

VIRGINIA DIVISION OF MINERAL RESOURCES
 Box 3667, Charlottesville, VA 22903

INTERVAL SHEET

Page 1 of 1

Well Repository No.: W- 5634

Date rec'd: Date Processed: 1-14-80

Sample Interval: from 30 to: 860

PROPERTY:

Number of samples: 80

COMPANY: D'Appolonia (DAPP-1)

Total Depth: 860

COUNTY: Accomack

Oil or Gas: Water: Exploratory:

From-To	From-To	From-To	From-To	From-To
-	310 - 320	610 - 620	-	-
-	320 - 330	620 - 630	-	-
30 - 40	330 - 340	630 - 640	-	-
40 - 50	340 - 350	640 - 650	-	-
50 - 60	350 - 360	-	-	-
60 - 70	360 - 370	-	-	-
70 - 80	370 - 380	670 - 680	-	-
80 - 90	380 - 390	680 - 690	-	-
90 - 100	390 - 400	690 - 700	-	-
100 - 110	400 - 410	700 - 710	-	-
110 - 120	410 - 420	710 - 720	-	-
120 - 130	420 - 430	720 - 730	-	-
130 - 140	430 - 440	730 - 740	-	-
140 - 150	440 - 450	740 - 750	-	-
150 - 160	450 - 460	750 - 760	-	-
160 - 170	460 - 470	760 - 770	-	-
170 - 180	470 - 480	770 - 780	-	-
180 - 190	480 - 490	780 - 790	-	-
190 - 200	490 - 500	790 - 800	-	-
200 - 210	500 - 510	800 - 810	-	-
210 - 220	510 - 520	810 - 820	-	-
220 - 230	520 - 530	820 - 830	-	-
230 - 240	530 - 540	830 - 840	-	-
240 - 250	540 - 550	840 - 850	-	-
250 - 260	550 - 560	850 - 860	-	-
260 - 270	560 - 570	-	-	-
270 - 280	570 - 580	-	-	-
280 - 290	-	-	-	-
290 - 300	590 - 600	-	-	-
300 - 310	600 - 610	-	-	-

Unwashed only

VIRGINIA DIVISION OF MINERAL RESOURCES
 Box 3667, Charlottesville, VA 22903

INTERVAL SHEET

Page 1 of 1

Date rec'd: Date Processed: 7-14-80

Well Repository No: 5634
 Sample Interval: from: to: 30-860

PROPERTY:

Number of samples: 80

COMPANY: D'APOLONIA (DAPP-1)

Total Depth: 860

COUNTY: ACCOMACK

Oil or Gas: Water: Exploratory:

From-To	From-To	From-To	From-To
-	260	270	510
-	270	280	520
-	280	290	530
30	290	300	540
40	300	310	550
50	310	320	560
60	320	330	570
70	330	340	580
80	340	350	590
90	350	360	600
100	360	370	610
110	370	380	620
120	380	390	630
130	390	400	640
140	400	410	650
150	410	420	-
160	420	430	-
170	430	440	670
180	440	450	680
190	450	460	690
200	460	470	700
210	470	480	710
220	480	490	720
230	490	500	730
240	500	510	740
250			750
			760
			770
			780
			790
			800
			810
			820
			830
			840
			850
			860

UNWASHED ONLY

County: ACCOMACK
VDMR Well # 5634

Well: DAPP - 1
Property:
Driller: D'Appolonia
Location: Chincoteague West 7.5' Quadrangle: North end of Wallops Island
at Cow Gut Flat; 200' SE of lookout tower, south of road.
37°52'58" N; 75°25'59" W.
Elevation: 5'+ (1.5 m)
Total depth: 860'
Started Drilling: 1979
Finished Drilling: 1979
Sample Description: Joan K. Polzin, Virginia Division of Mineral Resources
Reference: D'Appolonia; 1980, Hot dry rock geothermal evaluation, Cris-Wall
site, eastern shore of Maryland and Virginia: Los Alamos
Scientific Laboratory, Los Alamos, N. M.

GEOLOGIC SUMMARY

Depth	Thickness	Formation (and remarks)
0-3	30	Samples not received
30-40	10	Pleistocene undivided
40-300	260	Yorktown Fm.
300-600	300	St. Marys Fm.
600-750	150	Choptank Fm.
750-860	110	Calvert Fm.

Note: All formations picked from gamma log.

WELL LOG

DEPTH (FEET)	DESCRIPTION
0 - 30	No samples
30 - 40	Clay - Light olive gray (5y 6/1), very sparse sand, medium to coarse; wood fragments.
40 - 50	Sand - Pale yellowish brown (10YR6/2); medium, sub-angular; well sorted; quartz; 7% medium-grained brown to dark green glauconite.
50 - 60	Sand - As above, except: leaf debris; shell fragments.
60 - 70	Sand - As above, except; some coarse grains; Ostracod; Gastropod; Pelecypod - <u>Isognomen</u> type; Foram - <u>Nonion</u> .
70 - 80	Sand - As above.
80 - 90	Sand - As above, except. Pelecypod - <u>Astarte</u> ; Foram- <u>Nonion</u> : (Fragments of shell showing color).
90 - 100	Sand - As above.
100 -110	Sand - As above, except: Mica; iron; Echinoderm spines.
110 - 120	Sand - As above, except: medium to coarse; moderately well sorted; 5% glauconite; forams (<u>Marinulina?</u> , <u>Nonion</u>); 5% fine shell fragments; root debris; mica; iron.
120 -130	Sand - As above.
140 -150	Sand - As above, except; Lignite fragments.
150 -160	Sand - As above, except: medium-grained, well sorted, 5% very fine glauconite; 1% shell fragments; mica; wood fragments.
160 -170	Sand - As above, except: very sparse shell fragments.
170 -180	Sand - As above.
180 -190	Sand - As above, except: some very coarse grains.
190 - 200	Sand - As above.

DEPTH (FEET)	DESCRIPTION
200 -210	Sand - As above.
210 -220	Sand - As above, except: tan to light green glauconite.
220 -230	Sand - As above, except: Echinoderm spines, biotite mica in very small flakes.
230 -240	Sand - As above, except: sparse clasts of clay, sand grains, medium to very coarse, sub-angular; some granules; poor sorting; quartz; 10% glauconite (black to dark green); 10% shell fragments; Echinoderm spines; wood fragments; mica (muscovite); garnet.
240 -250	Sand - As above, except: 30% dark gray shell fragments - (Baranckle), 10% shell fragments.
250 -260	Sand - "Salt and Pepper;" 40% dark shell fragments; 20% light shell fragments.
260 -270	Sand - Light olive gray (5Y 5/2); fine to coarse; sub-angular, moderate sorting; quartz; 12% glauconite; 5% shell fragments wood fragments.
270 -280	Sand - As above, except: 20% glauconite; 3% shell fragments.
280 -290	Sand - As above, except: 15% glauconite; plant debris (contamination?).
290 - 300	Sand - As above, except: gray (6/1); 8% glauconite; 7% shell fragments; limestone? with pyrite.
300 -310	Sand - As above, except: medium to coarse, some sand clasts; 3% fine glauconite; 10% shell fragments.
310 -320	Sand - As above, except: medium-grained; well sorted; 3% shell fragments.
320 -330	Sand - As above, except: 3% very fine glauconite; 3% shell fragments; wood fragments; mica; garnet.
330 -340	Sand - As above, except: 7% shell fragments.
340 -350	Sand - As above, except: medium- to coarse-grained; 2% glauconite; 10% shell fragments.
350 -360	Sand - As above, except: few granules.

DEPTH (FEET)	DESCRIPTION
360 -370	Sand - As above, except: very well sorted; medium-grained; sparse glauconite; 3% shell fragments.
370 -380	Sand - As above, except: mica, wood fragments; 2% glauconite.
380 -390	Sand - As above.
390 - 400	Sand - As above, except: 7% fine shell fragments.
400 -410	Sand - As above; except: foram- <u>Nonion</u> ; some mica.
410 -420	Sand - As above, except: 5% glauconite; 10% wood fragments; forams- <u>Guttulina</u> , <u>Nonion</u> .
420 -430	Sand - As above, except: 1% shell fragments; 2% glauconite.
430 -440	Sand - As above, except: well sorted; some coarse grains; 8% shell fragments; 8% wood fragments, (leaf & root debris also); Foram- <u>Nonion</u> ; (5% glauconite)
440 -450	Sand - As above, except: 2% shell fragments; 1% wood fragments; some mica; pyrite.
450 -460	Sand - As above, except: 7% glauconite; sparse shell fragments; 1-2% fine wood fragments.
460 -470	Sand - As above, except: 2% glauconite; 1% mica (muscovite).
470 -480	Sand - As above, except: pyrite; traces of green mica.
480 -490	Sand - As above.
490 - 500	Sand - As above, except: some pyrite; Foram (<u>Nonion</u>).
500 -510	Sand - As above, except: 5% fine black glauconite; echinoderm spines; Foram-(<u>Guttulina</u>); tan and light green glauconite present; few iron fragments and staining.

DEPTH (FEET)	DESCRIPTION
510 -520	Sand - As above, except: some mica; some pyrite; sparse shell fragments; biotite mica.
520 - 530	Sand - As above, except: 10% fine mixture of fine black glauconite, tan and light green pellet glauconite, lignite, phosphatic bone fragments, wood, mica (biotite); Forams.
530 -540	Sand - As above; except: muscovite, biotite and chromite mica; Forams - <u>Nonion</u> ; wood fragments; ostracods.
540 -550	Sand - As above, except: medium- to coarse-grained; moderate sorting; 1% muscovite mica; wood fragments; ostracod; Forams- <u>Nonion</u> , <u>Robulus</u> .
550 -560	Sand - As above.
560 -570	Sand - as above.
570 -580	Sand - as above, except: fine- to medium-grained, some coarse; 7% glauconite; some mica Forams- <u>Nonion</u> .
580 -590	No Sample.
590 - 600	Sand - As above.
600 - 610	Sand - As above, except: chromite mica; <u>nonion</u> .
610 -620	Sand - As above; Except: Iron; Forams- <u>Nonion</u> , <u>Guttulina</u> .
620 -630	Sand - As above, except: some wood and plant debris; 1% mica (muscovite); Forams- <u>Gyroïdina</u> , <u>Nonion</u> , <u>Robulus</u> ; Iron.
630 -640	Sand - As above, except: Forams- <u>Robulus</u> , <u>Marginulina</u> , <u>Lagena sulcata</u> , <u>Quinqueloculina?</u> , <u>Robulus calcar</u> ; <u>Nodosaria</u> , <u>Nonion</u> ; Chromite Mica.
640 -650	Sand - As above, except: 7% glauconite; wood- (lignite); some mica; Forams - <u>Nonion spp</u> ; <u>Lagena</u> .
650 -670	No Sample.
670 - 680	Sand - As above, except: medium-grained; few coarse grains; moderately well sorted; 7% glauconite; 1% shell fragments; Forams- <u>Nonion</u> , <u>Marginulina</u> , <u>Robulus (L)</u> , 1% wood; coral; ostracod; 1% mica (muscovite); iron.

DEPTH (FEET)	DESCRIPTION
680 -690	Sand - As above, except: medium- to coarse-grained; some very coarse; angular to sub-angular; moderate sorting; quartz; some black glauconite, Foram- <u>Nonion</u> ; wood fragments, mica.
690 - 700	Sand - As above, except: medium-grained; moderately well sorted; 2% mixed glauconite; Foram- <u>Nonion</u> ; ostracod; mica; wood fragments.
700 - 710	Sand - As above, except: some coarse grains; moderate sorting, echinoderm spine; shell fragments.
710 - 720	Sand - As above, except: medium-grained; moderately well sorted; 3% fine black glauconite; some mica; foram- <u>Nonion</u> ; ostracod; wood.
720 -730	Sand - As above, except: Very sparse clay; fine- to coarse-grained moderate sorting; 1% glauconite; Foram - <u>Nonion</u> ; mica; wood.
730 -740	Sand - As above, except: medium-grained.
740 -750	Sand - As above, some glauconite, some wood fragments.
750 -760	Sand - As above fine- to medium-grained and fish scales.
760 -770	Sand - as above.
770 -780	Sand - As above, except: Foram - <u>Lagena</u> , <u>Robulus</u> , <u>Nonion</u> .
780 -790	Sand - As above, except: sparse clay, medium-grained, sub-angular, moderately well sorted, quartz; some glauconite; Forams- <u>Nonion</u> ; fish scales; wood fragments; mica (muscovite); chromite mica; iron.
790 - 800	Sand - As above except: some coarse-grained; Foram- <u>Lagena</u> , <u>Nonion</u> .
800 -810	Sand - As above, except: No clay, no coarse grains; Foram- <u>Glubulina?</u> .
810 -820	Sand - As above, except: some coarse; few glauconite, wood; mica; Foram- <u>Lagena</u> , <u>Nonion</u> ; echinoderm spines.

DEPTH (FEET)	DESCRIPTION
820 - 830	Sand - As above, except - medium; 10% dark green glauconite; forams, few wood and shell fragments; mica, feldspar.
830 - 840	Sand - As above, except: Ostracod Foram - <u>Bolivina</u> , <u>Lagena</u> ; minute gastropod; few wood fragments.
840 - 850	Sand - As above, except: foram - <u>Nonion</u> , <u>Lagena</u> , few wood; mica.
850 - 860	Sand - As above, except: some coarse grains, 5% glauconite; foram - <u>Nonion</u> , <u>Bolivina</u> ; fish scales; wood fragments, mica; iron.

D'APPOLONIA

CONSULTING ENGINEERS, INC.

December 10, 1979

Project No. 78-356

Mr. Gene Rader
Virginia Division of Mineral Resources
P. O. Box 3667
Charlottesville, VA 22903

Accomack County Well
Data Transmittal

Dear Mr. Rader:

In response to your request to our client, Los Alamos Scientific Laboratories, we are providing you with samples and well logs for the borings we have completed in Accomack County, Virginia. We thank you for the logs of the Tangier Island well you promised to send, as well as for past information exchanges. D'Appolonia appreciates the cooperative working relationship we have established.

Samples collected from Borings DAPP-1, DAPP-3, and DAPP-4 are being sent separately. Gamma logs and field logs for these holes, as well as for DAPP-2, are enclosed. Gamma logging will be performed on DAPP-1 in mid-January and a copy will be forwarded shortly after it becomes available.

Sediment samples were collected from the return fluid flow by washing in a No. 140 sieve. A nylon mesh was used for DAPP-4. For Borings DAPP-3 and DAPP-4, the samples are incomplete due to very small amounts of material in the return flow. Indicated with a check mark on the field logs are the samples which are being made available to you. We do not require return of these samples.

We have enclosed a copy of the preliminary correlations of the gamma logs with a gamma log and geologic description from the Taylor well near Atlantic, Virginia. The gamma logging in the Taylor well was done to the same parameters as used in the logging of DAPP-2, DAPP-3, and DAPP-4 but, of course, the response is different here due to it being a much larger diameter well. Of interest is a marker bed at 630 feet in the Taylor well which can be identified throughout each boring. Conversations with VPI&SO indicate that this may be a radioactive sand that they observed in their Crisfield, Maryland well.

10 DUFF ROAD, PITTSBURGH, PA 15235 TELEPHONE: 412/243-3200

BECKLEY, WV CHESTERTON, IN CHICAGO, IL DENVER, CO HOUSTON, TX LAGUNA NIGUEL, CA
WILMINGTON, NC BRUSSELS, BELGIUM SEOUL, KOREA TEHERAN, IRAN

Mr. Gene Rader

- 2 -

December 10, 1979

You will also find enclosed a geologic description from the Taylor well, as well as coordinates of each of our borings.

Bill Miller, who performed the logging and sampling will be out of the country until February 1, 1980, therefore, please direct any future questions to Carl Schubert or Bill Johnson.

D'Appolonia trusts that these samples and logs will be of value to you and would appreciate your technical comments.

Sincerely yours,



William Miller *W.M.*
Geophysicist



Carl E. Schubert
Senior Project Engineer

WM:CES:rt
Enclosures

D'APPOLONIA

October 9, 1979

Project No. 78-356

Commonwealth of Virginia
 Department of Labor and Industry
 Division of Mines and Quarries
 Big Stone Gap, Virginia 24219

Attention: Mr. William Kelly

Revision to Request for Approval
 to Conduct Drilling Operations in
 Accomack County, Virginia

Dear Mr. Kelly:

In the Request for Approval to Conduct Drilling for geothermal test borings sent to your attention on October 1, 1979, proposed drilling locations were provided. These drilling locations have been finalized by establishing agreements with specific landlords and this has resulted in slight changes to the locations presented to you on October 1, 1979. The revised final locations are shown on the attached topographic maps and are described as follows:

BORING NO.	LOCATION	COORDINATE	ELEVATION
DAPP-1	Wallops Island	37° 52' 58" N- 75° 25' 59" W	El. 15 ft
DAPP-2 ⁴	New Church - East	37° 58' 34" N- 75° 30' 30" W	El. 35 ft
DAPP-3	Makemie Park	37° 54' 32" N- 75° 34' 16" W	El. 17 ft
DAPP-4 ²	Saxis	37° 55' 12" N- 75° 43' 39" W	El. 5 ft

The drilling procedures remain as presented in our letter of October 1, 1979. The drilling program is still scheduled to begin about October 15. The incorporation of the revised drilling locations into your permit is greatly appreciated. If you require any additional information,

D'APPOLONIA

CONSULTING ENGINEERS, INC.



By _____ Date _____ Subject _____ Sheet No. _____ of _____

Chkd. By _____ Date _____ Proj. No. _____

GENE RADER
VIRGINIA DIVISION OF MINERAL RESOURCES
P.O. BOX 3667
CHARLOTTESVILLE, VA 22903

MR. RADER:

ENCLOSED PLEASE FIND SAMPLES FROM WELL DAPP-2 TAKEN BY MYSELF AT NEW CHURCH, VIRGINIA. SAMPLES WERE COLLECTED FROM THE RETURN FLOW USING A # 100 SIEVE (.0041 INCHES).

COORDINATES OF THE WELL ARE APPROXIMATELY:

42 03 000 N
4 55 000 E

OR

37° 58' N
75° 30' 30" E

THE WELL IS LOCATED ON Rt. 709, 1.4 MILES EAST OF HIGHWAY 13, NEAR NEW CHURCH, VIRGINIA.

FINAL DEPTH OF THE WELL WAS 1005'.

IF YOU HAVE ANY QUESTIONS OR COMMENTS, PLEASE DIRECT THEM TO BILL JOHNSON IN OUR PITTSBURGH OFFICE. (PHONE # 412-243-3200).

WE WILL BE IN TOUCH SHORTLY, AND I WILL FORWARD SAMPLES FROM OUR REMAINING WELLS AS SOON AS THEY ARE COMPLETED AND CATALOGUED.

Sincerely,

William Miller

D'APPOLONIA

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER:		PROJECT NAME:		
BORING NUMBER:		COORDINATES		DATE:
ELEVATION:		GWL:	AT	HRS.
ENGINEER/GEOLOGIST:			AT	HRS.
DRILLING METHODS:				PAGE OF

DEPTH ()	SAMPLE TYPE & NO.	ESTIMATED MUD FLOW RATE	DRILLING RATE	DESCRIPTION	USCS SYMBOL	ESTIMATED DEPTH CORRECTION	REMARKS
				OVER			

NOTES:

THIS IS THE CLASSIFICATION SYSTEM USED IN THE FIELD LOGS.

W. S. M. J.

Unified Soil Classification System

UNIFIED SOIL CLASSIFICATION (Including Identification and Description)								
Major Division	Group Symbols	Typical Names	Field Identification Procedures (Excluding particles larger than 3 in., and listing fractions on estimated weights.)	Information Required for Describing Soil	Laboratory Classification Criteria			
1	2	3	4	5	6			
Coarse-grained Soils More than half of material is larger than No. 200 sieve size. Gravels More than half of coarse fraction is larger than 4.75 mm (No. 40 sieve) size. Sands More than half of coarse fraction is finer than 4.75 mm (No. 40 sieve) size. Well-sorted For visual classification, the 1/4-in. size may be used as approximate to the No. 60 sieve size.	Clean Gravels (Little or no fines) Gravels with Applicable Amounts of Fines	GW	Well-graded gravels, gravel-sand mixtures, little or no fines.	Wide range in grain sizes and substantial amounts of all intermediate particle sizes.	For undisturbed soils add information on stratification, degree of compaction, cementation, moisture conditions, and drainage characteristics. Give typical name; indicate approximate percentage of sand and gravel, maximum size; angularity, surface condition, and hardness of the coarse grains; local or geologic name and other pertinent descriptive information; and symbol in parentheses. Examples: Silty sand, gravelly; about 20% hard, angular gravel particles 1/2-in. maximum size; rounded and subangular sand grains, coarse to fine; about 15% nonplastic fines with low dry strength; well compacted and moist in place; at least sand. (SU)	$C_u = \frac{D_{60}}{D_{10}} \text{ Greater than } 4$ $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}} \text{ Between } 1 \text{ and } 3$ <p style="text-align: center;">Not meeting all gradation requirements for GW</p> Atterberg limits below "A" line or PI less than 4 Atterberg limits above "A" line with PI greater than 7 $C_u = \frac{D_{60}}{D_{10}} \text{ Greater than } 6$ $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}} \text{ Between } 1 \text{ and } 3$ <p style="text-align: center;">Not meeting all gradation requirements for SW</p> Atterberg limits below "A" line or PI less than 4 Atterberg limits above "A" line with PI greater than 7		
		GP	Poorly graded gravels or gravel-sand mixtures, little or no fines.	Predominantly one size or a range of sizes with some intermediate sizes missing.				
		GMH	Silty gravels, gravel-sand-silt mixture.	Nonplastic fines or fines with low plasticity (For identification procedures see ML below)				
		GM	Clayey gravels, gravel-sand-clay mixtures.	Plastic fines (For identification procedures see CL below)				
	Well-sorted For visual classification, the 1/4-in. size may be used as approximate to the No. 60 sieve size.	Clean Sands (Little or no fines) Sands with Applicable Amounts of Fines	SW	Well-graded sands, gravelly sands, little or no fines.			Wide range in grain size and substantial amounts of all intermediate particle sizes.	
			SP	Poorly graded sands or gravelly sands, little or no fines.			Predominantly one size or a range of sizes with some intermediate sizes missing.	
		Silty Sands (Applicable amount of fines)	SM	Silty sands, sand-silt mixtures.			Nonplastic fines or fines with low plasticity (For identification procedures see ML below)	
			SC	Clayey sands, sand-clay mixtures.			Plastic fines (For identification procedures see CL below)	
			Identification Procedures on Fraction Smaller than No. 40 Sieve Size				For undisturbed soils add information on structure, stratification, consistency in undisturbed and remolded states, moisture, and drainage conditions. Give typical name; indicate degree and character of plasticity amount and maximum size of coarse grains; color in wet condition; odor, if any; local or geologic name and other pertinent descriptive information; and symbol in parentheses. Examples: Clayey silt, brown; slightly plastic; small percentage of fine sand; numerous vertical root holes; firm and dry in place; loess; (ML)	
			Silts and Clays Liquid limits less than 50	ML				Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity.
CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.	Medium to high None to very slow Medium						
Silts and Clays Liquid limits greater than 50	OL	Organic silts and organic silty clays of low plasticity.	Slight to Medium Slow Slight					
	MH	Inorganic silts, micaceous or silty silts, silty silts.	Slight to medium Slow to none Slight to medium					
	CH	Inorganic clays of high plasticity, fat clays.	High to very high None High					
	OH	Organic clays of medium to high plasticity, organic silts.	Medium to high None to very slow Slight to medium					
Highly Organic Soils	PT	Peat and other highly organic soils.	Readily identified by color, odor, spongy feel and frequently by fibrous texture.					

1) **Boundary classification** Soils possessing characteristics of two groups are designated by combinations of group symbols. For example GW-GC, well-graded gravel-sand mixture with clay binder. 2) All sieve sizes on this chart are U.S. standard.

FIELD IDENTIFICATION PROCEDURES FOR FINE-GRAINED SOILS OR FRACTIONS
 These procedures are to be performed on the minus No. 40 sieve particles, approximately 1/64 in. For field classification purposes, rounding is not intended, simply remove by hand the coarse particles that interfere with the tests.

Dilatancy (reaction to shaking)

After removing particles larger than No. 40 sieve size, prepare a pat of moist soil with volume of about one-half cubic inch. Add enough water if necessary to make the soil soft but not sticky. Place the pat in the open palm of one hand and shake horizontally, shifting vigorously against the other hand several times. A positive reaction consists of the appearance of water on the surface of the pat which changes to a livery consistency and becomes glossy. When the sample is squeezed between the fingers, the water and silt disappear from the surface, the pat stiffens, and finally it cracks or crumbles. The rapidity of appearance of water during shaking and its disappearance during squeezing assist in identifying the plasticity of the fines in a soil. Very fine clays are the stiffest and most dilatant reaction whereas a plastic clay has the softest and least dilatant reaction.

Dry Strength (crushing characteristics)

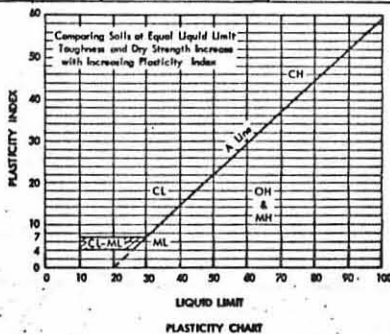
After removing particles larger than No. 40 sieve size, mold a pat of soil to the consistency of putty, rolling with fingers if necessary. Allow the pat to dry completely by oven, sun, or air-drying, and then test its strength by breaking and crumbling between the fingers. This strength is a measure of the character and quantity of the colloidal fraction contained in the soil. The dry strength increases with increasing plasticity. High dry strength is characteristic for clays of the CH group. A typical inorganic silt possesses only very slight dry strength. Silty fine sands and silts have about the same slight dry strength, but can be distinguished by the feel when powdering the dried specimen. Fine sand feels gritty whereas a typical silt has the smooth feel of flour.

Toughness (consistency near plastic limit)

After particles larger than the No. 40 sieve size are removed, a specimen of soil about one-half inch in cube size is molded to the consistency of putty. If too dry, water must be added and if silty, the specimen should be spread out in a thin layer and allowed to lose some moisture by evaporation. Then the specimen is rolled out by hand on a smooth surface or between the palms into a thread about one-eighth inch in diameter. The thread is then folded and rolled repeatedly. During this manipulation the moisture content is gradually reduced and the specimen stiffens, finally loses its plasticity, and crumbles when the plastic limit is reached. After the thread crumbles, the pieces should be lumped together and a slight kneading action continued until the lump crumbles. The tougher the thread near the plastic limit and the stiffer the lump when it finally crumbles, the more potent is the colloidal clay fraction in the soil. Weakness of the thread at the plastic limit and quick loss of coherence of the lump below the plastic limit indicate either inorganic clay of low plasticity, or materials such as kaolin-type clays and organic clays which occur below the A-line. Highly organic clays have a very weak and spongy feel at the plastic limit.

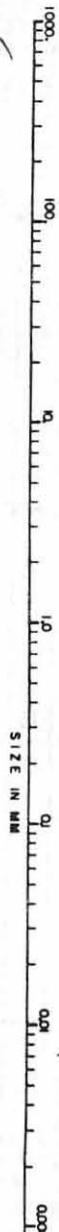
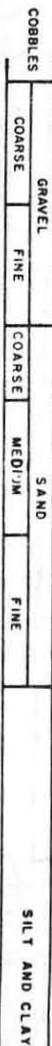
Use plasticity curves in identifying the fractions as given under field identification.

Determine percentages of gravel and sand from gravimetric curves. Depending on percentages of fines (fraction smaller than No. 200 sieve size) coarse-grained soils are classified as follows:
 GW, GP, SW, SP, GM, GC, SM, SC, SC. Some soils require use of dual symbols.
 Less than 5%
 More than 12%
 5% to 12%



For laboratory classification of fine-grained soils

U.S.C.S. CLASSIFICATION FOR SOILS



US STANDARD SIEVE OPENINGS

D'APPOLONIA

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 78-356	PROJECT NAME: LASL - HDR	DATE: 14 Nov '79
BORING NUMBER: DAPP-1	COORDINATES N 37° 52' 58" W 75° 25' 59"	DATE STARTED: 14 NOV '79
ELEVATION: 15 ft	GWL: AT HRS.	DATE COMPLETED: 19 NOV '79
ENGINEER/GEOLOGIST: W. S. Miller	AT HRS.	PAGE 1 OF 28
DRILLING METHODS: ROLLER BIT, 3 1/4 FUSP JOINT, BENTONITE		

DEPTH	SAMPLE TYPE & NO.	ESTIMATED MUD FLOW RATE	DRILLING RATE	DESCRIPTION	USCS SYMBOL	ESTIMATED DEPTH CORRECTION	REMARKS
40	SI-5		1010	VERY FINE WELL ROUNDED QUARTZ SAND 10% IRON STAINED GRAINS REDDISH TAN COLOR POORLY GRADED	SP		AUGERETS TO 40' MAY BE ALOT OF SURFACE MATERIAL IN SAMPLE AUGER HIT BLUE-GREEN CLAY FROM 30-40'. SEE SAMPLE SI-4
50	SI-6		1020 1030	SAME WITH TRACE BROKEN SHELL FRAGMENTS AND TRACE BLUE CLAY	SP U SC		
60	SI-7		1040 1055	SAME	SP SC		
70			1105				

NOTES:

D'APPOLONIA

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 78-356	PROJECT NAME: LAGL-HDR		DATE: 14 NOV '79
BORING NUMBER: DAPP-1	COORDINATES		DATE STARTED: 14 NOV '79
ELEVATION:	GWL: AT	HRS.	DATE COMPLETED: 17 NOV '79
ENGINEER/GEOLOGIST: <i>W. J. Miller</i>	AT	HRS.	PAGE 2 OF 28
DRILLING METHODS:			

DEPTH ()	SAMPLE TYPE & NO.	ESTIMATED MUD FLOW RATE	DRILLING RATE	DESCRIPTION	USCS SYMBOL	ESTIMATED DEPTH CORRECTION	REMARKS
70	SI-8		1140	VERY FINE WELL ROUNDED REDDISH-TAN QUARTZ SAND, TRACE (10%) IRON STAINED QUARTZ, POORLY GRADED MINUTE TRACE OF SHELLS SOME BLUE CLAY	SP ↓ SC		
80	SI-9		1150 1200	SAME	SP ↓ SC		
90	SI-10		1206 1214	VERY FINE TO FINE GREY QUARTZ SAND, TRACE (5%) IRON STAINED QUARTZ, TRACE (2%) VERY FINELY BROKEN SHELL FRAGMENTS POORLY GRADED	SP		
100			1223				

NOTES:

D'APPOLONIA

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 78-356	PROJECT NAME: LASL-HDR		DATE: 14 NOV '79
BORING NUMBER: DAPP-1	COORDINATES		DATE STARTED: 14 NOV '79
ELEVATION:	GWL: AT	HRS.	DATE COMPLETED: 19 NOV '79
ENGINEER/GEOLOGIST: <i>usm dly</i>	AT	HRS.	PAGE 3 OF 28
DRILLING METHODS:			

DEPTH ()	SAMPLE TYPE & NO.	ESTIMATED MUD FLOW RATE	DRILLING RATE	DESCRIPTION	USCS SYMBOL	ESTIMATED DEPTH CORRECTION	REMARKS
100	SI-11		1341	VERY FINE TO FINE GREY QUARTZ SAND, TRACE (5%) IRON STAINED QUARTZ, TRACE (2%) FINELY BROKEN SHELL FRAGMENTS, POORLY GRADED	SP		
110	SI-12		1350 1355	SAME	SP		
120	SI-13		1405 1410	SAME	SP		
130			1420				

NOTES:

D'APPOLONIA

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 78-356	PROJECT NAME: LASL-HDR	
BORING NUMBER: DAPP-1	COORDINATES	DATE: 14 Nov 79
ELEVATION:	GWL: AT HRS.	DATE STARTED: 14 NOV '79
ENGINEER/GEOLOGIST: usmjllr	AT HRS.	DATE COMPLETED: 17 NOV 79
DRILLING METHODS:		PAGE 4 OF 28

DEPTH ()	SAMPLE TYPE & NO.	ESTIMATED MUD FLOW RATE	DRILLING RATE	DESCRIPTION	USCS SYMBOL	ESTIMATED DEPTH CORRECTION	REMARKS
130	SI-14		1425	VERY FINE TO FINE LIGHT GREY QUARTZ SAND, TRACE (5%) BROKEN SHELL FRAGMENTS, TRACE (2%) IRON STAINED QUARTZ GRAINS, POORLY GRADED	SP		
140	SI-15		1432 1438	SAME	SP		
150	SI-16		1445 1455	SAME	SP		
160			1502				

NOTES:

D'APPOLONIA

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 78-356	PROJECT NAME: LASL-HDR		DATE: 14 NOV '79
BORING NUMBER: DAPP-1	COORDINATES		DATE STARTED: 14 NOV '79
ELEVATION:	GWL: AT	HRS.	DATE COMPLETED: 19 NOV '79
ENGINEER/GEOLOGIST: <i>wsmiller</i>	AT	HRS.	PAGE 5 OF 28
DRILLING METHODS:			

DEPTH ()	SAMPLE TYPE & NO.	ESTIMATED MUD FLOW RATE	DRILLING RATE	DESCRIPTION	USCS SYMBOL	ESTIMATED DEPTH CORRECTION	REMARKS
160	SI-17		1507	VERY FINE TO FINE GREY QUARTZ SAND TRACE (42%) IRON STAINED QUARTZ POORLY GRADED VERY MINUTE TRACE OF FINELY BROKEN SHELL FRAGMENTS	SP		
170	SI-18		1515 1520	SAME WITH TRACE (5%) BROKEN SHELL FRAGMENTS	SP		
180	SI-19		1526 1532	SAME	SP		
190			1540				

NOTES:

D'APPOLONIA

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 78-356	PROJECT NAME: LASL - HDR		DATE: 14 Nov '79
BORING NUMBER: DAPP-1	COORDINATES		DATE STARTED: 14 Nov '79
ELEVATION:	GWL: AT	HRS.	DATE COMPLETED: 19 Nov '79
ENGINEER/GEOLOGIST: <i>Wampler</i>	AT	HRS.	PAGE 6 OF 28
DRILLING METHODS:			

DEPTH ()	SAMPLE TYPE & NO.	ESTIMATED MUD FLOW RATE	DRILLING RATE	DESCRIPTION	USCS SYMBOL	ESTIMATED DEPTH CORRECTION	REMARKS
190	S1-20		1548	VERY FINE TO FINE LIGHT GREY QUARTZ SAND, TRACE (2%) BROKEN SHELL FRAGMENTS MINUTE TRACE IRON STAINED QUARTZ GRAINS POORLY GRADED	SP		
200	S1-21		1554 1605	FINE TO MEDIUM GREY QUARTZ SAND, TRACE 5% BROKEN SHELL FRAGMENTS WITH A FEW COARSELY BROKEN FRAGMENTS, FAIR TO POOR GRADING MINUTE TRACE OF GHAUDONITE	SP		
210	S1-22		1612 1630	VERY FINE TO FINE GREY QUARTZ SAND, TRACE (2%) FINELY BROKEN SHELL FRAGMENTS	SP		
220			1638				

NOTES:

D'APPOLONIA

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 78-356	PROJECT NAME: LASL-HDR		DATE: 15 NOV 79
BORING NUMBER: DAPP-1	COORDINATES		DATE STARTED: 12 NOV 79
ELEVATION:	GWL: AT	HRS.	DATE COMPLETED: 19 NOV 79
ENGINEER/GEOLOGIST: <i>W. J. Allen</i>	AT	HRS.	PAGE 7 OF 28

DEPTH	SAMPLE TYPE & NO.	ESTIMATED MUD FLOW RATE	DRILLING RATE	DESCRIPTION	USCS SYMBOL	ESTIMATED DEPTH CORRECTION	REMARKS
220	SI-23		0752	VERY FINE TO FINE GREY QUARTZ SAND, TRACE (4.2%) FINELY BROKEN SHELL FRAGMENTS POORLY GRADED	SP		
230	SI-24		0800 0807	VERY FINE TO FINE GREY QUARTZ SAND SOME 15% FINELY BROKEN SHELL FRAGMENTS, VERY MINUTE TRACE OF GLAUCONITE, POORLY GRADED	SP		
240	SI-25		0815 0822	SAME	SP		
250			0830				

NOTES:

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 78-356	PROJECT NAME: LASL-HDR		DATE: 15 Nov 79
BORING NUMBER: DAPP-1	COORDINATES		DATE STARTED: 14 NOV 79
ELEVATION:	GWL: AT	HRS.	DATE COMPLETED: 19 NOV 79
ENGINEER/GEOLOGIST: W. Miller	AT	HRS.	PAGE 8 OF 28
DRILLING METHODS:			

DEPTH ()	SAMPLE TYPE & NO.	ESTIMATED MUD FLOW RATE	DRILLING RATE	DESCRIPTION	USCS SYMBOL	ESTIMATED DEPTH CORRECTION	REMARKS
250	SI-26		0840	FINE TO MEDIUM GRAY QUARTZ SAND SOME 20% BROKEN SHELL FRAGMENTS TRACE (2%) GREY CHERT? POOR TO GOOD GRADING	SP		
260	SI-27		0850 0856	FINE DARK GRAY QUARTZ SAND TRACE (5%) BROKEN SHELL FRAGMENTS (FINE) POORLY GRADED TRACES CARBONITE (DARK)	SP		
270	SI-28		0905 0913	FINE DARK GRAY QUARTZ SAND SOME 30% BLACK CHLORITE TRACE (5%) FINELY BROKEN SHELL FRAGMENTS, POORLY GRADED	SP		
280			0920				

NOTES:

D'APPOLONIA

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 78-356	PROJECT NAME: LASL-HDR		DATE: 15 Nov 79
BORING NUMBER: DAPP-1	COORDINATES		DATE STARTED: 14 Nov 79
ELEVATION:	GWL: AT	HRS.	DATE COMPLETED: 19 Nov 79
ENGINEER/GEOLOGIST: <i>usmiller</i>	AT	HRS.	PAGE 9 OF 28
DRILLING METHODS:			

DEPTH	SAMPLE TYPE & NO.	ESTIMATED MUD FLOW RATE	DRILLING RATE	DESCRIPTION	USCS SYMBOL	ESTIMATED DEPTH CORRECTION	REMARKS
280	SI-29		0930	FINE DARK GREY QUARTZ SAND SOME 10% BLACK CHLORITE MINUTE TRACE FINELY BROKEN SHELL FRAGMENTS POORLY GRADED	SP		
290	SI-30		0947	FINE GREY QUARTZ SAND TRACE (2%) BLACK CHLORITE TRACE (2%) FINELY BROKEN SHELL FRAGMENTS POORLY GRADED	SP		
300	SI-31		1013	VERY FINE TO FINE GREY QUARTZ SAND, TRACE (2%) BROKEN SHELL FRAGMENTS, POORLY GRADED	SP		
310			1020				

NOTES:

D'APPOLONIA

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 78-356	PROJECT NAME: LASL-HDR		
BORING NUMBER: DAPP-1	COORDINATES		DATE: 15 NOV '79
ELEVATION:	GWL: AT	HRS.	DATE STARTED: 14 NOV '79
ENGINEER/GEOLOGIST: W. S. Miller	AT	HRS.	DATE COMPLETED: 19 NOV '79
DRILLING METHODS:			PAGE 10 OF 28

DEPTH ()	SAMPLE TYPE & NO.	ESTIMATED MUD FLOW RATE	DRILLING RATE	DESCRIPTION	USCS SYMBOL	ESTIMATED DEPTH CORRECTION	REMARKS
310	SI-32		1035	VERY FINE TO FINE LIGHT GREY QUARTZ SAND, MINUTE TRACE OF BROKEN SHELL FRAGMENTS, POORLY GRADED	SP		
320	SI-33		1043 1052	SAME - TRACES OF MEDIUM QUARTZ	SP		HARD DRILLING @ 325'
330	SI-3A		1059 1106	FINE LIGHT GREY QUARTZ SAND TRACE (5%) BROKEN SHELL FRAGMENTS POORLY GRADED	SP		
340			1113				

NOTES:

D'APPOLONIA

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 78-356	PROJECT NAME: LASL-HDR		DATE: 15 NOV 79
BORING NUMBER: DAPP-1	COORDINATES		DATE STARTED: 14 NOV 79
ELEVATION:	GWL: AT	HRS.	DATE COMPLETED: 19 NOV 79
ENGINEER/GEOLOGIST: <i>W. S. Miller</i>	AT	HRS.	PAGE 11 OF 28
DRILLING METHODS:			

DEPTH ()	SAMPLE TYPE & NO.	ESTIMATED MUD FLOW RATE	DRILLING RATE	DESCRIPTION	USCS SYMBOL	ESTIMATED DEPTH CORRECTION	REMARKS
340	S1-35		1126	FINE GREY QUARTZ SAND, TRACE (5%) BROKEN SHELL FRAGMENTS POORLY GRADED	SP		
350	S1-36		1132 1138	FINE LIGHT GREY QUARTZ SAND TRACE (5%) BROKEN SHELL FRAGMENTS TRACE (2%) COARSE BROKEN SHELL FRAGMENTS POORLY GRADED	SP		
360	S1-37		1144 1151	VERY FINE TO FINE LIGHT GREY QUARTZ SAND, TRACE (<2%) BROKEN SHELL FRAGMENTS POORLY GRADED	SP		VERY CLEAN SAND
370			1157				

NOTES:

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 78-356	PROJECT NAME: LASL-HDR		DATE: 15 Nov 79
BORING NUMBER: DAPP-1	COORDINATES		DATE STARTED: 14 Nov 79
ELEVATION:	GWL: AT	HRS.	DATE COMPLETED: 19 Nov 79
ENGINEER/GEOLOGIST: W. S. Miller	AT	HRS.	PAGE 12 OF 28
DRILLING METHODS:			

DEPTH ()	SAMPLE TYPE & NO.	ESTIMATED MUD FLOW RATE	DRILLING RATE	DESCRIPTION	USCS SYMBOL	ESTIMATED DEPTH CORRECTION	REMARKS
370	SI-38		1202	VERY FINE TO FINE LIGHT GREY QUARTZ SAND, MINUTE TRACES OF COARSE BROKEN SHELL FRAGMENTS AND BLACK CHERT(?) PROPLY GRADED	SP		
380	SI-39		1206 1214	SAME. NO CHERT	SP		VERY HARD LAYER @ 387'
390	SI-40		1224 1440	SAME	SP		
400			1446				

NOTES:

D'APPOLONIA

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 78-356	PROJECT NAME: LASL-HDR		DATE: 15 NOV '99
BORING NUMBER: DAPP-1	COORDINATES		DATE STARTED: 14 NOV '99
ELEVATION:	GWL: AT	HRS.	DATE COMPLETED: 19 NOV '99
ENGINEER/GEOLOGIST: <i>W. J. Miller</i>	AT	HRS.	PAGE 13 OF 28
DRILLING METHODS:			

DEPTH	SAMPLE TYPE & NO.	ESTIMATED MUD FLOW RATE	DRILLING RATE	DESCRIPTION	USCS SYMBOL	ESTIMATED DEPTH CORRECTION	REMARKS
400	SI-41		1455	VERY FINE TO FINE GREY QUARTZ SAND TRACE (2%) BROKEN SHELL FRAGMENTS	SP		MUD HAS THICKENED SMALLER AMOUNT OF MATERIAL WASHING UP
410	SI-42		1503 1516	SAME	SP		DRILLER SAYS THAT WE'RE IN CLAY, BUT NO EVIDENCE IN SAMPLE AS OF YET EXCEPT FOR SMALLER AMOUNT OF MATERIAL
420	SI-43		1526 1540	SAME - TRACE (2%) IRON STAINED QUARTZ GRAINS	SP		DRILLING SLOW, HAVE TO TAKE IT EASY BECAUSE CLAY APPEARS TO BE CLOGGING RETURN FLOW IF DRILLING IS TOO FAST MUCH GREATER AMOUNT OF MATERIAL WASHING OUT NOW
430			1600				

NOTES:

D'APPOLONIA

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 78-356	PROJECT NAME: LASL-HDR		
BORING NUMBER: DAPP-1	COORDINATES		DATE: 15 NOV '79
ELEVATION:	GWL: AT	HRS.	DATE STARTED: 14 NOV '79
ENGINEER/GEOLOGIST: W. J. Miller	AT	HRS.	DATE COMPLETED: 17 NOV '79
DRILLING METHODS:			PAGE 14 OF 28

DEPTH	SAMPLE TYPE & NO.	ESTIMATED MUD FLOW RATE	DRILLING RATE	DESCRIPTION	USCS SYMBOL	ESTIMATED DEPTH CORRECTION	REMARKS
430	SI-44		1610	VERY FINE TO FINE GREY QUARTZ SAND TRACE (2%) FINELY BROKEN SHELL FRAGMENTS, MINUTE TRACES OF IRON STAINED QUARTZ GRAINS, POORLY GRADED	SP		
440	SI-45		1628 1638	SAME	SP		
450	SI-46		1650 1655	SAME	SP		IN A CLAY - CLOSED UP THE BIT AND SAW BLUE CLAY IN THE BIT WATER THE HOLE WAS TRIPPED
460			1705				

NOTES:

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 78-356	PROJECT NAME: LASL-HDR		DATE: 16 Nov '79
BORING NUMBER: DAPP-1	COORDINATES		DATE STARTED: 14 Nov 79
ELEVATION:	GWL: AT	HRS.	DATE COMPLETED: 19 Nov 79
ENGINEER/GEOLOGIST: <i>wsm/lln</i>	AT	HRS.	PAGE 15 OF 28
DRILLING METHODS:			

DEPTH ()	SAMPLE TYPE & NO.	ESTIMATED MUD FLOW RATE	DRILLING RATE	DESCRIPTION	USCS SYMBOL	ESTIMATED DEPTH CORRECTION	REMARKS
460	SI-47		1437	VERY FINE TO FINE LIGHT GREY QUARTZ SAND, TRACE (<2%) FINELY BROKEN SMALL FRAGMENTS, POORLY GRADED VERY CLEAN	SP		
470	SI-48		1447 1452	SAME	SP		
480	SI-49		1503 1510	SAME	SP		
490			1523				

NOTES: DEBINED 2 DAYS - CLOGGED STEEL, HAD TO TRIP THE HOLE TWICE

D'APPOLONIA

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 78-356	PROJECT NAME: LASL-HDR		DATE: 18 Nov 79
BORING NUMBER: DAPP-1	COORDINATES		DATE STARTED: 14 Nov 79
ELEVATION:	GWL: AT	HRS.	DATE COMPLETED: 19 Nov 79
ENGINEER/GEOLOGIST: W. J. Miller	AT	HRS.	PAGE 16 OF 28
DRILLING METHODS:			

DEPTH ()	SAMPLE TYPE & NO.	ESTIMATED MUD FLOW RATE	DRILLING RATE	DESCRIPTION	USCS SYMBOL	ESTIMATED DEPTH CORRECTION	REMARKS
490	SI-50		1525	VERY FINE TO FINE LIGHT GREY QUARTZ SAND, TRACE (2%) FINELY BROKEN SHELL FRAGMENTS, POORLY GRADED VERY CLEAN	SP		
500	SI-51		1537 1549	SAME	SP		
510	SI-52		1552 1559	SAME - SLIGHT TRACES OF CLAY	SP ↓ SC		HAD TO STOP - NEED A NEW SUB, GOING TO STOP TO WELD ONE, CONTINUE TOMORROW
520			1607				

NOTES:

D'APPOLONIA

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 78-356	PROJECT NAME: LASL-HDR		
BORING NUMBER: DAPP-1	COORDINATES		DATE: 19 NOV 79
ELEVATION:	GWL: AT	HRS.	DATE STARTED: 14 NOV 79
ENGINEER/GEOLOGIST: <i>W. J. Miller</i>	AT	HRS.	DATE COMPLETED: 19 NOV 79
DRILLING METHODS:			PAGE 17 OF 28

DEPTH ()	SAMPLE TYPE & NO.	ESTIMATED MUD FLOW RATE	DRILLING RATE	DESCRIPTION	USCS SYMBOL	ESTIMATED DEPTH CORRECTION	REMARKS
520	SI-53		1000	VERY FINE TO FINE GREY QUARTZ SAND TRACE (<2%) IRON STAINED QUARTZ GRAINS, POORLY GRADED	SP		SMALL AMOUNT OF MATERIAL WASHING UP IN RETURN
530	SI-54		1009 1016	SAME	SP		
540	SI-55		1021 1028	SAME - VERY MINUTE TRACE OF VERY FINELY BROKEN SHELL FRAGMENTS	SP		
550			1034				

NOTES:

D'APPOLONIA

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 78-356	PROJECT NAME: LASL-HDR		DATE: 19 Nov 79
BORING NUMBER: DAPP-1	COORDINATES		DATE STARTED: 14 NOV 79
ELEVATION:	GWL: AT	HRS.	DATE COMPLETED: 19 NOV 79
ENGINEER/GEOLOGIST: <i>wsmiller</i>	AT	HRS.	PAGE 18 OF 28
DRILLING METHODS:			

DEPTH	SAMPLE TYPE & NO.	ESTIMATED MUD FLOW RATE	DRILLING RATE	DESCRIPTION	USCS SYMBOL	ESTIMATED DEPTH CORRECTION	REMARKS
550	51-56		1050	VERY FINE TO FINE LIGHT GREY QUARTZ SAND, TRACE (2%) IRON STAINED QUARTZ GRAINS, MINUTE TRACE OF FINELY BROKEN SHELL FRAGMENTS, POORLY GRADED	SP		
560	51-57		1057 1102	SAME	SP		
570	51-58		1108 1113	SAME	SP		SMALL AMOUNT OF MATERIAL IN RETURN FLOW
580			1120				

NOTES:

D'APPOLONIA

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 78-356	PROJECT NAME: LASL-HDR	
BORING NUMBER: DAPP-1	COORDINATES	DATE: 19 NOV 79
ELEVATION:	GWL: AT HRS.	DATE STARTED: 14 NOV 79
ENGINEER/GEOLOGIST: <i>usmiller</i>	AT HRS.	DATE COMPLETED: 14 NOV 79
DRILLING METHODS:		PAGE 19 OF 28

DEPTH ()	SAMPLE TYPE & NO.	ESTIMATED MUD FLOW RATE	DRILLING RATE	DESCRIPTION	USCS SYMBOL	ESTIMATED DEPTH CORRECTION	REMARKS
580	S1-59		1125	VERY FINE TO FINE LIGHT GREY QUARTZ SAND, TRACE (2%) IRON STAINED QUARTZ GRAINS, MINUTE TRACES CLAY POORLY GRADED	SP & SC		SMALL AMOUNT OF MATERIAL IN RETURN. MUD HAS THICKENED, PROBABLY IN CLAY AGAIN
590	S1-60		1130 1135	SAME	SP & SC		SAME COMMENT
600	S1-61		1140 1142	SAME	SP & SC		SAME COMMENT
610			1147				

NOTES:

D'APPOLONIA

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 78-356		PROJECT NAME: LASL-HDR	
BORING NUMBER: DAPP-1		COORDINATES	
ELEVATION:		GWL: AT HRS.	DATE: 19 Nov '79
ENGINEER/GEOLOGIST: W. M. Miller		AT HRS.	DATE STARTED: 14 Nov '79
DRILLING METHODS:			DATE COMPLETED: 19 NOV 79
			PAGE 20 OF 28

DEPTH ()	SAMPLE TYPE & NO.	ESTIMATED MUD FLOW RATE	DRILLING RATE	DESCRIPTION	USCS SYMBOL	ESTIMATED DEPTH CORRECTION	REMARKS
610	SI-62		1157	VERY FINE TO FINE GREY QUARTZ SAND, TRACE (<2%) IRON STAINED QUARTZ GRAINS, TRACE (<2%) BROKEN SILL FRAGMENTS, POORLY GRADED SLIGHT TRACES CLAY	SP ↓ SC		SMALL AMOUNT OF MATERIAL WAS WASHING UP - PROBABLY IN CLAY
620	SI-63		1202 1206	SAME	SP ↓ SC		SAME COMMENT
630	SI-64		1210 1215	SAME	SP ↓ SC		SAME COMMENT
640			1270				

NOTES: VERY LARGE ANNULUS AT SURFACE AROUND THE SURFACE CASING N 4' DIAMETER EXTENDING DOWN 3 1/2', PROBABLY CAUSING A LOT OF THE COARSER CUTTINGS TO FALL OUT.

D'APPOLONIA

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 78-356		PROJECT NAME: LASL-HDR	
BORING NUMBER: DAPP-1		COORDINATES	
ELEVATION:		GWL: AT HRS.	DATE: 17 NOV '79
ENGINEER/GEOLOGIST: <i>W. J. Miller</i>		AT HRS.	DATE STARTED: 14 NOV '79
DRILLING METHODS:		DATE COMPLETED: 19 NOV '79	
		PAGE 21 OF 28	

DEPTH	SAMPLE TYPE & NO.	ESTIMATED MUD FLOW RATE	DRILLING RATE	DESCRIPTION	USCS SYMBOL	ESTIMATED DEPTH CORRECTION	REMARKS
640	SI-65		1226	VERY FINE TO FINE GREY QUARTZ SAND, TRACE (<2%) IRON STAINED QUARTZ GRAINS, SLIGHT TRACE OF FINELY BROKEN SHELL FRAGMENTS	SP + SC		SMALL AMOUNT OF MATERIAL IN RETURN FLOW - PROBABLY IN CLAY
650	SI-66		1233 1238	SAME	SP + SC		SAME COMMENT.
660	SI-67		1244 1250	SAME	SP + SC		SAME COMMENT
670			1256				

NOTES:

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 78-356		PROJECT NAME: LASL-HDR	
BORING NUMBER: DAPP-1		COORDINATES	
ELEVATION:		GWL: AT	HRS.
ENGINEER/GEOLOGIST: W. Miller		AT	HRS.
DRILLING METHODS:		PAGE 22 OF 28	
		DATE: 19 NOV '79	
		DATE STARTED: 14 NOV '79	
		DATE COMPLETED: 19 NOV '79	

DEPTH ()	SAMPLE TYPE & NO.	ESTIMATED MUD FLOW RATE	DRILLING RATE	DESCRIPTION	USCS SYMBOL	ESTIMATED DEPTH CORRECTION	REMARKS
670	SI-68		1301	VERY FINE TO FINE GREY QUARTZ SAND, MINUTE TRACE OF IRON STAINED QUARTZ GRAINS, MINUTE TRACE BROKEN SHELL FRAGMENTS, POORLY GRADED	SP ↓ SC		SMALL AMOUNT OF MATERIAL IN RETURN FLOW - PROBABLY IN CLAY
680	SI-69		1306 1311	VERY FINE TO FINE LIGHT GREY QUARTZ SAND, TRACE (2%) BROKEN SHELL FRAGMENTS, POORLY GRADED	SP		MORE MATERIAL NOW IN RETURN FLOW
690	SI-70		1316 1320	SAME	SP		GOOD AMOUNT OF MATERIAL IN RETURN FLOW NOW
700			1325				

NOTES:

D'APPOLONIA

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 78-356	PROJECT NAME: LASL-HDR	
BORING NUMBER: DAPP-1	COORDINATES	DATE: 19 NOV '79
ELEVATION:	GWL: AT HRS.	DATE STARTED: 14 NOV '79
ENGINEER/GEOLOGIST: <i>Wasmiller</i>	AT HRS.	DATE COMPLETED: 19 NOV '79
DRILLING METHODS:		PAGE 23 OF 28

DEPTH	SAMPLE TYPE & NO.	ESTIMATED MUD FLOW RATE	DRILLING RATE	DESCRIPTION	USCS SYMBOL	ESTIMATED DEPTH CORRECTION	REMARKS
700	SI-71		1350	VERY FINE TO FINE LIGHT GREY QUARTZ SAND, TRACE (2%) BROKEN SHELL FRAGMENTS, SLIGHT TRACE OF IRON STAINED QUARTZ GRAINS, POORLY GRADED	SP		
70	SI-72		1400	SAME	SP		
720	SI-73		1405	SAME	SP		
740			1418				

NOTES:

D'APPOLONIA

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 78-356	PROJECT NAME: LASL-HDR	
BORING NUMBER: DAPP-1	COORDINATES	DATE: 19 Nov '79
ELEVATION:	GWL: AT HRS.	DATE STARTED: 14 Nov '79
ENGINEER/GEOLOGIST: Wasmiller	AT HRS.	DATE COMPLETED: 19 Nov '79
DRILLING METHODS:		PAGE 24 OF 28

DEPTH	SAMPLE TYPE & NO.	ESTIMATED MUD FLOW RATE	DRILLING RATE	DESCRIPTION	USCS SYMBOL	ESTIMATED DEPTH CORRECTION	REMARKS
730	SI-74		1424	VERY FINE TO FINE LIGHT GREY QUARTZ SAND, TRACE (2%) BROKEN SHELL FRAGMENTS, SLIGHT TRACE IRON STAINED QUARTZ GRAINS, POORLY GRADED	SP		
740	SI-75		1428 1432	SAME	SP		
750	SI-76		1436 1442	SAME - 5% BROKEN SHELL FRAGMENTS	SP		
760			1446				

NOTES:

D'APPOLONIA

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 78-356		PROJECT NAME: LASL-HDR	
BORING NUMBER: DAPP-1		COORDINATES	
ELEVATION:		GWL: AT	HRS.
ENGINEER/GEOLOGIST: W. S. Miller		AT	HRS.
DRILLING METHODS:		PAGE 25 OF 28	

DEPTH ()	SAMPLE TYPE & NO.	ESTIMATED MUD FLOW RATE	DRILLING RATE	DESCRIPTION	USCS SYMBOL	ESTIMATED DEPTH CORRECTION	REMARKS
760	51-77		1451	VERY FINE TO FINE LIGHT GREY QUARTZ SAND, SLIGHT TRACES OF IRON STAINED QUARTZ GRAINS AND BROKEN SHELL FRAGMENTS, POORLY GRADED	SP		
770	51-78		1456 1506	SAME	SP		
780	51-79		1510 1514	SAME	SP		
790			1518				

NOTES:

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 78-356	PROJECT NAME: LASL-HDR		
BORING NUMBER: DAPP-1	COORDINATES		DATE: 19 Nov '79
ELEVATION:	GWL: AT	HRS.	DATE STARTED: 14 Nov '79
ENGINEER/GEOLOGIST: W. S. Miller	AT	HRS.	DATE COMPLETED: 19 Nov '79
DRILLING METHODS:			PAGE 26 OF 28

DEPTH ()	SAMPLE TYPE & NO.	ESTIMATED MUD FLOW RATE	DRILLING RATE	DESCRIPTION	USCS SYMBOL	ESTIMATED DEPTH CORRECTION	REMARKS
775	SI-80		1523	VERY FINE TO FINE GREY QUARTZ SAND MINUTE TRACES OF IRON STAINED QUARTZ GRAINS AND VERY FINELY BROKEN SHELL FRAGMENTS	SP		
800	SI-81		1527 1532	SAME	SP		
810	SI-82		1534 1542	SAME	SP		HARD LAYER @ 815'
820			1551				

NOTES:

D'APPOLONIA

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 78-356	PROJECT NAME: LASC-HDR		
BORING NUMBER: DAPP-1	COORDINATES		DATE: 19 Nov '79
ELEVATION:	GWL: AT	HRS.	DATE STARTED: 14 Nov '79
ENGINEER/GEOLOGIST: <i>W. J. Miller</i>	AT	HRS.	DATE COMPLETED: 19 Nov '79
DRILLING METHODS:	PAGE 27 OF 28		

DEPTH ()	SAMPLE TYPE & NO.	ESTIMATED MUD FLOW RATE	DRILLING RATE	DESCRIPTION	USCS SYMBOL	ESTIMATED DEPTH CORRECTION	REMARKS
820	SI-83		1558	VERY FINE TO FINE GREY QUARTZ SAND TRACE (2%) VERY FINELY BROKEN SHELL FRAGMENTS, POORLY GRADED	SP		
830	SI-84		1603 1609	SAME	SP		
840	SI-85		1613 1619	SAME	SP		
850			1624				

NOTES:

D'APPOLONIA

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 78-356		PROJECT NAME: LASL-HDR	
BORING NUMBER: DAPP-1		COORDINATES	
ELEVATION:		GWL: AT	HRS.
ENGINEER/GEOLOGIST: <i>W. J. Miller</i>		AT	HRS.
DRILLING METHODS:		PAGE 28 OF 28	

DEPTH ()	SAMPLE TYPE & NO.	ESTIMATED MUD FLOW RATE	DRILLING RATE	DESCRIPTION	USCS SYMBOL	ESTIMATED DEPTH CORRECTION	REMARKS
850	S1-86		1629	VERY FINE TO FINE GREY QUARTZ SAND, MINUTE TRACE OF VERY FINELY BROKEN SHELL FRAGMENTS, POORLY GRADED.	SP		
860			1634				
870							
880							

NOTES: