOLUBLE						
ACID SOLUBLE						
WET WASH RESIDUE (250 MESH)	224.5	197.4	27.1			
THROUGH (250 MESH)			22.9			

RO TAP TIME 12

WT. OF SAMPLE 27.1

SIEVE OPENING IN MM	MESH						
OVER 8	2.5	—					
8 - 4	5	—					
4 - 2	9	—					
2 - 1	16	—					
1 - 0.5	32	197.7	197.4	0.3	0.6	0.6	
0.5 - 0.25	60	198.8		1.1	2.2	2.8	
0.25 - 0.125	115	202.5		3.7	7.4	10.2	
.125-0.0625	250	214.6		12.1	24.2	34.4	
PAN		224.5	32.8	9.9	65.6	100.0	
CUMULATIVE WT.				22.9 / 50.0			
SIEVE LOSS	0						
TOTAL							

224.5
197.4
27.1

TEST HOLE # 56-B-47 DATE Febr. 26 49

SAMPLE DEPTH 50-52 TEST BY G.H.C

	TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE	228.5	178.5	50.0			
~~ACID INSOLUBLE~~						
~~ACID SOLUBLE~~						
WET WASH RESIDUE (250 MESH)	224.6	197.4	27.2			
THROUGH (250 MESH)			22.8			
RO TAP TIME 12						
WT. OF SAMPLE 27.2						
SIEVE OPENING IN MM / MESH						
OVER 8 / 2.5	—					
8 - 4 / 5	—					
4 - 2 / 9	—					
2 - 1 / 16	—					
1 - 0.5 / 32	197.8	197.4	0.4	0.8	0.8	
0.5 - 0.25 / 60	201.1		3.3	6.6	7.4	
0.25 - 0.125 / 115	207.5		6.4	12.8	20.2	
.125-0.0625 / 250	220.7		13.2	27.4	47.6	
PAN	224.6	26.7	53.9	53.4	100.0	
CUMULATIVE WT.			22.8 / 50.0			
SIEVE LOSS 0						
TOTAL						

224.6
197.4
27.2

TEST HOLE # 56-8-97 DATE Febr. 26 97

SAMPLE DEPTH 60-66 TEST BY HRD

	TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE	228.5	178.5	50.0			
~~ACID INSOLUBLE~~						
ACID SOLUBLE						
WET WASH RESIDUE (250 MESH)	222.8	197.4	25.4			
THROUGH (250 MESH)			24.6			
	50					
RO TAP TIME 12						
WT. OF SAMPLE 25.4						
SIEVE OPENING IN MM / MESH						
OVER 8 / 2.5	—					
8 - 4 / 5	—					
4 - 2 / 9	—					
2 - 1 / 16	—					
1 - 0.5 / 32	197.6	197.4	0.2	0.4	0.4	
0.5 - 0.25 / 60	198.7		1.1	2.2	2.6	
0.25 - 0.125 / 115	203.5		4.8	9.6	12.2	
.125-0.0625 / 250	214.0		10.5	21.0	33.2	
PAN	222.8		33.4	66.8	100.0	
CUMULATIVE WT.			50.0			
SIEVE LOSS 0						
TOTAL						

222.8
197.4
25.4

reddish tan

56-B-47

	9-15		15-20		20-25		25-30		30-34		52-55		
	Wt. Ret	Cum %	Wt. Ret.	Cum %	Wt. Ret.	Cum %	Wt. Ret.	Cum %	Wt. Ret.	Cum %	Wt. Ret	Cum %	
2.5	—		—		—		—		—		—		
5	0.40	0.2	—		—		—		—		—		
9	5.54	2.4	8.91	3.1	1.30	0.5	—		—		—		
16	9.17	6.1	15.77	8.5	6.46	3.1	0.93	0.4	0.32	0.1	0.79	0.3	0.3
32	46.66	24.5	58.09	28.5	40.24	19.3	23.56	10.5	17.68	7.0	19.10	7.6	7.9
60	93.78	61.6	103.06	64.3	89.94	56.3	114.75	51.2	107.60	42.5	107.00	42.6	50.5
115	79.11	92.8	76.47	90.3	77.45	87.5	71.67	32.0	101.08	39.9	90.20	35.9	86.4
250	9.24	96.6	10.75	94.6	19.81	93.5	9.37	4.2	16.52	6.5	23.67	9.4	95.8
Pan	8.52	100.2	15.78	100.0	13.61	100.0	3.49	1.7	10.15	4.0	10.43	4.2	100.0
Total	252.47		288.83		248.81		223.77	100.0	253.35	100.0	251.19	100.0	

	55-60		66-70		70-77		80-85		85-90		90-95	
	Wt. Ret	Cum %	Wt. Ret.	Cum %	Wt. Ret.	Cum %	Wt. Ret	Cum %	Wt. Ret.	Cum %	Wt. Ret.	Cum %
2.5	—		—		—		19.66	6.5	51.73	18.0	25.67	9.6
5	—		—		—		77.69	25.6	104.72	36.5	71.22	26.5
9	—		—		5.15	1.5	73.80	24.3	75.42	26.2	83.12	31.0
16	4.00	1.6	15.91	4.6	43.88	12.3	54.20	17.9	34.23	11.9	52.98	19.8
32	45.26	18.2	100.56	29.1	96.79	27.2	25.87	8.5	10.00	3.5	22.34	8.3
60	119.11	47.7	118.22	34.1	117.54	33.0	15.33	5.1	4.33	1.5	7.32	2.7
115	64.97	26.0	59.13	17.1	47.86	13.4	10.20	3.4	2.73	1.0	1.97	0.7
250	9.52	3.8	33.51	9.7	26.08	7.3	8.34	2.8	1.77	0.6	1.28	0.5
Pan	6.59	2.7	18.60	5.4	18.82	5.3	18.00	5.9	2.41	0.8	2.35	0.9
Total	249.45	100.0	345.93	100.0	356.12	100.0	303.09	100.0	287.34	100.0	268.25	100.0

	1.6		4.6		1.5		6.5		18.0		9.6	
	17.8		33.7		13.8		32.1		54.5		36.1	
	67.5		67.8		41.0		56.4		88.7		62.1	
	93.5		84.9		74.0		74.3		92.6		86.9	
	97.3		94.6		87.4		82.8		96.1		95.2	
	100.0		100.0		94.7		87.9		97.6		97.9	
							91.3		98.6		98.6	
							94.1		99.2		99.1	
							100.0		100.0		100.0	

56-B-47

Mesh	95-100		100-105		105-110		110-115		115-120		120-123	
	Wt. Ret	Cum %	Wt. Ret	Cum %	Wt. Ret.	Cum %	Wt. Ret.	Cum %	Wt. Ret.	Cum %	Wt. Ret	Cum %
2.5	21.31	6.9	10.76	3.9	21.46	7.2	40.21	13.6	40.83	12.8	12.84	4.3
5	81.36	26.3	61.41	22.2	73.96	24.9	85.16	28.9	83.52	26.3	84.60	28.4
9	101.38	32.7	81.62	29.5	83.50	28.2	80.30	27.0	88.21	27.8	92.28	31.0
16	67.76	21.9	71.06	26.0	71.48	24.1	54.52	18.3	61.53	19.4	55.60	18.8
32	25.53	8.2	30.49	11.0	28.15	9.5	21.61	7.3	23.81	7.5	28.93	9.7
60	7.28	2.3	12.25	4.4	10.90	3.7	8.53	2.9	11.33	3.6	13.49	4.5
115	1.63	0.5	4.26	1.5	3.56	1.2	2.97	1.0	4.00	1.3	5.84	2.0
250	1.27	0.4	1.93	0.7	1.70	0.6	1.36	0.5	1.68	0.5	2.15	0.7
Pan	2.56	0.8	2.48	0.8	2.55	0.8	1.98	0.7	2.49	0.8	1.93	0.6
Total	310.08	100.0	276.26	100.0	296.76	100.0	296.64	100.0	317.40	100.0	297.66	100.0
Perm.									5,590		2580	
Temp									76°		78°	

	123-125		125-130		130-135		135-140		140-145		145-150	
2.5	—		—		—		3.34	1.0	4.93	1.7	3.07	1.1
5	1.90	1.1	4.06	1.2	1.69	0.7	76.98	23.0	71.52	27.0	47.59	17.4
9	16.69	9.5	11.73	3.6	8.88	3.7	82.65	24.5	81.35	30.6	93.08	34.0
16	42.60	24.3	71.06	21.7	43.37	18.2	64.90	19.3	55.26	20.8	68.00	24.8
32	22.80	13.0	131.82	40.0	77.68	32.4	53.05	15.8	29.95	11.3	37.40	13.6
60	17.61	10.0	63.52	19.4	53.33	22.4	34.70	10.4	14.23	5.4	16.32	5.9
115	19.25	11.0	24.27	7.4	26.16	10.9	12.79	3.8	4.91	1.9	4.71	1.7
250	19.96	11.4	10.83	3.3	10.97	4.6	4.13	1.2	1.61	0.6	1.98	0.7
Pan	34.50	19.7	11.05	3.4	16.93	7.1	3.46	1.0	1.76	0.7	2.20	0.8
Total	175.31	100.0	328.34	100.0	239.01	100.0	336.00	100.0	265.02	100.0	274.35	100.0
Perm			248		7.4		715		3,100		3,000	
Temp			76°		78°		77°		76°		78	
Cor. Perm												

56-B-47

Mesh	150-155		155-160		160-165		165-170		170-175		175-180	
	Wt. Ret.	Cum %	Wt. Ret.	Cum %	Wt. Ret.	Cum %	Wt. Ret.	Cum %	Wt. Ret.	Cum %	Wt. Ret.	Cum %
2.5	2.59	0.8	15.88	4.8	–		3.76	1.1	3.61	1.1	4.54	1.6
5	67.37	21.5	80.92	24.3	37.43	11.6	40.71	12.3	49.98	15.3	69.86	22.5
9	107.76	34.4	96.25	29.0	70.26	21.7	86.80	26.2	100.37	30.4	103.61	33.3
16	69.19	22.2	72.20	21.6	82.86	25.6	88.85	26.9	71.51	22.3	68.27	22.0
32	32.83	10.5	34.22	10.3	66.92	20.6	61.29	18.5	48.45	14.8	33.70	10.9
60	20.50	6.7	21.43	6.4	46.55	14.4	35.47	10.7	35.49	10.8	20.13	6.5
115	7.15	2.3	6.49	1.9	13.55	4.2	9.43	2.9	11.82	3.6	5.98	1.9
250	2.36	0.8	2.24	0.7	3.46	1.1	2.41	0.7	3.05	0.9	1.96	0.6
Pan	2.74	0.8	3.53	1.0	2.68	0.8	2.36	0.7	2.78	0.8	2.36	0.7
Total	312.49	100.0	333.16	100.0	323.71	100.0	331.08	100.0	327.06	100.0	311.01	100.0
Perm.	1750		3,040		520							
Temp.	76°		77°		76°		73°		74°			
Corr. Perm.												

Mesh	180-185		188-195		195-200	200-205	205-210	210-215
2.5	–		4.58	1.3				
5	30.30	9.4	63.85	18.6				
9	90.58	28.0	102.92	30.0				
16	89.19	27.6	68.48	19.9				
32	59.30	18.4	46.00	13.4				
60	36.99	11.5	36.09	10.6				
115	11.43	3.5	14.36	4.2				
250	2.77	0.9	3.40	1.0				
Pan	2.00	0.6	3.27	1.0				
Total	322.56	100.0	342.90	100.0				
Perm.								
Temp								
Corr. Perm.								

170-175

Unwashed		Washed	
Wt %	Cum %	Wt. %	Cum %
3.61		0	3.61
49.98		-0.96	49.02
100.37		-2.84	97.53
71.51		-0.53	70.98
48.95		-0.46	47.91
35.49		-0.59	34.90
11.82		-0.26	11.56
3.05		-0.87	2.18
2.78		-2.30	0.48
327.06		318.17	

327.06
318.17
8.89

lost 8.89 grams

175-180

Unwashed		Washed	
Wt. %	Cum %	Wt. %	Cum %
4.94		-0.04	4.9
69.86		-1.46	68.4
103.61		-5.11	98.5
68.27		+0.13	68.4
33.90		-0.4	33.5
20.13		-0.07	20.2
5.98		+0.12	6.1
1.96		-0.85	1.1
2.36		-1.96	0.4
341.01		301.5	

lost 9.5 grams

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 56-B-47 DATE: Febr. 21 '99

SAMPLE DEPTH: 180-185 TEST MADE BY: V.H.D.

WT. OF TEST SAMPLE: _____ TIME OF SHAKING IN RO-TAP: 12 min

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5					
8 - 4	5	226.5	197.6	28.9		
4 - 2	9	314.1	226.5	87.6		
2 - 1	16	399.6		85.5		
1 - 0.5	32	457.3		57.7		
0.5 - 0.25	60	491.5		34.2		
0.25 - 0.125	115	501.3		9.8		
.125 - 0.0625	250	503.4		2.1		
Pan		504		0.6		
				306.4		

Sieve Loss-------- _____ _____

REMARKS: Washed sample

504.0
197.6
306.4

322.50
306.4
16.10 lost in washing?

TEST HOLE # 56-B-47

SAMPLE DEPTH 185-188

DATE Feb. 26, 49

TEST BY O.A.D.

		TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE		220.4	178.5	41.9			
~~ACID INSOLUBLE~~							
~~ACID SOLUBLE~~							
WET WASH RESIDUE (250 MESH)				16.5			
THROUGH (250 MESH)				25.4			
RO TAP TIME 12. WT. OF SAMPLE 16.5							
SIEVE OPENING IN MM	MESH						
OVER 8	2.5	—					
8 - 4	5	—					
4 - 2	9	—					
2 - 1	16	198.3	197.4	0.9	2.1	2.1	
1 - 0.5	32	202.6		4.3	10.2	12.3	
0.5 - 0.25	60	206.4	3.1	3.8	9.1	21.4	
0.25 - 0.125	115	209.6		3.2	7.6	29.0	
.125-0.0625	250	212.3		2.7	6.5	435.5	
PAN		213.8	26.9	1.5	64.5	100.0	
CUMULATIVE WT.				25.4	100.0		
SIEVE LOSS - 0.1				41.9			
TOTAL							

213.9
197.4
16.5

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 56-B-47 DATE: Febr. 21

SAMPLE DEPTH: 188-195 TEST MADE BY: V.H.D.

WT. OF TEST SAMPLE: 338.4 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	201.9	197.6	4.3	1.3	1.3
8 - 4	5	266.8		64.9	19.2	20.5
4 - 2	9	366.9		100.1	29.5	50.0
2 - 1	16	435.1		68.2	20.2	70.2
1 - 0.5	32	482.7		47.6	14.1	84.3
0.5 - 0.25	60	518.8		36.1	10.6	94.9
0.25 - 0.125	115	533.1		14.3	4.2	99.1
.125 - 0.0625	250	535.5		2.4	0.7	99.8
Pan		536.0		0.5	0.2	100
				~~338.4~~	~~100~~	
Sieve Loss			0			

REMARKS:

~~536.0~~ 536.0
~~201.9~~ 197.6
~~334.1~~ 338.4

Before wash 342.9
after wash 338.4
4.5 gms lost in washing.

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 56-B-47 DATE: Feb. 21

SAMPLE DEPTH: 195-200 TEST MADE BY: V.H.D.

WT. OF TEST SAMPLE: Not weighed TIME OF SHAKING IN RO-TAP: 12 min

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	200.9	197.6	3.3	1.1	1.1
8 - 4	5	265.6		64.7	22.2	23.3
4 - 2	9	362.2		96.6	33.0	56.3
2 - 1	16	422.3		60.1	20.5	76.8
1 - 0.5	32	457.8		35.5	12.1	88.9
0.5 - 0.25	60	481.4		23.6	8.0	96.9
0.25 - 0.125	115	489.2		7.8	2.6	99.5
.125 - 0.0625	250	490.4		1.2	0.4	99.9
Pan		490.7		0.3	0.1	100.0
				293.1	100.0	
Sieve Loss--------						

REMARKS:

Washed sample

490.7
197.6
293.1

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 56-B-47 DATE: Feb. 21

SAMPLE DEPTH: 200-205 TEST MADE BY: A.R.L.

WT. OF TEST SAMPLE: 508.5 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				—
8 - 4	5	240.5	197.6	42.9	13.8	13.8
4 - 2	9	336.9		96.4	31.1	44.9
2 - 1	16	411.0		74.1	23.8+	68.7
1 - 0.5	32	459.5		48.5	15.6	84.3
0.5 - 0.25	60	494.7		35.2	11.4-	95.7
0.25 - 0.125	115	506.2		11.5	3.7	99.4
.125 - 0.0625	250	507.9		1.7	0.5+	99.9
Pan		508.1	310.5	.2	0.1-	100.0
		508.5		310.5	100.0	

Sieve Loss-------- 0.4gm.

REMARKS:

508.1
197.6
310.5

508.5
508.1
0.4 gm.

Wt. before washing 513.8
197.6
316.2

Wt. after washing 508.5
192.6
310.9

316.2
310.9
5.3 gms.

508.1
197.6
310.5

Washed SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 56-B-47 DATE: Febr. 21

SAMPLE DEPTH: 205-210 TEST MADE BY: V.H.D.

WT. OF TEST SAMPLE: 346.5 TIME OF SHAKING IN RO-TAP: 12 min.

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	198.3	197.6	0.7	0.2	0.2
8 - 4	5	260.2		61.9	17.8	18.0
4 - 2	9	368.5		108.3	31.2	49.2
2 - 1	16	446.4		77.9	22.5	71.7
1 - 0.5	32	492.6		46.2	13.4	85.1
0.5 - 0.25	60	528.2		35.6	10.3	95.4
0.25 - 0.125	115	540.5		12.3	3.6	99.0
.125 - 0.0625	250	543.2		2.7	0.8	99.8
Pan		543.9	346.3	0.7	0.2	100
				346.3	100.0	

Sieve Loss-------- 346.5

REMARKS: 543.9 − 197.6 = 346.3   346.3   0.2 gms. lost in sieving.

543.9 − 197.6 = 346.3

wt. of sample before washing 548.5 − 197.6 = 350.9   544.1 − 197.6 = 346.5

wt. of sample after washing 548.5 − 544.1 = 4.4 gms. lost in washing

Washed SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 56-B-47 DATE: Febr. 21

SAMPLE DEPTH: 210-215 TEST MADE BY: V.H.D

WT. OF TEST SAMPLE: 554.6 TIME OF SHAKING IN RO-TAP:

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—		—	—	—
8 - 4	5	223.4	197.6	25.8	7.3	7.2
4 - 2	9	317.6		94.2	26.4	33.6
2 - 1	16	420.9		103.3	28.9	62.5
1 - 0.5	32	489.8		68.9	19.3	81.8
0.5 - 0.25	60	534.5		44.7	12.5	94.3
0.25 - 0.125	115	549.0		14.5	4.1	98.4
.125 - 0.0625	250	552.4		3.4	1.0	99.4
Pan		554.3	356.7	1.9	0.6	100.0
			554.6	356.7	100.0	

Sieve Loss 554.3 — 554.6 = 0.3 gm.

REMARKS: 0.3 gm. sieve loss.

554.3
197.6
356.7

Wt. before wash. 558.6
197.6
361.0

Wt. after wash 554.6

4.0 gms. lost in washing

554.3
197.6
356.7

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 56-B-47 DATE: _____

SAMPLE DEPTH: 215-220 Dry. TEST MADE BY: _____

WT. OF TEST SAMPLE: 554.9 TIME OF SHAKING IN RO-TAP: _____

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	236.5	197.6	38.9		
8 - 4	5	338.7		102.2		
4 - 2	9	430.1		91.4		
2 - 1	16	491.4		61.3		
1 - 0.5	32	533.7		42.3		
0.5 - 0.25	60	547.7		14.0		
0.25 - 0.125	115	550.9		3.2		
.125 - 0.0625	250	554.4		3.5		
Pan			356.8	352.3		
				356.8		
Sieve Loss--------				0.5		

REMARKS:

554.4
197.6
356.8

Wt. before dry sieving 554.9
197.6
357.5 gms.

554.9
197.6
357.3

554.4
197.6
356.8

356.8

0.5 grams lost in sieving

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 56-B-47 DATE: Feb. 22

SAMPLE DEPTH: 215-220 Washed TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 347.6 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %	
Over 8	2.5	———	192.6		———	———	
8 - 4	5	236.8	170.3	39.2	11.3	11.3	38.9
4 - 2	9	338.9	-0.1	102.1	29.3	40.6	102.2
2 - 1	16	427.4	-2.9	88.5	25.5	66.1	91.4
1 - 0.5	32	486.4	-2.3	59.0	17.0	83.1	61.3
0.5 - 0.25	60	527.5	-1.2	41.1	11.8	94.9	42.3
0.25 - 0.125	115	540.6	-0.9	13.1	3.8	98.7	14.
.125 - 0.0625	250	544.0	+0.2	3.4	1.0	99.7	3.2
Pan		544.9	-2.6	0.9	0.3	100.0	3.5
				347.3	100.0		

Sieve Loss-------- 347.6 ———

0.3 gms

REMARKS:

544.9
192.6
352.3

356.8

1.1
347.3

356.8
347.6
9.2 gms. lost in washing

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 56-B-47 DATE: Feb. 22,

SAMPLE DEPTH: 220-225 TEST MADE BY:

WT. OF TEST SAMPLE: 388.4 washed TIME OF SHAKING IN RO-TAP:

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				—
8 - 4	5	203.1	197.6	5.5	1.9	1.9
4 - 2	9	264.0		60.9	21.1	23.0
2 - 1	16	362.3		98.3	34.1	57.1
1 - 0.5	32	424.4		62.1	21.5	78.6
0.5 - 0.25	60	465.2		40.8	14.2	92.8
0.25 - 0.125	115	481.0		15.8	5.5	98.3
.125 - 0.0625	250	484.8		3.8	1.3	99.6
Pan		485.9	288.3	1.1	0.4	100.0
		388.4		288.3	100.0	

Sieve Loss-------- 288.3 — 0.1 gm.

REMARKS:

485.1
197.6
288.3

Wt. before washing, 489.6
197.6
293.0
288.4
4.6 gms. lost in washing

466.7
178.3
288.4

388.4

485.9
197.6
288.3

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 56-B-47 DATE: Febr. 22

SAMPLE DEPTH: 225-230 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 356.3 TIME OF SHAKING IN RO-TAP:

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—			—	—
8 - 4	5	1890	1783	10.7	3.0	3.0
4 - 2	9	275.5		86.5	24.2	27.2
2 - 1	16	401.3		125.8	35.3	62.5
1 - 0.5	32	468.9		67.1	18.8	81.3
0.5 - 0.25	60	512.0		43.6	12.2	93.5
0.25 - 0.125	115	529.1		17.1	4.8	98.3
.125 - 0.0625	250	533.2		4.1	1.2	99.5
Pan		534.9	356.6	1.7	0.5	100.0
			356.6	356.6	100.0	

Sieve Loss 356.3

REMARKS: 0.3 gms lost in sieving

534.9

556.2 wt. before washing
553.9
4.3 gms. lost washing

553.9
197.6
356.3

534.9
178.3
356.6

Unwashed SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 56-B-47 DATE: Febr. 22, 49

SAMPLE DEPTH: 230-235 Dry TEST MADE BY: V.Q.D

WT. OF TEST SAMPLE: 340.5 TIME OF SHAKING IN RO-TAP:

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5					
8 - 4	5	200.9	197.6	3.3		
4 - 2	9	245.8		44.9		
2 - 1	16	361.6		115.8		
1 - 0.5	32	449.9		88.3		
0.5 - 0.25	60	506.8		56.9		
0.25 - 0.125	115	528.0		21.2		
.125 - 0.0625	250	533.4		5.4		
Pan		537.6		4.2		
		340.5		340.0		

Sieve Loss-------- 340.5 / 340.0 — 0.5 gm. loss.

REMARKS:

538.1 − 197.6 = 340.5 − 336.3 = 4.2 gms. lost in washing

537.6 − 197.6 = 340.0

340.10 − 336.3 = 3.7 gms. lost in washing

In U.S.G.S. beaker Q

Washed SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 56-B-42 DATE: Febr. 23

SAMPLE DEPTH: 230-235 TEST MADE BY:

WT. OF TEST SAMPLE: 336.3 TIME OF SHAKING IN RO-TAP:

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %	
Over 8	2.5	—				—	
8 - 4	5	181.6	178.3	3.3	1.0	1.0	3 3.3
4 - 2	9	223.7		42.1	12.5	13.5	44.9 -2.8
2 - 1	16	342.6		118.9	35.4	48.9	115.8 + 3.1
1 - 0.5	32	427.8		85.2	25.3	74.2	88.3 - 3.1
0.5 - 0.25	60	485.1		57.3	17.1	91.3	56.9 +0.4
0.25 - 0.125	115	506.8		21.7	6.5	97.8	21.2 -0.5
.125 - 0.0625	250	512.2		5.4	1.6	99.4	5.4 0
Pan		514.2	335.9	2.0	0.6	100.0	4.2 -2.2
				335.9	100.0		

Sieve Loss-------- 0.4 gms. lost

REMARKS:

514.6
178.3
336.3

514.2
178.3
335.9

336.3
335.9

Unwashed SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 56-B-47 DATE: 2-23

SAMPLE DEPTH: 235-240 TEST MADE BY:

WT. OF TEST SAMPLE: 294.4 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %	
Over 8	2.5	—	178.3				
8 - 4	5	180.5		2.2			
4 - 2	9	223.7		43.2			
2 - 1	16	324.1		100.4			
1 - 0.5	32	401.5		77.4			
0.5 - 0.25	60	448.0		46.5			
0.25 - 0.125	115	464.9		16.9			
.125 - 0.0625	250	468.9		4.0			
Pan		472.8		3.9			
				294.5			

Sieve Loss-------- 0 gm.

REMARKS:

472.8 − 178.3 = 294.5

472.8 − 178.3 = 294.5

294.1 − 291.7 = 2.4 gms. lost in washing

Washed

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 56-B-97 DATE: Febr. 23, '99

SAMPLE DEPTH: 235-240 TEST MADE BY: H.R.D.

WT. OF TEST SAMPLE: 291.7 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %		
Over 8	2.5	—	178.3			—		
8 - 4	5	180.9		2.6	0.9	0.9	2.2	+0.4
4 - 2	9	221.9		41.0	14.1	15.0	43.2	-2.2
2 - 1	16	323.6		101.7	34.8	49.8	100.4	+1.3
1 - 0.5	32	398.0		74.4	25.6	75.4	77.4	-3.0
0.5 - 0.25	60	446.0		48.0	16.5	91.9	46.5	+1.5
0.25 - 0.125	115	463.0		17.0	5.7	97.6	16.9	+0.1
.125 - 0.0625	250	467.3		4.3	1.6	99.2	4.0	+0.3
Pan		469.6	291.3	2.3	0.8	100	3.9	-1.6
				291.3	100.0			

Sieve Loss-------- 0.4 gms.

REMARKS:

470.0 − 178.3 = 291.7

469.6 − 188.3 = 291.3

Unwashed SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 56-B-47 DATE: 2-23

SAMPLE DEPTH: 240-245 TEST MADE BY: AJHD

WT. OF TEST SAMPLE: 340.4 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %	
Over 8	2.5	—	197.6				
8 - 4	5	207.8	2	102			
4 - 2	9	244.1		36.3			
2 - 1	16	322.2		78.1			
1 - 0.5	32	422.5		100.3			
0.5 - 0.25	60	497.4		74.9			
0.25 - 0.125	115	526.2		28.8			
.125 - 0.0625	250	532.8		6.6			
Pan		537.6		4.8			
				340.0			

Sieve Loss-------- ——— = ———

0.4 gms.

REMARKS:

538.0
197.6
340.4

537.6
197.6
340.0
336.9
3.1 gms. lost in washing

Washed SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 56-B-47 DATE: Febr. 23

SAMPLE DEPTH: 240-245 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 336.9 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %	
Over 8	2.5	—				—	
8 - 4	5	207.2	197.1	10.1	-81 3.0	3.0	10.2
4 - 2	9	242.0		34.8	-1.5 10.3	13.3	36.3
2 - 1	16	321.6		79.6	+1.5 23.6	36.9	78.1
1 - 0.5	32	418.6		97.0	-33 28.8	65.7	100.3
0.5 - 0.25	60	494.7		76.1	+1.2 22.6	88.3	74.9
0.25 - 0.125	115	523.9		29.2	+0.4 8.7	97.0	28.8
.125 - 0.0625	250	330.8		6.9	+0.3 2.1	99.1	6.6
Pan		533.9	336.8	3.1	-1.5 0.9	100.0	4.8
				336.8	100.0		

Sieve Loss-------- 0.1 gm.

REMARKS:

534.0
192.1
336.9

533.9
197.1
336

Unwashed SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 56-B-77 DATE: Febr. 23

SAMPLE DEPTH: 245-250 TEST MADE BY: OEKD

WT. OF TEST SAMPLE: 348.4 TIME OF SHAKING IN RO-TAP: 15

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %	
Over 8	2.5						
8 - 4	5	205.3	197.6	7.7			10.1
4 - 2	9	254.5		49.2			39.7
2 - 1	16	347.3		92.8			70.6
1 - 0.5	32	441.1		93.8			97.
0.5 - 0.25	60	510.5		69.4			76.1
0.25 - 0.125	115	535.8		25.3			
.125 - 0.0625	250	541.3		5.5			
Pan		545.1		3.8			
				347.5			

Sieve Loss-------- 0.5 gm.

REMARKS: 10.1

543.6
197.6
348.0
348.4

545.11
197.6
347.5
344.8
2.7 gms. lost in ~~washing~~

Washed SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 56-B-47 DATE: Feb. 23, '99

SAMPLE DEPTH: 245-250 TEST MADE BY: J.R.D.

WT. OF TEST SAMPLE: 344.8 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %	
Over 8	2.5	—				—	
8 - 4	5	205.0	197.1	7.9	2.3	2.3	7.7 − 0.2
4 - 2	9	253.3		48.3	14.1	16.4	49.2 − 0.9
2 - 1	16	345.5		92.2	27.0	43.4	92.8 − 0.6
1 - 0.5	32	441.1		95.6	28.0	71.4	93.8 + 1.8
0.5 - 0.25	60	506.9		65.8	19.2	90.6	69.4 + 3.6
0.25 - 0.125	115	531.1		24.2	7.1	97.7	25.3 + 1.1
.125 - 0.0625	250	536.2		5.1	1.5	99.2	5.5 + 0.4
Pan		538.8	341.7	2.6	0.8	100.0	3.8 − 1.6
				341.7	100.0		

Sieve Loss-------- 3.1 gms ?

REMARKS:

541.9
197.1
344.8

5 538.8
197.1
341.7

Unwashed SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 56-8-47 DATE: Febr. 23

SAMPLE DEPTH: 250-255 TEST MADE BY: A.R.D

WT. OF TEST SAMPLE: 328.2 TIME OF SHAKING IN RO-TAP: 15

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	199.2	197.6	1.6	0.5	0.5
4 - 2	9	225.1		25.9	7.9	8.4
2 - 1	16	301.7		76.6	23.3	31.7
1 - 0.5	32	398.2		96.5	29.4	61.1
0.5 - 0.25	60	478.3		80.1	24.4	85.5
0.25 - 0.125	115	513.3		35.0	10.7	96.2
.125 - 0.0625	250	521.4		8.1	2.5	98.7
Pan		525.6	328.0	4.2	1.3	100.0
				328.0	100.0	

Sieve Loss-------- 0.2 gms.

REMARKS: 12.3

525.6
197.6
328.2

525.6
197.6
328.0
324.6
3.4 gms. lost in washing

Washed

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 56-B-47 DATE: Febr. 23 '49

SAMPLE DEPTH: 250-255 TEST MADE BY: V.V.D.

