

PANAMA CANAL COMPANY
ENGINEERING AND CONSTRUCTION BUREAU

GEOLOGICAL FIELD LOG

1 INCH=2 FT.

PROJECT / LAUNCH AND LINEHANDLERS FACILITY

HOLE NO. / CLLF- 16

GEOLOGIST / P. FRANCESCHI

LOCATION / COROZAL

LATITUDE N. / 8 59' + 1425

LONGITUDE W. / 79 34' + 5350

COMPLETION DATE / 9 MAY 1989

STATION / 2274 + 6

OFFSET / 1194 E

CORE RECOVERY / 55.70 FT. 82.8 P/C / RMD 0.7 P/C

GROUND ELEVATION /

20.80

HOLE DEPTH /

74.80 FT.

DRILLER / D. WALTERS

VERTICAL HOLE

THIS IS A FOUNDATION HOLE, SEE NOTE 14 IN SUMMARY FOR SPT DATA.

| ELEVATION IN FEET | DEPTH IN FEET | COLUMNAR SECTION | DESCRIPTION OF MATERIAL | DRILLING CHARACTERISTICS * CR CR P/C RMD P/C * | CORE RECOVERY |
|----------------------|------------------|---------------------|--|---|------------------|
| 20.80 | 0.00 | | ASH FLOW, OH-3, MEDIUM HARD OVERBURDEN, TO R | FROM 0.0 FT. TO 1 | |
| | 1.00 | | H-5, VERY HARD ROCK, VARIABLE STRENGTH, WEATHE | 0 FT. STANDARD PENETRATI | 1.00 |
| | | | RED, VERY CLOSE JOINTING, JOINTS IRON-STAINED | ON TEST (SPT) -----FROM | |
| | 1.50 | | + OXIDIZED, JOINTS OPEN, JOINTS CONTAIN CALC | 1.0 FT. TO 1.5 | 0.50 |
| | | | ITE, ZEOLITE, CHLORITE, JOINTS DIP AT RANDOM | FT. DRILLED DRY WITH 4 IN | |
| | | | ANGLES, INDETERMINATE BEDDING, EXHIBITS FLOW | . CASING, H.P. 800 PSI. | |
| | | | STRUCTURE, ANGULAR TO WELL ROUNDED, WATER-LAID | -----FROM 1.5 FT. TO | |
| | 3.00 | | , TUFFACEOUS, VOLCANIC DEBRIS, PERLITIC, | 3.0 FT. DRILLED SLOW | 0.50 |
| | | | ANDESITIC, BASALTIC, BRECCIATED, PYROCLASTI | LY WITH 4X5-1/2 IN. TRIP | |
| | | | C ROCK, CONTAINS ABUNDANT AGGLOMERATIC WATER | LE TUBE CARBOLOY BIT + W | |
| | | | IAL, SCORACEOUS FRAGMENTS, UP TO 0.1 FT. IN D | ATER, CORE IN POOR CONDI | |
| | | | IAMETER, IN A FINE-GRAINED, TUFFACEOUS MATRIX, | TION 0.1 TO 0.2 FT. | |
| | | | THIN, ALTERNATING AGGLOMERATIC LAYERS, CONT | LENGTHS.-----FROM 3.0 | |
| | | | AINS DEVITRIFIED GLASS FRAGMENTS, WEATHERING D | FT. TO 10.0 FT. DRIL | |
| | | | ECREASES + HARDNESS INCREASES WITH DEPTH. COLO | LED WITH TRICONE ROTARY BI | |
| | | | R- MOTTLED MEDIUM GREY-BROWN, IN UPPER PART, | T, NO ATTEMPT TO RECOVER | |
| | | | MOTTLED OCHRE, + GREEN, IN CENTRAL PART | CORE. MATERIAL INFERRED | |
| | | | + MOTTLED DARK GREY-GREEN, IN LOWER PART, | FROM CUTTINGS + COLOR OF W | |
| | | | NOTE/ SPT'S WERE TAKEN WITH A STANDARD 2 INCH | ATER. -----FROM 10.5 | |
| | | | SPLIT SPOON + A 140-LB. HAMMER DROPPED 30 INCHES | FT. TO 41.6 FT. DRILLE | |
| | | | FOR EACH BLOW. SEE NOTE 12 IN SUMMARY | D SLOWLY WITH 4 X 5-1/2 | |
| | | | | IN. DOUBLE TUBE, CARBOLOY | |
| | | | | BIT + WATER, CORE GROUND | |
| | | | | D + BLOCKED, CORE IN POOR | |
| | | | | CONDITION 0.1 TO 0.2 | |

14.50

16.50

19.50

24.50

27.00

30.50

FT. LENGTHS.-----FROM
41.6 FT. TO 51.9 FT
DRILLED SLOWLY WITH 2-
3/4 X 3-7/8 IN. DOUBLE TUB
E, DIAMOND BIT + WATER,
CORE GROUND + BLOCKED, CU
RE IN POOR CONDITION 0.1
TO 0.2 FT. LENGTHS.--
---FROM 51.9 FT. TO
54.9 FT. DRILLED SLOWLY
WITH 2-3/4 X 3-7/8 IN.
DOUBLE TUBE, CARBOLOY BIT
+ WATER, CORE GROUND +
BLOCKED, CORE IN FAIR CON
DITION 0.1 TO 0.4 FT
LENGTHS.-----FROM 54
.9 FT. TO 59.2 FT. AS
ABOVE. CORE IN POOR, FR
AGMENTARY CONDITION.

4.50

3.00

1.75

0.90

0.90

32.50

35.80

38.50

40.30

41.60

43.10

45.10

47.50

48.80

51.90

1.40

2.80

2.70

1.80

1.30

1.50

2.00

1.70

1.50

3.10

| | | | | |
|--------|-------|--|--|------|
| | 54.90 | | | 3.00 |
| | 57.90 | | | 3.00 |
| -38.40 | 59.20 | | * 40.10 77.0 0.8* | 1.30 |
| | 60.20 | AGGLOMERATE, TUFFACEOUS, RH-2, MEDIUM SOFT ROCK, TO RH-4, HARD ROCK, VARIABLE STRENGTH, VERY CLOSE JOINTING, WITH PLANAR SLICKENSIDES, JOINTS IRON-STAINED + OXIDIZED IN UPPER PART, JOINTS OPEN, JOINTS CONTAIN PYRITE, CHLORITE, EXHIBITS FLOW STRUCTURE, FINE-GRAINED, TUFFACEOUS, CONTAINS ABUNDANT AGGLOMERATIC MATERIAL, FINELY DIVIDED PYRITE CRYSTALS, UP TO 0.1 FT. IN DIAMETER, IN A FINE-GRAINED, TUFFACEOUS MATRIX, CONTAINS DEVITRIFIED GLASS FRAGMENTS, COLOR- BLACK, MOTTLED DARK GREY-GREEN, + MEDIUM GREEN, NOTE/ CORE PARTIALLY HYDRATES, SWELLS + DISINTEGRATES ON EXPOSURE TO AIR. | FROM 59.2 FT. TO 68.8 FT. DRILLED SLOWLY WITH 2-3/4 X 3-7/8 IN. DOUBLE TUBE, CARBOLOY BIT + WATER, CORE IN POOR, FRAGMENTARY CONDITION. | 1.00 |
| | 62.20 | | | 2.00 |
| | 64.50 | | | 2.30 |
| | 66.50 | | | 2.00 |
| -48.00 | 68.80 | | * 9.60 100.0 0.0* | 2.30 |
| | | ASH FLOW, RH-4, HARD ROCK, STRONG, VERY CLOSE JOINTING, CONTAINS SOME NEAR VERTICAL JOINTS, JOINTS OPEN, JOINTS CONTAIN CHLORITE, SUBANGULAR TO WELL ROUNDED, WATER-LAID, ANDESITIC, BASALTIC, AGGLOMERATIC MATERIAL, UP TO 0.1 FT. IN DIAMETER, IN A COARSE-GRAINED, TUFFACEOUS MATRIX, CONTAINS DEVITRIFIED GLASS FRAGMENTS, COLOR- BLACK, | FROM 68.8 FT. TO 74.8 FT. DRILLED SLOWLY WITH 2-3/4 X 3-7/8 IN. DOUBLE TUBE, CARBOLOY BIT + WATER, CORE IN FAIR CONDITION 0.1 TO 0.6 FT. LENGTHS. SEE NOTE 13 IN SUMMARY | |
| -54.00 | 74.80 | | * 6.00 100.0 0.0* | 0.00 |

NOTES

1. TYPE OF MATERIAL

| ELEVATION | DEPTH | |
|------------------|----------------|--------------------------|
| 20.80 TO -38.40 | 0.00 TO 59.20 | ASH FLOW, |
| -38.40 TO -48.00 | 59.20 TO 68.80 | AGGLOMERATE, TUFFACEOUS, |
| -48.00 TO -54.00 | 68.80 TO 74.80 | ASH FLOW, |
| -54.00 | 74.80 | BOTTOM OF HOLE |

2. ENGINEERING + GEOLOGICAL FORMATION CONTACTS

| ELEVATION | DEPTH | |
|------------------|----------------|------------------|
| 20.80 TO -38.40 | 0.00 TO 59.20 | WEATHERED ROCK |
| -38.40 TO -54.00 | 59.20 TO 74.80 | SOUND ROCK |
| 20.80 TO -54.00 | 0.00 TO 74.80 | LAS CASCADAS FM. |

3. AMOUNT OF CASING USED

27.0 FT. OF 6" CASING

42.0 FT. OF 4" CASING

5. PURPOSE OF HOLE / GEOLOGICAL AND GEOTECHNICAL INVESTIGATION.

8. WATER TABLE

| ELEVATION | DEPTH | DATE |
|-----------|-------|----------|
| 7.30 | 13.50 | 25/ 5/89 |

10. CORE BOX NUMBERS AND DEPTHS

| FROM | TO | FROM | TO | FROM | TO | FROM | TO | FROM | TO |
|----------|------|----------|------|----------|------|---------|------|----------|------|
| 1) 1.0 | 12.0 | 2) 12.0 | 18.9 | 3) 18.9 | 30.5 | 4) 30.5 | 35.8 | 5) 35.8 | 40.3 |
| 6) 40.3 | 44.8 | 7) 44.8 | 48.2 | 8) 48.2 | 52.4 | 9) 52.4 | 57.9 | 10) 57.9 | 62.2 |
| 11) 62.2 | 67.7 | 12) 67.7 | 71.5 | 13) 71.5 | 74.8 | | | | |

12. ADDITIONAL DESCRIPTIVE INFORMATION

FROM DEPTH 19.5' TO 20.0' THERE IS A QUARTZ DIKE. THIS MATERIAL IS BRECCIATED FROM DEPTH 18.5'. THE CORE CONTAINS CLAY, SAND, SILT, PEBBLES AND PIECES OF AGGLOMERATE, ASH FLOW AND PERLITE ALL MIXED. ALL THE CORE IS HIGHLY BROKEN. THIS AREA SEEMS TO BE PART OF A SHEAR ZONE.

13. ADDITIONAL DRILLING INFORMATION

IN ALL THE DRILLING RUNS THE BARREL WAS BLOCKED. THE CORE WAS ALL FRAGMENTED FROM DEPTH 0.0' TO 74.8'.

14. STANDARD PENETRATION DATA

| SPT NO. | DEPTH IN FEET FROM | TO | BLOW COUNT | FEET |
|---------|-----------------------|------|----------------------------|--------------|
| 1 | 0.00 | 1.01 | 63 BLOWS TO 68 BLOWS TO | 0.50 0.50 |