WT. OF TEST SAMPLE: 324.6 TIME OF SHAKING IN RO-TAP: 15

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %	
Over 8	2.5						
8 - 4	5	199.0	197.1	1.9	0.6	1.6	+0.3
4 - 2	9	221.7		22.7	7.0	25.9	-3.2
2 - 1	16	300.7		79.0	24.4	76.6	+2.0
1 - 0.5	32	393.9		93.2	28.8	96.5	-3.3
0.5 - 0.25	60	474.6		80.7	24.8	80.1	+0.6
0.25 - 0.125	115	509.7		35.1	10.8	35.	+0.1
.125 - 0.0625	250	517.2		7.5	2.3	8.1	-0.6
Pan		521.3		4.1	1.3	9.2	same
		517.2		324.2	100		

Sieve Loss ---------- 0.4 gms.

REMARKS:

521.3
197.1
324.2

521.7
197.1
324.6

last sample.

TEST HOLE # 57-B-47 — 47 samples — DATE Febr. 28

SAMPLE DEPTH 10-15 — TEST BY [illegible]

	TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE	274.4	197.4	50			
~~ACID INSOLUBLE~~						
~~ACID SOLUBLE~~						
WET WASH RESIDUE (250 MESH)	230.2	197.2	33.			
THROUGH (250 MESH)			17.			
RO TAP TIME 12						
WT. OF SAMPLE 33						
SIEVE OPENING IN MM / MESH						
OVER 8 / 2.5	—	197.2				
8 - 4 / 5	—					
4 - 2 / 9	—					
2 - 1 / 16	197.8		.6	1.2	1.2	
1 - 0.5 / 32	205.7		7.9	15.8	17.0	
0.5 - 0.25 / 60	217.5		11.8	23.6	40.6	
0.25 - 0.125 / 115	226.2	19.4	8.7	17.4	58.0	
.125-0.0625 / 250	227.8	7	1.6	3.2	61.2	
PAN	230.1	19.3	2.3	38.8	100.0	
CUMULATIVE WT.			17.0 / 49.9			
SIEVE LOSS	.1					
TOTAL						

230.2
197.2
33.0

SIEVE ANALYSIS WORK SHEET Washed Samples

TEST HOLE NUMBER: 57-B-47 DATE: Febr. 23 '99

SAMPLE DEPTH: 15-20 TEST MADE BY: A.R.D.

WT. OF TEST SAMPLE: 331.8 TIME OF SHAKING IN RO-TAP: 15

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	—				
4 - 2	9	—				
2 - 1	16	205.2	197.1	8.1	2.4	2.4
1 - 0.5	32	333.7		128.5	38.7	41.1
0.5 - 0.25	60	480.3		146.6	44.1	85.2
0.25 - 0.125	115	517.9		37.6	11.3	96.5
.125 - 0.0625	250	521.0		3.1	0.9	97.4
Pan		529.5	332.4	8.5	2.6	100.0
				332.4	100.0	

Sieve Loss-------- 331.8 + 0.6?

REMARKS:

529.5
197.1
332.4

528.9
197.1
331.8

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 57-B-47 DATE: _____

SAMPLE DEPTH: 20-27.5 TEST MADE BY: A.R.D.

WT. OF TEST SAMPLE: 315.4 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	—				
4 - 2	9	~~197.2~~	197.1	0.1		
2 - 1	16	204.0		6.8	2.1	2.1
1 - 0.5	32	304.5		100.5	31.8	33.9
0.5 - 0.25	60	452.9		148.4	47.3	81.2
0.25 - 0.125	115	502.4		49.5	15.7	96.9
.125 - 0.0625	250	508.7		6.3	2.0	98.9
Pan		512.4	315.3	3.7	1.1	100.0
				315.3	100.0	
Sieve Loss--------				-0.1		

REMARKS:

512.5
197.1
315.9

512.4
197.1
315.3

TEST HOLE # 57-B-97 DATE Febr. 28 '49

SAMPLE DEPTH 27.5-29.5 TEST BY A.R.D.

		TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE		279.4	197.4	50			
ACID ~~INSOLUBLE~~							
ACID SOLUBLE							
WET WASH RESIDUE (~~250~~ MESH)		227.2	197.2	30.0			
THROUGH (250 MESH)				20.0			
RO TAP TIME 12							
WT. OF SAMPLE 30.0							
SIEVE OPENING IN MM	MESH						
OVER 8	2.5	—	197.2				
8 - 4	5	—					
4 - 2	9	—					
2 - 1	16	197.6	197.2	0.4	0.8	0.8	
1 - 0.5	32	199.8		2.2	4.4	5.2	
0.5 - 0.25	60	205.1		5.3	10.6	15.8	
0.25 - 0.125	115	213.8		8.7	17.4	33.2	
.125-0.0625	250	223.1		9.3	18.6	51.8	
PAN		227.2	24.1	24.1	48.2	100.0	
~~CUMULATIVE~~ WT.				(20.0 / 50.0			
SIEVE LOSS	0						
TOTAL							

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 57-B-42 DATE: Febr. 24

SAMPLE DEPTH: 29.5-35 TEST MADE BY: O.S.D.

WT. OF TEST SAMPLE: 279.7 TIME OF SHAKING IN RO-TAP: 12.

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	—				
4 - 2	9	—	197.1			
2 - 1	16	213.3		16.2	5.8	5.8
1 - 0.5	32	311.8		98.5	35.2	41.0
0.5 - 0.25	60	417.4		105.6	37.8	78.8
0.25 - 0.125	115	466.5		49.1	17.6	96.4
.125 - 0.0625	250	474.0		7.5	2.7	99.1
Pan		476.5	279.4	2.5	0.9	100.0
				279.4	100.0	

Sieve Loss-------- 0.3 gms.

REMARKS:

476.8
197.1
279.7

476.5
197.1
279.4

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 57-B-47 DATE: _____

SAMPLE DEPTH: 35-40 TEST MADE BY: A.W.D.

WT. OF TEST SAMPLE: 290.1 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %	
Over 8	2.5	—					
8 - 4	5	—					
4 - 2	9	—					
2 - 1	16	207.7	197.1	10.6	3.7	3.7	
1 - 0.5	32	297.3		89.6	30.8	34.5	
0.5 - 0.25	60	417.1		119.8	41.4	75.9	
0.25 - 0.125	115	475.6		58.5	20.2	96.1	
.125 - 0.0625	250	484.7		9.1	3.1	99.2	
Pan		487.0		2.3	0.8	100.0	
				289.9	100.0		

Sieve Loss -------- -0.2 gms.

REMARKS:

487.2
197.1
290.1

487.0
197.1
389.9

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 57-B-47 DATE: Febr. 24

SAMPLE DEPTH: 40-45 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 173.3 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	—				
4 - 2	9	—				
2 - 1	16	202.5	197.1	5.4	3.1	3.1
1 - 0.5	32	261.0		58.5	33.8	36.9
0.5 - 0.25	60	333.3		72.3	41.8	78.7
0.25 - 0.125	115	365.6		32.3	18.6	97.3
.125 - 0.0625	250	369.9		4.3	2.5	99.8
Pan		370.4		0.5	0.2	100.0
				173.3	100.0	

Sieve Loss -------- 0

REMARKS:

535.9
197.1
338.8
2
169.4

370.4
197.1
173.3
[illegible]
3.9

Split sample

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 57-B-47 DATE: Febr. 24 '49

SAMPLE DEPTH: 45-50 TEST MADE BY: O.P.D

WT. OF TEST SAMPLE: 155.8 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %	
Over 8	2.5	—					
8 - 4	5	—					
4 - 2	9	—					
2 - 1	16	207.6	192.1	10.5	6.7	6.7	
1 - 0.5	32	262.6		55.0	35.3	42.0	
0.5 - 0.25	60	323.3		60.7	39.0	81.0	
0.25 - 0.125	115	349.3		26.0	16.7	97.7	
.125 - 0.0625	250	352.4		3.1	2.0	99.7	
Pan		352.8		0.4	0.3	100.0	
				155.7	100.0		

Sieve Loss-------- 0.1

REMARKS:

352.9
197.1
155.8 Split sample

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 57-B-4P DATE: Feb. 29 '91

SAMPLE DEPTH: 50-55 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 156.7 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	—				
4 - 2	9	—				
2 - 1	16	200.7	197.1	3.6	2.3	2.3
1 - 0.5	32	245.1		44.4	28.3	30.6
0.5 - 0.25	60	314.4		69.3	44.3	74.9
0.25 - 0.125	115	348.0		33.6	21.4	96.3
.125 - 0.0625	250	353.4		5.4	3.4	99.7
Pan		353.8 ?		0.4	0.3	100.0
				156.7	100.0	
Sieve Loss--------				0.0		

REMARKS:

353.8
197.1
156.7

Split Sample

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 57-B-99 DATE: Febr. 29 '99

SAMPLE DEPTH: 55-60 TEST MADE BY: R.R.D.

WT. OF TEST SAMPLE: 147.1 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	—				
4 - 2	9	—				
2 - 1	16	213.3	197.1	16.2	11.0	11.0
1 - 0.5	32	254.6		41.3	28.1	39.1
0.5 - 0.25	60	293.0		38.4	26.1	65.2
0.25 - 0.125	115	330.8		37.8	25.7	90.9
.125 - 0.0625	250	341.2		10.4	7.1	98.0
Pan		344.2		3.0	2.0	100.0
				147.1	100.0	

Sieve Loss -------- 0.0

REMARKS:

344.2
197.1
147.1

344.2
197.1
147.1

Split Sample

TEST HOLE # 52-B-97

SAMPLE DEPTH 60-65

DATE Febr. 28 '99

TEST BY O.Y.D.

	TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE	247.9	197.9	50			
ACID ~~INSOLUBLE~~						
ACID ~~SOLUBLE~~						
WET WASH RESIDUE (250 MESH)	240.6	197.2	43.4			
THROUGH (250 MESH)			6.6			

RO TAP TIME 12

WT. OF SAMPLE 43.4

SIEVE OPENING IN MM	MESH						
OVER 8	2.5	—					
8 - 4	5	—					
4 - 2	9	—		3			
2 - 1	16	197.3	197.2	0.1	0.2	0.2	
1 - 0.5	32	202.4		5.1	10.2	10.4	
0.5 - 0.25	60	218.3		15.9	31.8	42.2	
0.25 - 0.125	115	230.6		12.3	24.6	66.8	
.125-0.0625	250	237.0		6.4	12.8	79.6	
PAN		239.8	1.4	3.8	5.6	85.2	
CUMULATIVE WT.		240.5	7.3	51.3	14.8	100.0	
SIEVE LOSS 0.1				6.6			
TOTAL				49.9			

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 57-B-42 DATE: Febr. 29

SAMPLE DEPTH: 70-75 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 298.3 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %	
Over 8	2.5	—					
8 - 4	5						
4 - 2	9	197.4	197.1	0.3	0.1	0.1	
2 - 1	16	217.5		20.1	6.7	6.8	
1 - 0.5	32	330.2		112.7	37.9	44.7	
0.5 - 0.25	60	441.4		111.2	37.3	82.0	
0.25 - 0.125	115	481.1		39.7	13.4	95.4	
.125 - 0.0625	250	490.1		9.0	3.0	98.4	
Pan		495.0		4.9	1.6	100.0	
				297.9	100.0		

Sieve Loss-------- 0.4

REMARKS:

495.4
197.1
298.3

495.0
197.1
297.9

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 57-B-47 DATE: Feb. 24 1999

SAMPLE DEPTH: 75-80 TEST MADE BY: D.H.D.

WT. OF TEST SAMPLE: 325.4 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	—				
4 - 2	9	192.4	192.1	0.3	0.1	0.1
2 - 1	16	221.1		23.7	7.3	7.4
1 - 0.5	32	332.3		111.2	34.3	41.7
0.5 - 0.25	60	454.3		122.0	37.5	79.2
0.25 - 0.125	115	502.4		48.1	14.8	94.0
.125 - 0.0625	250	513.3		10.9	3.4	97.4
Pan		521.8		8.5	2.6	100.0
				324.7	100.0	

Sieve Loss-------- 0.7

REMARKS:

522.5 − 192.1 = 325.4

521.8 − 192.1 = 324.7

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 57-B-47 DATE: Febr. 25 '49

SAMPLE DEPTH: 80-84.5 TEST MADE BY: O.P.S.

WT. OF TEST SAMPLE: 307.2 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %	
Over 8	2.5	—					
8 - 4	5	—					
4 - 2	9	197.3	1972	0.1	—	—	
2 - 1	16	218.0		20.7	6.8	6.8	
1 - 0.5	32	328.2		110.2	35.9	42.7	
0.5 - 0.25	60	498.5		120.3	39.2	81.9	
0.25 - 0.125	115	496.7		48.2	15.6	97.5	
.125 - 0.0625	250	502.7		6.0	2.0	99.5	
Pan		504.2		1.5	0.5	100.0	
				307.0	100.0		

Sieve Loss-------- 0.2

REMARKS:

504.4
197.2
307.2

504.2
197.2
307.0

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 57-B-47 DATE: Febr. 25 '57

SAMPLE DEPTH: 84.5-90 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 274.3 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	—				
4 - 2	9	219.5	197.2	22.3	8.1	8.1
2 - 1	16	342.0		122.5	44.7	52.8
1 - 0.5	32	433.7		91.7	33.5	86.3
0.5 - 0.25	60	461.4		27.7	10.1	96.4
0.25 - 0.125	115	468.1		6.7	2.4	98.8
.125 - 0.0625	250	469.5		1.4	0.5	99.3
Pan		471.5		2.0	0.7	100.0
				274.3	100.0	

Sieve Loss-------- 0

REMARKS: Sample highly iron stained

471.5
197.2
274.3

471.5

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 57-B-99 DATE: Febr. 25. '99

SAMPLE DEPTH: 90-93 TEST MADE BY: J.A.D.

WT. OF TEST SAMPLE: 293.5 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	199.0	197.2	1.8	0.6	0.6
4 - 2	9	332.0		133.0	45.4	46.0
2 - 1	16	415.9		83.9	28.5	74.5
1 - 0.5	32	459.5		43.6	14.8	89.3
0.5 - 0.25	60	482.3		22.8	7.7	97.0
0.25 - 0.125	115	489.3		7.0	2.4	99.4
.125 - 0.0625	250	490.5		1.2	0.4	99.8
Pan		491.2		0.7	0.2	100.0
				294.0	100.0	

Sieve Loss-------- ±0.5

REMARKS:

490.7
197.2
293.5

491.2
197.2
294.0

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 57-B-47 DATE: Febr. 25 '99

SAMPLE DEPTH: 93-100 TEST MADE BY: O.R.D.

WT. OF TEST SAMPLE: 333.3 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	216.0	197.2	18.8	5.6	5.6
4 - 2	9	309.8		93.8	28.1	33.7
2 - 1	16	421.4		111.6	33.5	67.2
1 - 0.5	32	491.6		70.2	21.1	88.3
0.5 - 0.25	60	519.3		27.7	8.3	96.6
0.25 - 0.125	115	525.8		6.5	2.0	98.6
.125 - 0.0625	250	527.9		2.1	0.6	99.2
Pan		530.7		2.8	0.8	100.0
				333.5	100.0	
Sieve Loss--------				+0.2		

REMARKS:

530.5
197.2
333.3

530.7
197.2
333.5

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 57-B-47 DATE: Feb. 25 '99

SAMPLE DEPTH: 100-105 TEST MADE BY: OPAD

WT. OF TEST SAMPLE: 320.2 TIME OF SHAKING IN RO-TAP: 12.

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	204.1	197.2	6.9	2.2	2.2
4 - 2	9	311.4		107.3	33.5	35.7
2 - 1	16	408.1		96.7	30.3	66.0
1 - 0.5	32	466.2		58.1	18.2	84.2
0.5 - 0.25	60	502.2		36.0	11.2	95.4
0.25 - 0.125	115	512.9		10.7	3.4	98.8
.125 - 0.0625	250	515.7		2.8	0.9	99.7
Pan		516.8		1.1	0.3	100.0
				319.6	100.0	
Sieve Loss--------						

REMARKS: -0.6

517.4
197.2
320.2

516.8
197.2
319.6

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 57-B-92 DATE: Febr. 14 1959

SAMPLE DEPTH: 105-110 TEST MADE BY: A.R.D.

WT. OF TEST SAMPLE: 302.7 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	-				
8 - 4	5	210.1	197.2	12.9	4.3	4.3
4 - 2	9	316.8		106.7	35.3	39.6
2 - 1	16	412.3		95.5	31.6	71.2
1 - 0.5	32	460.5		48.2	16.0	87.2
0.5 - 0.25	60	482.5		27.6	8.9	96.1
0.25 - 0.125	115	495.9		8.4	2.8	98.9
.125 - 0.0625	250	497.8		1.9	0.6	99.5
Pan		499.3		1.5	0.5	100.0
				302.1	100.0	

Sieve Loss -------- -0.6

REMARKS:

499.9
197.2
302.7

499.3
197.2
302.1

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 57-B-97 DATE: Febr. 25, 1999

SAMPLE DEPTH: 110-116 TEST MADE BY: O.R.D.

WT. OF TEST SAMPLE: 343.0 TIME OF SHAKING IN RO-TAP: 12 min.

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	202.6	197.2	5.4	1.6	1.6
4 - 2	9	236.9		34.3	10.0	11.6
2 - 1	16	339.0		102.1	29.9	41.5
1 - 0.5	32	460.4		121.4	35.5	77.0
0.5 - 0.25	60	512.9		52.5	15.2	92.2
0.25 - 0.125	115	532.0		19.1	5.6	97.8
.125 - 0.0625	250	536.8		4.8	1.4	99.2
Pan		539.5		2.7	0.8	100.0
				342.3	100.0	
Sieve Loss--------				-0.7		

REMARKS:

540.2
197.2
343.0

539.5
197.2
342.3

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 59-B-42 DATE: Febr. 25, 1949

SAMPLE DEPTH: 116-120 TEST MADE BY: G.A.D.

WT. OF TEST SAMPLE: 329.4 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %	
Over 8	2.5	—					
8 - 4	5	243.5	197.2	46.3	14.0	14.0	
4 - 2	9	346.4		102.9	31.2	45.2	
2 - 1	16	445.9		99.5	30.2	75.4	
1 - 0.5	32	492.5		46.6	14.1	89.5	
0.5 - 0.25	60	514.4		21.9	6.7	96.2	
0.25 - 0.125	115	522.2		7.8	2.4	98.6	
.125 - 0.0625	250	524.9		2.7	0.8	99.4	
Pan		526.8		1.9	0.6	100.0	
				329.6	100.0		
Sieve Loss				+0.2			

REMARKS:

526.6
197.2
329.4

526.8
197.2
329.6

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 57-B-47 DATE: Feb. 28 '99

SAMPLE DEPTH: 120-125 TEST MADE BY: J. Hill

WT, OF TEST SAMPLE: 332.9 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—	197.2			
8 - 4	5	203.7		6.5	2.0	2.0
4 - 2	9	271.6		67.9	20.5	22.5
2 - 1	16	400.0		128.4	38.5	61.0
1 - 0.5	32	481.7		81.7	24.5	85.5
0.5 - 0.25	60	515.4		33.7	10.2	95.7
0.25 - 0.125	115	526.2		10.8	3.2	98.9
.125 - 0.0625	250	528.4		2.2	0.7	99.6
Pan		529.6		1.2	0.4	100.0
				332.4	100.0	

Sieve Loss -------- 0.5

REMARKS:

530.1 − 197.2 = 332.9

529.6 + 197.2 = 332.4

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 57-B-47 DATE: Febr. 28 '94

SAMPLE DEPTH: 125-131 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 314.3 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	205.7	197.2	8.5	2.7	2.7
4 - 2	9	284.6		78.9	25.1	27.8
2 - 1	16	397.7		113.1	36.0	63.8
1 - 0.5	32	466.6		68.9	21.9	85.7
0.5 - 0.25	60	477.5		10.9	3.5	89.2
0.25 - 0.125	115	507.6		30.3	9.7	98.9
.125 - 0.0625	250	509.9		2.1	0.7	99.6
Pan		511.1		1.2	0.4	100.0
				313.9	100.0	

Sieve Loss-------- 0.4

REMARKS:

511.5 − 197.2 = 314.3

511.1 − 197.2 = 313.9

TEST HOLE #57-B-97 DATE _____

SAMPLE DEPTH 131-135.5 TEST BY ADD

	TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE	247.2	197.2	50.0			
ACID INSOLUBLE						
ACID SOLUBLE						
WET WASH RESIDUE (250 MESH)	234.7	197.2	37.5			
THROUGH (250 MESH)			12.5			
			50.0			

RO TAP
TIME _____

WT. OF SAMPLE 37.5

SIEVE OPENING IN MM	MESH						
OVER 8	2.5	—					
8 - 4	5	—					
4 - 2	9	197.4	197.2	0.2	.4	.4	
2 - 1	16	203.1		5.7	11.4	11.8	
1 - 0.5	32	209.5		6.4	12.8	24.6	
0.5 - 0.25	60	219.1		9.6	19.2	43.8	
0.25 - 0.125	115	228.9		9.8	19.6	63.4	
.125-0.0625	250	233.4	13.8	4.5	9.0	72.4	
PAN		234.6	13.1	1.2	27.6	100.0	
CUMULATIVE WT.				12.5			
SIEVE LOSS	-.1			49.9			
TOTAL							

234.6
197.2
37.4

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 57-B-47 DATE: Febr. 28 1949

SAMPLE DEPTH: 135.5-140 TEST MADE BY: C.H.A.

WT. OF TEST SAMPLE: 257.6 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—	197.2			
8 - 4	5	218.4		21.2	8.2	8.2
4 - 2	9	283.0		64.6	25.1	33.3
2 - 1	16	400.3		117.3	45.6	78.9
1 - 0.5	32	431.2		30.9	12.0	90.9
0.5 - 0.25	60	445.2		14.0	5.4	96.3
0.25 - 0.125	115	451.7		6.5	2.5	98.8
.125 - 0.0625	250	453.5		1.8	0.7	99.5
Pan		454.8		1.3	0.5	100.0
				257.6	100.0	

Sieve Loss ------- 0 = _____

REMARKS:

454.8
197.2
257.6

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 52-B-47 DATE: Febr. 28, 1999

SAMPLE DEPTH: 140-145 TEST MADE BY: JRD

WT, OF TEST SAMPLE: 271.3 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	201.7	197.2	4.5	1.6	1.6
4 - 2	9	213.4		11.7	4.3	5.9
2 - 1	16	322.8		109.4	40.4	46.3
1 - 0.5	32	411.8		89.0	32.8	79.1
0.5 - 0.25	60	453.3		41.5	15.3	94.4
0.25 - 0.125	115	465.4		12.1	4.5	98.9
.125 - 0.0625	250	467.5		2.1	0.8	99.7
Pan		468.4		0.9	0.3	100.0
				271.2	100.0	

Sieve Loss-------- 0.1

REMARKS:

468.5 − 197.2 = 271.3

468.4 − 197.2 = 271.2

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 57-B-47 DATE: Febr. 28 '99

SAMPLE DEPTH: 145-150 TEST MADE BY: JKD

WT. OF TEST SAMPLE: 344.2 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	202.0	197.2	4.8	1.4	1.4
4 - 2	9	271.9		69.9	20.3	21.7
2 - 1	16	397.5		125.6	36.6	58.3
1 - 0.5	32	480.8		83.3	24.2	82.5
0.5 - 0.25	60	524.9		44.1	12.8	95.3
0.25 - 0.125	115	537.9		13.0	3.8	99.1
.125 - 0.0625	250	540.0		2.1	0.6	99.7
Pan		541.0		1.0	0.3	100.0
				343.8	100.0	

Sieve Loss---------0.4 ——— = ———

REMARKS:

541.4
197.2
344.2

541.0
197.2
343.8

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 57-B-47 DATE: Feb. 28, 1949

SAMPLE DEPTH: 150-156 TEST MADE BY: J.H.D.

WT. OF TEST SAMPLE: 245.5 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—	197.2			
8 - 4	5	220.5		23.3	9.5	9.5
4 - 2	9	297.1		76.6	31.2	40.7
2 - 1	16	385.5		88.4	36.0	76.7
1 - 0.5	32	422.5		37.0	15.1	91.8
0.5 - 0.25	60	435.5		13.0	5.3	97.1
0.25 - 0.125	115	440.5		5.0	2.0	99.1
.125 - 0.0625	250	441.7		1.2	0.5	99.6
Pan		442.6		0.9	0.4	100.0
				245.4	100.0	
Sieve Loss--------				0.1		

REMARKS:

442.7 442.6
197.2 197.2
245.5 245.4

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 57-B-47 DATE: Febr. 28, 1949

SAMPLE DEPTH: 156-160 TEST MADE BY: O.H.L.

WT. OF TEST SAMPLE: 299.5 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	273.2	197.2	76.0	25.4	25.4
4 - 2	9	390.8		117.6	39.3	64.7
2 - 1	16	446.8		56.0	18.7	83.4
1 - 0.5	32	474.2		27.4	9.1	92.5
0.5 - 0.25	60	487.2		13.0	4.3	96.8
0.25 - 0.125	115	493.5		6.3	2.1	98.9
.125 - 0.0625	250	495.3		1.8	0.6	99.5
Pan		496.8		1.5	0.5	100.0
				299.6	100.0	

Sieve Loss -------- +0.1

REMARKS:

496.7
197.2
299.5

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 52-B-47 DATE: Febr. 28 '49

SAMPLE DEPTH: 160-165 TEST MADE BY: J.H.L.

WT. OF TEST SAMPLE: 298.8 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	263.1	197.2	65.9	21.8	21.8
4 - 2	9	369.4		106.3	35.0	57.5
2 - 1	16	431.3		61.9	20.8	78.3
1 - 0.5	32	470.4		39.1	13.1	91.4
0.5 - 0.25	60	488.6		18.2	6.2	97.6
0.25 - 0.125	115	493.7		5.1	1.7	99.3
.125 - 0.0625	250	495.0		1.3	0.4	99.7
Pan		495.9		0.9	0.3	100.0
				298.7	100.0	

Sieve Loss -0.1

REMARKS:

495.0 495.9
197.2 197.2
298.8 298.7

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 57-B-47 DATE: Feb. 28, 1949

SAMPLE DEPTH: 165-170 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 320.8 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	———				
8 - 4	5	306.5	197.2	109.3	34.2	34.2
4 - 2	9	397.8		91.3	28.4	62.6
2 - 1	16	452.9		55.1	17.2	79.8
1 - 0.5	32	490.0		37.1	11.6	91.4
0.5 - 0.25	60	509.1		19.1	6.0	97.4
0.25 - 0.125	115	515.4		6.3	1.9	99.3
.125 - 0.0625	250	516.8		1.4	0.4	99.7
Pan		517.9		1.1	0.3	100.0
				320.7	100.0	

Sieve Loss-------- ——— ———

REMARKS: 0.1

518.0
197.2
320.8

517.9
197.2
320.7

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 57-B-97 DATE: March 1 '99

SAMPLE DEPTH: 170-176 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: X TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %	
Over 8	2.5	—					
8 - 4	5	213.3	197.2	16.1	5.7	5.7	
4 - 2	9	239.8		26.5	9.4	15.1	
2 - 1	16	324.8		85.0	30.1	45.2	
1 - 0.5	32	423.1		98.3	34.9	80.1	
0.5 - 0.25	60	467.2		44.1	15.6	95.7	
0.25 - 0.125	115	476.6		9.4	3.3	99.0	
.125 - 0.0625	250	478.7		2.1	0.7	99.7	
Pan		479.6		0.9	0.3	100.0	
				282.4	100.0		
Sieve Loss--------							

REMARKS:

Not weighed first 479.6
197.2
282.4

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 57-B-47 DATE: March 1, '49

SAMPLE DEPTH: 176-180.5 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 298.5 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—	191.2			
8 - 4	5	221.8		30.6	10.2	10.2
4 - 2	9	390.1		168.3	56.5	66.7
2 - 1	16	443.9		53.8	18.1	84.8
1 - 0.5	32	463.6		19.7	6.6	91.4
0.5 - 0.25	60	475.7		12.1	4.1	95.5
0.25 - 0.125	115	481.0		5.3	1.8	97.3
.125 - 0.0625	250	483.8		2.8	0.9	98.2
Pan		489.2		5.4	1.8	100.0
				298.0	100.0	

Sieve Loss-------- 0.5 = ———

REMARKS:

495.7
191.2
298.5

489.2
191.2
298.0

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 57-B-47 DATE: March 1, 1999

SAMPLE DEPTH: 180.5-185 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 285.1 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %	
Over 8	2.5	—	191.2				
8 - 4	5	197.4		6.2	2.2	2.2	
4 - 2	9	265.7		68.3	24.0	26.2	
2 - 1	16	353.4		87.7	30.7	56.9	
1 - 0.5	32	416.9		63.5	22.3	79.2	
0.5 - 0.25	60	458.8		41.9	14.7	93.9	
0.25 - 0.125	115	471.0		12.2	4.3	98.2	
.125 - 0.0625	250	474.1		3.1	1.1	99.3	
Pan		476.2		2.1	0.7	100.0	
				285.0	100.0		

Sieve Loss-------- 0.1

REMARKS:

476.3
191.2
285.1

476.2
191.2
285.0

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 57-B-47 DATE: March 1, 1948

SAMPLE DEPTH: 185-190 TEST MADE BY: OKH

WT. OF TEST SAMPLE: 158.4 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	195.2	191.2	4.0	2.5	2.5
4 - 2	9	232.3		37.1	23.4	25.9
2 - 1	16	282.0		49.7	31.4	57.3
1 - 0.5	32	316.6		34.6	21.8	79.1
0.5 - 0.25	60	340.8		24.2	15.3	94.4
0.25 - 0.125	115	347.4		6.6	4.2	98.6
.125 - 0.0625	250	348.7		1.3	0.8	99.4
Pan		349.6		0.9	0.6	100.0
				158.4	100.0	

Sieve Loss-------- 0.

REMARKS:

Split Sample 349.6
191.2
158.4

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 57-B-47 DATE: March 1, 1949

SAMPLE DEPTH: 190-195 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 166.6 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	200.4	191.2	9.2	5.5	5.5
4 - 2	9	224.3		23.9	14.4	19.9
2 - 1	16	245.6		21.3	12.8	32.7
1 - 0.5	32	290.4		44.8	26.9	59.6
0.5 - 0.25	60	337.2		46.8	28.2	87.8
0.25 - 0.125	115	352.9		15.7	9.4	97.2
.125 - 0.0625	250	356.3		3.4	2.0	99.2
Pan		357.6		1.3	0.8	100.0
				166.4	100.0	

Sieve Loss-------- 0.2

REMARKS:

Split Sample

357.8 − 191.2 = 166.6

357.6 − 191.2 = 166.4

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 57-B-47 DATE: March 1, '99

SAMPLE DEPTH: 195-200 TEST MADE BY: JPH

WT. OF TEST SAMPLE: 166.9 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	197.2	191.2	6.0	3.6	3.6
4 - 2	9	214.2		17.0	10.1	13.7
2 - 1	16	238.5		24.3	14.6	28.3
1 - 0.5	32	285.7		47.2	28.4	56.7
0.5 - 0.25	60	337.0		51.3	30.8	87.5
0.25 - 0.125	115	353.2		16.2	9.7	97.2
.125 - 0.0625	250	356.5		3.3	2.0	99.2
Pan		357.8		1.3	0.8	100.0
				166.6	100.0	

Sieve Loss-------- 0.3

REMARKS:

358.1
191.2
166.9

357.8
191.2
166.6

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 57-B-47 DATE: March 6 1949

SAMPLE DEPTH: 200-205 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 174.6 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	193.3	191.2	2.1	1.2	1.2
4 - 2	9	206.0		12.7	7.3	8.5
2 - 1	16	241.3		35.3	20.2	28.7
1 - 0.5	32	295.2		53.9	30.9	59.6
0.5 - 0.25	60	347.4		52.2	29.9	89.5
0.25 - 0.125	115	362.3		14.9	8.6	98.1
.125 - 0.0625	250	364.6		2.3	1.3	99.4
Pan		365.7		1.1	0.6	100.0
				174.5	100.0	

Sieve Loss-------- 0.1

REMARKS:

365.8 365.7
191.2 191.2
174.6 174.5

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 57-B-47 DATE: March 1, 1949

SAMPLE DEPTH: 205-210 TEST MADE BY: H.R.D.

WT. OF TEST SAMPLE: 155.6 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	195.0	191.2	3.8	2.4	2.4
4 - 2	9	236.7		41.7	26.8	29.2
2 - 1	16	259.0		22.3	14.3	43.5
1 - 0.5	32	287.0		28.0	18.0	61.5
0.5 - 0.25	60	330.4		43.4	27.9	89.4
0.25 - 0.125	115	344.0		13.6	8.8	98.2
.125 - 0.0625	250	346.0		2.0	1.3	99.5
Pan		346.8		0.8	0.5	100.0
				155.6	100.0	

Sieve Loss-------- 0

REMARKS:

346.8
191.2
155.6

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 57-B-47 DATE: March 1 1999

SAMPLE DEPTH: 210-215 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 156.3 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %	
Over 8	2.5	—					
8 - 4	5	195.1	191.2	3.9	2.5	2.5	
4 - 2	9	203.4		8.3	5.3	7.8	
2 - 1	16	214.1		10.7	6.8	14.6	
1 - 0.5	32	241.2		27.1	17.4	32.0	
0.5 - 0.25	60	307.7		66.5	42.6	74.6	
0.25 - 0.125	115	339.3		31.6	20.2	94.8	
.125 - 0.0625	250	345.2		5.9	3.8	98.6	
Pan		347.4		2.2	1.4	100.0	
				156.2	100.0		

Sieve Loss-------- 0.1

REMARKS:

347.5
191.2
156.3

347.4
191.2
156.2

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 57-B-97 DATE: March 1-99

SAMPLE DEPTH: 215-220 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 161.5 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %	
Over 8	2.5						
8 - 4	5	194.5	191.2	3.3	2.0	2.0	
4 - 2	9	202.4		7.9	4.9	6.9	
2 - 1	16	211.7		9.3	5.8	12.7	
1 - 0.5	32	242.1		30.4	18.9	31.6	
0.5 - 0.25	60	312.5		70.4	43.6	75.2	
0.25 - 0.125	115	344.5		32.0	19.8	95.0	
.125 - 0.0625	250	350.4		5.9	3.7	98.7	
Pan		352.5		2.1	1.3	100.0	
				161.3	100.0		

Sieve Loss-------- 0.2

REMARKS:

352.7 − 191.2 = 161.5

352.5 − 191.2 = 161.3

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 57-B-97 DATE: 3-1-99

SAMPLE DEPTH: 220-225 TEST MADE BY: JFD

WT. OF TEST SAMPLE: 163.2 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	194.3	191.2	3.1	1.9	1.9
4 - 2	9	215.7		21.4	13.1	15.0
2 - 1	16	238.7		23.0	14.1	29.1
1 - 0.5	32	263.0		24.3	14.9	44.0
0.5 - 0.25	60	316.0		53.0	32.5	76.5
0.25 - 0.125	115	347.0		31.0	19.0	95.5
.125 - 0.0625	250	352.4		5.4	3.3	98.8
Pan		354.3		1.9	1.2	100.0
				163.1	100.0	

Sieve Loss-------- 0.1

REMARKS:

354.4 − 191.2 = 163.2

354.3 − 191.2 = 163.1

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 57-B-49 DATE: 3-1-49

SAMPLE DEPTH: 225-230 TEST MADE BY: DHD

WT. OF TEST SAMPLE: 161.1 TIME OF SHAKING IN RO-TAP: R

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	193.1	191.2	1.9	1.2	1.2
4 - 2	9	208.1		15.0	9.3	10.5
2 - 1	16	221.0		12.9	8.0	18.5
1 - 0.5	32	251.8		30.8	19.2	37.7
0.5 - 0.25	60	315.8		64.0	39.7	77.4
0.25 - 0.125	115	344.9		29.1	18.1	95.5
.125 - 0.0625	250	350.2		5.3	3.3	98.8
Pan		352.1		1.9	1.2	100.0
				160.9	100.0	

Sieve Loss-------- -0.2

REMARKS:

352.3
191.2
161.1

352.1
191.2
160.9

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 57-B-49 DATE: 3-1-49

SAMPLE DEPTH: 230-235 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 166.9 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	201.9	191.2	10.7	6.4	6.4
4 - 2	9	223.9		22.0	13.2	19.6
2 - 1	16	254.7		30.8	18.4	38.0
1 - 0.5	32	287.0		32.3	19.4	57.4
0.5 - 0.25	60	332.5		45.5	27.3	84.7
0.25 - 0.125	115	353.1		20.6	12.3	97.0
.125 - 0.0625	250	356.9		3.8	2.3	99.3
Pan		358.1		1.2	0.7	100.0
				166.9	100.0	

Sieve Loss-------- 0

REMARKS:

358.1
191.2
166.9

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 57-B-47 DATE: 3-1-99

SAMPLE DEPTH: 235-240 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 155.8 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	197.1	191.2	5.9	3.8	3.8
4 - 2	9	213.1		16.0	10.3	14.1
2 - 1	16	245.9		32.8	21.1	35.2
1 - 0.5	32	279.1		33.2	21.3	56.5
0.5 - 0.25	60	323.0		43.9	28.2	84.7
0.25 - 0.125	115	342.5		19.5	12.5	97.2
.125 - 0.0625	250	346.0		3.5	2.2	99.4
Pan		346.9		0.9	0.6	100.0
				155.7	100.0	

Sieve Loss-------- 0.1

REMARKS:

347.0 − 191.2 = 155.8

346.9 − 191.2 = 155.7

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 57-B-49 DATE: 3-1-99

SAMPLE DEPTH: 240-245 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 160.3 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	196.4	191.2	5.2	3.2	3.2
4 - 2	9	204.6		8.2	5.1	8.3
2 - 1	16	229.3		24.7	15.4	23.7
1 - 0.5	32	262.9		33.6	21.0	44.7
0.5 - 0.25	60	319.5		56.6	35.4	80.1
0.25 - 0.125	115	345.8		26.3	16.5	96.6
.125 - 0.0625	250	350.1		4.3	2.7	99.3
Pan		351.2		1.1	0.7	100.0
				160.0	100.0	
Sieve Loss--------				-0.3		

REMARKS:

351.5
191.2
160.3

351.2
191.2
160.0

Check

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 59-B-47 DATE: 3-1-49

SAMPLE DEPTH: 245-251 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 170.0 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	196.8	191.2	5.6	3.3	3.3
4 - 2	9	220.4		23.6	13.8	17.1
2 - 1	16	265.6		45.2	26.6	43.7
1 - 0.5	32	296.8		31.2	18.4	62.1
0.5 - 0.25	60	337.9		41.1	24.2	86.3
0.25 - 0.125	115	356.8		18.9	11.1	97.4
.125 - 0.0625	250	360.1		3.3	2.0	99.4
Pan		361.1		1.0	0.6	100.0
				169.9	100.0	

Sieve Loss-------- 0.1

REMARKS:

Split Sample

361.2
191.2
170.0

361.1
191.2
169.9

TEST HOLE # 58-B-47 (63 samples)

SAMPLE DEPTH 17.5-20

DATE March 2 49

TEST BY [illegible]

	TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE			50.0			
~~ACID INSOLUBLE~~						
~~ACID SOLUBLE~~						
WET WASH RESIDUE (250 MESH)	215.9	191.2	24.7			
THROUGH (250 MESH)			25.3			
			50.0			

RO TAP
TIME 10

WT. OF SAMPLE 24.7

SIEVE OPENING IN MM	MESH						
OVER 8	2.5	—					
8 - 4	5	—					
4 - 2	9	—					
2 - 1	16	— trace					
1 - 0.5	32	191.8	191.2	0.6	1.2	1.2	
0.5 - 0.25	60	197.0		5.2	10.4	11.6	
0.25 - 0.125	115	206.1		9.1	18.2	29.8	
.125-0.0625	250	212.2	29.0	6.1	12.2	42.0	
PAN		215.8	28.9	3.6	58.0	100.0	
CUMULATIVE WT.				(25.3			
				49.9			
SIEVE LOSS	0.1						
TOTAL							

TEST HOLE # 58-B-47 DATE 3-2-49

SAMPLE DEPTH 20-25 TEST BY [illegible]

	TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE			50.			
ACID INSOLUBLE						
ACID SOLUBLE						
WET WASH RESIDUE (250 MESH)	218.6	191.2	27.4			
THROUGH (250 MESH)			22.6			
			50.0			

RO TAP
TIME 10

WT. OF SAMPLE 27.4

SIEVE OPENING IN MM	MESH						
OVER 8	2.5	—					
8 - 4	5	—					
4 - 2	9	—					
2 - 1	16	— trace					
1 - 0.5	32	192.2	191.2	1.0	2.0	2.0	
0.5 - 0.25	60	198.6		6.4	12.8	14.8	
0.25 - 0.125	115	209.0		10.4	20.8	35.6	
.125-0.0625	250	215.4	25.8	6.4	12.8	48.4	
PAN		218.7	25.9	3.3	51.6	100.0	
CUMULATIVE WT.				22.6			
SIEVE LOSS +0.1				50.1			
TOTAL							

TEST HOLE # 58-B-47 DATE 3-2-47

SAMPLE DEPTH 25-27 TEST BY [illegible]

		TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE				50			
ACID INSOLUBLE							
ACID SOLUBLE							
WET WASH RESIDUE (250 MESH)		222.2	191.2	31.0			
THROUGH (250 MESH)				19.0			
				50.0			
RO TAP TIME _____ WT. OF SAMPLE 31.0							
SIEVE OPENING IN MM	MESH						
OVER 8	2.5	—					
8 - 4	5	—					
4 - 2	9	—					
2 - 1	16	trace					
1 - 0.5	32	192.9	191.2	1.2	2.4	2.4	
0.5 - 0.25	60	199.4		7.0	14.0	16.4	
0.25 - 0.125	115	210.9		11.5	23.0	39.4	
.125-0.0625	250	217.0		6.1	12.2	51.6	
PAN		222.2	24.2	5.2	48.4	100.0	
CUMULATIVE WT.				19.0			
SIEVE LOSS 0				50.0			
TOTAL							

TEST HOLE # 58-B-47 DATE 3-2-49

SAMPLE DEPTH 27-28.5 TEST BY JHR

	TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE			50			
ACID ~~INSOLUBLE~~						
ACID SOLUBLE						
WET WASH RESIDUE (250 MESH)	219.4	191.2	28.2			
THROUGH (250 MESH)			21.8			
			50.0			

RO TAP
TIME 12

WT. OF SAMPLE 28.2

SIEVE OPENING IN MM	MESH						
OVER 8	2.5	—					
8 - 4	5	—					
4 - 2	9	—					
2 - 1	16	trace					
1 - 0.5	32	193.3	191.2	2.1	4.2	4.2	
0.5 - 0.25	60	201.2		7.9	15.8	20.0	
0.25 - 0.125	115	211.1		9.9	19.8	39.8	
.125-0.0625	250	216.8	24.4	5.7	11.4	51.2	
PAN		219.5	24.5	2.7	4.8	100.0	
CUMULATIVE WT.		219.5		21.8	48.0		
SIEVE ~~LOSS~~	+0.1			50.1			
TOTAL							

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 58-B-47 DATE: March 4 49

SAMPLE DEPTH: 28.5-35 TEST MADE BY: AHD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	—				
4 - 2	9	—	178.0			
2 - 1	16	183.5		5.5		5.5
1 - 0.5	32	219.8		36.1		41.6
0.5 - 0.25	60	264.4		44.8	44.9	86.5
0.25 - 0.125	115	276.0		11.6		98.1
.125 - 0.0625	250	276.9		0.9		99.0
Pan		277.9		1.0		100.0
				99.9		
Sieve Loss				-0.1		

REMARKS:

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 58-B-47 DATE: March 9, 49

SAMPLE DEPTH: 35-40 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	—				
4 - 2	9	—				
2 - 1	16	182.4	178.0	4.4		4.4
1 - 0.5	32	221.6		39.2		43.6
0.5 - 0.25	60	268.8		47.2		90.8
0.25 - 0.125	115	277.8		9.0		99.8
.125 - 0.0625	250	278.0		0.2		100.0
Pan	-	278.0		0.0		
				100.0		

Sieve Loss

REMARKS:

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 58-B-47 DATE: March 4-49

SAMPLE DEPTH: 40-45.5 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	—				
4 - 2	9	—				
2 - 1	16	178.8	178.0	0.8		0.8
1 - 0.5	32	192.6		13.8		14.6
0.5 - 0.25	60	235.2		42.6		57.2
0.25 - 0.125	115	268.5		33.3		90.5
.125 - 0.0625	250	272.8		4.3		94.8
Pan		278.0		5.2		100.0
				1000		
Sieve Loss				—		

REMARKS: D

TEST HOLE # 58-B-49   DATE 3-2-49

SAMPLE DEPTH 455-465   TEST BY [illegible]

	TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE			50			
ACID ~~INSOLUBLE~~						
ACID ~~SOLUBLE~~						
WET WASH RESIDUE (250 MESH)	213.1	191.2	21.9			
THROUGH (250 MESH)	191.2		28.1			
RO TAP TIME 12 WT. OF SAMPLE 21.9			50.0			

SIEVE OPENING IN MM	MESH	TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
OVER 8	2.5	—					
8 - 4	5	—					
4 - 2	9	—					
2 - 1	16	191.25	191.2	.05	.10	.10	
1 - 0.5	32	192.0		.75	1.50	1.60	
0.5 - 0.25	60	195.4		3.4	6.8	8.40	
0.25 - 0.125	115	202.6		7.2	14.4	22.8	
.125 - 0.0625	250	209.8		7.2	14.4	37.2	
PAN		213.1	31.4	3.3	62.8	100.0	
CUMULATIVE WT.				28.1			
SIEVE LOSS 0				50.0			
TOTAL							

TEST HOLE # 58-B-97

SAMPLE DEPTH 465-48

DATE 3-2-99

TEST BY [illegible]

	TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE			50.0			
ACID ~~INSOLUBLE~~						
ACID ~~SOLUBLE~~						
WET WASH RESIDUE (250 MESH)	208.5	191.2	17.3			
THROUGH (250 MESH)			32.7			
			50.0			

RO TAP
TIME 12

WT. OF SAMPLE 17.3

SIEVE OPENING IN MM	MESH						
OVER 8	2.5	—					
8 - 4	5	—					
4 - 2	9	—					
2 - 1	16	—					
1 - 0.5	32	191.3	191.2	0.1	0.2	0.2	
0.5 - 0.25	60	192.6		1.3	2.6	2.8	
0.25 - 0.125	115	196.6		4.0	8.0	10.8	
.125-0.0625	250	203.6		7.0	14.0	24.8	
PAN		208.5	37.6	54.9	75.2	100.0	
CUMULATIVE WT.				(32.7)			
SIEVE LOSS 0				50.0			
TOTAL							

TEST HOLE # 58-B-47

SAMPLE DEPTH 48-50

DATE 3-2-99

TEST BY [illegible]

		TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE				50			
ACID ~~INSOLUBLE~~							
~~ACID SOLUBLE~~							
WET WASH RESIDUE (250 MESH)		200.6	191.2	9.4			
THROUGH (250 MESH)				40.6			
				50.0			
RO TAP TIME 12							
WT. OF SAMPLE 9.4							
SIEVE OPENING IN MM	MESH						
OVER 8	2.5	—					
8 - 4	5	—					
4 - 2	9	—					
2 - 1	16	—					
1 - 0.5	32	trace					
0.5 - 0.25	60	192.1	191.2	1.0	2.0	2.0	
0.25 - 0.125	115	194.6		2.5	5.0	7.0	
.125-0.0625	250	197.3		2.6	5.2	12.2	
PAN		200.6	43.9	53.3	87.8	100.0	
CUMULATIVE WT.		793		40.6			
SIEVE LOSS 0				50.0			
TOTAL							

TEST HOLE # 58-B-49

SAMPLE DEPTH 50-51.5

DATE 3-2-49

TEST BY [illegible]

	TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE			50			
ACID INSOLUBLE						
ACID SOLUBLE						
WET WASH RESIDUE (250 MESH)	203.0	191.2	11.8			
THROUGH (250 MESH)	191.2		38.2			
			50.0			
RO TAP TIME 12						
WT. OF SAMPLE 11.8						
SIEVE OPENING IN MM / MESH						
OVER 8 / 2.5	—					
8 - 4 / 5	—					
4 - 2 / 9	—					
2 - 1 / 16	—					
1 - 0.5 / 32	—					
0.5 - 0.25 / 60	192.0	191.2	0.8	1.6	1.6	
0.25 - 0.125 / 115	196.1		4.1	8.2	9.8	
.125-0.0625 / 250	200.3	40.9	4.12	8.4	18.2	
PAN	203.1	41.0	52.8	81.8	100.0	
CUMULATIVE WT.			38.2			
SIEVE LOSS +0.1			50.1			
TOTAL						

TEST HOLE # 58-B-47

SAMPLE DEPTH 51.5-54

DATE 3-2-99

TEST BY J.R.D

		TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE				50			
ACID INSOLUBLE							
ACID SOLUBLE							
WET WASH RESIDUE (250 MESH)		213.6	191.2	22.4			
THROUGH (250 MESH)				27.6			
				50.0			
RO TAP TIME 12							
WT. OF SAMPLE 22.4							
SIEVE OPENING IN MM	MESH						
OVER 8	2.5	—					
8 - 4	5	—					
4 - 2	9	—					
2 - 1	16	—					
1 - 0.5	32	191.3	191.2	0.1	0.2	0.2	
0.5 - 0.25	60	193.8		2.5	5.0	5.2	
0.25 - 0.125	115	201.8		8.0	16.0	21.2	
.125-0.0625	250	208.6		6.8	13.6	34.8	
PAN		213.6	32.6	5.0	65.2	100.0	
CUMULATIVE WT.				27.6 / 50.0			
SIEVE LOSS 0							
TOTAL							

TEST HOLE # 58-B-47

SAMPLE DEPTH 54-57

DATE 3-2-99

TEST BY [illegible]

	TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE			50.0			
~~ACID INSOLUBLE~~						
~~ACID SOLUBLE~~						
WET WASH RESIDUE (250 MESH)	219.5	191.2	28.3			
THROUGH (250 MESH)	191.2		21.7			
			50.0			

RO TAP
TIME 12

WT. OF SAMPLE 28.3

SIEVE OPENING IN MM	MESH						
OVER 8	2.5	—					
8 - 4	5	—					
4 - 2	9	—					
2 - 1	16	—					
1 - 0.5	32	191.8	191.2	0.6	1.2	1.2	
0.5 - 0.25	60	196.4		4.6	9.2	10.4	
0.25 - 0.125	115	208.3		11.9	23.8	34.2	
.125-0.0625	250	218.4		10.1	20.2	54.4	
PAN		219.5	22.85	1.1	45.6	100.0	
CUMULATIVE WT.				21.7			
SIEVE LOSS 0				50.0			
TOTAL							

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 58-B-47 DATE: 3-4-49

SAMPLE DEPTH: 57-60 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %	
Over 8	2.5	—					
8 - 4	5	—					
4 - 2	9	—					
2 - 1	16	178.5	178.0	0.5		0.5	
1 - 0.5	32	190.7		12.2		12.7	
0.5 - 0.25	60	225.9		35.2		47.9	
0.25 - 0.125	115	263.4		37.5		85.4	
.125 - 0.0625	250	272.2		8.8		94.2	
Pan		278.0		5.8		100.0	
				100.0			

Sieve Loss---------- 0

REMARKS:

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 58-B-47 DATE: 3-4-99

SAMPLE DEPTH: 60-65 TEST MADE BY: [illegible]

WT, OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	—				
4 - 2	9	—				
2 - 1	16	180.7	178.0	2.7		2.7
1 - 0.5	32	203.8		23.1		25.8
0.5 - 0.25	60	232.1		29.3		55.1
0.25 - 0.125	115	267.1		35.0		90.1
.125 - 0.0625	250	275.0		7.9		98.0
Pan		278.0		2.0		100.0
				100.0		
Sieve Loss						

REMARKS: O

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 58-B-47 DATE: 3-4-99

SAMPLE DEPTH: 65-68 TEST MADE BY: AHD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	—				
4 - 2	9	— trace				
2 - 1	16	180.9	178.0	2.9		2.9
1 - 0.5	32	199.5		18.6		21.5
0.5 - 0.25	60	234.8		35.3	35.4	56.9
0.25 - 0.125	115	267.2		32.4		89.3
.125 - 0.0625	250	274.6		7.4		96.7
Pan		277.9		3.3		100.0
		46		99.9		
			Sieve Loss	- 0.1		

REMARKS:

TEST HOLE # 58-B-47

SAMPLE DEPTH 68-75

DATE 3-2-99

TEST BY DAB

	TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE			50			
~~ACID INSOLUBLE~~						
~~ACID SOLUBLE~~						
WET WASH RESIDUE (250 MESH)	220.2	191.2	29.0			
THROUGH (250 MESH)			21.0			
RO TAP TIME 12						
WT. OF SAMPLE 29.0						
SIEVE OPENING IN MM / MESH						
OVER 8 / 2.5	—					
8 - 4 / 5	—					
4 - 2 / 9	—					
2 - 1 / 16	—					
1 - 0.5 / 32	191.4	191.2	0.2	0.4	0.4	
0.5 - 0.25 / 60	192.8		1.4	2.8	3.2	
0.25 - 0.125 / 115	197.5		4.7	9.4	12.6	
.125-0.0625 / 250	212.3		14.8	29.6	42.2	
PAN	220.2	28.9	7.9	57.8	100.0	
CUMULATIVE WT.			21.0			
SIEVE LOSS 0			50.0			
TOTAL						

TEST HOLE # 58-B-49

SAMPLE DEPTH 75-79

DATE 3-2-49

TEST BY DHL

		TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE				50			
~~ACID INSOLUBLE~~							
~~ACID SOLUBLE~~							
WET WASH RESIDUE (250 MESH)		221.0	191.2	29.8			
THROUGH (250 MESH)				20.2			
RO TAP TIME 12							
WT. OF SAMPLE 29.8							
SIEVE OPENING IN MM	MESH						
OVER 8	2.5	—					
8 - 4	5	—					
4 - 2	9	—					
2 - 1	16	—					
1 - 0.5	32	178.1	178	.01	.2	.2	
0.5 - 0.25	60	179.0		0.9	1.8	2.0	
0.25 - 0.125	115	183.1		4.1	8.2	10.2	
.125-0.0625	250	202.1		19.0	38.0	48.2	
PAN		207.8	25.9	55.7	51.8	100.0	
CUMULATIVE WT.				20.2			
SIEVE LOSS 0				50.0			
TOTAL							

207.8
178.0
298

TEST HOLE # 58-B-47

SAMPLE DEPTH 79-86

DATE 3-2-49

TEST BY [illegible]

	TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE			50			
ACID INSOLUBLE						
ACID SOLUBLE						
WET WASH RESIDUE (250 MESH)	202.0	178.0	24.0			
THROUGH (250 MESH)			26.0			
RO TAP TIME 12						
WT. OF SAMPLE 24.0						
SIEVE OPENING IN MM / MESH						
OVER 8 / 2.5	—					
8 - 4 / 5	—	178.0				
4 - 2 / 9	178.1		0.1	0.2	0.2	
2 - 1 / 16	179.6		1.5	3.0	3.2	
1 - 0.5 / 32	182.3		2.7	5.4	8.6	
0.5 - 0.25 / 60	188.8		6.5	13.0	21.6	
0.25 - 0.125 / 115	196.6		7.8	15.6	37.2	
.125 - 0.0625 / 250	200.6		4.0	8.0	45.2	
PAN	202.0	27.4	1.4	54.8	100.0	
CUMULATIVE WT.			26.0			
SIEVE LOSS 0			50.0			
TOTAL						

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 58-B-47 DATE: 3-4-49

SAMPLE DEPTH: 86-90 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	—				
4 - 2	9	—				
2 - 1	16	184.7	178.0	6.7		6.7
1 - 0.5	32	225.8		41.1		47.8
0.5 - 0.25	60	257.8		32.0		79.8
0.25 - 0.125	115	272.9		15.1		94.9
.125 - 0.0625	250	276.3		3.4		98.3
Pan		278.0		1.7		100.0
				100.0		

Sieve Loss ---- 0

REMARKS:

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 38-B-97 DATE: 3-9-99

SAMPLE DEPTH: 90-95 TEST MADE BY: DHR

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	—				
4 - 2	9	178.6	178.0	0.6		0.6
2 - 1	16	193.4		14.8		15.4
1 - 0.5	32	223.8		30.4		45.8
0.5 - 0.25	60	255.7		31.9		77.7
0.25 - 0.125	115	272.9		17.2		94.9
.125 - 0.0625	250	277.0		4.1		99.0
Pan		278.0		1.0		100.0
				100.0		
Sieve Loss						

REMARKS: 0

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 58-B-47 DATE: 8-4-49

SAMPLE DEPTH: 95-100 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	—		5		
4 - 2	9	178.9	178.0	0.9		0.9
2 - 1	16	195.6		16.7		17.6
1 - 0.5	32	229.4		33.8		51.4
0.5 - 0.25	60	259.5		30.1		81.5
0.25 - 0.125	115	274.4		14.9		96.4
.125 - 0.0625	250	277.1		2.7		99.1
Pan		278.0		0.9		100.0
				100.0		

Sieve Loss

REMARKS: 0

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 58-B-47 DATE: 3-4-49

SAMPLE DEPTH: 100-105 TEST MADE BY: ORD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	179.0	178.0	1.0		1.0
4 - 2	9	186.2		7.2		8.2
2 - 1	16	205.6		19.4		27.6
1 - 0.5	32	225.9		20.3		47.9
0.5 - 0.25	60	253.2		27.3		75.2
0.25 - 0.125	115	272.2		19.0		94.2
.125 - 0.0625	250	276.5		4.3		98.5
Pan		279.0		1.5		100.0
				100.0		
Sieve Loss						

REMARKS: 0

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 58-B-97 DATE: 3-9-99

SAMPLE DEPTH: 105-110 TEST MADE BY: DHD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	179.2	178.0	1.2		1.2
4 - 2	9	197.3		18.1		19.3
2 - 1	16	232.3		35.0		54.3
1 - 0.5	32	258.5		26.2		80.5
0.5 - 0.25	60	270.2		11.7		92.2
0.25 - 0.125	115	275.7		5.5		97.7
.125 - 0.0625	250	277.1		1.4		99.1
Pan		278		0.9		100.0
				100.0		

Sieve Loss--------

REMARKS: 0

Some iron staining

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 58-B-47 DATE: 3-4-49

SAMPLE DEPTH: 110-115 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	*2.5	182.1	178.0	4.1		4.1
8 - 4	5	192.4		10.3		14.4
4 - 2	9	224.0		31.6		46.0
2 - 1	16	258.1		34.1		80.1
1 - 0.5	32	273.0		14.9		95.0
0.5 - 0.25	60	277.1		4.1		99.1
0.25 - 0.125	115	277.6		0.5		99.6
.125 - 0.0625	250	277.9		0.3		99.9
Pan		278.0		0.1		100.0
				100.0		

Sieve Loss

REMARKS: 0

*one pebble

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 58-B-47 DATE: 3-4-49

SAMPLE DEPTH: 115-120 TEST MADE BY: Todd

WT, OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	*181.4	178.0	3.4		3.4
8 - 4	5	197.3		15.9		19.3
4 - 2	9	229.5		32.2		51.5
2 - 1	16	260.1		30.6		82.1
1 - 0.5	32	274.1		14.0		96.1
0.5 - 0.25	60	277.1		3.0		99.1
0.25 - 0.125	115	277.8		0.7		99.8
.125 - 0.0625	250	277.95		.15		99.95
Pan		278.0		.05		100.00
				10000		

Sieve Loss--------

REMARKS: 0

* 2 pebbles

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 58-B-47 DATE: 3-4-99

SAMPLE DEPTH: 120-125.5 TEST MADE BY: JAB

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—	1780			
8 - 4	5	190.1		12.1		12.1
4 - 2	9	219.0		28.9		41.0
2 - 1	16	240.2		21.2		62.2
1 - 0.5	32	257.1		16.9		79.1
0.5 - 0.25	60	269.2		12.1		91.2
0.25 - 0.125	115	276.2		7.0		98.2
.125 - 0.0625	250	277.6		1.4		99.6
Pan		278.0		0.4		100.0
				1000		

Sieve Loss---------

REMARKS: 0

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 58-B-47 DATE: 3-4-49

SAMPLE DEPTH: 125.5-130 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 100 gms. TIME OF SHAKING IN RO-TAP: 12 min

Sieve opening in mm.	Mesh	Total weight	Tare ~~178.0~~	Net	Percent	Cumulative %
Over 8	2.5	179.0	178.0	1.0		1.0
8 - 4	5	187.8		8.8		9.8
4 - 2	9	196.2		8.4		18.2
2 - 1	16	214.3		18.1		36.3
1 - 0.5	32	240.6		26.3		62.6
0.5 - 0.25	60	262.3		21.7		84.3
0.25 - 0.125	115	274.6		12.3		96.6
.125 - 0.0625	250	276.9		2.3		98.9
Pan		278.0		1.1		100.0
				100.0		
Sieve Loss						

REMARKS: 0

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 58-B-47 DATE: 3-4-49

SAMPLE DEPTH: 130-135 TEST MADE BY: DHD

WT. OF TEST SAMPLE: 100gm TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	*180.7	178.0	2.7		2.7
8 - 4	5	204.6		23.9		26.6
4 - 2	9	236.2		31.6		58.2
2 - 1	16	262.6		26.4		84.6
1 - 0.5	32	274.0		11.4		96.0
0.5 - 0.25	60	277.0		3.0		99.0
0.25 - 0.125	115	277.85		.85		99.85
.125 - 0.0625	250	277.95		.10		99.95
Pan		278.0		.05		100.00
				100.00		
Sieve Loss						

REMARKS: 0

* 1 pebble

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 58-B-47 DATE: 3-4-49

SAMPLE DEPTH: 135-140 TEST MADE BY: GHD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	182.4	178.0	4.4		4.4
8 - 4	5	204.3		21.9		26.3
4 - 2	9	242.1		37.8		64.1
2 - 1	16	264.0		21.9		86.0
1 - 0.5	32	273.2		9.2		95.2
0.5 - 0.25	60	275.8		2.6		97.8
0.25 - 0.125	115	277.1		1.3		99.1
.125 - 0.0625	250	277.7		0.6		99.7
Pan		278.0		0.3		100.00
		278.0		100.0		

Sieve Loss---------

REMARKS:

0

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 38-B-49 DATE: 3-5-49

SAMPLE DEPTH: 140-145 TEST MADE BY: JRD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—		—		
8 - 4	5	186.0	178.0	8.0		8.0
4 - 2	9	210.5		24.5	24.4	32.4
2 - 1	16	243.3		32.8	32.6	65.0
1 - 0.5	32	264.4		21.1		86.1
0.5 - 0.25	60	275.2		10.8		96.9
0.25 - 0.125	115	277.8		2.6		99.5
.125 - 0.0625	250	278.1		0.3		99.8
Pan		278.3		0.2		100.0
				100.3		

Sieve Loss ---------- —

REMARKS: +0.3

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 58-B-47 DATE: 3-5-99

SAMPLE DEPTH: 145-150 TEST MADE BY: DHD

WT. OF TEST SAMPLE: 100.2 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	179.4	178.0	1.4		1.4
8 - 4	5	192.6		13.2		14.6
4 - 2	9	224.0		31.4	31.2	45.8
2 - 1	16	249.8		25.8	25.65	71.45
1 - 0.5	32	265.9		16.1		87.55
0.5 - 0.25	60	275.4		9.5		97.05
0.25 - 0.125	115	278.0		2.6		99.65
.125 - 0.0625	250	278.2		0.2		99.85
Pan		278.35		.15		100.00
				100.35		
Sieve Loss						

REMARKS: +0.35 (?)

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 58-B-47 DATE: 3-5-49

SAMPLE DEPTH: 150-155 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 100. TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	179.5	178.0	1.5		1.5
8 - 4	5	198.5		19.0		20.5
4 - 2	9	231.4		32.9		53.4
2 - 1	16	254.6		23.2		76.6
1 - 0.5	32	265.4		10.8		87.4
0.5 - 0.25	60	274.4		9.0		96.4
0.25 - 0.125	115	277.1		2.7		99.1
.125 - 0.0625	250	277.7		0.6		99.7
Pan		278.0		0.3		100.0
				100.0		

Sieve Loss--------

REMARKS: 0

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 58-B-47 DATE: 3-5-49

SAMPLE DEPTH: 155-160 TEST MADE BY: GHD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare 17	Net	Percent	Cumulative %
Over 8	2.5	180.0	178.0	2.0		2.0
8 - 4	5	208.7		28.9		30.7
4 - 2	9	243.7		35.0		65.7
2 - 1	16	262.3		18.6		84.3
1 - 0.5	32	270.3		8.0		92.3
0.5 - 0.25	60	275.3		5.0		97.3
0.25 - 0.125	115	277.1		1.8		99.1
.125 - 0.0625	250	277.7		0.6		99.7
Pan		278.0		0.3		100.0
				100.0		

Sieve Loss

REMARKS: 0

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 58-B-47 DATE: 3-5-48

SAMPLE DEPTH: 160-165 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	179.6	178.0	1.6		1.6
8 - 4	5	201.8		22.2		23.8
4 - 2	9	234.0		32.2	32.3	56.1
2 - 1	16	258.3		24.3		80.4
1 - 0.5	32	270.8		12.5		92.9
0.5 - 0.25	60	275.6		4.8		97.7
0.25 - 0.125	115	277.2		1.6		99.3
.125 - 0.0625	250	277.6		0.4		99.7
Pan		278.9		0.3		100.0
				99.9		

Sieve Loss--------

REMARKS:

-0.1

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 58-B-47 DATE: 3-5-49

SAMPLE DEPTH: 165-170 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	183.7	178.0	5.7		5.7
8 - 4	5	209.9		26.2		31.9
4 - 2	9	244.9		35.0		66.9
2 - 1	16	263.0		18.1		85.0
1 - 0.5	32	272.1		9.1		94.1
0.5 - 0.25	60	276.2		4.1		98.2
0.25 - 0.125	115	277.5		1.3		99.5
.125 - 0.0625	250	277.8		0.3		99.8
Pan		278.0		0.2		100.0
				100.0		

Sieve Loss

REMARKS: 0

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 58-B-47 DATE: 3-5-49

SAMPLE DEPTH: 170-175 TEST MADE BY: GRD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	179.9	178.0	1.9		1.9
8 - 4	5	209.4		29.5		31.4
4 - 2	9	241.4		32.0		63.4
2 - 1	16	264.2		22.8		86.2
1 - 0.5	32	271.9		7.7		93.9
0.5 - 0.25	60	275.7		3.8		97.7
0.25 - 0.125	115	277.2		1.5		99.2
.125 - 0.0625	250	277.7		0.5		99.7
Pan		278.0		0.3		100.0
				100.0		

Sieve Loss

REMARKS: 0

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 58-B-47 DATE: 3-5-45

SAMPLE DEPTH: 175-180 TEST MADE BY: GRD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	179.5	178.0	1.5		1.5
8 - 4	5	203.3		23.8		25.3
4 - 2	9	234.3		31.0	30.9	56.2
2 - 1	16	259.5		25.2		81.4
1 - 0.5	32	269.8		10.3		91.7
0.5 - 0.25	60	274.4		4.6		96.3
0.25 - 0.125	115	276.8		2.4		98.7
.125 - 0.0625	250	277.8		1.0		99.7
Pan		278.1		0.3		100.0
				100.1		

Sieve Loss--------

REMARKS: +0.1

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 58-B-47 DATE: 3-5-49

SAMPLE DEPTH: 180-185 TEST MADE BY: CHD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	179.8	178.0		1.8	1.8
8 - 4	5	194.4			14.6	16.4
4 - 2	9	226.1			31.7	48.1
2 - 1	16	253.7			27.6	75.7
1 - 0.5	32	266.4			12.7	88.4
0.5 - 0.25	60	273.5			7.1	95.5
0.25 - 0.125	115	276.7			3.2	98.7
.125 - 0.0625	250	277.7			1.0	99.7
Pan		278.0+			0.3	100.0
					100.0	

Sieve Loss--------

REMARKS: 0.

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 58-B-47 DATE: 3-5-99

SAMPLE DEPTH: 185-190 TEST MADE BY: DPD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	178.7	178.0	0.7		0.7
8 - 4	5	203.6		24.9		25.6
4 - 2	9	237.7		34.1	34.2	59.8
2 - 1	16	262.1		24.4		84.2
1 - 0.5	32	272.5		10.4		94.6
0.5 - 0.25	60	276.0		3.5		98.1
0.25 - 0.125	115	277.1		1.1		99.2
.125 - 0.0625	250	277.5		0.4		99.6
Pan		277.9		0.4		100.0
				99.9		

Sieve Loss--------

REMARKS: -0.1

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 58-B-47 DATE: 3-5-99

SAMPLE DEPTH: 190-195 TEST MADE BY: GRD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	179.7	178.0	1.7		1.7
8 - 4	5	206.9		27.2		28.9
4 - 2	9	240.4		33.5	33.6	62.5
2 - 1	16	264.3		23.9		86.4
1 - 0.5	32	273.9		9.6		96.0
0.5 - 0.25	60	276.7		2.8		98.8
0.25 - 0.125	115	277.4		0.7		99.5
.125 - 0.0625	250	277.7		0.3		99.8
Pan		277.9		0.2		100.0
				99.9		

Sieve Loss--------

REMARKS:

-0.1

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 58-B-97 DATE: 3-5-99

SAMPLE DEPTH: 195-201 TEST MADE BY: GPD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	181.5	178.0	3.5		3.5
8 - 4	5	210.3		28.8	28.7	32.2
4 - 2	9	237.5		27.2		59.4
2 - 1	16	258.1		20.6		80.0
1 - 0.5	32	268.7		10.6		90.6
0.5 - 0.25	60	274.0		5.3		95.9
0.25 - 0.125	115	276.9		2.9		98.8
.125 - 0.0625	250	277.7		0.8		99.6
Pan		278.1		0.4		100.0
				100.1		
Sieve Loss--------						

REMARKS: +0.1

TEST HOLE # 58-B-47

SAMPLE DEPTH 201-203

DATE 3-2-49

TEST BY DJH

	TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE	215.7	178.4	47.3			
ACID INSOLUBLE	178.1					
ACID SOLUBLE						
WET WASH RESIDUE (250 MESH)	195.8	178.0	17.8			
THROUGH (250 MESH)			29.6 47.3			
RO TAP TIME 12						
WT. OF SAMPLE 17.8						
SIEVE OPENING IN MM / MESH						
OVER 8 / 2.5	—					
8 - 4 / 5	—					
4 - 2 / 9	178.5	178.0	0.5	1.0	1.0	
2 - 1 / 16	182.0		3.5	7.4	8.4	
1 - 0.5 / 32	187.2		5.2	11.0	19.4	
0.5 - 0.25 / 60	191.5		4.3	9.1	28.5	
0.25 - 0.125 / 115	193.9		2.4	5.1	33.6	
.125-0.0625 / 250	195.4		1.5	3.2	36.8	
PAN	195.8	29.9	0.4	63.2	100.0	
CUMULATIVE WT.			29.5 / 47.3	1000		
SIEVE LOSS	0					
TOTAL						

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 58-B-47 DATE: 3-5-49

SAMPLE DEPTH: 203-210 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	186.9	178.0	8.7		8.7
4 - 2	9	205.6		18.9		27.6
2 - 1	16	233.3		27.7		55.3
1 - 0.5	32	256.5		23.2		78.5
0.5 - 0.25	60	269.8		13.3		91.8
0.25 - 0.125	115	275.9		6.1		97.9
.125 - 0.0625	250	277.5		1.6		99.5
Pan		278.0		0.5		100.0
				100.0		

Sieve Loss--------

REMARKS: 0

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 58-B-99 DATE: 3-5-99

SAMPLE DEPTH: 210-215 TEST MADE BY: AWD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5					
8 - 4	5	186.8	178.0	8.8		8.8
4 - 2	9	217.3		30.5		39.3
2 - 1	16	246.7		29.4		68.7
1 - 0.5	32	263.3		16.6		85.3
0.5 - 0.25	60	272.2		8.9		94.2
0.25 - 0.125	115	275.9		3.7		97.9
.125 - 0.0625	250	277.2		1.3		99.2
Pan		278.0		0.8		100.0
				100.0		

Sieve Loss--------

REMARKS:

0

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 38-B-47 DATE: 3-5-49

SAMPLE DEPTH: 215-220 TEST MADE BY: ASD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	191.2	178.0	13.2		13.2
4 - 2	9	219.0		27.8	27.9	41.1
2 - 1	16	244.6		25.6		66.7
1 - 0.5	32	262.0		17.4		84.1
0.5 - 0.25	60	272.1		10.1		94.2
0.25 - 0.125	115	276.1		4.0		98.2
.125 - 0.0625	250	277.4		1.3		99.5
Pan		277.9		0.5		100.0
				99.9		
Sieve Loss--------						

REMARKS:

-0.1

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 58-B-47 DATE: 3-5-49

SAMPLE DEPTH: 220-225 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %	
Over 8	2.5	—					
8 - 4	5	178.7	178.0	0.7		0.7	
4 - 2	9	192.1		13.4		14.1	
2 - 1	16	217.0		24.9		39.0	
1 - 0.5	32	246.3		29.3		68.3	
0.5 - 0.25	60	268.9		22.6		90.9	
0.25 - 0.125	115	276.3		7.4		98.3	
.125 - 0.0625	250	277.7		1.4		99.7	
Pan		278.0		0.3		100.0	
				100.0			

Sieve Loss--------

REMARKS:

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 58-B-47 DATE: 3-5-49

SAMPLE DEPTH: 225-230 TEST MADE BY: GRD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—		3		
8 - 4	5	180.6	178.0	2.6		2.6
4 - 2	9	196.1		15.5		18.1
2 - 1	16	223.8		26.7		44.8
1 - 0.5	32	250.2		27.4		72.2
0.5 - 0.25	60	270.5		20.3		92.5
0.25 - 0.125	115	276.7		6.2		98.7
.125 - 0.0625	250	277.7		1.0		99.7
Pan		278.0		0.3		100.0
				100.0		

Sieve Loss--------

REMARKS:

O.

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 58-B-47 DATE: 3-5-48

SAMPLE DEPTH: 230-235 TEST MADE BY: ODD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %	
Over 8	2.5	—		3			
8 - 4	5	179.0	178.0	1.0		1.0	
4 - 2	9	188.0		9.0		10.0	
2 - 1	16	208.6		20.6		30.6	
1 - 0.5	32	241.4		32.8		63.4	
0.5 - 0.25	60	267.6		26.2		89.6	
0.25 - 0.125	115	275.9		8.3		97.9	
.125 - 0.0625	250	277.5		1.6		99.5	
Pan		278.0		.5		100.0	
				100.0			

Sieve Loss--------

REMARKS:

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 58-B-47 DATE: 3-5-99

SAMPLE DEPTH: 235-240 TEST MADE BY: VHB

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	180.5	176.0	2.5		2.5
4 - 2	9	195.0		14.5		17.0
2 - 1	16	215.4		20.4		37.4
1 - 0.5	32	245.4		30.0	30.1	67.5
0.5 - 0.25	60	269.3		23.9		91.4
0.25 - 0.125	115	276.1		6.8		98.2
.125 - 0.0625	250	277.4		1.3		99.5
Pan		277.9		0.5		100.0
				99.9		
Sieve Loss--------				—	—	

REMARKS: -0.1

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 58-B-47 DATE: 3-5-49

SAMPLE DEPTH: 240-247 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	179.2	178.0	1.2		1.2
4 - 2	9	186.0		6.8		8.0
2 - 1	16	203.1		17.1		25.1
1 - 0.5	32	237.1		34.0		59.1
0.5 - 0.25	60	267.5		30.4		89.5
0.25 - 0.125	115	275.9		8.4		97.9
.125 - 0.0625	250	277.5		1.6		99.5
Pan		278.0		0.5		100.0
				100.0		

Sieve Loss--------

REMARKS:

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 58-B-47 DATE: 3-5-49

SAMPLE DEPTH: 247-250 TEST MADE BY: RPH

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	179.3	178.0	1.3		1.3
4 - 2	9	182.5		3.2		4.5
2 - 1	16	194.3		11.8		16.3
1 - 0.5	32	230.1		35.8	35.7	52.2
0.5 - 0.25	60	264.3		34.2		86.4
0.25 - 0.125	115	275.0		10.7		97.1
.125 - 0.0625	250	277.0		2.0		99.1
Pan		277.9		0.9		100.0
				99.9		

Sieve Loss-------- ——— = ———

REMARKS: -0.1

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 58-B-49 DATE: 3-5-49

SAMPLE DEPTH: 250-257 TEST MADE BY: GRD

WT. OF TEST SAMPLE: 100.1 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—		3		
8 - 4	5	178.1	178.0	0.1		0.1
4 - 2	9	178.6		0.5		0.6
2 - 1	16	187.1		8.5		9.1
1 - 0.5	32	223.2		36.1		45.2
0.5 - 0.25	60	261.8		38.6	38.5	83.7
0.25 - 0.125	115	275.0		13.2		96.9
.125 - 0.0625	250	279.4		3.4		99.3
Pan		278.1		0.7		100.0
				100.1		

Sieve Loss--------

REMARKS: T.1

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 58-B-47 DATE: 3-5-49

SAMPLE DEPTH: 257-260 TEST MADE BY: 8210

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	178.05	178.0	.05		.05
4 - 2	9	178.7		.65		.70
2 - 1	16	187.4		8.7		9.4
1 - 0.5	32	223.6		36.2	36.3	45.7
0.5 - 0.25	60	261.2		37.6	37.7	83.4
0.25 - 0.125	115	273.7		12.5		95.9
.125 - 0.0625	250	276.5		2.8		98.7
Pan		277.8		1.3		100.0
				99.80		
Sieve Loss--------						

REMARKS: -0.2

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 58-B-47 DATE: 3-5-99

SAMPLE DEPTH: 260-265 TEST MADE BY: GHD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	—				
4 - 2	9	181.1	178.0	3.1		3.1
2 - 1	16	190.4		9.3		12.4
1 - 0.5	32	216.4		26.0		38.4
0.5 - 0.25	60	253.4		37.0	36.9	75.3
0.25 - 0.125	115	271.7		18.3		93.6
.125 - 0.0625	250	276.5		4.8		98.4
Pan		278.1		1.6		100.0
				100.1		
Sieve Loss--------						

REMARKS:

+0.1

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 58-B-97 DATE: 3-5-49

SAMPLE DEPTH: 265-270 TEST MADE BY: JRD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	178.2	178.0	0.2		0.2
4 - 2	9	181.1		2.9		3.1
2 - 1	16	192.7		11.6		14.7
1 - 0.5	32	223.3		30.6	30.7	45.4
0.5 - 0.25	60	260.0		36.7	36.8	82.2
0.25 - 0.125	115	294.0		14.0		96.2
.125 - 0.0625	250	296.8		2.8		99.0
Pan		277.8		1.0		100.0
				99.8		
Sieve Loss--------						

REMARKS:

-0.2

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 58-B-47 DATE: 3-5-49

SAMPLE DEPTH: 270-275 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	—				
4 - 2	9	185.7	178.0	7.7		7.7
2 - 1	16	201.3		15.6		23.3
1 - 0.5	32	227.4		26.1		49.4
0.5 - 0.25	60	260.6		33.2	33.3	82.7
0.25 - 0.125	115	274.3		13.7		96.4
.125 - 0.0625	250	277.0		2.7		99.1
Pan		277.9		0.9		100.0
				99.9		
Sieve Loss--------						

REMARKS: -0.1

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 58-B-47 DATE: 3-5-49

SAMPLE DEPTH: 275-280 TEST MADE BY: 9220

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %	
Over 8	2.5	—					
8 - 4	5	178.1	178.0	0.1		0.1	
4 - 2	9	182.1		4.0		4.1	
2 - 1	16	195.5		13.4		17.5	
1 - 0.5	32	221.1		25.6		43.1	
0.5 - 0.25	60	257.2		36.1		79.2	
0.25 - 0.125	115	274.1		16.9		96.1	
.125 - 0.0625	250	277.2		3.1		99.2	
Pan		278.0		0.8		100.0	
				100.0			

Sieve Loss-------- 0

REMARKS:

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 58-B-47 DATE: 3-7-99

SAMPLE DEPTH: 280-285 TEST MADE BY: JHD

WT. OF TEST SAMPLE: 100. TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	179.4	178.0	1.4		1.4
4 - 2	9	183.7		4.3		5.7
2 - 1	16	192.7		9.0		14.7
1 - 0.5	32	219.5		26.8		41.5
0.5 - 0.25	60	259.4		39.9	39.8	81.3
0.25 - 0.125	115	275.4		16.0		97.3
.125 - 0.0625	250	277.7		2.3		99.6
Pan		278.1		0.4		100.0
				100.1		

Sieve Loss-------- ——— ———

REMARKS:

+ 0.1

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 58-B-47 DATE: 3-7-99

SAMPLE DEPTH: 285-290 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	179.0	178.0	1.0		1.0
4 - 2	9	188.5		9.5		10.5
2 - 1	16	209.3		20.8		31.3
1 - 0.5	32	233.2		23.9		55.2
0.5 - 0.25	60	261.8		28.6		83.8
0.25 - 0.125	115	274.6		12.8		96.6
.125 - 0.0625	250	277.0		2.4		99.0
Pan		278.0		1.0		100.0
				100.0		

Sieve Loss--------

REMARKS:

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 58-B-47 DATE: 3-7-49

SAMPLE DEPTH: 290-295 TEST MADE BY: AHD

WT. OF TEST SAMPLE: 100.1 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %	
Over 8	2.5	—					
8 - 4	5	180.7	178.0	2.7		2.7	
4 - 2	9	191.9		11.2		13.9	
2 - 1	16	213.9		22.0		35.9	
1 - 0.5	32	238.8		24.9	24.8	60.7	
0.5 - 0.25	60	266.6		27.8	27.6	88.3	
0.25 - 0.125	115	276.6		10.0		98.3	
.125 - 0.0625	250	277.8		1.2		99.5	
Pan		278.3		0.5		100.0	
				109.3			
Sieve Loss--------							

REMARKS: + 0.3

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 58-B-47 DATE: 3-7-49

SAMPLE DEPTH: 295-300 TEST MADE BY: ARD

WT. OF TEST SAMPLE: 100. TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	178.9	178.0	0.9		0.9
4 - 2	9	183.6		4.7		5.6
2 - 1	16	197.3		13.7		19.3
1 - 0.5	32	226.0		28.7		48.0
0.5 - 0.25	60	263.7		37.7	37.8	85.8
0.25 - 0.125	115	276.4		12.7		98.5
.125 - 0.0625	250	277.6		1.2		99.7
Pan		277.9		0.3		100.0
				99.9		
Sieve Loss--------						

REMARKS: -0.1

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 58-B-47 DATE: 3-7-49

SAMPLE DEPTH: 300-305 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %	
Over 8	2.5	—		—			
8 - 4	5	178.3	178.0	0.3		0.3	
4 - 2	9	180.5		2.2		2.5	
2 - 1	16	192.7		12.2		14.7	
1 - 0.5	32	218.8		26.1		40.8	
0.5 - 0.25	60	256.7		37.9		78.7	
0.25 - 0.125	115	273.8		17.1		95.8	
.125 - 0.0625	250	276.8		3.0		98.8	
Pan		278.0		1.2		100.0	
				100.0			

Sieve Loss-------- ——— ———

REMARKS: 0

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 58-B-47 DATE: 3-7-49

SAMPLE DEPTH: 305-310 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %	
Over 8	2.5	—					
8 - 4	5	—					
4 - 2	9	185.1	178.0	7.1		7.1	16
2 - 1	16	203.6		18.5		25.6	32
1 - 0.5	32	248.6		45.0		70.6	60
0.5 - 0.25	60	273.1		24.5		95.1	115
0.25 - 0.125	115	277.0		3.9		98.0	250
.125 - 0.0625	250	278.0		1.0		100.0	Pan
Pan				100.0			

Sieve Loss--------

REMARKS: 0

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: _____ DATE: _____

SAMPLE DEPTH: _____ TEST MADE BY: _____

WT. OF TEST SAMPLE: _____ TIME OF SHAKING IN RO-TAP: _____

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %	
Over 8	2.5						
8 - 4	5						
4 - 2	9						
2 - 1	16						
1 - 0.5	32						
0.5 - 0.25	60						
0.25 - 0.125	115						
.125 - 0.0625	250						
Pan							

Sieve Loss-------- _____ = _____

REMARKS:

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: _____ DATE: _____

SAMPLE DEPTH: _____ TEST MADE BY: _____

WT. OF TEST SAMPLE: _____ TIME OF SHAKING IN RO-TAP: _____

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %	
Over 8	2.5						
8 - 4	5						
4 - 2	9						
2 - 1	16						
1 - 0.5	32						
0.5 - 0.25	60						
0.25 - 0.125	115						
.125 - 0.0625	250						
Pan							

Sieve Loss-------- _____ = _____

REMARKS:

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: _____ DATE: _____

SAMPLE DEPTH: _____ TEST MADE BY: _____

WT. OF TEST SAMPLE: _____ TIME OF SHAKING IN RO-TAP: _____

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %	
Over 8	2.5						
8 - 4	5						
4 - 2	9						
2 - 1	16						
1 - 0.5	32						
0.5 - 0.25	60						
0.25 - 0.125	115						
.125 - 0.0625	250						
Pan							

Sieve Loss-------- _____ = _____

REMARKS:

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: _____ DATE: _____

SAMPLE DEPTH: _____ TEST MADE BY: _____

WT. OF TEST SAMPLE: _____ TIME OF SHAKING IN RO-TAP: _____

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %	
Over 8	2.5						
8 - 4	5						
4 - 2	9						
2 - 1	16						
1 - 0.5	32						
0.5 - 0.25	60						
0.25 - 0.125	115						
.125 - 0.0625	250						
Pan							

Sieve Loss-------- _____ = _____

REMARKS:

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: _____ DATE: _____

SAMPLE DEPTH: _____ TEST MADE BY: _____

WT. OF TEST SAMPLE: _____ TIME OF SHAKING IN RO-TAP: _____

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %	
Over 8	2.5						
8 - 4	5						
4 - 2	9						
2 - 1	16						
1 - 0.5	32						
0.5 - 0.25	60						
0.25 - 0.125	115						
.125 - 0.0625	250						
Pan							
Sieve Loss--------							

REMARKS:

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: _____ DATE: _____

SAMPLE DEPTH: _____ TEST MADE BY: _____

WT. OF TEST SAMPLE: _____ TIME OF SHAKING IN RO-TAP: _____

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %	
Over 8	2.5						
8 - 4	5						
4 - 2	9						
2 - 1	16						
1 - 0.5	32						
0.5 - 0.25	60						
0.25 - 0.125	115						
.125 - 0.0625	250						
Pan							

Sieve Loss-------- _____ _____

REMARKS:

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: _____ DATE: _____

SAMPLE DEPTH: _____ TEST MADE BY: _____

WT. OF TEST SAMPLE: _____ TIME OF SHAKING IN RO-TAP: _____

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %	
Over 8	2.5						
8 - 4	5						
4 - 2	9						
2 - 1	16						
1 - 0.5	32						
0.5 - 0.25	60						
0.25 - 0.125	115						
.125 - 0.0625	250						
Pan							
		Sieve Loss--------					

REMARKS:

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: _____ DATE: _____

SAMPLE DEPTH: _____ TEST MADE BY: _____

WT. OF TEST SAMPLE: _____ TIME OF SHAKING IN RO-TAP: _____

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %	
Over 8	2.5						
8 - 4	5						
4 - 2	9						
2 - 1	16						
1 - 0.5	32						
0.5 - 0.25	60						
0.25 - 0.125	115						
.125 - 0.0625	250						
Pan							

Sieve Loss-------- _____ = _____

REMARKS:

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: _____ DATE: _____

SAMPLE DEPTH: _____ TEST MADE BY: _____

WT. OF TEST SAMPLE: _____ TIME OF SHAKING IN RO-TAP: _____

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %	
Over 8	2.5						
8 - 4	5						
4 - 2	9						
2 - 1	16						
1 - 0.5	32						
0.5 - 0.25	60						
0.25 - 0.125	115						
.125 - 0.0625	250						
Pan							

Sieve Loss-------- _____ = _____

REMARKS:

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: _____ DATE: _____

SAMPLE DEPTH: _____ TEST MADE BY: _____

WT. OF TEST SAMPLE: _____ TIME OF SHAKING IN RO-TAP: _____

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %	
Over 8	2.5						
8 - 4	5						
4 - 2	9						
2 - 1	16						
1 - 0.5	32						
0.5 - 0.25	60						
0.25 - 0.125	115						
.125 - 0.0625	250						
Pan							

Sieve Loss-------- _____ = _____

REMARKS:

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: _____ DATE: _____

SAMPLE DEPTH: _____ TEST MADE BY: _____

WT. OF TEST SAMPLE: _____ TIME OF SHAKING IN RO-TAP: _____

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %	
Over 8	2.5						
8 - 4	5						
4 - 2	9						
2 - 1	16						
1 - 0.5	32						
0.5 - 0.25	60						
0.25 - 0.125	115						
.125 - 0.0625	250						
Pan							
		Sieve Loss--------					

REMARKS:

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: _____ DATE: _____

SAMPLE DEPTH: _____ TEST MADE BY: _____

WT. OF TEST SAMPLE: _____ TIME OF SHAKING IN RO-TAP: _____

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %	
Over 8	2.5						
8 - 4	5						
4 - 2	9						
2 - 1	16						
1 - 0.5	32						
0.5 - 0.25	60						
0.25 - 0.125	115						
.125 - 0.0625	250						
Pan							

Sieve Loss-------- _____ = _____

REMARKS:

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: _____ DATE: _____

SAMPLE DEPTH: _____ TEST MADE BY: _____

WT. OF TEST SAMPLE: _____ TIME OF SHAKING IN RO-TAP: _____

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %	
Over 8	2.5						
8 - 4	5						
4 - 2	9						
2 - 1	16						
1 - 0.5	32						
0.5 - 0.25	60						
0.25 - 0.125	115						
.125 - 0.0625	250						
Pan							
Sieve Loss--------							

REMARKS:

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: _____ DATE: _____

SAMPLE DEPTH: _____ TEST MADE BY: _____

WT. OF TEST SAMPLE: _____ TIME OF SHAKING IN RO-TAP: _____

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %	
Over 8	2.5						
8 - 4	5						
4 - 2	9						
2 - 1	16						
1 - 0.5	32						
0.5 - 0.25	60						
0.25 - 0.125	115						
.125 - 0.0625	250						
Pan							

Sieve Loss-------- _____ = _____

REMARKS:

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: _____ DATE: _____

SAMPLE DEPTH: _____ TEST MADE BY: _____

WT, OF TEST SAMPLE: _____ TIME OF SHAKING IN RO-TAP: _____

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %	
Over 8	2.5						
8 - 4	5						
4 - 2	9						
2 - 1	16						
1 - 0.5	32						
0.5 - 0.25	60						
0.25 - 0.125	115						
.125 - 0.0625	250						
Pan							

Sieve Loss-------- _____ _____

REMARKS:

Sieved Sample of Med. Sand 0.25-0.5 mm.

Split. $\frac{h}{h_0} = 0.5$

Water run through sample under a head of 15 cm.

A.		B.	
19.1	Initial reading	12.2	Ferm 880
20.6	2 min	22.8	
19.1	5 min	23.3	water not working
upsurge	8 min	22.9	
	15 min		

A		B
13.1	Init. Reading	15.2
17.2	2 min	X
18.7	5 min	
19.1	8 min	
19.4	12 min.	
19.4	15 min	

Sample H

A.			B		
14.5	14.8		16.8	16.4	
7.3	7.4		9.0	8.9	
	2.2		2.4	2.5	
14.9	15.2		16.8	17.0	
7.9	(8.1)		8.8	9.0	
2.3			2.5	2.6	
(15.8)	15.5	1150	(17.2)	~~17.2~~	1060
7.8	(7.9)	1160	(9.1)	9.1	1035
2.4	(2.4)	1165	(2.6)		1075
15.7	15.7	3475	17.1	17.2	3170
	~~8.1~~ 8.1	1158	9.2		1050
		1050			
		108	~~11% error~~		10% error

J

A.			B.		
27.5	27.8		32.1	31	
14.4	15.0		16.	16.2	
4.4	4.3		4.8	(4.7)	600
28.1	(28.4)		(30.6)	30.0	610
15.1	14.9		(16.0)		600
4.3	4.4				603
28.5	(28.4)	650			
(15.0)		635			
4.4		640+			
		3(1925)			
		642			
		603			
		39			
		5%			

C-D-E related

Sample E Split

A		B	
12.1	1500	12.8	
6.1	1540	6.2	
12.0		12.7	
6.1		6.2	
		12.8	1460
		6.4	
		12.4	1500
		6.3	

1520
1480
40

4% error

2960
1480

Sample E Split

	A Time	Perm	Time	B Perm.
.5	27.4		29.1	
.7	14.4		15.5	
.09	4.3			
0.5	29.1	635	30.9	
0.7	15.1	635	16.2	
0.9	4.2	655?	4.8	
0.5	29.9		31.9	580
0.7	15.2		16.8	570
0.9	4.3		4.9	575
	29.0			
	29.	635		
		575		
		60		

10% error

Sample C

Sample A

0.5	13.3	1360
0.7	6.9	1350
0.9	1.7	~~1450~~
0.5	13.4	1350
0.7	6.7	1400
0.9	1.8	
0.5	13.1+	1380
0.7	~~6.8~~ 6.7	1400
0.9	1.8	
		6 | 8240
		1373

5% error

Sample B

	12.4	~~1460~~
	6.2	~~1520~~
	1.8	
	12.3	1480
	6.5	1450
	1.8	
	12.2	1480
	6.6	1420
		8775
		6 | 1520
		1492
		3 | 7230
		1446
		1351
		75
		B

Sample D

A

1.5	14.0		12.1
0.7	7.5		9.0
0.9			
0.5	14.9		180
0.7	7.7		9.2
	15.0	1,200	18.2
	7.7	1220	9.2
	15.0		
		~~1210~~ 1010 200	

20% error

1,000
1,020
1,010

Grand Island Padding Sand

1.	32.7	565	
	18.4	515	
	5.5	510	
2.	38	485	
	21.8	435	
	6.2	455	
3.	39	475	
	21.2	450	
	6.1	460	

465	40	32.8	32.8	32.8	465
455	21.2	21.	21.	21.2	455
465	6.1	6.0	6.2	6.2	465

3 | 1375
456
456

V. H. Dreeszen

Master Thesis Material

Nebraska Hall

TEST HOLE # 59-B-47 (1972 samples 59-66) DATE 3-9-49

SAMPLE DEPTH 16.5-20.5 TEST BY [illegible]

	TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE			50.0			
ACID INSOLUBLE						
ACID SOLUBLE						
WET WASH RESIDUE (250 MESH)	194.5	178.0	16.5			
THROUGH (250 MESH)			33.5			

RO TAP TIME 10

WT. OF SAMPLE 16.5

SIEVE OPENING IN MM	MESH						
OVER 8	2.5	—					
8 - 4	5	—					
4 - 2	9	—					
2 - 1	16	—					
1 - 0.5	32	178.3	178.0	0.3	0.6	0.6	
0.5 - 0.25	60	181.6		3.3	6.6	7.2	
0.25 - 0.125	115	189.5		7.9	15.8	23.0	
.125-0.0625	250	193.5		4.0	8.0	31.0	
PAN		194.5	34.5	1.0	69.0	100.0	
CUMULATIVE WT.				33.5 50.0	100.0		
SIEVE LOSS	0						
TOTAL							

TEST HOLE # 59-B-97 DATE 3-9-99

SAMPLE DEPTH 20.5-25 TEST BY [illegible]

		TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE				50.0			
ACID INSOLUBLE							
ACID SOLUBLE							
WET WASH RESIDUE (250 MESH)		226.5	178.0	48.5			
THROUGH (250 MESH)		178.0		1.5			
RO TAP TIME 10							
WT. OF SAMPLE 48.5							
SIEVE OPENING IN MM	MESH						
OVER 8	2.5	—					
8 - 4	5	—					
4 - 2	9	—					
2 - 1	16	180.0	179.3	0.7	1.4	1.4	
1 - 0.5	32	192.8		12.8	25.6	27.0	
0.5 - 0.25	60	215.1		22.3	44.6	71.6	
0.25 - 0.125	115	225.7		10.6	21.2	92.8	
.125-0.0625	250	227.7		2.0	4.0	96.8	
PAN		227.8	1.6	0.1	3.2	100.0	
CUMULATIVE WT.				1.5 / 50.0	100.0		
SIEVE LOSS 0							
TOTAL							

227.8
179.3
48.5

TEST HOLE # 59-B-47 DATE 3-9-99

SAMPLE DEPTH 25-30 TEST BY [illegible]

		TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE				50.0			
ACID INSOLUBLE							
ACID SOLUBLE							
WET WASH RESIDUE (250 MESH)		228.5	179.3	49.2			
THROUGH (250 MESH)				0.8			
RO TAP TIME 10 WT. OF SAMPLE 492							
SIEVE OPENING IN MM	MESH						
OVER 8	2.5	—					
8 - 4	5	—					
4 - 2	9	—					
2 - 1	16	179.8	179.3	0.5	1.0	1.0	
1 - 0.5	32	187.7		7.9	15.8	16.8	
0.5 - 0.25	60	209.6		21.9	43.8	60.6	
0.25 - 0.125	115	226.2		16.6	33.2	93.8	
.125-0.0625	250	228.4		2.2	4.4	98.2	
PAN		228.5	0.9	0.1	1.8	100.0	
CUMULATIVE WT.				0.8 / 50.0	100.0		
SIEVE LOSS 0							
TOTAL							

TEST HOLE # 59-B-47 DATE 3-9-99

SAMPLE DEPTH 30-35 TEST BY GRD

		TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE				50.0			
ACID INSOLUBLE							
ACID SOLUBLE							
WET WASH RESIDUE (250 MESH)		228.2	179.3	48.9			
THROUGH (250 MESH)				1.1			
RO TAP TIME 10 WT. OF SAMPLE 48.9							
SIEVE OPENING IN MM	MESH						
OVER 8	2.5	—					
8 - 4	5	—					
4 - 2	9	—					
2 - 1	16	182.3	179.3	3.0	6.0	6.0	
1 - 0.5	32	202.0		19.7	39.4	45.4	
0.5 - 0.25	60	219.5		17.5	35.0	80.4	
0.25 - 0.125	115	227.2		7.7	15.4	95.8	
.125-0.0625	250	228.2		1.0	2.0	97.8	
PAN		0		1.1	2.2	100.0	
CUMULATIVE WT.				50.0	100.0		
SIEVE LOSS 0							
TOTAL							

TEST HOLE # 59-B-47 DATE 3-9-99

SAMPLE DEPTH 35-40 TEST BY OPHD

		TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE				50.0			
ACID INSOLUBLE							
ACID SOLUBLE							
WET WASH RESIDUE (250 MESH)		226.4	179.3	47.1			
THROUGH (250 MESH)		179.3		2.9			
RO TAP TIME 10 WT. OF SAMPLE 47.1							
SIEVE OPENING IN MM	MESH						
OVER 8	2.5	—					
8 - 4	5	—					
4 - 2	9	179.9	179.3	0.6			
2 - 1	16	186.0		6.1	1.2	1.2	1.2
1 - 0.5	32	200.0		14.0	12.2	13.4	13.4
0.5 - 0.25	60	218.6		18.6	28.0	41.4	41.5
0.25 - 0.125	115	225.7		7.1	37.2	78.6	78.8
.125-0.0625	250	226.3		50.6	14.2	92.8	93.0
PAN		0	3.5	2.9	7.0	99.8	100.0
CUMULATIVE WT.				49.9	99.8		
SIEVE LOSS 0.1							
TOTAL							

TEST HOLE # 59-B-49 DATE 3-9-49

SAMPLE DEPTH 40-45 TEST BY [illegible]

		TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE				50.0			
ACID INSOLUBLE							
ACID SOLUBLE							
WET WASH RESIDUE (250 MESH)		210.6	179.3	31.3			
THROUGH (250 MESH)		179.3		18.7			
RO TAP TIME 10 WT. OF SAMPLE 31.3							
SIEVE OPENING IN MM	MESH						
OVER 8	2.5	—					
8 - 4	5	—					
4 - 2	9	—					
2 - 1	16	—					
1 - 0.5	32	179.4	179.1	0.3	0.6	0.6	
0.5 - 0.25	60	179.9		0.5	1.0	1.6	
0.25 - 0.125	115	184.0		4.1	8.2	9.8	
.125-0.0625	250	204.9		20.9	41.8	51.6	
PAN		210.4	24.2	5.5	48.4	100.0	
CUMULATIVE WT.				18.7 50.0	100.0		
SIEVE LOSS							
TOTAL							

210.4
179.1
0.3

TEST HOLE # 57B-49 DATE 3-9-99

SAMPLE DEPTH 45-48 TEST BY DPH

	TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE			50.0			
ACID INSOLUBLE						
ACID SOLUBLE						
WET WASH RESIDUE (250 MESH)	202.7		23.6			
THROUGH (250 MESH)	179.1		26.4			

RO TAP TIME 10

WT. OF SAMPLE 23.4

SIEVE OPENING IN MM	MESH						
OVER 8	2.5	—					
8 - 4	5	—					
4 - 2	9	—					
2 - 1	16	179.2	179.1	0.1	0.2	0.2	
1 - 0.5	32	179.4		0.2	0.4	0.6	
0.5 - 0.25	60	181.9		2.5	5.0	5.6	
0.25 - 0.125	115	188.1		6.2	12.4	18.0	
.125-0.0625	250	198.5		10.4	20.8	38.8	
PAN		202.8	30.7	54.3	61.4	100.0	tooth at 0.2
CUMULATIVE WT.				26.4 50.1	100.2		
SIEVE LOSS +0.1							
TOTAL							

202.8
179.1
23.7

TEST HOLE # 59-B-47 DATE 3-9-49

SAMPLE DEPTH 48-53 TEST BY [illegible]

		TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE				50.0			
ACID INSOLUBLE							
ACID SOLUBLE							
WET WASH RESIDUE (250 MESH)		227.2	179.1	48.1			
THROUGH (250 MESH)		189.1		1.9			
RO TAP TIME 10 WT. OF SAMPLE 48.1							
SIEVE OPENING IN MM	MESH						
OVER 8	2.5	—					
8 - 4	5	—					
4 - 2	9	—					
2 - 1	16	179.4	179.1	0.3	0.6	0.6	
1 - 0.5	32	189.0		7.6	15.2	15.8	
0.5 - 0.25	60	206.4		19.7	38.8	54.4	-.2
0.25 - 0.125	115	221.1		14.7	29.4	83.6	-.2
.125-0.0625	250	227.1		6.0	12.0	95.6	
PAN		227.4		2.2	50.3 / 1.9 / 50.2	4.4	100.0
CUMULATIVE WT.							
SIEVE LOSS +0.2							
TOTAL							

TEST HOLE # 59-B-47 DATE 3-9-49

SAMPLE DEPTH 53-60 TEST BY [illegible]

		TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE				50.0			
ACID INSOLUBLE							
ACID SOLUBLE							
WET WASH RESIDUE (250 MESH)		228.8	179.1	49.7			
THROUGH (250 MESH)		179.1		0.3			
RO TAP TIME 10							
WT. OF SAMPLE 49.7							
SIEVE OPENING IN MM	MESH						
OVER 8	2.5	—					
8 - 4	5	—					
4 - 2	9	181.0	179.1	1.9	3.8	3.8	16
2 - 1	16	196.7		15.7	31.4	35.4	+2 32
1 - 0.5	32	216.1		19.4	38.8	74.4	+2 60
0.5 - 0.25	60	226.1		10.0	20.0	94.6	+2 115
0.25 - 0.125	115	228.3		2.2	4.4	99.0	250
.125-0.0625	250	228.5		0.2	1.0	100	Pan
PAN			0.5	0.3			
CUMULATIVE WT.				49.7	99.4		
SIEVE LOSS -0.3							
TOTAL							

TEST HOLE # 59-B-12 DATE 3-9-49

SAMPLE DEPTH 60-65 TEST BY [illegible]

		TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE				50.0			
ACID INSOLUBLE							
ACID SOLUBLE							
WET WASH RESIDUE (250 MESH)		228.6		49.5			
THROUGH (250 MESH)		179.1		0.5			
RO TAP TIME 10 WT. OF SAMPLE 49.5							
SIEVE OPENING IN MM	MESH						
OVER 8	2.5	—					
8 - 4	5	—					
4 - 2	9	—					
2 - 1	16	180.1	179.0	1.1	2.2	2.2	
1 - 0.5	32	191.7		11.6	23.3	25.5	±0.1
0.5 - 0.25	60	213.5		21.8	43.7	69.2	±0.1
0.25 - 0.125	115	225.8		12.3	24.6	93.8	
.125-0.0625	250	228.3		2.5	5.0	98.8	
PAN		228.9	0.6	0.1	1.2	100.0	
CUMULATIVE WT.				49.9	100.0		
SIEVE LOSS 0.1							
TOTAL							

228.9
179.0
49.9

TEST HOLE # 59-B-47 DATE 3-10-99

SAMPLE DEPTH 65-70 TEST BY PMD

	TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE			50.0			
ACID INSOLUBLE						
ACID SOLUBLE						
WET WASH RESIDUE (250 MESH)	228.3	179.0	49.3			
THROUGH (250 MESH)	179.0		0.7			

RO TAP TIME 10

WT. OF SAMPLE 49.3

SIEVE OPENING IN MM	MESH						
OVER 8	2.5	—					
8 - 4	5	—					
4 - 2	9	—					
2 - 1	16	180.5	179.0	1.5	3.0	3.0	
1 - 0.5	32	191.8		11.3	22.6	25.5	~.1
0.5 - 0.25	60	212.1		20.3	40.6	66.0	~.1
0.25 - 0.125	115	224.8		12.7	25.4	91.4	
.125-0.0625	250	228.3		3.5	7.0	98.4	
PAN		228.4	0.8	0.1	1.6	100.0	
CUMULATIVE WT.				50.1	100.2		
SIEVE LOSS ±0.1							
TOTAL							

TEST HOLE # 59-8-99 DATE 3-10-99

SAMPLE DEPTH 70-73.5 TEST BY 0921

	TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE			500			
ACID INSOLUBLE						
ACID SOLUBLE						
WET WASH RESIDUE (250 MESH)	191.6	178.0	13.6			
THROUGH (250 MESH)	178.0		364			
RO TAP TIME 10 WT. OF SAMPLE 13.6						

SIEVE OPENING IN MM	MESH						
OVER 8	2.5	—					
8 - 4	5	—					
4 - 2	9	—					
2 - 1	16	178.5	178.0	0.5	1.0	1.0	
1 - 0.5	32	179.6		1.1	2.2	3.2	
0.5 - 0.25	60	181.2		1.6	3.2	6.4	
0.25 - 0.125	115	183.5		2.3	4.6	11.0	
.125-0.0625	250	188.8		5.3	10.6	21.6	
PAN		191.6	392	3.28	78.4	100.0	
CUMULATIVE WT.				36.4 / 500	100.0		
SIEVE LOSS 0							
TOTAL							

TEST HOLE # 59-B-47 DATE 3-10-49

SAMPLE DEPTH 73.5-77.5 TEST BY GHD

		TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE				50.0			
ACID INSOLUBLE							
ACID SOLUBLE							
WET WASH RESIDUE (250 MESH)		196.3	178.0	18.3			
THROUGH (250 MESH)		178.0		31.7			
RO TAP TIME 10 WT. OF SAMPLE 183							
SIEVE OPENING IN MM	MESH						
OVER 8	2.5	—					
8 - 4	5	—					
4 - 2	9	—					
2 - 1	16	*178.1	178.0	0.1	0.2	0.2	
1 - 0.5	32	179.1		1.0	2.0	2.2	
0.5 - 0.25	60	182.3		3.2	6.4	8.6	
0.25 - 0.125	115	187.9		5.6	11.2	19.8	
.125-0.0625	250	194.8		6.9	13.8	33.6	
PAN		196.3	33.2	31.5	66.4	100.0	
CUMULATIVE WT.		4.0		31.7 / 50.0	100.0		
SIEVE LOSS 0							
TOTAL							

* 103 iron concretions

TEST HOLE # 59-B-47 DATE 3-10-49

SAMPLE DEPTH 72.5-80 TEST BY [illegible]

		TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE				50.0			
ACID INSOLUBLE							
ACID SOLUBLE							
WET WASH RESIDUE (250 MESH)		192.5	178.0	14.5			
THROUGH (250 MESH)		178.0		35.5			
RO TAP TIME 10 WT. OF SAMPLE 14.5							
SIEVE OPENING IN MM	MESH						
OVER 8	2.5	—					
8 - 4	5	—					
4 - 2	9	—					
2 - 1	16	—					
1 - 0.5	32	178.3	178.0	0.3	0.6	0.6	
0.5 - 0.25	60	179.5		1.2	2.4	3.0	
0.25 - 0.125	115	182.5		3.0	6.0	9.0	
.125-0.0625	250	190.4		7.9	15.8	24.8	
PAN		192.5	37.6	52.1	75.2	100.0	
CUMULATIVE WT.				35.5 / 50.0	100.0		
SIEVE LOSS 0							
TOTAL							

TEST HOLE # 598-97 DATE 3-10-99

SAMPLE DEPTH 80-84.5 TEST BY [illegible]

		TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE				50.0			
ACID INSOLUBLE							
ACID SOLUBLE							
WET WASH RESIDUE (250 MESH)		196.6	178.0	18.6			
THROUGH (250 MESH)		178.3		31.4			
RO TAP TIME 10 WT. OF SAMPLE 18.6							
SIEVE OPENING IN MM	MESH						
OVER 8	2.5	—					
8 - 4	5	—					
4 - 2	9	—					
2 - 1	16	—					
1 - 0.5	32	178.4	178.0	0.4	0.8	0.8	
0.5 - 0.25	60	180.3		1.9	3.8	4.6	
0.25 - 0.125	115	185.0		4.7	9.4	14.0	
.125-0.0625	250	194.6		9.6	19.2	33.2	
PAN		196.7	33.5	2.1	67.0	100.0	-0.2
CUMULATIVE WT.				31.4 / 50.0	100.2		
SIEVE LOSS +0.1							
TOTAL							

TEST HOLE # 59-B-97 DATE 3-10-99

SAMPLE DEPTH 84.5-86 TEST BY CRD

		TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE				50.0			
ACID INSOLUBLE							
ACID SOLUBLE							
WET WASH RESIDUE (250 MESH)		226.8	178.0	48.8			
THROUGH (250 MESH)		178.0		1.2			
RO TAP TIME 10							
WT. OF SAMPLE 48.8							
SIEVE OPENING IN MM	MESH						
OVER 8	2.5	—					
8 – 4	5	—					
4 – 2	9	—					
2 – 1	16	180.5	178.0	2.5	5.0	5.0	
1 – 0.5	32	195.1		14.6	29.2	34.2	
0.5 – 0.25	60	215.0		19.9	39.8	74.0	
0.25 – 0.125	115	224.2		9.2	18.4	92.4	
.125–0.0625	250	226.5		2.3	4.6	97.0	
PAN		226.8		1.5 ≤ 0.3 < 1.2	3.0	100.0	
CUMULATIVE WT.				50.0			
SIEVE LOSS 0							
TOTAL							

TEST HOLE # 59-8-49 DATE 3-10-49

SAMPLE DEPTH 88-93 TEST BY [illegible]

		TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE				50.0			
ACID INSOLUBLE							
ACID SOLUBLE							
WET WASH RESIDUE (250 MESH)		197.5	178.0	19.5			
THROUGH (250 MESH)		178.0		30.5			
RO TAP TIME 10 WT. OF SAMPLE 19.5							
SIEVE OPENING IN MM	MESH						
OVER 8	2.5	—					
8 - 4	5	—					
4 - 2	9	178.3	178.0	0.3	0.6	0.6	
2 - 1	16	179.1		0.8	1.6	2.0	-.2
1 - 0.5	32	179.7		0.6	1.2	3.2	
0.5 - 0.25	60	181.3		1.6	3.2	6.4	
0.25 - 0.125	115	185.2		3.9	7.8	14.2	
.125-0.0625	250	194.8		9.6	19.2	33.4	
PAN		197.6	33.3	2.8	66.6	100.0	
CUMULATIVE WT.				30.5 50.1	100.2		
SIEVE LOSS +0.1							
TOTAL							

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 59-B-42 DATE: 3-10-49

SAMPLE DEPTH: 93-100 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5					
8 - 4	5					
4 - 2	9	178.1	178.0	0.1		0.1
2 - 1	16	192.7		14.6		14.7
1 - 0.5	32	224.1		31.4		46.1
0.5 - 0.25	60	253.1		29.0		75.1
0.25 - 0.125	115	272.2		19.1		94.2
.125 - 0.0625	250	277.2		5.0		99.2
Pan		278.0		0.8		100.0
				100.0		

Sieve Loss-------- 0

REMARKS:

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 59-B-47 DATE: 3-10-99

SAMPLE DEPTH: 100-105 TEST MADE BY: JHD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	178.4	178.0	0.4		0.4
4 - 2	9	190.7		12.3		12.7
2 - 1	16	219.2		28.5		41.2
1 - 0.5	32	248.4		29.2		70.4
0.5 - 0.25	60	262.8		14.4		84.8
0.25 - 0.125	115	272.2		9.4		94.2
.125 - 0.0625	250	277.1		4.9		99.1
Pan		278.0		0.9		100.0
				100.0		

Sieve Loss-------- 0

REMARKS: 0

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 59-B-47 DATE: 3-10-49

SAMPLE DEPTH: 105-108 TEST MADE BY: SHD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %	
Over 8	2.5	—					
8 - 4	5	179.5	178.0	1.5		1.5	
4 - 2	9	199.3		19.8		21.3	
2 - 1	16	234.6		35.3		56.6	
1 - 0.5	32	261.9		27.3		83.9	
0.5 - 0.25	60	272.8		10.9		94.8	
0.25 - 0.125	115	276.0		3.2		98.0	
.125 - 0.0625	250	277.3		1.3		99.3	
Pan		278.0		0.7		100.0	

Sieve Loss-------- 0

REMARKS:

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 59-B-47 DATE: 3-10-99

SAMPLE DEPTH: 108-110 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 200 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %	
Over 8	2.5	—					
8 - 4	5	223.5	178.0	45.5	22.7	22.7	
4 - 2	9	333.9		110.4	55.2	77.9	
2 - 1	16	365.5		31.6	15.8	93.7	
1 - 0.5	32	372.4		6.9	3.5	97.2	
0.5 - 0.25	60	374.4		2.0	1.0	98.2	
0.25 - 0.125	115	376.3		1.9	0.9	99.1	
.125 - 0.0625	250	377.6		1.3	0.7	99.8	
Pan		378.0		0.4	0.2	100.0	
					100.0		

Sieve Loss-------- 0

REMARKS:

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 39-B-47 DATE: 3-10-49

SAMPLE DEPTH: 110-115 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	183.0	178.0	5.0		5.0
4 - 2	9	204.6		21.6		26.6
2 - 1	16	232.1		27.5		54.0
1 - 0.5	32	260.7		28.6		82.6
0.5 - 0.25	60	275.0		14.3		96.9
0.25 - 0.125	115	297.1		2.1		99.0
.125 - 0.0625	250	277.7		0.6		99.6
Pan		278.1		0.4		100.0
				100.1		
Sieve Loss--------						

REMARKS: +0.1

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 59-B-47 DATE: 3-10-49

SAMPLE DEPTH: 115-120 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—	178.0	—		
8 - 4	5	186.2		8.2		8.2
4 - 2	9	213.1		26.9		35.1
2 - 1	16	237.6		24.5		59.6
1 - 0.5	32	261.8		24.2		83.8
0.5 - 0.25	60	274.4		12.6		96.4
0.25 - 0.125	115	276.9		2.5		98.9
.125 - 0.0625	250	277.6		0.7		99.6
Pan		278.0		0.4		100.0
				100.0		

Sieve Loss -------- 0

REMARKS:

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 59-B-47 DATE: 3-10-99

SAMPLE DEPTH: 120-122.5 TEST MADE BY: GRD

WT. OF TEST SAMPLE: 100.3 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	194.7	178.0	16.7	16.6	16.6
4 - 2	9	223.1		28.4	28.3	44.9
2 - 1	16	254.1		31.0	30.9	75.8
1 - 0.5	32	264.8		10.7		86.5
0.5 - 0.25	60	270.6		5.8		92.3
0.25 - 0.125	115	275.8		5.2		97.5
.125 - 0.0625	250	277.8		2.0		99.5
Pan		278.3		0.5		100.0
				100.3		
Sieve Loss--------						

REMARKS: +0.3

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 59-B-47 DATE: 3-10-99

SAMPLE DEPTH: 125-130 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 200 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	180.2	178.0	2.2	1.1	1.1
8 - 4	5	257.2		77.0	38.5	39.6
4 - 2	9	336.8		79.6	39.8	79.4
2 - 1	16	359.6		22.8	11.4	90.8
1 - 0.5	32	364.6		5.0	2.5	93.3
0.5 - 0.25	60	367.9		3.3	1.7	95.0
0.25 - 0.125	115	374.8		6.9	3.4	98.4
.125 - 0.0625	250	377.6		2.8	1.4	99.8
Pan		378.0		0.4	0.2	100.0
				200.0		

Sieve Loss -------- 0

REMARKS:

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 59-B-47 DATE: 3-10-59

SAMPLE DEPTH: 130-135 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	178.2	178.0	0.2		0.2
4 - 2	9	182.6		4.4		4.6
2 - 1	16	194.3		11.7		16.3
1 - 0.5	32	218.4		24.1	24.0	40.3
0.5 - 0.25	60	245.7		27.3	27.2	67.5
0.25 - 0.125	115	266.7		21.0		88.5
.125 - 0.0625	250	274.9		8.2		96.7
Pan		278.2		3.3		100.0
		79.9		100.2		
Sieve Loss--------						

REMARKS: +0.2

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 59-B-42 DATE: 3-10-49

SAMPLE DEPTH: 135-1405 TEST MADE BY: ODD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	178.7	176.0	0.7		0.7
4 - 2	9	183.0		4.3		5.0
2 - 1	16	193.2		10.2		15.2
1 - 0.5	32	221.1		27.9		43.1
0.5 - 0.25	60	250.7		29.6		72.7
0.25 - 0.125	115	268.7		18.0		90.7
.125 - 0.0625	250	275.2		6.5		97.2
Pan		278.0		2.8		100.0
				100.0		

Sieve Loss-------- 0

REMARKS:

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 59-B-47 DATE: 3-10-79

SAMPLE DEPTH: 140.5-145 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 100.3- TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5					
8 - 4	5	181.1	178.0	3.1		3.1
4 - 2	9	192.3		11.2		14.3
2 - 1	16	222.6		30.3	30.2	44.5
1 - 0.5	32	255.6		33.0	32.9	77.4
0.5 - 0.25	60	272.0		16.4		93.8
0.25 - 0.125	115	276.4		4.4		98.2
.125 - 0.0625	250	277.8		1.4		99.6
Pan		278.2		0.4		100.0
				100.3		
Sieve Loss--------						

REMARKS: -0.1

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 59-B-47 DATE: 3-10-99

SAMPLE DEPTH: 145-149 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	184.5	178.0	6.5		6.5
4 - 2	9	202.7		18.2		24.7
2 - 1	16	230.1		27.4		52.1
1 - 0.5	32	262.2		32.1	32.2	84.3
0.5 - 0.25	60	273.8		11.6		95.9
0.25 - 0.125	115	276.8		3.0		98.9
.125 - 0.0625	250	277.6		0.8		99.7
Pan		277.9		0.3		100.0
				99.9		
Sieve Loss--------				—		

REMARKS: -0.1

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 59-B-47 DATE: 3-10-49

SAMPLE DEPTH: 149-155 TEST MADE BY: ORD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	184.5	178.0	6.5		6.5
4 - 2	9	200.8		16.3		22.8
2 - 1	16	224.3		23.5		46.3
1 - 0.5	32	253.9		29.6		75.9
0.5 - 0.25	60	271.9		18.0		93.9
0.25 - 0.125	115	276.0		4.1		98.0
.125 - 0.0625	250	277.7		1.7		99.7
Pan		278.0		0.3		100.0
				100.0		

Sieve Loss-------- ——— = ———

REMARKS: 0

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 59-B-47 DATE: 3-10-59

SAMPLE DEPTH: 155-160 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	x180.5	178.0	2.5		2.5
8 - 4	5	192.0		11.5		14.0
4 - 2	9	210.1		18.1		32.1
2 - 1	16	228.9		18.8	18.9	51.0
1 - 0.5	32	255.9		27.0	27.1	78.1
0.5 - 0.25	60	272.6		16.7		94.8
0.25 - 0.125	115	276.4		3.8		98.6
.125 - 0.0625	250	277.6		1.2		99.8
Pan		277.8		0.2		100.0
				99.8		

Sieve Loss-------- 100.0

-0.2

REMARKS:

x 1 pebble

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 59-B-47 DATE: 3-10-99

SAMPLE DEPTH: 160-165 TEST MADE BY: DKD

WT. OF TEST SAMPLE: 100. TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	187.4	178.0	9.4		9.4
4 - 2	9	209.0		21.6		31.0
2 - 1	16	240.1		31.1		62.1
1 - 0.5	32	264.4		24.3		86.4
0.5 - 0.25	60	274.4		10.0		96.4
0.25 - 0.125	115	276.7		2.3		98.7
.125 - 0.0625	250	277.4		0.7		99.4
Pan		278.0		0.6		100.0
				100.0		

Sieve Loss-------- 0

REMARKS:

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 59-B-47 DATE: 3-10-49

SAMPLE DEPTH: 165-170 TEST MADE BY: OFHD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	192.2	178.0	14.2		14.2
4 - 2	9	210.8		18.6		32.8
2 - 1	16	235.4		24.6		57.4
1 - 0.5	32	264.1		28.7		86.1
0.5 - 0.25	60	276.2		12.1		98.2
0.25 - 0.125	115	277.6		1.4		99.6
.125 - 0.0625	250	277.8		0.2		99.8
Pan		278 ? was 800?		0.2		100.0
				100.0		

Sieve Loss-------- 0

REMARKS:

Sample not properly split.?

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 59-B-47 DATE: 3-11-49

SAMPLE DEPTH: 170-175 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	190.7	178.0	12.7		12.7
4 - 2	9	210.1		19.4		32.1
2 - 1	16	233.7		23.6		53.7
1 - 0.5	32	259.8		26.1		81.8
0.5 - 0.25	60	274.1		14.3		96.1
0.25 - 0.125	115	276.7		2.6		98.7
.125 - 0.0625	250	277.6		0.9		99.6
Pan		278.0		0.4		100.0
				100.0		

Sieve Loss-------- 0.

REMARKS:

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 59-B-47 DATE: 3-11-59

SAMPLE DEPTH: 175-180 TEST MADE BY: DRD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	179.7		1.7		1.7
8 - 4	5	192.8	178.0	13.1		14.8
4 - 2	9	210.9		18.1		32.9
2 - 1	16	235.7		24.8		57.7
1 - 0.5	32	261.4		25.7		83.4
0.5 - 0.25	60	274.6		13.2		96.6
0.25 - 0.125	115	277.0		2.4		99.0
.125 - 0.0625	250	277.7		0.7		99.7
Pan		278.0		0.3		100.0
				100.0		

Sieve Loss-------- 0

REMARKS:

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 59-B-97 DATE: 3-11-99

SAMPLE DEPTH: 180-185 TEST MADE BY: DOLD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	191.7	178.0	13.7		13.7
4 - 2	9	231.4		39.7	39.5	53.2
2 - 1	16	234.7		23.3	23.2	76.4
1 - 0.5	32	267.2		12.5		88.9
0.5 - 0.25	60	274.8		7.6		96.5
0.25 - 0.125	115	277.4		2.6		99.1
.125 - 0.0625	250	278.0		0.6		99.7
Pan		278.3		0.3		100.0
				100.0		

Sieve Loss-------- ——— = ———

REMARKS: + 0.3

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 59-B-47 DATE: 3-11-49

SAMPLE DEPTH: 185-190 TEST MADE BY: JHH

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	182.6	178.0	4.6		4.6
4 - 2	9	209.6		27.0	27.1	31.7
2 - 1	16	233.0		23.4		55.1
1 - 0.5	32	254.2		21.2		76.3
0.5 - 0.25	60	269.8		15.6		91.9
0.25 - 0.125	115	275.4		5.6		97.5
.125 - 0.0625	250	277.5		2.1		99.6
Pan		277.9		0.4		100.0
				100.0		

Sieve Loss-------- ———= ———

REMARKS: 0.1

TEST HOLE # 59-B-47 DATE 3-10-49

SAMPLE DEPTH 190-193 TEST BY [illegible]

		TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE		210.1	178.0	32.1			
ACID INSOLUBLE		178.0					
ACID SOLUBLE							
WET WASH RESIDUE (250 MESH)		195.6	178.0	17.6			
THROUGH (250 MESH)		178.0		14.5			
RO TAP TIME 10 WT. OF SAMPLE 17.6							
SIEVE OPENING IN MM	MESH						
OVER 8	2.5	—					
8 - 4	5	—					Cum.%
4 - 2	9	178.6	178.0	0.6		2.1	2.0
2 - 1	16	179.8		1.2		3.7	5.7
1 - 0.5	32	181.5		1.7		5.3	11.0
0.5 - 0.25	60	184.3		2.8		8.7	19.7
0.25 - 0.125	115	188.7		4.4		13.7	33.4
.125-0.0625	250	194.3		5.6		17.4	50.8
PAN		195.6	178.0	15.8	1.3	49.2	100.0
CUMULATIVE WT.				14.5 / 32.1		100.0	
SIEVE LOSS 0							
TOTAL							

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 59-B-47 DATE: 3-11-99

SAMPLE DEPTH: 193-200 TEST MADE BY: DRD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	183.2	178.0	5.2		5.2
4 - 2	9	194.2		11.0		16.2
2 - 1	16	221.2		27.0		43.2
1 - 0.5	32	251.6		30.4	30.5	73.7
0.5 - 0.25	60	270.2		18.6		92.3
0.25 - 0.125	115	275.1		4.9		97.2
.125 - 0.0625	250	277.1		2.0		99.2
Pan		277.9		0.8		100.0
				100		

Sieve Loss-------- — —

REMARKS: -0.1

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 59-B-47 DATE: 3-11-59

SAMPLE DEPTH: 200-208 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	——				
8 - 4	5	181.7	178.0		3.7	3.7
4 - 2	9	203.3			21.6	25.3
2 - 1	16	237.6		34.4	34.3	59.7
1 - 0.5	32	262.7			25.1	84.8
0.5 - 0.25	60	273.8			11.1	95.9
0.25 - 0.125	115	276.5			2.7	98.6
.125 - 0.0625	250	277.5			1.0	99.6
Pan		277.9			0.4	100.0
					100.0	

Sieve Loss-------- ——— ———

REMARKS: -0.1

TEST HOLE # 59-8-90 DATE 3-10-99

SAMPLE DEPTH 208-210 TEST BY AHD

	TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE	193.0	178.0	15.0			
ACID ~~INSOLUBLE~~	178.0					
ACID ~~SOLUBLE~~						
WET WASH RESIDUE (250 MESH)	185.4	178.0	7.4			
THROUGH (250 MESH)	178.0		7.6			
			15.0			
RO TAP TIME 10						
WT. OF SAMPLE 7.4						
SIEVE OPENING IN MM / MESH						
OVER 8 / 2.5	—					
8 - 4 / 5	—					
4 - 2 / 9	—					
2 - 1 / 16	178.05	178.0	0.05		0.3	0.3
1 - 0.5 / 32	178.5		0.45		3.0	3.3
0.5 - 0.25 / 60	179.9		01.4		19.3	12.6
0.25 - 0.125 / 115	182.0		02.1		14.0	26.6
.125-0.0625 / 250	184.7		02.7		18.0	44.6
PAN	185.4	8.3	00.7		55.4	100.0
CUMULATIVE WT.			2.6 / 15.00		100.0	
SIEVE LOSS 0						
TOTAL						

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 59-B-47 DATE: 3-11-99

SAMPLE DEPTH: 210-215 TEST MADE BY: DHD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	—				
4 - 2	9	182.8	178.0		4.8	4.8
2 - 1	16	216.8			34.0	38.8
1 - 0.5	32	255.3		38.6	38.5	77.4
0.5 - 0.25	60	293.0			17.7	95.1
0.25 - 0.125	115	296.9			3.9	99.0
.125 - 0.0625	250	297.6			0.7	99.7
Pan		297.9			0.3	100.0
					100.0	
Sieve Loss--------					—	—

REMARKS: -0.1

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 59-B-47 DATE: 3-11-49

SAMPLE DEPTH: 215-220.5 TEST MADE BY: OSD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	178.2	178.0		0.2	0.2
4 - 2	9	182.3			4.1	4.3
2 - 1	16	207.2			24.9	29.2
1 - 0.5	32	250.3		43.2	43.1	72.4
0.5 - 0.25	60	271.5			21.2	93.6
0.25 - 0.125	115	276.7			5.2	98.8
.125 - 0.0625	250	277.5			0.8	99.6
Pan		277.9			0.4	100.0
					100.0	
Sieve Loss--------					-0.1	

REMARKS:

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 59-B-47 DATE: 3-11-49

SAMPLE DEPTH: 220.5-225 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	178.5	178.0		0.5	0.5
4 - 2	9	197.4			18.9	19.4
2 - 1	16	237.2		40.0	39.8	59.4
1 - 0.5	32	264.3			27.1	86.5
0.5 - 0.25	60	273.3			9.0	95.5
0.25 - 0.125	115	276.3			3.0	98.5
.125 - 0.0625	250	277.6			1.3	99.8
Pan		277.8			0.2	100.0
					100.0	

Sieve Loss-------- ——— ———

REMARKS: -0.2

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 59-B-47 DATE: 3-11-49

SAMPLE DEPTH: 225-230 TEST MADE BY: OPHD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	179.7	178.0	1.7		1.7
4 - 2	9	202.6		22.9		24.6
2 - 1	16	237.9		35.3		59.9
1 - 0.5	32	267.4		29.5		89.4
0.5 - 0.25	60	275.4		8.0		97.4
0.25 - 0.125	115	277.3		1.9		99.3
.125 - 0.0625	250	277.8		0.5		99.8
Pan		278.0		0.2		100.0
				100.0		

Sieve Loss-------- —

REMARKS: 0

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 59-B-47 DATE: 3-11-49

SAMPLE DEPTH: 230-235 TEST MADE BY: GKD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %	
Over 8	2.5	—					
8 - 4	5	178.5	178.0	0.5		0.5	
4 - 2	9	187.3		8.8		9.3	
2 - 1	16	217.8		30.5	30.4	39.7	
1 - 0.5	32	252.6		34.8	34.7	74.4	
0.5 - 0.25	60	272.6		20.0		94.4	
0.25 - 0.125	115	277.0		4.4		98.8	
.125 - 0.0625	250	277.7		0.7		99.5	
Pan		278.2		0.5		100.0	
				100.0			

Sieve Loss-------- — = —

REMARKS: +0.2

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 59-B-47 DATE: 3-11-99

SAMPLE DEPTH: 235-240 TEST MADE BY: SRD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	178.4	178.0	0.4		0.4
4 - 2	9	189.7		11.3		11.7
2 - 1	16	215.8		26.1		37.8
1 - 0.5	32	251.8		36.0		73.8
0.5 - 0.25	60	292.1		20.3		94.1
0.25 - 0.125	115	276.7		4.6		98.7
.125 - 0.0625	250	277.6		0.9		99.6
Pan		278.0		0.4		100.0
				100.0		

Sieve Loss--------

REMARKS: 0

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 59-B-47 DATE: 3-11-99

SAMPLE DEPTH: 240-245 TEST MADE BY: DHD

WT. OF TEST SAMPLE: 100.0 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	178.1	178.0	0.1		0.1
4 - 2	9	185.6		7.5		7.6
2 - 1	16	204.5		18.9		26.5
1 - 0.5	32	236.5		32.0		58.5
0.5 - 0.25	60	266.4		29.9		88.4
0.25 - 0.125	115	275.6		9.2		97.6
.125 - 0.0625	250	277.5		1.9		99.5
Pan		278.0		0.5		100.0
				100.0		

Sieve Loss-------- ———

REMARKS: 0

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 59-B-92 DATE: 3-11-99

SAMPLE DEPTH: 245-250 TEST MADE BY: YRD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	178.3	178.0	0.3		0.3
4 - 2	9	184.0		5.7		6.0
2 - 1	16	202.5		18.5		24.5
1 - 0.5	32	239.7		37.2	37.2	61.8
0.5 - 0.25	60	267.5		27.8		89.6
0.25 - 0.125	115	275.4		7.9		97.5
.125 - 0.0625	250	277.4		2.0		99.5
Pan		277.9		0.5		.5
				100.0		100.0

Sieve Loss--------

REMARKS: -0.1

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 59-B-47 DATE: 3-11-49

SAMPLE DEPTH: 250 - 252.5 TEST MADE BY: DRD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	178.2	178.0	0.2		0.2
4 - 2	9	181.0		2.8		3.0
2 - 1	16	187.1		6.1		9.1
1 - 0.5	32	217.4		30.3	30.4	39.5
0.5 - 0.25	60	260.3		42.9	43.1	82.6
0.25 - 0.125	115	273.2		12.9		95.5
.125 - 0.0625	250	276.9		3.7		99.2
Pan		277.7		0.8		100.0
				100.0		

Sieve Loss--------

REMARKS: -0.3

Wet sieved

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 60-B-47 DATE: 3-11-99

SAMPLE DEPTH: 2-3 TEST MADE BY: DHD

WT. OF TEST SAMPLE: 50 TIME OF SHAKING IN RO-TAP: 10

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	—				
4 - 2	9	178.7	178.0	0.7	1.4	1.4
2 - 1	16	179.5		0.8	1.6	3.0
1 - 0.5	32	183.1		3.6	7.2	10.2
0.5 - 0.25	60	196.3		13.2	26.4	36.6
0.25 - 0.125	115	212.6		16.3	32.6	69.2
.125 - 0.0625	250	224.0		11.4	22.8	92.0
Pan		225.2	4.0	31.2	38.0	100.0
				2.8		
Sieve Loss--------				50.2		

REMARKS:

0

178
50
228

225.2
178.0
47.2 retained after wet sieving

50.0
47.2
2.8 through 250 mesh

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 60-B-47 DATE: 3-11-44

SAMPLE DEPTH: 3-4 TEST MADE BY: PKD

WT. OF TEST SAMPLE: 50 TIME OF SHAKING IN RO-TAP: 10

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	179.6	178.0	1.6	3.2	3.2
4 - 2	9	180.8		1.2	2.4	5.6
2 - 1	16	182.3		1.5	3.0	8.6
1 - 0.5	32	190.9		7.8	15.6	24.2
0.5 - 0.25	60	211.6		21.5	43.0	67.2
0.25 - 0.125	115	222.1		10.5	21.0	88.2
.125 - 0.0625	250	227.3		5.2	10.4	98.6
Pan		227.6	0.7	0.3	1.4	100.0
				0.4		
Sieve Loss				0		

REMARKS:

* 1 large pebble

212
178
34 grams removed

227.6
178.0
49.6 retained after wet sieving

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 60-B-47 DATE: 3-11-99

SAMPLE DEPTH: 4-5 TEST MADE BY: DRD

WT. OF TEST SAMPLE: 50 TIME OF SHAKING IN RO-TAP: 10

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	*179.6	178.0	1.6	3.2	3.2
8 - 4	5	181.9		2.3	4.6	7.8
4 - 2	9	184.8		2.9	5.8	13.6
2 - 1	16	190.7		5.9	11.8	25.4
1 - 0.5	32	203.8	13.2	13.1	26.2	51.6
0.5 - 0.25	60	221.3		17.5	35.0	86.6
0.25 - 0.125	115	226.8		5.5	11.0	97.6
.125 - 0.0625	250	227.8		1.0	2.0	99.6
Pan		none		0.2	0.4	100.0
				50.0		

Sieve Loss-------

REMARKS:

* 1 grain

227.8
178.0
49.8 wtred after wet sieve
0.2 passing 230 mesh

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 60-B-47 DATE: 3-11-49

SAMPLE DEPTH: 5-10 TEST MADE BY: GRD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	184.1	178.0	6.1		6.1
4 - 2	9	197.0		12.9		19.0
2 - 1	16	213.0		16.0		35.0
1 - 0.5	32	239.5		26.5	26.6	61.6
0.5 - 0.25	60	266.1		26.6	26.7	88.3
0.25 - 0.125	115	275.2		9.1		97.4
.125 - 0.0625	250	277.5		2.3		99.7
Pan		277.8		0.3		100.0
				100.0		
Sieve Loss--------				—	—	

REMARKS: -0.2

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 60-B-47 DATE: 3-11-49

SAMPLE DEPTH: 10-15 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	178.4	178.0	0.4		0.4
4 - 2	9	183.6		5.2		5.6
2 - 1	16	193.9		10.3		15.9
1 - 0.5	32	226.0		32.1		48.0
0.5 - 0.25	60	262.7		36.7		84.7
0.25 - 0.125	115	276.0		13.3		98.0
.125 - 0.0625	250	277.7		1.7		99.7
Pan		278.0		0.3		100.0
				100.0		

Sieve Loss ———— ————

REMARKS: 0

TEST HOLE # 60-B-47 DATE 3-11-99

SAMPLE DEPTH 15-20 TEST BY [illegible]

	TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE			50.0			
ACID INSOLUBLE						
ACID SOLUBLE						
WET WASH RESIDUE (250 MESH)	225.6		47.6			
THROUGH (250 MESH)	178.0		2.4			
RO TAP TIME 47.6 WT. OF SAMPLE 10						

SIEVE OPENING IN MM	MESH						
OVER 8	2.5	—					
8 - 4	5	180.3	178.0	2.3	4.6	4.6	
4 - 2	9	182.4		2.1	4.2	8.8	
2 - 1	16	185.5		3.1	6.2	15.0	
1 - 0.5	32	194.0		8.5	17.0	32.0	
0.5 - 0.25	60	209.1		15.1	30.2	62.2	
0.25 - 0.125	115	221.8		12.7	25.4	87.6	
.125-0.0625	250	225.3		3.5	7.0	94.6	
PAN		225.6	2.7	0.3	5.4	100.0	
CUMULATIVE WT.				2.4			
SIEVE LOSS	0			50.0			
TOTAL							

TEST HOLE # 60-B-47 DATE 3-11-99

SAMPLE DEPTH 20-25 TEST BY [illegible]

		TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE				50.0			
ACID INSOLUBLE							
ACID SOLUBLE							
WET WASH RESIDUE (250 MESH)		225.6	178.0	47.6			
THROUGH (250 MESH)		178.0		2.4			
RO TAP TIME 10 WT. OF SAMPLE 47.6							
SIEVE OPENING IN MM	MESH						
OVER 8	2.5	—					
8 - 4	5	178.4	178.0	0.4	0.8	0.8	
4 - 2	9	179.4		1.0	2.0	2.8	
2 - 1	16	180.4		1.0	2.0	4.8	
1 - 0.5	32	187.3		6.9	13.8	18.6	
0.5 - 0.25	60	204.4		17.1	34.2	52.8	
0.25 - 0.125	115	220.8		16.4	32.8	85.6	
.125-0.0625	250	225.4		4.6	9.2	94.8	
PAN		225.6	2.4	50.2	5.2	100.0	
CUMULATIVE WT.				(2.4 50.0			
SIEVE LOSS							
TOTAL							

TEST HOLE # 60-B47 DATE 3-11-49

SAMPLE DEPTH 25-30 TEST BY [illegible]

		TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE				50.0			
ACID INSOLUBLE							
ACID SOLUBLE							
WET WASH RESIDUE (250 MESH)		225.6	178.	47.6			
THROUGH (250 MESH)		178.0		2.4			
RO TAP TIME 10 WT. OF SAMPLE 476							
SIEVE OPENING IN MM	MESH						
OVER 8	2.5	179.6	178.0	1.6	3.2	3.2	
8 - 4	5	181.6		2.0	4.0	7.2	
4 - 2	9	181.8		0.2	0.4	7.6	
2 - 1	16	182.3		0.5	1.0	8.6	
1 - 0.5	32	187.9		5.6	11.2	19.8	
0.5 - 0.25	60	209.0	16.0	16.1	32.0	51.8	
0.25 - 0.125	115	219.4		15.4	30.8	82.6	
.125-0.0625	250	224.9		5.5	11.0	93.6	
PAN		225.7	3.2	0.8	6.4	100.0	
CUMULATIVE WT.				3.4			
SIEVE LOSS +0.1				50.1			
TOTAL							

+ 1 pebble

TEST HOLE # 60-B-47 DATE 3-11-99

SAMPLE DEPTH 30-34.5 TEST BY 9940

	TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE			50.0			
ACID INSOLUBLE						
ACID SOLUBLE						
WET WASH RESIDUE (250 MESH)	202.5	178.0	24.5			
THROUGH (250 MESH)	178.0		25.5			

RO TAP TIME 10

WT. OF SAMPLE 24.5

SIEVE OPENING IN MM	MESH						
OVER 8	2.5	—					
8 - 4	5	—					
4 - 2	9	178.05	178.0	0.05	.10	.10	
2 - 1	16	178.4		0.35	.70	.80	
1 - 0.5	32	179.5		1.1	2.2	3.00	
0.5 - 0.25	60	182.7		3.2	6.4	9.40	
0.25 - 0.125	115	189.8		7.1	14.2	23.60	
.125-0.0625	250	200.0	10.1	10.2	20.2	43.80	
PAN		202.8	28.1	2.8	56.2	100.00	
CUMULATIVE WT.			25.5				
SIEVE LOSS	+0.3		50.30				
TOTAL							

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 60-B-47 DATE: 3-12-49

SAMPLE DEPTH: 34.5-41 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	—	1780			
4 - 2	9	—				
2 - 1	16	179.5		1.5		1.5
1 - 0.5	32	193.6		14.1		15.6
0.5 - 0.25	60	231.6		38.0		53.6
0.25 - 0.125	115	265.2		33.6		87.2
.125 - 0.0625	250	276.0		10.8		98.0
Pan		278.0		2.0		100.0
				100.0		
Sieve Loss						

REMARKS: 0

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 60-B-47 DATE: 3-12-49

SAMPLE DEPTH: 41-47 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	178.1	178.0	0.1		0.1
4 - 2	9	178.2		0.1		0.2
2 - 1	16	185.7		7.5		7.7
1 - 0.5	32	212.0		26.3		34.0
0.5 - 0.25	60	249.5		37.5		71.5
0.25 - 0.125	115	269.6		20.1		91.6
.125 - 0.0625	250	276.4		6.8		98.4
Pan		278.0		1.6		100.0
				100.0		

Sieve Loss-------- 0

REMARKS:

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 60-B-47 DATE: 3-12-79

SAMPLE DEPTH: 47-50 TEST MADE BY: DRD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	178.1	178.0	0.1		0.1
4 - 2	9	179.1		1.0		1.1
2 - 1	16	190.2		11.1		12.2
1 - 0.5	32	233.9		43.7		55.9
0.5 - 0.25	60	264.8		30.9		86.8
0.25 - 0.125	115	273.5		8.7		95.5
.125 - 0.0625	250	277.1		3.6		99.1
Pan		278.0		0.9		100.0
				100.0		
Sieve Loss						

REMARKS: 0

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 60-B-47 DATE: 3-12-49

SAMPLE DEPTH: 50-52 TEST MADE BY: DRD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	—				
4 - 2	9	178.5	178.0	0.5		0.5
2 - 1	16	194.2		15.7		16.2
1 - 0.5	32	239.2		40.0	40.1	56.4
0.5 - 0.25	60	266.2		32.0	32.1	88.4
0.25 - 0.125	115	275.8		9.6		98.0
.125 - 0.0625	250	277.5		1.7		99.7
Pan		277.8		0.3		100.0
				100.0		

Sieve Loss ——— ———

REMARKS: -0.2

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 60-B-47 DATE: 3-12-49

SAMPLE DEPTH: 52-55 TEST MADE BY: DRB

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	179.0	178.0	1.0		1.0
4 - 2	9	196.0		17.0		18.0
2 - 1	16	221.8		25.8	25.9	43.9
1 - 0.5	32	247.2		25.4		69.3
0.5 - 0.25	60	268.9		21.7		91.0
0.25 - 0.125	115	275.7		6.8		97.8
.125 - 0.0625	250	277.6		1.9		99.7
Pan		277.9		0.3		100.0
				100.0		

Sieve Loss--------

REMARKS: -0.1

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 60-B-47 DATE: 3-12-49

SAMPLE DEPTH: 55-62.5 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	186.4	178.0	8.4		8.4
4 - 2	9	211.0		24.6		33.0
2 - 1	16	231.4		20.4		53.4
1 - 0.5	32	253.6		22.2		75.6
0.5 - 0.25	60	271.6		18.0		93.6
0.25 - 0.125	115	276.9		5.3		98.9
.125 - 0.0625	250	277.75		.85		99.75
Pan		278.0		.25		100.00
		775		100.00		

Sieve Loss-------- 0

REMARKS:

TEST HOLE # 60-B-47 DATE 3-11-99

SAMPLE DEPTH 62.5-63 TEST BY [illegible]

		TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE		211.9	178.0	33.9			
ACID INSOLUBLE		178.					
ACID SOLUBLE							
WET WASH RESIDUE (250 MESH)		190.5	178.0	12.5			
THROUGH (250 MESH)		178.0		21.4			
RO TAP TIME 10 WT. OF SAMPLE 12.5							
SIEVE OPENING IN MM	MESH						
OVER 8	2.5	—					
8 - 4	5	—					
4 - 2	9	178.6	178.0	.6	1.8	1.8	
2 - 1	16	180.1		1.5	4.4	6.2	
1 - 0.5	32	181.6		1.5	4.4	10.6	15.2
0.5 - 0.25	60	183.1		1.5	4.4	15.0	
0.25 - 0.125	115	184.8		1.7	5.0	20.0	
.125-0.0625	250	189.6		4.8	14.2	34.2	
PAN		198.7	22.35	1.1	65.8	100.0	
CUMULATIVE WT.		89.6		21.4 / 34.1	198.7		
SIEVE LOSS		+0.2					
TOTAL							

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 60-B-47 DATE: 3-12-49

SAMPLE DEPTH: 63-70 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5					
8 - 4	5	194.5	178.0	16.5		16.5
4 - 2	9	220.2		25.7	25.8	42.3
2 - 1	16	244.3		24.1		66.4
1 - 0.5	32	265.7		21.4		87.8
0.5 - 0.25	60	275.3		9.6		97.4
0.25 - 0.125	115	277.4		2.1		99.5
.125 - 0.0625	250	277.8		0.4		99.9
Pan		277.9		0.1		100.0
				100.0		

Sieve Loss--------

REMARKS: -0.1

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 608-47 DATE: 3-12-99

SAMPLE DEPTH: 70-75 TEST MADE BY: DHD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	197.3	178.0	19.3		19.3
4 - 2	9	224.1		31.8		51.1
2 - 1	16	255.1		26.0		77.1
1 - 0.5	32	269.4		14.3		91.4
0.5 - 0.25	60	275.7		6.3		97.7
0.25 - 0.125	115	277.4		1.7		99.4
.125 - 0.0625	250	277.8		0.4		99.8
Pan		278.0		0.2		100.0
				100.0		

Sieve Loss-------- 0

REMARKS:

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 60-B-47 DATE: 3-12-79

SAMPLE DEPTH: 75-80 TEST MADE BY: SHD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %	
Over 8	2.5						
8 - 4	5	190.5	178.0	12.5		12.5	
4 - 2	9	218.8		28.3		40.8	
2 - 1	16	243.6		24.8		65.6	
1 - 0.5	32	263.1		19.5		85.1	
0.5 - 0.25	60	273.7		10.6		95.7	
0.25 - 0.125	115	277.0		3.3		99.0	
.125 - 0.0625	250	277.7		0.7		99.7	
Pan		278.0		0.3		100.0	
		2.7		100.0			

Sieve Loss--------

REMARKS: 0

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 60-B-47 DATE: 3-12-49

SAMPLE DEPTH: 80-85 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—		—		
8 - 4	5	195.6	178.0	17.6		17.6
4 - 2	9	226.9		31.3	31.2	48.8
2 - 1	16	256.9		30.0		78.8
1 - 0.5	32	269.5		12.6		91.4
0.5 - 0.25	60	275.7		6.2		97.6
0.25 - 0.125	115	277.3		1.6		99.2
.125 - 0.0625	250	277.8		0.5		99.7
Pan		278.1		0.3		100.0
				100.0		

Sieve Loss-------- ——— ———

REMARKS: +0.1

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 60-B-47 DATE: 3-12-49

SAMPLE DEPTH: 85-90 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	202.0	178.0	24.0	24.1	24.1
4 - 2	9	232.6		30.6	30.7	54.8
2 - 1	16	255.6		23.0		77.8
1 - 0.5	32	268.8		13.2		91.0
0.5 - 0.25	60	275.3		6.5		97.5
0.25 - 0.125	115	277.0		1.7		99.2
.125 - 0.0625	250	277.5		0.5		99.7
Pan		277.8		0.3		100.0
				100.0		

Sieve Loss -------- -0.2

REMARKS:

(large grain chalk (pink)

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 60-B47 DATE: 3-12-49

SAMPLE DEPTH: 90-95 TEST MADE BY: JPD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	181.6	178.0	3.6		3.6
8 - 4	5	201.7		20.1		23.7
4 - 2	9	220.6		18.9		42.6
2 - 1	16	244.1		23.5	23.4	66.0
1 - 0.5	32	263.2		19.1		85.1
0.5 - 0.25	60	273.8		10.6		95.7
0.25 - 0.125	115	277.1		3.3		99.0
.125 - 0.0625	250	277.7		0.6		99.6
Pan		278.1		0.4		100.0
				100.0		
Sieve Loss--------						

REMARKS: +0.1

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 60-B-47 DATE: 3-12-49

SAMPLE DEPTH: 95-100 TEST MADE BY: ADD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %	
Over 8	2.5	187.6	178.0	9.6		9.6	
8 - 4	5	211.7		24.1		33.7	
4 - 2	9	234.6		22.9	23.0	56.7	
2 - 1	16	257.0		22.4		79.1	
1 - 0.5	32	271.6		14.6		93.7	
0.5 - 0.25	60	276.7		5.1		98.8	
0.25 - 0.125	115	277.6		0.9		99.7	
.125 - 0.0625	250	277.8		0.2		99.9	
Pan		277.9		0.1		100.0	
				100.0			
Sieve Loss							

REMARKS: -0.1

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 60-B-47 DATE: 3-12-49

SAMPLE DEPTH: 100-105 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	182.6	178.0	4.6		4.6
8 - 4	5	190.9		8.3		12.9
4 - 2	9	203.1		12.2		25.1
2 - 1	16	226.5		23.4		48.5
1 - 0.5	32	256.0		29.5		78.0
0.5 - 0.25	60	169.4		13.4		91.4
0.25 - 0.125	115	276.5		7.1		98.5
.125 - 0.0625	250	277.7		1.2		99.7
Pan		298.0		0.3		100.0
				100.0		

Sieve Loss-------- ____ ____

REMARKS:

0

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 60-B-47 DATE: 3-12-49

SAMPLE DEPTH: 105-110 TEST MADE BY: OKD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	182.7	178.0	4.7		4.7
8 - 4	5	203.8		21.1		25.8
4 - 2	9	223.5		19.7		45.5
2 - 1	16	244.0		20.5		66.0
1 - 0.5	32	265.6		21.6		87.6
0.5 - 0.25	60	273.3		7.7		95.3
0.25 - 0.125	115	277.1		3.8		99.1
.125 - 0.0625	250	277.9		0.8		99.9
Pan		278.0		0.1		100.0
				100.0		
Sieve Loss				0		

REMARKS:

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 60-B-47 DATE: 3-12-49

SAMPLE DEPTH: 110-115 TEST MADE BY: OPD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	180.0	178.0	2.0		2.0
8 - 4	5	201.1		21.1		23.1
4 - 2	9	225.1		24.0	23.9	47.0
2 - 1	16	246.5		21.4		68.4
1 - 0.5	32	261.6		15.1		83.5
0.5 - 0.25	60	272.3		10.7		94.2
0.25 - 0.125	115	276.8		4.5		98.7
.125 - 0.0625	250	277.8		1.0		99.7
Pan		278.1		0.3		100.0
				100.0		

Sieve Loss--------

REMARKS: +0.1

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 60-B-47 DATE: 3-12-49

SAMPLE DEPTH: 115-121 TEST MADE BY: ARD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	180.0	178.0	2.0		2.0
8 - 4	5	202.2		22.2		24.2
4 - 2	9	230.2		28.0		52.2
2 - 1	16	250.6		20.4		72.6
1 - 0.5	32	264.5		13.9		86.5
0.5 - 0.25	60	273.3		8.8		95.3
0.25 - 0.125	115	276.7		3.4		98.7
.125 - 0.0625	250	277.8		1.1		99.8
Pan		278.0		0.2		100.0
				100.0		

Sieve Loss-------- 0

REMARKS:

TEST HOLE # 60-B-47 DATE

SAMPLE DEPTH 121-122.5 TEST BY VRD

		TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE				500			
ACID INSOLUBLE							
ACID SOLUBLE							
WET WASH RESIDUE (250 MESH)		195.1	178.0	17.1			
THROUGH (250 MESH)		78.0		32.9			
RO TAP TIME 10 WT. OF SAMPLE 17.1							
SIEVE OPENING IN MM	MESH						
OVER 8	2.5	—					
8 - 4	5	178.1	178.0	0.1	0.2	0.2	
4 - 2	9	179.4		1.3	2.6	2.8	
2 - 1	16	181.3		1.9	3.8	6.6	
1 - 0.5	32	184.0		2.7	5.4	12.0	
0.5 - 0.25	60	187.4		3.4	6.8	18.8	
0.25 - 0.125	115	191.1		3.7	7.4	26.2	
.125-0.0625	250	194.6		3.5	7.0	33.2	
PAN		195.1	33.45	0.5	66.8	100.0	
CUMULATIVE WT.				32.9 50.0			
SIEVE LOSS	0						
TOTAL							

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 60-B-47 DATE: 3-12-49

SAMPLE DEPTH: 122.5-125 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5					
8 - 4	5	182.7	178.0	4.7		4.7
4 - 2	9	210.8		28.1		32.8
2 - 1	16	240.6		29.8		62.6
1 - 0.5	32	260.8		20.2		82.8
0.5 - 0.25	60	272.2		11.4		94.2
0.25 - 0.125	115	276.7		4.5		98.7
.125 - 0.0625	250	277.6		0.9		99.6
Pan		278.0		0.4		100.0
				100.0		

Sieve Loss-------- 0

REMARKS:

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 60-B-47 DATE: 3-12-49

SAMPLE DEPTH: 125-130 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—		—		
8 - 4	5	186.4	178.0	8.4		8.4
4 - 2	9	214.2		27.8		36.2
2 - 1	16	241.1		26.9		63.1
1 - 0.5	32	262.6		21.5		84.6
0.5 - 0.25	60	273.0		10.4		95.0
0.25 - 0.125	115	276.9		3.9		98.9
.125 - 0.0625	250	277.7		0.8		99.7
Pan		278.0		0.3		100.0
				100.0		

Sieve Loss-------- ———

REMARKS: 0

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 60-B-47 DATE: 3-12-49

SAMPLE DEPTH: 130-135 TEST MADE BY: W.H.D.

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—		5		
8 - 4	5	187.7	178.0	9.7		9.7
4 - 2	9	214.5		26.8		36.5
2 - 1	16	243.2		28.7		65.2
1 - 0.5	32	264.1		20.9		86.1
0.5 - 0.25	60	274.2		10.1		96.2
0.25 - 0.125	115	277.1		2.9		99.1
.125 - 0.0625	250	277.8		0.7		99.8
Pan		278.0		0.2		100.0
				100.0		

Sieve Loss -------- 0

REMARKS:

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 60-B-47 DATE: 3-12-49

SAMPLE DEPTH: 135-140 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5					
8 - 4	5	185.4	178.0	7.4		7.4
4 - 2	9	216.2		30.8	30.9	38.3
2 - 1	16	243.8		27.6		65.9
1 - 0.5	32	263.7		19.9		85.8
0.5 - 0.25	60	273.5		9.8		95.6
0.25 - 0.125	115	277.0		3.5		99.1
.125 - 0.0625	250	277.65		.65		99.75
Pan		277.9		.25		100.00
				100.0		

Sieve Loss--------

REMARKS: -0.1

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 60-B-47 DATE: 3-12-49

SAMPLE DEPTH: 140-147.5 TEST MADE BY: JHO

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	190.8	178.0	12.9		12.8
4 - 2	9	222.5		31.7		44.5
2 - 1	16	254.4		31.9		76.4
1 - 0.5	32	268.9		14.5		90.9
0.5 - 0.25	60	274.6		5.7		96.6
0.25 - 0.125	115	277.0		2.4		99.0
.125 - 0.0625	250	277.7		0.7		99.7
Pan		278.0		0.3		100.0
				100.0		

Sieve Loss--------

REMARKS: 0

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 61-B-47 DATE: 3-16-49

SAMPLE DEPTH: 5-6 TEST MADE BY: DRR

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	179.5	178.0	1.5		1.5
8 - 4	5	187.1		7.6		9.1
4 - 2	9	210.5		23.4	23.5	32.6
2 - 1	16	232.0		21.5	21.6	54.2
1 - 0.5	32	240.0		8.0		62.2
0.5 - 0.25	60	265.8		25.8		88.0
0.25 - 0.125	115	274.9		9.1		97.1
.125 - 0.0625	250	277.1		2.2		99.3
Pan		277.8		0.7		100.0
				100.0		

Sieve Loss--------

REMARKS: -0.2

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 61-B-47 DATE: 3-16-99

SAMPLE DEPTH: 6-10 TEST MADE BY: SHD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	183.9	178.0	5.9		5.9
8 - 4	5	202.6		18.7		24.6
4 - 2	9	226.4		23.8	23.7	48.3
2 - 1	16	251.0		24.6	24.4	72.7
1 - 0.5	32	266.6		15.6		88.3
0.5 - 0.25	60	274.2		7.6		95.9
0.25 - 0.125	115	277.6		3.4		99.3
.125 - 0.0625	250	278.1		0.5		99.8
Pan		278.3		0.2		100.0
				100.0		
Sieve Loss				+0.3		

REMARKS:

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 61-B-47 DATE: 3-16-49

SAMPLE DEPTH: 10-15 TEST MADE BY: SHD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	187.5	178.0	9.5		9.5
8 - 4	5	199.3		11.8		21.3
4 - 2	9	220.3		21.0		42.3
2 - 1	16	246.0		25.7	25.8	68.1
1 - 0.5	32	268.0		22.0		90.1
0.5 - 0.25	60	275.9		7.9		98.0
0.25 - 0.125	115	277.3		1.4		99.4
.125 - 0.0625	250	277.7		0.4		99.8
Pan		277.9		0.2		100.0
				100.0		
Sieve Loss-------						

REMARKS: -0.1

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 61-B-47 DATE: 3-16-49

SAMPLE DEPTH: 15-20 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	180.6	178.0	2.6		2.6
8 - 4	5	194.1		13.5		16.1
4 - 2	9	213.4		19.3		35.4
2 - 1	16	243.2		29.8		65.2
1 - 0.5	32	267.3		24.1		89.3
0.5 - 0.25	60	285.7		8.4		97.7
0.25 - 0.125	115	277.4		1.7		99.4
.125 - 0.0625	250	277.8		0.4		99.8
Pan		278.0 -		0.2		100.0
				100.0		
Sieve Loss------						

REMARKS: 0

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 61-B-47 DATE: 3-16-99

SAMPLE DEPTH: 20-22 TEST MADE BY: DPH

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	195.8	178.0	17.8	17.9	17.9
4 - 2	9	226.8		31.0	31.1	49.0
2 - 1	16	245.6		18.8		67.8
1 - 0.5	32	257.4		11.8		79.6
0.5 - 0.25	60	268.1		10.7		90.3
0.25 - 0.125	115	275.6		7.5		97.8
.125 - 0.0625	250	277.4		1.8		99.6
Pan		277.8		0.4		100.0
				100.0		

Sieve Loss -------- -0.2

REMARKS:

TEST HOLE # 61-R-97 DATE 3-16-99

SAMPLE DEPTH 22-24 TEST BY [illegible]

	TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE			50.0			
ACID INSOLUBLE						
ACID SOLUBLE						
WET WASH RESIDUE (250 MESH)	199.5	178.0	21.5			
THROUGH (250 MESH)	178.0		28.5			
RO TAP TIME 10						
WT. OF SAMPLE 215						

SIEVE OPENING IN MM	MESH						
OVER 8	2.5	—					
8 - 4	5	* —					
4 - 2	9	* —					
2 - 1	16	* 178.9	178.0	0.9	1.8	1.8	
1 - 0.5	32	180.2		1.3	2.6	4.4	
0.5 - 0.25	60	183.2		3.0	6.0	10.4	
0.25 - 0.125	115	187.8		4.6	9.2	19.6	
.125-0.0625	250	197.3		9.5	19.0	38.6	
PAN		199.5	30.7	2.2	6.4	100.0	
CUMULATIVE WT.		73		28.5			
SIEVE LOSS				50.0			
TOTAL							

* some removed

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 61-B-47 DATE: 3-16-49

SAMPLE DEPTH: 24-28 TEST MADE BY: GHD

WT. OF TEST SAMPLE: 99.8 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	179.2	178.0	1.2		1.2
8 - 4	5	181.6		2.4		3.6
4 - 2	9	187.5		5.9		9.5
2 - 1	16	210.6		23.1	23.2	32.7
1 - 0.5	32	250.4		39.8	39.9	72.6
0.5 - 0.25	60	269.3		18.9		91.5
0.25 - 0.125	115	274.3		5.0		96.5
.125 - 0.0625	250	276.6		2.3		98.8
Pan		277.8		1.2		100.0
				99.8		
Sieve Loss--------						

REMARKS: 0

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 61-B-47 DATE: 3-16-99

SAMPLE DEPTH: 28-35 TEST MADE BY: DKD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	200.6	178.0		22.6	22.7
8 - 4	5	216.0			15.4	38.1
4 - 2	9	229.6			13.6	51.7
2 - 1	16	243.5			13.9	65.6
1 - 0.5	32	260.2			16.7	82.3
0.5 - 0.25	60	271.1			10.9	93.2
0.25 - 0.125	115	276.2			5.1	98.3
.125 - 0.0625	250	277.7			1.5	99.8
Pan		277.9			0.2	100.0
					99.9	
Sieve Loss--------					-0.1	

REMARKS:

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 61-B-47 DATE: 3-16-49

SAMPLE DEPTH: 35-40 TEST MADE BY: GLD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	192.9	178.0	14.9		14.9
8 - 4	5	205.0		12.1		27.0
4 - 2	9	217.3		12.3		39.3
2 - 1	16	234.2		16.9	16	56.2
1 - 0.5	32	255.8		21.6	21.5	77.7
0.5 - 0.25	60	269.7		13.9		91.6
0.25 - 0.125	115	275.5		5.8		97.4
.125 - 0.0625	250	277.5		2.0		99.4
Pan		278.1		0.6		100.0
				100.1		

Sieve Loss -------- +0.1

REMARKS: ~~+0#~~ +0.1

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 61-B-47 DATE: 3-16-49

SAMPLE DEPTH: 40-45 TEST MADE BY: DRD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	180.3	178.0	2.3		2.3
8 - 4	5	190.2		9.9		12.2
4 - 2	9	204.4		14.2		26.4
2 - 1	16	225.6		21.2		47.6
1 - 0.5	32	248.5		22.9		70.5
0.5 - 0.25	60	267.4		18.9		89.4
0.25 - 0.125	115	276.2		8.8		98.2
.125 - 0.0625	250	277.7		1.5		99.7
Pan		278.0		0.3		100.0
				100.0		

Sieve Loss-------- 0

REMARKS:

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 61-B-47 DATE: 3-16-49

SAMPLE DEPTH: 45-50 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	181.2	178.0	3.2		3.2
8 - 4	5	187.7		6.5		9.7
4 - 2	9	202.4		14.7		24.4
2 - 1	16	228.5		26.1	26.0	50.4
1 - 0.5	32	253.0		24.5	24.4	74.8
0.5 - 0.25	60	269.5		16.5		91.3
0.25 - 0.125	115	276.7		7.2		98.5
.125 - 0.0625	250	278.0		1.3		99.8
Pan		278.2		0.2		100.0
				100.2		

Sieve Loss--------

REMARKS: +0.2

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 61-B-47 DATE: 3-16-49

SAMPLE DEPTH: 50-56 TEST MADE BY: DHD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	195.8	178.0	17.8		17.8
4 - 2	9	221.3		25.5		43.3
2 - 1	16	243.8		22.5		65.8
1 - 0.5	32	262.8		19.0		84.8
0.5 - 0.25	60	272.8		10.0		94.8
0.25 - 0.125	115	277.1		4.3		99.1
.125 - 0.0625	250	277.7		0.6		99.7
Pan		278.0		0.3		100.0
				100.0		

Sieve Loss-------- —

REMARKS: 0

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 61-B-49 DATE: 3-16-49

SAMPLE DEPTH: 56-60 TEST MADE BY: DKD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	181.6	178.0	3.6		3.6
8 - 4	5	208.8		27.2		30.8
4 - 2	9	242.7		33.9		64.7
2 - 1	16	261.8		19.1		83.8
1 - 0.5	32	270.3		8.5		92.3
0.5 - 0.25	60	273.4		3.1		95.4
0.25 - 0.125	115	274.6		1.2		96.6
.125 - 0.0625	250	275.6		1.0		97.6
Pan		278.0		3.4		100.0
				100.0		

Sieve Loss--------

REMARKS:

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 61-B-47 DATE: 3-16-49

SAMPLE DEPTH: 60-65 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—		[illegible]		
8 - 4	5	193.8	178.0	15.8		15.8
4 - 2	9	223.8		30.0		45.8
2 - 1	16	247.8		24.0		69.8
1 - 0.5	32	264.1		16.3		86.1
0.5 - 0.25	60	273.4		9.3		95.4
0.25 - 0.125	115	276.8		3.4		98.8
.125 - 0.0625	250	277.6		0.8		99.6
Pan		278.0		0.4		100.0
				100.0		

Sieve Loss-------- 0

REMARKS:

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 61-B-47 DATE: 3-16-49

SAMPLE DEPTH: 65-70 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	181.0	178.0	3.0		3.0
8 - 4	5	209.1		28.1		31.1
4 - 2	9	241.5		32.4	32.5	63.6
2 - 1	16	261.0		19.5		83.1
1 - 0.5	32	271.8		10.8		93.9
0.5 - 0.25	60	276.3		4.5		98.4
0.25 - 0.125	115	277.5		1.2		99.6
.125 - 0.0625	250	277.7		0.2		99.8
Pan		277.9		0.2		100.0
				99.9		
			Sieve Loss--------			

REMARKS: -0.1

Rerun May 16 '49

2061

2.5	1.83
5	32.53
9	62.63
16	80.95
32	92.16
60	97.57
115	99.42
250	99.76
Pan	99.91

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 61-B-47 DATE: 8-16-99

SAMPLE DEPTH: 70-75 TEST MADE BY: ORD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	193.3	178.0	15.3		15.3
4 - 2	9	224.5		31.2	31.3	46.6
2 - 1	16	250.0		25.5		72.1
1 - 0.5	32	267.0		17.0		89.1
0.5 - 0.25	60	275.2		8.2		97.3
0.25 - 0.125	115	277.3		2.1		99.4
.125 - 0.0625	250	277.7		0.4		99.8
Pan		277.9		0.2		100.0
				99.9		
Sieve Loss--------				-0.1		

REMARKS:

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 61-B-47 DATE: 3-16-99

SAMPLE DEPTH: 75-80 TEST MADE BY: DRD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	179.7	178.0	1.7		1.7
8 - 4	5	193.2		13.5		15.2
4 - 2	9	225.9		32.7	32.8	48.0
2 - 1	16	251.3		25.4		73.4
1 - 0.5	32	267.7		16.4		89.8
0.5 - 0.25	60	275.3		7.6		97.4
0.25 - 0.125	115	277.4		2.1		99.5
.125 - 0.0625	250	277.6		0.2		99.7
Pan		277.9		0.3		100.0
				79.9		

Sieve Loss -------- -0.1

REMARKS:

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 80-85 DATE: 3-16-99

SAMPLE DEPTH: 61-8-47 TEST MADE BY: OHD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	181.6	178.0	3.6		3.6
8 - 4	5	197.1		15.5		19.1
4 - 2	9	223.3		26.2		45.3
2 - 1	16	245.9		22.6		67.9
1 - 0.5	32	263.8		17.9		85.8
0.5 - 0.25	60	274.3		10.5		96.3
0.25 - 0.125	115	277.2		2.9		99.2
.125 - 0.0625	250	277.8		0.6		99.8
Pan		278.0		0.2		100.0
				100.0		

Sieve Loss-------- 0

REMARKS:

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 61-B-47 DATE: 3-16-49

SAMPLE DEPTH: 85-90 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	181.7	178.0	3.7		3.7
8 - 4	5	194.1		12.4		16.1
4 - 2	9	216.8		22.7		38.8
2 - 1	16	239.7		22.9		61.7
1 - 0.5	32	260.5		20.8		82.5
0.5 - 0.25	60	273.4		12.9		95.4
0.25 - 0.125	115	277.1		3.7		99.1
.125 - 0.0625	250	277.8		0.7		99.8
Pan		278.0		0.2		100.0
				100.0		
Sieve Loss--------→						

REMARKS: 0

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 61-B-47 DATE: 3-16-49

SAMPLE DEPTH: 90-95 TEST MADE BY: DDS

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	183.0	178.0	5.0		5.0
8 - 4	5	205.9		22.9		27.9
4 - 2	9	226.1		20.2		48.1
2 - 1	16	242.3		16.2		64.3
1 - 0.5	32	260.7		18.4		82.7
0.5 - 0.25	60	273.3		12.6		95.3
0.25 - 0.125	115	277.2		3.9		99.2
.125 - 0.0625	250	277.7		0.5		99.7
Pan		278.0		0.3		100.0
				100.0		

Sieve Loss -------- = ____

REMARKS: 0

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 61-B-47 DATE: 3-16-49

SAMPLE DEPTH: 95-100 TEST MADE BY: GRO

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	179.7	178.0	1.7		1.7
8 - 4	5	201.8		22.1	22.2	23.9
4 - 2	9	222.6		20.8		44.7
2 - 1	16	237.8		15.2		59.9
1 - 0.5	32	256.1		18.3		78.2
0.5 - 0.25	60	271.3		15.2		93.4
0.25 - 0.125	115	276.7		5.4		98.8
.125 - 0.0625	250	277.8		1.1		99.9
Pan		277.9		0.1		100.0
				99.9		
Sieve Loss--------						

REMARKS: -0.1

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 61-B-47 DATE: 3-16-49

SAMPLE DEPTH: 100-103.5 TEST MADE BY: DHD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	179.3	178.0	1.3		1.3
8 - 4	5	190.9		11.6		12.9
4 - 2	9	204.3		13.4		26.3
2 - 1	16	222.7		18.4		44.7
1 - 0.5	32	250.3		27.6	27.7	72.4
0.5 - 0.25	60	270.1		19.8		92.2
0.25 - 0.125	115	276.2		6.1		98.3
.125 - 0.0625	250	277.6		1.4		99.7
Pan		277.9		0.3		100.0
				99.9		

Sieve Loss -------- -0.1

REMARKS:

TEST HOLE # 62-B-47 DATE 3-14-99

SAMPLE DEPTH 6-6.5 TEST BY [illegible]

	TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE	228.0	178.0	50.0			
ACID INSOLUBLE						
ACID SOLUBLE						
WET WASH RESIDUE (250 MESH)	223.9	178.0	45.9			
THROUGH (250 MESH)	178.0		4.1			
			50.0			
RO TAP TIME 10						
WT. OF SAMPLE 45.9	(??)					
SIEVE OPENING IN MM / MESH						
OVER 8 / 2.5	—					
8 - 4 / 5	181.3	178.0	3.3	6.6		6.6
4 - 2 / 9	194.0		13.7	25.4		32.0
2 - 1 / 16	208.0		14.0	28.0		60.0
1 - 0.5 / 32	215.9		7.7	15.4		25.4
0.5 - 0.25 / 60	220.0		4.3	8.0		84.0
0.25 - 0.125 / 115	222.9		2.9	5.8		89.8
.125-0.0625 / 250	223.7		0.8	1.6		91.4
PAN	223.9	4.3	50.2	8.6		100.0
CUMULATIVE WT.			4.1			
SIEVE LOSS	0		50.0			
TOTAL						

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 62-B-47 DATE: 3-14-49

SAMPLE DEPTH: 6.5-10 TEST MADE BY: DHD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	182.3	178.0	4.3		4.3
4 - 2	9	203.7		21.4		25.7
2 - 1	16	235.9		32.2	32.3	58.0
1 - 0.5	32	261.9		26.0		84.0
0.5 - 0.25	60	273.4		11.5		95.5
0.25 - 0.125	115	277.3		3.9		99.4
.125 - 0.0625	250	277.8		.05		99.9
Pan		277.9		0.1		100.0
				99.9		

Sieve Loss--------

REMARKS: -0.1

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 62-B-47 DATE: 3-14-49

SAMPLE DEPTH: 10-15 TEST MADE BY: GAD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	180.6	178.0	2.6		2.6
8 - 4	5	192.0		11.4		14.0
4 - 2	9	213.3		21.3		35.3
2 - 1	16	236.0		22.7	22.8	58.1
1 - 0.5	32	258.7		22.7		80.8
0.5 - 0.25	60	270.4		11.7		92.5
0.25 - 0.125	115	276.6		6.2		98.7
.125 - 0.0625	250	277.8		1.2		99.9
Pan		277.9		0.1		100.0
				99.9		

Sieve Loss -0.1

REMARKS:

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 62-B-77 DATE: 3-14-49

SAMPLE DEPTH: 15-22 TEST MADE BY: VHD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	178.9	178.0	0.9		0.9
8 - 4	5	193.1		14.2		15.1
4 - 2	9	216.8		23.7	23.8	38.9
2 - 1	16	238.9		23.1		61.0
1 - 0.5	32	259.6		20.7		81.7
0.5 - 0.25	60	271.5		11.9		93.6
0.25 - 0.125	115	276.9		5.4		99.0
.125 - 0.0625	250	277.8		0.9		99.9
Pan		277.9+		0.1		100.0
				99.9		
Sieve Loss						

REMARKS: -0.1

TEST HOLE # 62-B-47 DATE 3-14-79

SAMPLE DEPTH 22-27 TEST BY GAB

		TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE		228.0	178.0	50			
ACID INSOLUBLE							
ACID SOLUBLE							
WET WASH RESIDUE (250 MESH)		206.3	178.0	28.3			
THROUGH (250 MESH)		178.0		21.7			
RO TAP TIME 10 WT. OF SAMPLE 28.3							
SIEVE OPENING IN MM	MESH						
OVER 8	2.5	—					
8 - 4	5	—					
4 - 2	9	178.3	178.0	0.3	0.6	0.6	
2 - 1	16	179.7		1.4	2.8	3.4	
1 - 0.5	32	182.3		3.6	5.2	8.6	
0.5 - 0.25	60	186.1		3.8	7.6	16.2	
0.25 - 0.125	115	194.0		7.9	15.8	32.0	
.125-0.0625	250	203.8		9.8	19.6	51.6	
PAN		206.3	24.25	2.5	48.4	100.0	
CUMULATIVE WT.				(21.7			
SIEVE LOSS				50.0			
TOTAL							

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 62-B-47 DATE: 3-14-49

SAMPLE DEPTH: 27-30 TEST MADE BY: WHD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5					
8 - 4	5	179.1	178.0	1.1		1.1
4 - 2	9	194.6		15.5		16.6
2 - 1	16	217.4		22.8	22.9	39.5
1 - 0.5	32	244.4		27.0	27.1	66.6
0.5 - 0.25	60	264.8		20.4		87.0
0.25 - 0.125	115	274.9		10.1		97.1
.125 - 0.0625	250	277.4		2.5		99.6
Pan		277.8		0.4		100.0
				99.8		

Sieve Loss -0.2

REMARKS:

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 62-B-47 DATE: 3-14-49

SAMPLE DEPTH: 30-35 TEST MADE BY: A.R.D.

WT. OF TEST SAMPLE: 1009.8 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—		—		
8 - 4	5	179.1	178.0	1.1		1.1
4 - 2	9	199.1		20.0		21.1
2 - 1	16	223.9		24.8	24.9	46.0
1 - 0.5	32	249.3		25.4	25.5	71.5
0.5 - 0.25	60	268.4		19.1		90.6
0.25 - 0.125	115	276.1		7.7		98.3
.125 - 0.0625	250	277.5		1.4		99.7
Pan		277.8		0.3		100.0
				99.8		
Sieve Loss--------						

REMARKS: - 0.2

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 62-B-47 DATE: 3-14-49

SAMPLE DEPTH: 35-40 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 100 99.8 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—		—		
8 - 4	5	178.1	178.0	0.1		0.1
4 - 2	9	186.3		8.2		8.3
2 - 1	16	205.6		19.3		27.6
1 - 0.5	32	238.7		33.1	33.2	60.8
0.5 - 0.25	60	263.8		25.1	25.2	86.0
0.25 - 0.125	115	294.7		10.9		96.9
.125 - 0.0625	250	297.4		2.7		99.6
Pan		297.8		0.4		100.0
				99.8		
Sieve Loss-------				—		

REMARKS: -0.2

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 62-B-47 DATE: 3-14-99

SAMPLE DEPTH: 40-44 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 100 99.8 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5					
8 - 4	5			3		
4 - 2	9	184.1	178.0	6.1		6.1
2 - 1	16	200.9		168		22.9
1 - 0.5	32	227.1		26.2	26.3	49.2
0.5 - 0.25	60	254.9		27.8	28.0	77.2
0.25 - 0.125	115	272.4		17.5		94.7
.125 - 0.0625	250	276.9		4.5		99.2
Pan		277.7		0.8		100.0
				99.7		

Sieve Loss--------

REMARKS: -0.3

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 62-B-47 DATE: 3-14-49

SAMPLE DEPTH: 44-50 TEST MADE BY: DRD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	108.7	178.0	0.7		0.7
4 - 2	9	189.4		10.7		11.4
2 - 1	16	221.9		32.5		43.9
1 - 0.5	32	251.9		30.0		73.9
0.5 - 0.25	60	265.7		13.8		87.7
0.25 - 0.125	115	274.4		8.7		96.4
.125 - 0.0625	250	277.5		3.1		99.5
Pan		278.0		0.5		100.0
				100.0		

Sieve Loss-------- 0

REMARKS:

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 62-B-72 DATE: 3-14-49

SAMPLE DEPTH: 50-55 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—		—		
8 - 4	5	182.1	178.0	4.1		4.1
4 - 2	9	206.9		24.8	24.9	29.0
2 - 1	16	235.0		28.1	28.2	57.2
1 - 0.5	32	256.4		21.4		78.6
0.5 - 0.25	60	269.7		13.3		91.9
0.25 - 0.125	115	275.7		6.0		97.9
.125 - 0.0625	250	277.4		1.7		99.6
Pan		277.8		0.4		100.0
				99.8		

Sieve Loss -------- ____ = ____

REMARKS: -0.2

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 62-B-47 DATE: 3-14-79

SAMPLE DEPTH: 55-60 TEST MADE BY: SDD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5					
8 - 4	5	182.2	178.0	4.2		4.2
4 - 2	9	207.9		25.7		29.9
2 - 1	16	237.5		29.6		59.5
1 - 0.5	32	260.2		22.7		82.2
0.5 - 0.25	60	272.4		12.2		94.4
0.25 - 0.125	115	276.7		4.3		98.7
.125 - 0.0625	250	277.8		1.1		99.8
Pan		278.0		0.2		100.0
				100.0		

Sieve Loss--------

REMARKS: 0

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 62-B-47 DATE: 3-14-29

SAMPLE DEPTH: 60-65 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—		3		
8 - 4	5	188.4	178.0	10.4		10.4
4 - 2	9	214.9		26.5	26.4	36.8
2 - 1	16	235.5		20.6		57.4
1 - 0.5	32	254.7		19.2		76.6
0.5 - 0.25	60	270.4		15.7		92.3
0.25 - 0.125	115	276.7		6.3		98.6
.125 - 0.0625	250	277.9		1.2		99.8
Pan		278.1+		0.2		100.0
		77		100.1		
Sieve Loss--------						

REMARKS: +0.1

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 62-B-42 DATE: 3-14-44

SAMPLE DEPTH: 65-70 TEST MADE BY: DHD

WT. OF TEST SAMPLE: 100.2 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	192.6	178.0	15.6		15.6
4 - 2	9	221.9		29.3	29.2	44.8
2 - 1	16	240.2		18.3	18.2	63.0
1 - 0.5	32	258.0		17.8		80.8
0.5 - 0.25	60	271.5		12.5		93.3
0.25 - 0.125	115	277.0		5.5		98.8
.125 - 0.0625	250	278.0		1.0		99.8
Pan		278.2		0.2		100.0
				100.2		
Sieve Loss--------				—		

REMARKS: +.2

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 62-B-47 DATE: 3-14-49

SAMPLE DEPTH: 70-75 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 100.2 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	189.7	178.0	11.7		11.7
4 - 2	9	219.0		29.3	29.2	40.9
2 - 1	16	245.7		26.7	26.6	67.5
1 - 0.5	32	262.2		16.5		84.0
0.5 - 0.25	60	272.0		9.8		93.8
0.25 - 0.125	115	277.1		5.1		98.9
.125 - 0.0625	250	278.0		0.9		99.8
Pan		278.2		0.2		100.0
				100.2		

Sieve Loss--------

REMARKS: +0.2

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 62-B-47 DATE: 3-14-49

SAMPLE DEPTH: 75-80 TEST MADE BY: DHD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	178.6	178.0	0.6		0.6
8 - 4	5	196.7		18.1		18.7
4 - 2	9	226.8		30.1	30.0	48.7
2 - 1	16	253.8		27.0		75.7
1 - 0.5	32	269.4		15.6		91.3
0.5 - 0.25	60	275.7		6.3		97.6
0.25 - 0.125	115	277.5		1.8		99.4
.125 - 0.0625	250	278.0		0.5		99.9
Pan		278.1		0.1		100.0
				100.1		

Sieve Loss--------

REMARKS: +0.1

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 62-B-77 DATE: 3-14-99

SAMPLE DEPTH: 80-85 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	178.7	170.0	0.7		0.7
8 - 4	5	192.6		13.9		14.6
4 - 2	9	223.4		30.8		45.4
2 - 1	16	254.3		30.9	31.0	76.4
1 - 0.5	32	268.0		13.7		90.1
0.5 - 0.25	60	274.5		6.5		96.6
0.25 - 0.125	115	277.0		2.5		99.1
.125 - 0.0625	250	277.7		0.7		99.8
Pan		277.9		0.2		100.0
				99.9		
Sieve Loss--------						

REMARKS: -0.1

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 62-B-47 DATE: 3-14-99

SAMPLE DEPTH: 85-90 TEST MADE BY: AKD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—		—		
8 - 4	5	189.5	178.0	11.5		11.5
4 - 2	9	214.7		25.2		36.7
2 - 1	16	247.0		32.3	32.4	69.1
1 - 0.5	32	265.3		18.3		87.4
0.5 - 0.25	60	273.6		8.3		95.7
0.25 - 0.125	115	277.1		3.5		99.2
.125 - 0.0625	250	277.8		0.7		99.9
Pan		277.9		0.1		100.0
				99.9		

Sieve Loss -------- — —

REMARKS: -0.1

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 62-B-77 DATE: 3-14-77

SAMPLE DEPTH: 90-95 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5					
8 - 4	5	188.7	178.0	10.7		10.7
4 - 2	9	215.1		26.4	26.5	37.2
2 - 1	16	239.1		22.0	22.1	59.3
1 - 0.5	32	253.5		16.4		75.7
0.5 - 0.25	60	266.7		13.2		88.9
0.25 - 0.125	115	274.5		7.8		96.7
.125 - 0.0625	250	277.5		3.0		99.7
Pan		277.8		0.3		100.0
				99.8		
Sieve Loss--------						

REMARKS: -0.2

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 62-B-47 DATE: 3-14-99

SAMPLE DEPTH: 95-100 TEST MADE BY: AKD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—		4		
8 - 4	5	189.9	178.0	11.9		11.9
4 - 2	9	219.2		29.3	29.2	41.1
2 - 1	16	243.8		24.6		65.7
1 - 0.5	32	260.4		16.6		82.3
0.5 - 0.25	60	271.2		10.8		93.1
0.25 - 0.125	115	276.8		5.6		98.7
.125 - 0.0625	250	277.8		1.0		99.7
Pan		278.1		0.3		100.0
				100.1		
Sieve Loss--------						

REMARKS: +0.1

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 62-B-72 DATE: 3-14-72

SAMPLE DEPTH: 100-103.5 TEST MADE BY: DKD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—		2.3		
8 - 4	5	189.6	178.0	11.6		11.6
4 - 2	9	208.4		18.8		30.4
2 - 1	16	240.5		32.1		62.5
1 - 0.5	32	263.1		22.6		85.1
0.5 - 0.25	60	273.1		10.0		95.1
0.25 - 0.125	115	276.5		3.4		98.5
.125 - 0.0625	250	277.6		1.1		99.6
Pan		278.0		0.4		100.0
				100.0		

Sieve Loss-------- 0

REMARKS:

TEST HOLE # 63-B-47 DATE _____

SAMPLE DEPTH 2.5-3.5 TEST BY _____

		TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE							
ACID INSOLUBLE							
ACID SOLUBLE							
WET WASH RESIDUE (250 MESH)							
THROUGH (250 MESH)							
RO TAP TIME _____ WT. OF SAMPLE _____							
SIEVE OPENING IN MM	MESH						
OVER 8	2.5						
8 - 4	5						
4 - 2	9						
2 - 1	16						
1 - 0.5	32						
0.5 - 0.25	60						
0.25 - 0.125	115						
.125-0.0625	250						
PAN							
CUMULATIVE WT.							
SIEVE LOSS							
TOTAL							

TEST HOLE # 63-B-47 DATE 3-16-49

SAMPLE DEPTH 3.5-4 TEST BY [illegible]

		TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE				50.0			
ACID INSOLUBLE							
ACID SOLUBLE							
WET WASH RESIDUE (250 MESH)		199.4	178.0	21.4			
THROUGH (250 MESH)		178.0		28.6			
RO TAP TIME 10							
WT. OF SAMPLE 21.4							
SIEVE OPENING IN MM	MESH						
OVER 8	2.5	—					
8 - 4	5	—					
4 - 2	9	178.3	178.0	0.3		0.3	0.6
2 - 1	16	179.0		0.7		1.0	2.0
1 - 0.5	32	180.5		1.5		2.5	5.0
0.5 - 0.25	60	183.5		3.0		5.5	11.0
0.25 - 0.125	115	188.5		5.0		10.5	21.0
.125-0.0625	250	196.4		7.9		18.4	36.8
PAN		199.6	31.6	3.2		30.0	100.0
CUMULATIVE WT.				28.6 / 30.2			
SIEVE LOSS +0.2							
TOTAL							

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 63-B-47 DATE: 3-16-49

SAMPLE DEPTH: 4-5.5 TEST MADE BY: DHD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	178.4	178.0	0.4		0.4
4 - 2	9	185.6		7.2		7.6
2 - 1	16	208.1		22.5		30.1
1 - 0.5	32	244.8		36.7		66.8
0.5 - 0.25	60	273.0		28.2		95.0
0.25 - 0.125	115	277.6		4.6		99.6
.125 - 0.0625	250	277.9		0.3		99.9
Pan		278.0		0.1		100.0
				100.0		

Sieve Loss--------

REMARKS:

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 63-B-47 DATE: 3-16-49

SAMPLE DEPTH: 5.5-10 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—		—		
8 - 4	5	179.4	178.0	1.4		1.4
4 - 2	9	194.4		15.0		16.4
2 - 1	16	228.7		34.3		50.7
1 - 0.5	32	259.1		30.4		81.1
0.5 - 0.25	60	273.4		14.3		95.4
0.25 - 0.125	115	276.5		3.1		98.5
.125 - 0.0625	250	277.6		1.1		99.6
Pan		278.0		0.4		100.0
				100.0		

Sieve Loss-------- 0

REMARKS:

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 63-B-47 DATE: 3-16-49

SAMPLE DEPTH: 10-15 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—		—		
8 - 4	5	192.4	178.0	14.4		14.4
4 - 2	9	223.8		31.4	31.35	45.75
2 - 1	16	250.3		26.5		72.25
1 - 0.5	32	268.3		18.0		90.25
0.5 - 0.25	60	275.5		7.2		97.45
0.25 - 0.125	115	277.8		2.3		99.75
.125 - 0.0625	250	278.0		0.2		99.95
Pan		278.05		0.05		100.00
				100.05		

Sieve Loss--------

REMARKS: +0.05

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 63-B-47 DATE: 3-16-49

SAMPLE DEPTH: 15-20 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	192.9	178.0	14.9		14.9
4 - 2	9	222.0		29.1		44.0
2 - 1	16	248.9		26.9	27.05	71.05
1 - 0.5	32	266.4		17.5		88.55
0.5 - 0.25	60	274.5		8.1		96.65
0.25 - 0.125	115	277.5		3.0		99.65
.125 - 0.0625	250	277.8		0.3		99.95
Pan		277.85		0.05		100.00
				99.85		
Sieve Loss--------						

REMARKS: -0.15

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 63-B-47 DATE: 3-16-49

SAMPLE DEPTH: 20-25 TEST MADE BY: GHD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	195.7	178.0	17.7		17.7
4 - 2	9	222.3		26.6	26.55	44.25
2 - 1	16	249.7		27.4		71.65
1 - 0.5	32	268.1		18.4		90.05
0.5 - 0.25	60	275.3		7.2		97.25
0.25 - 0.125	115	277.8		2.5		99.75
.125 - 0.0625	250	278.0		0.2		99.95
Pan		278.05		005		100.00
				100.00		

Sieve Loss-------

REMARKS: +0.05

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 63-B-47 DATE: 3-16-99

SAMPLE DEPTH: 25-30 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	183.4	178.0	5.4		5.4
8 - 4	5	208.3		30.3		35.7
4 - 2	9	229.1		25.4		51.1
2 - 1	16	254.1		25.0		76.1
1 - 0.5	32	278.7		16.6		92.7
0.5 - 0.25	60	276.5		5.8		98.5
0.25 - 0.125	115	277.75		1.25		99.75
.125 - 0.0625	250	277.9		0.15		99.90
Pan		278.0		0.1		100.0
				100.00		

Sieve Loss--------

REMARKS: 0

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 63-B-47 DATE: 3-16-99

SAMPLE DEPTH: 30-35 TEST MADE BY: GAD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	182.6	178.0	4.6		4.6
8 - 4	5	198.3		15.7		20.3
4 - 2	9	228.6		30.3		50.6
2 - 1	16	256.2		27.6		78.2
1 - 0.5	32	271.1		14.9		93.1
0.5 - 0.25	60	276.5		5.4		98.5
0.25 - 0.125	115	277.7		1.2		99.7
.125 - 0.0625	250	277.9		0.2		99.9
Pan		278.0		0.1		100.0
				100.0		
Sieve Loss--------						

REMARKS: 0

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 63-B-47 DATE: 3-16-49

SAMPLE DEPTH: 35-40 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	180.5	178.0	2.5		2.5
8 - 4	5	194.6		14.1		16.6
4 - 2	9	229.8		35.2		51.8
2 - 1	16	258.8		29.0		80.8
1 - 0.5	32	272.4		13.6		94.4
0.5 - 0.25	60	276.6		4.2		98.6
0.25 - 0.125	115	277.7		1.1		99.7
.125 - 0.0625	250	278.85		0.15		99.85
Pan		278.0		0.15		100
				100.00		

Sieve Loss--------

REMARKS: 0

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 63-B-47 DATE: 3-16-99

SAMPLE DEPTH: 40-47.5 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	195.8	178.0	17.8		17.8
8 - 4	5	217.7		21.9		39.7
4 - 2	9	242.2		24.5	24.45	64.15
2 - 1	16	260.6		18.4		82.55
1 - 0.5	32	272.5		11.9		94.45
0.5 - 0.25	60	276.9		4.4		98.85
0.25 - 0.125	115	277.9		1.0		99.85
.125 - 0.0625	250	278.0		0.1		99.95
Pan		278.05		0.05		100.00
				100.05		
Sieve Loss--------						

REMARKS: +0.05

TEST HOLE # 64-B-97 DATE _____

SAMPLE DEPTH 4-5 TEST BY _____

		TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE							
ACID INSOLUBLE							
ACID SOLUBLE							
WET WASH RESIDUE (250 MESH)							
THROUGH (250 MESH)							
RO TAP TIME _____ WT. OF SAMPLE _____							
SIEVE OPENING IN MM	MESH						
OVER 8	2.5						
8 - 4	5						
4 - 2	9						
2 - 1	16						
1 - 0.5	32						
0.5 - 0.25	60						
0.25 - 0.125	115						
.125-0.0625	250						
PAN							
CUMULATIVE WT.							
SIEVE LOSS							
TOTAL							

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 64-B-47 DATE: 3-17-49

SAMPLE DEPTH: 5-9 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—		5		
8 - 4	5	185.9	178.0	7.9		7.9
4 - 2	9	203.0		17.1		25.0
2 - 1	16	233.3		30.3		55.3
1 - 0.5	32	257.5		24.2		79.5
0.5 - 0.25	60	272.9		15.4		94.9
0.25 - 0.125	115	277.1		4.2		99.1
.125 - 0.0625	250	277.6		0.5		99.6
Pan		2780		0.4		100.0
				100.0		

Sieve Loss-------- 0

REMARKS:

TEST HOLE # 64-B-47 DATE 3-17-49

SAMPLE DEPTH 9-10 TEST BY DKD

		TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE				50.0			
ACID INSOLUBLE							
ACID SOLUBLE							
WET WASH RESIDUE (250 MESH)		189.7	178.0	11.7			
THROUGH (250 MESH)		178.0		38.3			
RO TAP TIME 10 WT. OF SAMPLE 11.7							
SIEVE OPENING IN MM	MESH						
OVER 8	2.5	~~~					
8 - 4	5	*					
4 - 2	9	*					
2 - 1	16	186.0	178.0	2.0	4.0	4.0	
1 - 0.5	32	183.1		3.1	6.2	10.2	
0.5 - 0.25	60	185.9		2.8	5.6	15.8	
0.25 - 0.125	115	187.7		1.8	3.6	19.4	
.125-0.0625	250	189.2		1.5	3.0	22.4	
PAN		189.7	38.8	0.5	77.6	100.0	
CUMULATIVE WT.				38.3 50.0			
SIEVE LOSS							
TOTAL							

* Removed.

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 64-B-47 DATE: 3-17-49

SAMPLE DEPTH: 10-15 TEST MADE BY: SRD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	182.1	178.0	4.1		4.1
8 - 4	5	195.0		12.9		17.0
4 - 2	9	220.2		25.2	25.4	42.4
2 - 1	16	244.8		24.6	24.7	67.1
1 - 0.5	32	263.8		19.0		86.1
0.5 - 0.25	60	273.0		9.2		95.3
0.25 - 0.125	115	276.8		3.8		99.1
.125 - 0.0625	250	277.2		0.4		99.5
Pan		277.7		0.5		100.0
				99.7		
Sieve Loss--------						

REMARKS: - 0.3

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 64-B-47 DATE: 3-17-49

SAMPLE DEPTH: 15-20 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	187.4	178.0	9.4		9.4
8 - 4	5	213.5		26.1	26.3	35.7
4 - 2	9	238.9		25.4	25.5	61.2
2 - 1	16	255.0		16.1		77.3
1 - 0.5	32	267.5		12.5		89.8
0.5 - 0.25	60	273.4		5.9		95.7
0.25 - 0.125	115	276.8		3.4		99.1
.125 - 0.0625	250	277.5		0.7		99.8
Pan		277.7		0.2		100.0
				99.7		

Sieve Loss-------- ——— ———

REMARKS: -0.3

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 64-B-42 DATE: 3-17-49

SAMPLE DEPTH: 20-25 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	185.7	178.0	7.7		7.7
8 - 4	5	211.6		25.9	25.8	33.5
4 - 2	9	237.6		26.0	25.9	59.4
2 - 1	16	256.0		18.4		77.8
1 - 0.5	32	269.7		13.7		91.5
0.5 - 0.25	60	276.2		6.5		98.0
0.25 - 0.125	115	277.5		1.3		99.3
.125 - 0.0625	250	277.8		0.3		99.6
Pan		278.2		.04		100.0
				100.2		
Sieve Loss						

REMARKS: +0.2

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 64-B-47 DATE: 3-17-99

SAMPLE DEPTH: 25-30 TEST MADE BY: DAB

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	185.0	178.0	7.0		7.0
8 - 4	5	210.8		25.8	25.9	32.9
4 - 2	9	236.2		25.4		58.3
2 - 1	16	254.7		18.5		76.8
1 - 0.5	32	268.2		13.5		90.3
0.5 - 0.25	60	275.7		7.5		97.8
0.25 - 0.125	115	277.5		1.8		99.6
.125 - 0.0625	250	277.8		0.3		99.9
Pan		277.9		0.1		100.0
				99.9		

Sieve Loss -0.1

REMARKS:

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 64-B-47 DATE: 3-17-49

SAMPLE DEPTH: 30-35 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	183.2	178.0	5.2		5.2
8 - 4	5	192.2		9.0		14.2
4 - 2	9	214.0		21.8		36.0
2 - 1	16	243.8		29.8	29.7	65.7
1 - 0.5	32	265.9		22.1		87.8
0.5 - 0.25	60	275.5		9.6		97.4
0.25 - 0.125	115	277.6		2.1		99.5
.125 - 0.0625	250	277.9		0.3		99.8
Pan		278.1		0.2		100.0
				100.1		

Sieve Loss-------

REMARKS: +0.1

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 64-B-47 DATE: 3-17-49

SAMPLE DEPTH: 35-40 TEST MADE BY: DKD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	184.2	178.0	6.2		6.2
8 - 4	5	197.7		13.5		19.7
4 - 2	9	218.2		20.5		40.2
2 - 1	16	244.5		26.3		66.5
1 - 0.5	32	265.5		21.0		87.5
0.5 - 0.25	60	275.3		9.8		97.3
0.25 - 0.125	115	277.5		2.2		99.5
.125 - 0.0625	250	277.9		0.4		99.9
Pan		278.0		0.1		100.0
				100.0		

Sieve Loss-------- 0

REMARKS:

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 64-B-47 DATE: 3-17-49

SAMPLE DEPTH: 40-45 TEST MADE BY: DKD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	193.3	178.0	15.3		15.3
8 - 4	5	220.3		27.0		42.3
4 - 2	9	240.8		20.5		62.8
2 - 1	16	259.1		18.3		81.1
1 - 0.5	32	271.7		12.6		93.7
0.5 - 0.25	60	276.7		5.0		98.7
0.25 - 0.125	115	277.7		1.0		99.7
.125 - 0.0625	250	277.9		0.2		99.9
Pan		278.0		0.1		100.0
				100.0		

Sieve Loss ------- 0

REMARKS:

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 4+B-47 DATE: 3-17-49

SAMPLE DEPTH: 45-50 TEST MADE BY: RKD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	193.5	178.0	15.5		15.5
8 - 4	5	213.2		19.7	19.8	35.3
4 - 2	9	233.3		20.1	20.3	55.6
2 - 1	16	251.7		18.4		74.0
1 - 0.5	32	266.5		14.8		88.8
0.5 - 0.25	60	274.6		8.1		96.9
0.25 - 0.125	115	277.1		2.5		99.4
.125 - 0.0625	250	277.5		0.4		99.8
Pan		277.7		0.2		100.0
				99.7		

Sieve Loss--------

REMARKS: -0.3

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 64-B-47 DATE: 3-17-49

SAMPLE DEPTH: 50-55 TEST MADE BY: JRD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	181.9	1780	3.9		3.9
8 - 4	5	203.8		21.9		25.8
4 - 2	9	241.1		37.3	37.4	63.2
2 - 1	16	264.8		23.7		86.9
1 - 0.5	32	273.6		8.8		95.7
0.5 - 0.25	60	276.7		3.1		98.8
0.25 - 0.125	115	277.4		0.7		99.5
.125 - 0.0625	250	277.7		0.3		99.8
Pan		277.9		0.2		100.0
				99.9		

Sieve Loss -0.1

REMARKS:

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 64-B-47 DATE: 3-17-99

SAMPLE DEPTH: 55-60 TEST MADE BY: HKD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	181.9	178.0	3.9		3.9
8 - 4	5	195.8		13.9		17.8
4 - 2	9	233.1		37.3	37.5	55.3
2 - 1	16	260.5		27.4	27.5	82.8
1 - 0.5	32	272.2		11.7		94.5
0.5 - 0.25	60	276.4		4.2		98.7
0.25 - 0.125	115	277.3		0.9		99.6
.125 - 0.0625	250	277.6		0.3		99.9
Pan		277.7		0.1		100.0
				99.7		

Sieve Loss -0.3

REMARKS:

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 65-B-47 DATE: 3-17-49

SAMPLE DEPTH: 12-16 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 50 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	—				
4 - 2	9	178.1	178.0	0.1	0.2	0.2
2 - 1	16	179.7		1.6	3.2	3.4
1 - 0.5	32	193.7		14.0	28.0	31.4
0.5 - 0.25	60	222.4	28.55	28.7	57.40	88.5
0.25 - 0.125	115	227.9		5.5	11.00	99.5
.125 - 0.0625	250	228.1		0.2	0.4	99.9
Pan		228.15		.05	0.1	100.0
				50.15	100.0	
Sieve Loss--------				.10		

REMARKS: +0.15

28.7
57.9

~~much~~ V. little to no pink

seems to have some dark mineral characteristics all the way down

heavy mineral analysis looks advisable

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: _____ DATE: _____

SAMPLE DEPTH: TEST MADE BY:

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 65-B-47 DATE: 3-17-44

SAMPLE DEPTH: 16-20 TEST MADE BY: BHD

WT. OF TEST SAMPLE: 113 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	179.0	178	1.0	0.9	0.9
4 - 2	9	192.8		13.8	12.2	13.1
2 - 1	16	210.8		18.0	16.0	29.1
1 - 0.5	32	248.2		37.4	33.1	62.2
0.5 - 0.25	60	284.6		36.4	32.2	94.4
0.25 - 0.125	115	289.9		5.3	4.7	99.1
.125 - 0.0625	250	290.4		0.5	0.4	99.5
Pan		291.0		0.6	0.5	100.0
				111.0	100.0	

Sieve Loss--------

REMARKS:

0
291
178
113

V. little to no plastic

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 65-B-47 DATE: 3-17-49

SAMPLE DEPTH: 20-25 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	189.2	178.0	11.2		11.2
4 - 2	9	212.2		23.0		34.2
2 - 1	16	232.5		20.3		54.5
1 - 0.5	32	256.0		23.5		78.0
0.5 - 0.25	60	272.7		16.7		94.7
0.25 - 0.125	115	277.1		4.4		99.1
.125 - 0.0625	250	277.8		0.7		99.8
Pan		278.0		0.2		100.0
				100.0		

Sieve Loss -------- 0

REMARKS:

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 65-B-97 DATE: 3-17-99

SAMPLE DEPTH: 25-30 TEST MADE BY: DRD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	187.8	178.0	9.8		9.8
4 - 2	9	208.8		21.0		30.8
2 - 1	16	224.6		15.8		46.6
1 - 0.5	32	248.2		23.6		70.2
0.5 - 0.25	60	271.5		23.3		93.5
0.25 - 0.125	115	277.1		5.6		99.1
.125 - 0.0625	250	277.8		0.7		99.8
Pan		278.0		0.2		100.0
				100.0		

Sieve Loss-------- —— ——

REMARKS: 0

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 65-B-47 DATE: 3-17-99

SAMPLE DEPTH: 30-35 TEST MADE BY: [illegible]

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	196.9	178.0	18.4		18.4
4 - 2	9	226.0		29.6	29.7	48.1
2 - 1	16	252.0		26.0		74.1
1 - 0.5	32	267.5		15.5		89.6
0.5 - 0.25	60	274.6		7.1		96.7
0.25 - 0.125	115	277.4		2.8		99.5
.125 - 0.0625	250	277.8		0.4		99.9
Pan		277.9		0.1		100.0
				99.9		
Sieve Loss--------						

REMARKS: -0.1

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 65-B-47 DATE: 3-17-99

SAMPLE DEPTH: 35-40 TEST MADE BY: _____

WT. OF TEST SAMPLE: _____ TIME OF SHAKING IN RO-TAP: _____

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	195.5	178.0	17.5		17.5
4 - 2	9	223.0		27.5		45.0
2 - 1	16	248.7		25.7		70.7
1 - 0.5	32	265.8		17.1		87.8
0.5 - 0.25	60	274.8		9.0		96.8
0.25 - 0.125	115	277.5		2.7		99.5
.125 - 0.0625	250	277.9		0.4		99.9
Pan		278.0		0.1		100.0
				100.0		

Sieve Loss-------- 0 _____

REMARKS:

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 65-B-47 DATE: 3-17-49

SAMPLE DEPTH: 40-48.5 TEST MADE BY: DAD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	192.7	178.0	14.7		14.7
8 - 4	5	219.0		26.3	26.4	41.1
4 - 2	9	248.3		29.3	29.4	70.5
2 - 1	16	267.4		19.1		89.6
1 - 0.5	32	275.3		7.9		97.5
0.5 - 0.25	60	277.5		2.2		99.7
0.25 - 0.125	115	277.8		0.3		100.0
.125 - 0.0625	250	0		0.0		0
Pan		0 +		0.0		0
				99.8		
Sieve Loss--------						

REMARKS: -0.2

TEST HOLE # 66-B-47 A_4 DATE 3-24-99

SAMPLE DEPTH 0-2 TEST BY [illegible]

	TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE			50.00			
ACID INSOLUBLE	50.73	2.44	48.29			
ACID SOLUBLE	2.44 / 48.29		1.71			3.42
WET WASH RESIDUE (250 MESH)			1.63			
THROUGH (250 MESH)			46.66			
RO TAP TIME 8						
WT. OF SAMPLE 1.63						
SIEVE OPENING IN MM / MESH						
OVER 8 / 2.5	—					
8 - 4 / 5	—					
4 - 2 / 9	—					
2 - 1 / 16	0.08	0.08		0.2		
1 - 0.5 / 32	0.20	0.12		0.25		
0.5 - 0.25 / 60	0.31	0.11		0.2		
0.25 - 0.125 / 115	0.44	0.13		0.25		
.125-0.0625 / 250	1.41	0.97		2.0		
PAN	1.64	0.23	46.84	97.1		
CUMULATIVE WT.		46.66 / 48.30	97.18 - 100.00			
SIEVE LOSS ± 0.01						
TOTAL						

TEST HOLE # 66-B-47 B 4 DATE 3-24-49

SAMPLE DEPTH 2-3.5 TEST BY CRL

		TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE				50.00			
ACID INSOLUBLE		49.98	2.21	47.77			
ACID SOLUBLE		49.98 − 47.77		2.23			
WET WASH RESIDUE (250 MESH)				0.92			
THROUGH (250 MESH)				46.85			
RO TAP TIME 8 WT. OF SAMPLE 0.92							
SIEVE OPENING IN MM	MESH						
OVER 8	2.5	—					
8 - 4	5	—					
4 - 2	9	—					
2 - 1	16	0.01	0.01		0.0		
1 - 0.5	32	0.05	0.04		0.1		
0.5 - 0.25	60	0.09	0.04		0.1		
0.25 - 0.125	115	0.15	0.06		0.1		
.125-0.0625	250	0.74	0.59		1.20		
PAN		0.94	0.20	47.05	98.5%		
CUMULATIVE WT.				46.85 47.99			
SIEVE LOSS		+ 0.02					
TOTAL							

TEST HOLE # 66-B-47 C

DATE 3-29-49

SAMPLE DEPTH 3.5-5

TEST BY GKD

	TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE			50.00			
ACID INSOLUBLE	49.73	2.37	47.36			
ACID SOLUBLE	2.37 / 47.36		2.64			
WET WASH RESIDUE (250 MESH)			0.71			
THROUGH (250 MESH)			46.65			
RO TAP TIME 5						
WT. OF SAMPLE 0.71						
SIEVE OPENING IN MM / MESH						
OVER 8 / 2.5	—					
8 - 4 / 5	—					
4 - 2 / 9	—					
2 - 1 / 16	0.01	0.01		—		
1 - 0.5 / 32	0.04	0.03		0.05		
0.5 - 0.25 / 60	0.07	0.03		0.05		
0.25 - 0.125 / 115	0.11	0.04		0.1		
.125-0.0625 / 250	0.53	0.42		0.9		
PAN	0.70	0.17	46.83	98.9		
CUMULATIVE WT.		46.65 / 47.35		100.00		
SIEVE LOSS -0.01						
TOTAL						

TEST HOLE # 66-B-47 D

DATE 3-24-99

SAMPLE DEPTH 5-6.5

TEST BY RDD

	TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE			50.00			
ACID INSOLUBLE	49.59	2.20	47.39			
ACID SOLUBLE	2.20 / 47.39		2.61			
WET WASH RESIDUE (250 MESH)			0.53			
THROUGH (250 MESH)			46.86			
RO TAP TIME 5 WT. OF SAMPLE 053						
SIEVE OPENING IN MM / MESH						
OVER 8 / 2.5	—					
8 - 4 / 5	—					
4 - 2 / 9	—					
2 - 1 / 16	—					
1 - 0.5 / 32	0.01	0.01		—		
0.5 - 0.25 / 60	0.03	0.02		0.05		
0.25 - 0.125 / 115	0.06	0.03		0.05		
.125-0.0625 / 250	0.32	0.26		0.55		
PAN	0.53	0.21	47.04	99.35		
CUMULATIVE WT.		46.86 / 47.39		100.00		
SIEVE LOSS 0.00						
TOTAL						

TEST HOLE # 66-B-47 E DATE 3-24-49

SAMPLE DEPTH 6.5-7 TEST BY [illegible]

		TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE				50.00			
ACID INSOLUBLE		49.69	2.31	47.38			
ACID SOLUBLE		2.31 / 47.38		2.62			
WET WASH RESIDUE (250 MESH)				0.89			
THROUGH (250 MESH)				46.51			
RO TAP TIME 5 WT. OF SAMPLE 0.89							
SIEVE OPENING IN MM	MESH						
OVER 8	2.5	—					
8 - 4	5	—					
4 - 2	9	—					
2 - 1	16	0.01	0.01		0		
1 - 0.5	32	0.03	0.02		0.05		
0.5 - 0.25	60	0.05	0.02		0.03		
0.25 - 0.125	115	0.06	0.01		0.00		
.125-0.0625	250	0.56	0.50		1.05		
PAN		0.87	0.31	4.82	98.85		
CUMULATIVE WT.			46.51 / 47.38		100.00		
SIEVE LOSS	0						
TOTAL							

TEST HOLE # 66-B-47 F DATE 3-24-49

SAMPLE DEPTH 7-8 TEST BY GAD

	TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE			50.00			
ACID INSOLUBLE	48.58	2.21	46.77			
ACID SOLUBLE	~~2.21~~ 46.77		3.23			
WET WASH RESIDUE (250 MESH)			0.86			
THROUGH (250 MESH)			45.91			
RO TAP TIME 5 WT. OF SAMPLE 0.86						
SIEVE OPENING IN MM / MESH						
OVER 8 / 2.5	—					
8 - 4 / 5	—					
4 - 2 / 9	—					
2 - 1 / 16	0.01	0.01		0.0		
1 - 0.5 / 32	0.03	0.02		0.05		
0.5 - 0.25 / 60	0.05	0.02		0.05		
0.25 - 0.125 / 115	0.06	0.01		0.00		
.125-0.0625 / 250	0.60	0.54		1.15		
PAN	0.86	0.26	46.17	98.75		
CUMULATIVE WT.		45.91		100.00		
SIEVE LOSS 0		46.77				
TOTAL						

TEST HOLE # 66-B-47 G DATE 3-24-49

SAMPLE DEPTH 8-10 TEST BY GRB

		TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE				50.00			
ACID INSOLUBLE		~~49.98~~ 50.00	2.43	47.57			
ACID SOLUBLE		~~2.43~~ 2.425		2.43			
WET WASH RESIDUE (250 MESH)				1.61			
THROUGH (250 MESH)				45.96			
RO TAP TIME 5 WT. OF SAMPLE 1.61							
SIEVE OPENING IN MM	MESH						
OVER 8	2.5	—					
8 - 4	5	—					
4 - 2	9	—					
2 - 1	16	—					
1 - 0.5	32	0.01	0.01		0.0		
0.5 - 0.25	60	0.02	0.01		0.0		
0.25 - 0.125	115	0.05	0.03		0.05		
.125-0.0625	250	0.96	0.91		1.90		
PAN		1.58	0.62	46.58	98.05		
CUMULATIVE WT.			45.96 47.54		100.00		
SIEVE LOSS	0.03						
TOTAL							

TEST HOLE # 66-R-47 DATE 3-20-49

SAMPLE DEPTH 10-15 TEST BY [illegible]

	TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE			50.00			
ACID INSOLUBLE	49.90	2.27	47.63			
ACID SOLUBLE	2.27		2.37	1/2	4.74	
WET WASH RESIDUE (250 MESH)			3.34			
THROUGH (250 MESH)			44.29			
RO TAP TIME 10 WT. OF SAMPLE 3.34	47.63 3.34 44.29		47.63			

SIEVE OPENING IN MM	MESH	TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
OVER 8	2.5		—				
8 - 4	5		—				
4 - 2	9		—				
2 - 1	16		—				
1 - 0.5	32		—				
0.5 - 0.25	60		—				
0.25 - 0.125	115	x	0.04	.04	0.1	0.1	
.125 - 0.0625	250	x	1.3	1.13	2.3	2.4	
PAN		46.46	3.28	3.21	97.6	100.0	
CUMULATIVE WT.		3.28 1.3 1.98	1.13 2.15	44.29 47.57	000		
SIEVE LOSS	-0.06						
TOTAL							

10% aggregates

10 | 22.70

2.27

TEST HOLE # 66-B-47 DATE 3-20-49

SAMPLE DEPTH 15-20 TEST BY [illegible]

	TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE			50.00			
ACID INSOLUBLE	48.93	2.27	46.66			
ACID SOLUBLE	2.27 / 1.66		3.34		6.68	6.7%
WET WASH RESIDUE (250 MESH)			1.42			
THROUGH (250 MESH)			45.24			
		46.66 / 1.42 / 45.24				
RO TAP TIME 10						
WT. OF SAMPLE 1.42						

SIEVE OPENING IN MM	MESH						
OVER 8	2.5			—			
8 - 4	5			—			
4 - 2	9			—			
2 - 1	16			—			
1 - 0.5	32			—			
0.5 - 0.25	60			—			
0.25 - 0.125	115		0.07	0.07		0.15	0.15
.125-0.0625	250		0.80	0.73		1.65	1.80
PAN		45.86	1.44	5 0.64		98.2	100.0
CUMULATIVE WT.				45.22 / 46.66		100.30	
SIEVE LOSS	+0.02						
TOTAL							

TEST HOLE # 66-B-47 DATE 3-20-99

SAMPLE DEPTH 20-25 TEST BY DRD

		TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE				50.0			
ACID INSOLUBLE		50.01	22.9	17.74			
ACID SOLUBLE		47.74		2.26		4.52	4.52
WET WASH RESIDUE (250 MESH)				1.82			
THROUGH (250 MESH)				45.92			
			42.74 + 1.82 = 45.92				
RO TAP TIME 10							
WT. OF SAMPLE 1.82							
SIEVE OPENING IN MM	MESH						
OVER 8	2.5			—			
8 - 4	5			0.01	0.01		
4 - 2	9			0.03	0.02	0.02	0.05
2 - 1	16			0.07	0.04	0.04	0.10
1 - 0.5	32			0.12	0.05	0.08	0.10
0.5 - 0.25	60			0.16	0.09	0.10	0.10
0.25 - 0.125	115			0.67	0.51	0.08	1.05
.125-0.0625	250			1.80	1.15	91.1	98.6
PAN				47.07	45.92	98.7	100.00
CUMULATIVE WT.					47.74	100.10	
SIEVE LOSS	-0.02						
TOTAL							

TEST HOLE # 66-B-47 DATE 3-20-47

SAMPLE DEPTH 25-30 TEST BY [illegible]

	TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE			50.00			
ACID INSOLUBLE	48.93 − 2.27	2.27	46.66			
ACID SOLUBLE			3.34		6.68	6.7
WET WASH RESIDUE (250 MESH)			4.05			
THROUGH (250 MESH)			42.61			
RO TAP TIME 10		46.66 − 4.05 = 42.61				
WT. OF SAMPLE 4.05						
SIEVE OPENING IN MM / MESH						
OVER 8 / 2.5						
8 - 4 / 5						
4 - 2 / 9						
2 - 1 / 16						
1 - 0.5 / 32	X #	0.09	—			
0.5 - 0.25 / 60	X	0.14	0.11	0.25	0.24	
0.25 - 0.125 / 115	@	0.15	0.84	0.10	0.30	
.125-0.0625 / 250	1.18 #	1.07	0.24	0.50	2.7	
PAN / 46.14	7.52	2.60	3.53	99.15	100.0	
CUMULATIVE WT.	42.61 / 0.24	4.05 / 0.09	42.61	100.00		
SIEVE LOSS 0	42.52 / 1.20	3.96	46.56			
TOTAL						

1.26
.09
1.07

not figured in

wood fragments
*20% agg.
@ 80% agg.
# 80% agg.

} some pyrite

Some aggregation - Overheating of sample

X not cumulative

TEST HOLE # 66-B-47 DATE 3-20-49

SAMPLE DEPTH 30-32.5 TEST BY GHD

	TOTAL WT.	TARE	NET	%	CUM.%	TOTAL
WT. OF TEST SAMPLE			*50.00			
ACID INSOLUBLE	49.58	2.27	47.31			
ACID SOLUBLE	3.27		2.69		53.8	5.4
WET WASH RESIDUE (250 MESH)		*	6.58			
THROUGH (250 MESH)			40.73			
RO TAP TIME 10		47.31 6.58 40.73				
WT. OF SAMPLE 6.58						

SIEVE OPENING IN MM	MESH							
OVER 8	2.5			—				
8 - 4	5			—				
4 - 2	9			—				
2 - 1	16		5.00	0.08	.08	.08	0.15	0.2
1 - 0.5	32			0.62	.54	.52	1.1	1.3
0.5 - 0.25	60		20.2	1.70	1.08	.88	1.85	3.1
0.25 - 0.125	115	(46.101)	40.3	3.14	1.47	91	1.9	5.0
.125-0.0625	250	46.7+1.2	30.3	4.33	1.19	1.06	2.25	7.3
PAN		46.7+01		6.59	2.25	(3.13)	92.75	100.0
CUMULATIVE WT.						6.58	10000	
SIEVE LOSS	-0.01	4.3	43.86		(40.73)	47.31		
TOTAL		51						

* 0.11 gram of wood fragments removed before weighing after dry sieving

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 66-B-47 DATE: 3-18-99

SAMPLE DEPTH: 32.5-35 TEST MADE BY: DRD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	~~1~~	178.3			
8 - 4	5	180.0	178.3	1.7		1.7
4 - 2	9	197.3		17.3		19.0
2 - 1	16	222.5		25.2		44.2
1 - 0.5	32	254.0		31.5	31.6	75.8
0.5 - 0.25	60	274.7		20.7		96.5
0.25 - 0.125	115	277.2		2.5		99.0
.125 - 0.0625	250	277.6		0.4		99.4
Pan		278.2		0.6		100.0
				~~99.9~~		

Sieve Loss -------- -0.1

REMARKS:

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 66-B-47 DATE: 3-18-79

SAMPLE DEPTH: 35-39 TEST MADE BY: AC

WT. OF TEST SAMPLE: _____ TIME OF SHAKING IN RO-TAP: _____

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	186.8	178.3	8.5		8.5
4 - 2	9	215.9		29.1	29.2	37.7
2 - 1	16	247.5		31.6	31.8	69.5
1 - 0.5	32	267.7		20.2		89.7
0.5 - 0.25	60	277.6		9.9		99.6
0.25 - 0.125	115	277.8		0.2		99.8
.125 - 0.0625	250	278.0		0.2		100.0
Pan		0		.0		
				99.7		
Sieve Loss				-0.3		

REMARKS:

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 66-B-47 DATE: 3-18-49

SAMPLE DEPTH: 39-45 TEST MADE BY: WKD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	186.4	178.0	8.4		8.4
4 - 2	9	225.4		39.0	38.9	47.3
2 - 1	16	258.3		32.9	32.7	80.0
1 - 0.5	32	272.8		14.5	14.35	94.35
0.5 - 0.25	60	277.7		4.9		99.25
0.25 - 0.125	115	278.3		0.6		99.85
.125 - 0.0625	250	278.4		0.1		99.95
Pan		278.45		.05		100.0
				100.45		

Sieve Loss-------- +0.45

REMARKS:

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 66-B-47 DATE: 3-18-49

SAMPLE DEPTH: 45-50 TEST MADE BY: OHD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	—				
8 - 4	5	185.5	178.3	7.2		7.2
4 - 2	9	217.6		32.1	32.3	39.5
2 - 1	16	252.0		34.4	34.6	74.1
1 - 0.5	32	270.0		18.0		92.1
0.5 - 0.25	60	276.7		6.7		98.8
0.25 - 0.125	115	277.6		0.9		99.7
.125 - 0.0625	250	277.7		0.1		99.8
Pan		277.9		0.2		100.0
				99.6		
Sieve Loss				-0.4		

REMARKS:

SIEVE ANALYSIS WORK SHEET

TEST HOLE NUMBER: 66-B-49 DATE: 3-18-49

SAMPLE DEPTH: 50-52.5 TEST MADE BY: DHD

WT. OF TEST SAMPLE: 100 TIME OF SHAKING IN RO-TAP: 12

Sieve opening in mm.	Mesh	Total weight	Tare	Net	Percent	Cumulative %
Over 8	2.5	183.1	178.3	4.8		4.8
8 - 4	5	198.6		15.5		20.3
4 - 2	9	247.1		48.5	48.6	68.9
2 - 1	16	270.7		23.6		92.5
1 - 0.5	32	276.1		5.4		97.9
0.5 - 0.25	60	277.4		1.3		99.2
0.25 - 0.125	115	277.8		0.4		99.6
.125 - 0.0625	250	278.0		0.2		99.8
Pan		278.2		0.2		100.0
				99.9		
Sieve Loss--------				-0.1		

REMARKS: