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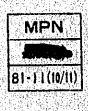
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FEASIBILITY REPORT ON AGOS RIVER HYDROPOWER PROJECT

DATA BOOK III GEOLOGICAL EXPLORATION

MARCH 1981

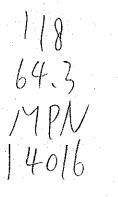


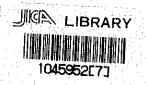


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FEASIBILITY REPORT ON AGOS RIVER HYDROPOWER PROJECT





DATA BOOK III GEOLOGICAL EXPLORATION

MARCH, 1981

JAPAN INTERNATIONAL COOPERATION AGENCY

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AGOS RIVER HYDROPOWER PROJECT FEASIBILITY REPORT

Main Report

Appendix	A	Hydrology and Reservoir Operation
Appendix	B	Geology and Construction Materials
Appendix	C	Power Study
Appendix	D	Optimization Study for the Development on the Agos River System
Appendix	E	Project Works
Appendix	F	Computer Outputs

Data Book I	Topographic Survey
Data Book II	Meteorology and Hydrology
Data Book III	Geological Exploration
Data Book IV	Construction Materials

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DATA BOOK III GEOLOGICAL EXPLORATION

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4.	Diagram of Water Pressure Test	L54





DATA BOOK III GEOLOGICAL EXPLORATION

This data book contains the results of the geological investigation carried out at the site from June 1979 to the end of 1980 for the feasibility study of the Agos River Hydropower Project.

Included are:

3.

1. Records of core drilling logs

2. Records of seismic exploration

Records of water pressure test and diagram.

CHAPTER 1

GEOLOGICAL RECORD OF BORING (BORING LOG)

GEOLOGICAL RECORD OF BORING HOLE No. 41-79-1 (DDH-1), 11) LOCATION AFON AND SITE X / States of Y of 7.572 (1) OF HOLE for an INCLINATION OF HOLE LOP UCA PROJECT HYDRIPOWER Agos ELEVATION OF GROUND BUBPACE IIIAAD AL DEPTH OF HOLE DIAMETER OF HOLE 7/ MACIENE ACKER ACE CORE RECOVERY 70.34 DRILLED BY DATE OF DELLING 17 JULY A & T. 11 71 M. WED CONL ROD LUGEON UNIT EI EVA-COLUMN DEPTH LICOVE. DESCRIPTION BOCK TYPE TION **SECTION** * (iii) (a) Tales deput 10 hight hoven day of set. ΧA miled of some subangalar 12 rock frequents. AT-AN AN CON HOWNY. 4 4 345 ____**3** Rodish boom daysy sail with high maisters 42.01 #.V Richal suit -47-30 11-10 the and moving J.M ٩ 210 200 2 Interesty needland hel onk 0⁴0 2.1 knowing case is compared of 0;JS only angular with firspecials 24 21- AO AD CAP MILWARD 101.1 Coyalon contain $(\omega$ 4 Ant classification (D) 14.1 millins Mostly short optimbra Light give owns Ó N.L. ò 1 44 Have parties very hird . "**f**∶y O đ \$7 m H.I - 164 MI-163 INA-163 Routed cracks. Mar Mar Son of thus cracks Mar Mar and son of thus cracks Mar Mar Sical. 44 ·ő" 1.10 Ó, 421 14 33 N. 63 Gry water . . Light gry come matter 16.4 conversion is very box, if al a helf is mit & frequents . 14 de sution mater ĉ A.e. 123 ALI MALE NO CAP HIMMY 1 110 (0~ C1) 4 very low we wanty. only subargular program to me recovered. ×1. Alandi with ses the case security (D~CI) 1.2 Very has cars a covery pully intering mathemed. 12; 1 = म् म् म् \$7.003 Care sting Coy Burnt · . Al./~ 23.8 (01) mer contening Abbles . Mastly glandic care, pert H. 1 1 141, 2811, 1847, MIN . shipp inclined raised cruch. 11. allen at at Takatal Huder Εz 224 2. 7 Pelles up contained. N.71 2.0-26.14 The make be 26.0.201 Shep a replical rad, and inclined cracks نور پز 27 Cog fa (CANCA

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PROJECT AGOS HYDRU ELEVATION OF CROUND SURFACE MANETER OF HOLE 1/1/2 MANETER OF HOLE 1/1/2 63 × GEOLOGICAL RECORD OF BORING HOLE No. A1-71-5 (004-5) , (1) HYDRO POWER LOCATION AFOS DATISTIE C.K. B. XILMARI MI/Y 336 ASS AFACE 51,175 DEPTH OF HOLE 71.00 INCLINATION OF HOLE Vartical MACHINE HILLY SILLY DATE OF DRILLING 12 DEC 1979 - 17 FEB 1980 DEPLED BY LOCGED BY DRILLED BY COLUMN RECOVERY CONK 4 M R Q D LUGEIN DAIT ELEVA-TION DATE DESCRIPTION DEPTH ROCK TYPE X SECTION (n) (m) Up to 29 m. care recovery is River Lad diposit wing pur. S Backders and samp soil are seared to be present 1 ι. 20 50 sinten Rostor gold case pinary. (and programmatel care and recover 20 Ð \mathcal{O} 1.73 ł 11.37 ~ 120m Rather good () COLD ATOMPY. ć, ٤, partly sends to a boulders $\mathcal{O}_{\mathcal{O}}$ are recovered. 60 $\langle \cdot \rangle$ 145 • . Ċ 125 ¢, , a 17.76 m yiny day Brenty Liter deputul bet not is not \mathcal{O} char beneve of pour Ē2 71.15 an noury \bigcirc 0 14 . Q $\dot{0}$ 22 - 24 0 -- 0 -1 1925 -1.94 minteret . Extremely methoded, more by anywek

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GEOLOGICAL RECORD OF BORING HOLE No. A1-99-5 (004-5) , (4) PROJECT AGOS MYDROAWLER ELEVATION OF GROUND SURFACE LOCATION DEPTH OF HOLE 70.0.52 INCLINATION OF HOLE Vertical DATE OF DRILLING DIAMETER OF HOLE MACHENE CORE RECOVERY LOGGED BY DRILLED BY 63 74 CORS 4 N BCOVERY S B E S CORS RECOVERY LUGGON UNIT RQD COLUMN BL&YA. DESCRIPTION DAT! DEPTH ROCK TYPE × TION 8101108 (m) (m) Any marks ĿΖ (b) 31.4 N M41 370-300 Caly forgosatel Ļ 354 erikay plas is an anoth 16 L 2225 assist. Bill Durk with publics. EU 32.25 41.2 4 alon ala consider fragile alon ala associating esith eson ala associating esith eson ala bes of catalo ver 4.1~ 44 42 45 per ly alab mins staf inchiel 1. mara - Long yhabic CARE MININTY. 47 4 (Cn) 2 *** 51.10 2 44 4 First sund stand stat ghidre 10 H because of mechanical be +(C 11 1.12 - 122 Shut aphalic 417 mays caintas comin froge Creite and furgened along 134 while mins . 31.9- 560 th 417 - 525 Within - 557 417 - 525 Within & Compe-572 - 503 Martin dermeter 572 - 523 Martin along calab 4 5716 Xile, 14 10-318 Min 17 wit Ans are help raid. 17

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GEOLOGICAL RECORD OF BORING HOLE No. A1-79-5 (DOH-5) , (3) PROJECT AFOS HIDROPOWER ELEVATION OF GROUND SURFACE NAMETER OF HOLE CORE RECOVERY 63× LOCATION DEPTH OF HOLE 7.0 A INCLINATION OF HOLE Willias MACIONE LOGGED BY DRILLED BY N D N ROD LUGEIN UNIT COLUNN ELEVA-DESCRIPTION DEPTH ROCK TYPE X TION SECTION · (# (m) Greynsiks (cn) 李 1.22 Because of moderical bourks may obert cybelic cases an account. Blact the base bolling plane. I dip about so: Parts fint sands to ze 1.4 (CA-CA) A.M Dark hight gog grymete. hignet Multy sinceria gladse]1 45 15.00 com we recovered. 11 Montener beauti at hay 15 owilly story catal mins NA. 6700 52 1.9 1 (Cm~CH) 111 1.1 70 74 4 - 43 34

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GEOLOGICAL RECORD OF BORING HOLE No. A1-91-6 (004-6) ,11)
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175 GEOLOGICAL RECORD OF BORING HOLE No. A1-71-7 (004-7) , 11) PROJECT AGOS HYDRO PONIR ELEVATION OF GROUND SURFACE AS SWITTE DEPTH OF HOLE SOOT INCLINATION OF HOLE Vylice DIAMETER OF HOLE 71% MACHINE Arks ASS DATE OF DRILLING 21 OFT ~ 4 DEC. 19 COPE RECOVERY 00 - DRILLED BY 4 DEC. 1929 LOGGED BY CORE RECOVERY DRILLED BY 80 × CORE 3 M LUFEAN UNIT RQD социня ELEVA DESCRIPTION ROCK TYPE DEPTH * 8 5 X TION SECTION {**=**) (à) Nx Yellow brown Surface sail Associated with was plured rock program. 123.545 1.90 Only shine is necessarial mapt iorn long cylumbric core at ham Stime , 5 not much claysy and , 5 dark yellowish between 1.4 **Ż**AŚ 1. (0) 125.1 ***** 6 4 mg mito Case is characterized by small while patchs These 4 Ax 11.4 patches are composed of timestan programmente. stores only forgonatel cans 44 AN neperied. 21-25" Vertices crack, to pho is match. 冯斟 han 20" Mechanical book hope heresh part is very 4 hard *N* 4 (e_n) 118 64.5 \mathcal{I} Core is chiracter god by Late Colemans & while parties of linestone Incia frequents . These frequents have 14.6 the sign of elision of 18.4-115 Vartical crocks, the plan is railed 1.00 N G 20 2 - 23.5 m Only dert lower thes is secovered the stim is sindy 4.5 Constant for number of small half. These hales are or probed from anyon of lines to frequents. 31.1 (Cm atut Mong small patchs are present Grywacke 173 Mostly long years come

16 HOLE No. A1- 29 - 2 (00H- 2) , 14) GEOLOGICAL RECORD OF BORING PROJECT ASAS HIDE AFWER ELEVATION OF GROUND SURFACE | NAMETER OF HOLE - -LOCATION DEPTH OF HOLE COMMINSTER OF HOLE VIPTICAP MACHINE 80 % DRILLED BY LOGGED BY CORE RECOVERY CORE S AS RQD LUGEON WIT ELEVA-ROCK TYPE DESCRIPTION DEPTH TION X SECTION (m) 341-343 this byor of black Figuecke dele . This Sugar dife to (Cn-Cn) يستركدونها والمع 103.145 Fran Sunditions For souther assented and black Sear 15 14 15 - 31.9 " try secto 11 see-ses" Frynntal. Crick begans along callet no NЮ (CM ACH) 17.545 4 very this calab see is prese Fige sould be (CM 10.295 20 Grymike 10 AS 2615 - 369 M л (CM 15 Mit Fine Suddies Allicented with anyaber programte of solitons and my dire are (Con Grynneke this you is chiracterized by small black anywher patch of black shall. 39.2- 39.7 the soudstone, A. 4 associated with then layer of black del. - H ann-all writed-wry ar - ars writed-wry mr - all stop crucks allong or - stor cracks allong EL. 120 (Cn) 40 Lote of angaber black public the standard of the spectra public the spectra public standard of the spectra public standard o frequent. a 47 2.20 AL- HIMY (См~Сн) 2.4K 9 Except of any celat and Gignecks Colut vies by my step. 413-421 which emet 12.15 26.193 16 e.t. 47-94 (Cn ~ CA) 25.595 50.00

HOLE No. A1-79- 2 (DDH-2) , 113 GEOLOGICAL RECORD OF BORING
 Inclusion
 <t PROJECT HYDRO POWER AGOS ELEVATION OF GROUND SURFACE 214/2-28 × DIAMETER OF HOLE LOGGED BY CORE RECOVERY DRILLED BY CORE EXCOVER ROD LUGEAN UNIT ELEVA-COLUMN DESCRIPTION Depth BOCK TYPE 1100 X **SECTION** (18) (# a, light boun chypy soil with small rowarded rubbs Reident soit. 14 111 47.893 _____ ຊີ Care reasoning is that good Telles depart 1 Most of the cases and gigs Rimr had associated as the few capacity adid catalo particles. С **€**50 deposit. 4 Course an divided by method ۵ steres. ٨ 6.11 0 Δ. 765 0 . . . 4 1.15 0 0 Þ 4 11.6 . Ð 8 12.4 4 0 ð (D): 17.16 44 小 The housing between your bed before and bedruck is not grymus - 1 , char because of pour come 4.1 ς. Heavily. From weathering condition to but rect seems to be from Nont rain. Ł 2 4.4 Daly short cylindric com 2 1 MCANAVAL May creeks are siret and 1 oust of the we with ! ×. es.z-alum - **7** Fine standstone 44 10.7 (Ci)

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18 GEOLOGICAL RECORD OF BORING HOLE No. A1- 19- 2 (DDH- 1), (4) -] PROJECT ASOS HYDROPOWER LOCATION
ELEVATION OF GROUND SURFACE DEPTH OF HOLE 7.0" INCLINATION OF HOLE VIEWAD
WACHINE DATE OF DRILLING
UCGED BY CORE RECOVERY DRILLED BY 28 DIAMETER COAL ROD LU GEON UVII соглян SLEVA-RECOVER DESCRIPTION DEPTH ROCK TYPE TION X SECTION 8 8 (19) (m) ΞĚ. Gryaniko 31.3 L. All, but y the an is 11, #13 Far sudstar ų į 3381 Graymank Generally sound part cares 1. or recorded Const Soudel L. Partly step include white veins are excised. Here cause cases to be fryit. 1.3 344-35.1, 38.7~368 m Fingil frequential ceres are recovered Cylindric come have Trubd 2 creeking plans ш 17.25 4 (Cn ~ Cu) U) 1135 1.313 Annually dury grow gray cars is seconded , it has partly sendstone (nit so fine grained) sze Mere while saint. 42.3- 40.4 m Jill stops the heling the dis alm 2.9. 3 7143 11 Durt gry pryouts, Cour store Grynner st of which patchs of low to promote (CH) 3.11 First Scaleto 451-451, d)+ ~ 491m sillstore ~ ship is suist 4 the lugar has builting school and it digs about sto 4(3) 2 det + 42/ 459 - 4/200 Ship inches / course along calci & voias, the courting 423S Ż plans are restel 1.612 (CAR CA) 1.193 Ň This part is characterized by 12 try mito 1.1.1 a Al of alile potely of ť. tivistic patche ; Ē sist- +3 as " Ground < 121 maker and for flowing 4 γ Sec- 511, 05. Lung 45-54 fed- 62.8m Marth forgentel come are recovered, and they see A; 1. 4 1mp: 6. A lot & catil ne are swit. 47 **1** 12 Party com has angalar makes May no mostly mades to 31 ¥ For bs (com) fry**nn**ts, 35.16~ 14M No return maker

GEOLOGICAL RECORD OF BORING HOLE No. A1-79-2 (004-2), (3) PROJECT AGAS HYDER AWFR RELEVATION OF GROUND SURFACE LOCATION LOCATION DEFTH OF HOLE 36, * INCLUATION OF HOLE Verecel R RATE OF DRILLING D BY LOCCED BY DANETER OF HOLE CORE RECOVERY MACHENE DAILLED BY 18 % CORK 4 M BOOYIN N 8 1-3 LUGEIN UNIT RQD ELEVA. TION COLUMN DEPTH BOCK TYPE DESCRIPTION X. eectros (æ) **(n)** Sugarthe in ¥.13 Ŋ 620 1404 Can an wy dert gray willy also him . jo (exes 8 webenical brough 13.4 6 -12.207 Fin sondsten (CA) þ 1/10

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GEOLOGICAL RECORD OF BORING HOLE No. 41-19- \$ (DOH-4) , (1)
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 LOCATION
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 ELEVATION OF GROUND SURFACE
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 DEPTH OF HOLE
 MASS DAMS/IF, A Ling, X SIZENZ / Y dda 221

 ELEVATION OF GROUND SURFACE
 Add. 0.2 m.
 DEPTH OF HOLE
 MASS DAMS/IF, A Ling, X SIZENZ / Y dda 221

 DIANETER OF HOLE
 Add. 0.2 m.
 DEPTH OF HOLE
 MASS DAMS/IF, A Ling, X SIZENZ / Y dda 221

 CORE RECOVERY
 21 %
 DEPTH OF HOLE
 MASS DAMS/IF, A Ling, X SIZENZ / Y dda 221

 CORE RECOVERY
 22 %
 DRILLED BY
 LOGGED BY
 M VALA
 BET & CORE LUGEON UNIT ROD COLUMN ELEVA RECOVERY DESCRIPTION DEPTH ROCK TYPE TION SECTION 8 8 (m) (.) Μŧ Rollish know wher iling soil. W soil 484 144167 <u> Li z er</u> Light brown where 3,0 Resident Sect 10-11 Colla AT- 20 He care recovery 10.01 3N DB ٨x ۰. 6 211 ٠ - . • 24 14.167 •___ Lighthrown soil with some Resident 1 \$10 al with Imposet of but maller 0 " All - He Ho care encoury He - He and the mount He - He aid the mount He - He class A 14.11 met st ۵. 21 . . . HI- HI N HAM HIL ···· 0 14 N.H-<u>ہ</u> ۔۔ 13 134 <u>.</u> (Þ) A MA 132.167 Ďð A), ul ~ H. & Rust with police 59 Coyber AX ٠, 4 A H . mill i All to spin nully in simil ŧ AL. Ast roubl crut pha 1 , d. HE AS THE CAR MENTY (CA) 14/4-11 16. 141 - 165 Reactered part and routed , Iĝ 121-12 Marsin crect and railing 121-12 Varsint crect and railing 1914-12 No case planners (CL) 77 Marsh. 124 7 lay optimie was with for , porty min . Viry hard 1 19.28, Mat Rul I water ۰. Non 100 Water Las i A 14 21 11.17 Multy by yhile cores. ţ 227-228 Hart and with must create po Confirmento السيلك "]/ TAS - MAR 16 CHI MONTY cillo 11 (Cn) أكسلسه 1.14 1915.00 1975.61 1877.91 Historia and racked for the must ports, only fragments are presented. 160 - 243" A care recovery MH (di) ò hecorytens of adapt is pr 5/ 24 - N.F . M n 11011 A. of sher to 团 ruit / plan HALD J PAR and marks the case second Very after counts are second to a the case second million arts the case second 27.34 Grynuks (Čm) Any perty Ē. -0 1.5 e. 1 (Ca) Aning the mest and they 11.111 67 porth frogit

GEOLOGICAL RECORD OF BORING HOLE No. A/ 79-9 (DAN-P) , (2) LOCATION PROJECT AGAS HYDRAELECTRIC ELEVATION OF GROUND SURFACE N.P. INCLINATION OF BOLE WICHIGP DATE OF DRILLING DEPTH OF HOLS MACHINE DEAMETER OF HOLE LOGGED BY M. YAKE DRILLED BY CORE RECOVERY 82% CORR AS PARENT LUGEON UNIT RQD COLUMN RECOVERY ELÉVA-DESCRIPTION DEPTH ROCK TYPE TION SECTION (....) (m) DB Hetty cylindric long capes 323, 21.9" Crip phases along Grymati 1 Z Confrance NX 115.167 4.15 31 peret wine . 21.5 21.7 Kubb start includ 21.6 eraits Gryoneto errite (CH - B) ىيى تد Durt grag tong gehadere cause surg hard. mar Annod croate 280 (CH) Ľ. ii -344 to be sound upor 4 14667 His inche along party ò Caylinins D containing o (4) collar, 0 174 portly From have possible patrons on cover and clear, their patro deni ż inlars. de fan 14 00 21 # an famil o 12.5" ANUS & crack ph 18.0-38 Stup makind gran 6 creat day pours mine Ch **4**.3 q Long aglandric cores Spand rest, surg hard LCH - B) Ø Į٩ 0.0 41.7 Parth coller - haller on intained and interest one never Study inclused mild low pair 1 Ô 6 o 9 . V -46 11.11 710 Marth long is her live and ving hard spectruly do not day of contained call to are Conclaires calaines Robbles O4 aut char. porth 1 actually an eret day ×. المدونه 44 and State in the second and a second and a state of the second and a second and a second a se 0 ò -76 (CH - - -) W ŧ, est, 12) Stephy includes along parts are 1 cred . 0 Q era-era shally ground created 1 97 12.30 1 0 16.167 11-11

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	PROJECT	AG N OF	GROUND SUR	ROPON FACE	136	145+		DEPTH OF HOLE 24.1 m.	D4/10/75 INCLINA	A-LW, XA	60' 30	1.073 E
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	w	FIEVA.		COLUMN	CON	E 4	Ê	DESCRIPTION	RQD	LUGE	IN W	LI E
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GEOLOGICAL RECORD OF BORING HOLE No. A1-79-10 (DDH-10) , 121 PROJECT AFOS HYDROPOWFR ELEVATION OF GROUND SURFACE LOCATION 710 M INCLINATION OF HOLE 10'SSE DATE OF DRILLING DEPTH OF HOLE MACHINE DIAMETER OF HOLE LOGGED BY CORE RECOVERY DRILLED BY 61 % CORE RECOVERY ROD LUGEN UNIT COLUMN ELEYA DESCRIPTION DEPTH ROCK. TYPE X TION STON STOR (p) (m) 51 1111 i i Grymitte Two calab vin the for must of them cause emotiony \$120 ALD - 32.1 Long COMI ONE 32.1 recoursed 34 Z +17 1 11.9 3680 18.7 10.1 4.1 K (CH-CH) 133 4165 Derit ging southers Freigt mechanical branks con Fine soul Star are good condition 11.45 (C4) 4 Grynnek Mastly Long Consider in 44 42.4-423" Only fingmental Cons are recovered and they ere firste. U "{}``. Ø (CMACH) 19.1 i Gji hilly the scher dits about as' ļ Hitt Fry Soulstone ŝ 14.7 Gry wet Partly catul verses one present and creats happen along des catals news . Mostly controp planes first 17 Ŀ. to rusting: Stranstation Frequential cases SLIN 523 Stranstal cases SLIN 523 Stranstation for SLIN 543 State cines are Sconed to present by 1 melenical benetic ŧ. SINA to petern mor 57 (Cnr 77.44 CH . 7.7 Front sand the Very hard and home yourses telling for dips 25° (Ch 16.545 ふりおい

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			RECOV	HOLE	61 2	D	ACIUN	D BY	OF DRILLIN	GED BY M. YAKU
	DATE	DEPTH (*)	F 11	ROCK TYPE	COLUMN SECTION	CORE RECOVER	EXT &	DESCRIPTION	ROD	LUGEON UNI7
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25 GEOLOGICAL RECORD OF BORING HOLE No. A1-99-11 (DOH- 11) , 11)
 PROJECT
 AFOS
 HYDRO DOWER
 LOCATION
 ASOS
 AMULE
 X 284 RDM / Y 144 RDM

 ELEVATION OF GROUND SURFACE
 122, 123
 DEPTH OF HOLE
 SAAM INCLINATION OF HOLE
 Varticed

 DAMETER OF HOLE
 24 / 44
 MACIDNE
 HILLY
 BILLY
 DATE OF DRULLING
 27 444
 ~ 14 DBC

 CORE RECOVERY
 85 /4
 DRILLED BY
 LOCGED BY
 LOCGED BY
 ~ 14 DEC. 1999 CORE RECOVERY 85% DRILLED BY COAL SA UNIT CORE RECOVERY LUGERN ROD COLUMN ELEVA DESCRIPTION DEPTH ROCH TYPE Ă 1108 **BECTICA** 6 (m) (m Butto with copy soil. Teles deport Na Ò Ô Boutless size wight be so \mathcal{Q} Som # Caro has black pathle of slab sugerat. **4**.ÇÇ 192 423 Slightly builting plans is present. I dige so 5.81 Mai minthe 3.32 Ax 176.62 11.11 aryank S.SA -S.JO CON is CONCEY 44 Capit has block patches 176 223 Fire suplices StaRIM Veitert creek. creeking place is rested. Grymits \$2~3.78 NJ CAP H449 Aronish isten water only. 17 (01) 10. INT- M. J. Vartial create 31.0 105 along calcil seins, craiting phone is mostly varied. Π N. 1444 H.S. M. S . No Care Privery. 12.6 - M3 " Durk brownich came acsociated with many catalo whine Generally came is much 1 stronging and mostly dust sylled ¥ 12.7, 123" Often creike KE-410" AN CAR PERMATY. Ŀя 15 40 . hypens in only about soon along catal views . Building is present and dips so ? Re- 10 6 m is creeky and forgit $n\mu$ 20 (\mathcal{C}_n) 1450 12.11 Fine soudstan 12 = . 125 The Croute along calab ۲d more dipping to mostly hard yeintre care 1/2.343 try with Butting plans tops when so . (CA) Y 189-173" Story successing along calcile tem. 20-2250 Worklad coucks along calcile tems. 3/10 228 БиÌ Rhat paths of shit from I seen . Andling plans has also 30° diping Pailly in sudstin layer is approved (CH) Many black patche of shill 179 assals High melined cruits on ong iscon 1 265-271 Hurblad eracts 28 12.0 crucking planes are exist. 11 all - Al Car No fight beste al shirt cours (CM -

zs

GEOLOGICAL RECORD OF BORING HOLE No. 41-19-11(00H-11) ,12) PROJECT AFOS HYDRO POWER ELEVATION OF GROUND SURFACE LOCATION DEPTH OF HOLE STAM INCLINATION OF HOLE DATE OF DRILLING Vertical DIANETER OF HOLE MACIONE CORE RECOVERY DRILLED BY LOGGED BY 85 Y CORE SI SI LICOVENY X B LIX COLUNN LUGEON UNIT ROD KLEVA-DESCRIPTION DEPTH ROCK TYPE TION X SECTION (m) (a) , M THE sur alla Many calcib soins. many conche and apar couts happen in this some. A.10 Grighteria JZ, to add part gomently long typhilis hard and and and a و دو . (Cn ~ en 128 - 35.1 Shepty included catal allow gone ч Ľ 31 360 Cares hand easily along colate inin . Along the crack to like somethy i.A 367- 369 the vertical crack along ×.7 abile sin On to creek plans what is magnifillized. 44 12 31.20 Grymiks This gry nects is chow to get by red frequental potches. 57 ALS-011 "Ship inchird ~ A32- A23 Ship inchird ~ A32- A21 Virtical crack, aboy A13- A22 Calaile van. Mustly boy cytotic come an proverse. Ē. K. 24 4 2 R (CH) . 6 141.14

2/ GEOLOGICAL RECORD OF BORING
 INCL. PO. AI-77-12 (DDM-D), (1)

 <t HOLE No. A1-19-13 (004-12), (1) PROJECT AGES HYDRO , ELEVATION OF GROUND SURFACE HYDROPIWER ~ 9 DEC. 1929 DIAMETER OF HOLE 7/2/2 CORE RECOVERY 13 % CONE * K ROD LUGEN IMIT COLUNN ÉLEVÁ-RECOVERY DESCRIPTION 7 DATI DEPTH ROCK TYPE TION SECTION 44 (m) (m) Bouldors with sitty soil River Ind deposils motorial. Doublass are mastly compar of conflormate. يە ف J Э; 3 4 0 ſ 1.15-1.40" Carbonated unde -£:÷ 0 o1.18 50 2.60 2 0 60 N Õ 6 32,417 4 11.10 Brinitize distances river had dopen and had rect is not clear because 1 of beiling if cores. restly boulder of programits 15.4 а 143 12 111 Ĺ (0)í 23.56 N.75 Core is compiled of populie Q o Carpin 14 a indestic capple and will 0 matrix. Ċ, Calcule view is stuply melaned . 22.5 °a¢ 269-26.3" Frequented cours 260-26.4 and only recovered. ù l 00 110 o. ľ 0,0 18 u " 30 28.6~28.2" Stop enclosed ~ vertical pender Here borg it seen on the planes o 41.110 N, 0 οb 1615 212 - 291 Horganile Capit 17 0 it in alon frond out 27 28.00 was fin plow og e) Ŀ Que (C_{l}) 1.

GEOLOGICAL RECORD OF BORING HOLE No. A1-29-12 (DDH-12) , (2) PROJECT ASCS HYDRO POWER LOCATION ELEVATION OF GROUND SURFACE DEPTH OF HOLE 74.0 M INCLINATION OF HOLE 124.0 M MACHINE DATE OF DRILLING NAMETER OF HOLE LOGGED BY 4 YAKO CORE RECOVERY DRILLED BY 23 % CONE of E CONE RECOVERY RQD LUGEON UNIT COLUNN ELEVA DESCRIPTION DEPTH ROCK TYPE X TION SECTIO (a) (m) Giogontes 45-110" Stop included ~ Willio 21-12.7 creeks to conce of YŲ, 1 31.00 strong musclining care is sing its and half of that is broken frequent C∎¢. 129-125 Only forgrantal cast 18 second , party callete van 18 opponessed. (CL-CA) 411 8317 Cose are received in every seen drog the had en confort of andestic calles. Coyland p 2 17.20 Ô, (C1~CH) ί¥ 6.317 4 Grigenek. 1 still-ans interst creek, the emiting play is restid 24.J.N λ_{i} 17- 41 At Areymontal Cours an preversed 1 Ē. (ci) Monato" Catal sum a 1/ 4/AS abile wines are appeared in ony is norm internet. alo-bes" Rether long was secondy, partly michanical 2.1 breats are hypored must of create and happ along catale seins bat on the plane on meting is sure. AL ACIN И (Cm ~ CN) 1 4 43 4 19.3 10 pully creeks are hope day atak owner. putty Ę4 11.4 sectionical breats are also L hoppined. He big clange of grain Size or calcor is observed Ł£ 51.50 ţ, FILL LEVEL \$7.1 9.1 (CH)

29 GEOLOGICAL RECORD OF BORING HOLE No. A1 - 79 - 12 (DOH -12) , (3) LOCATION DEPTH OF HOLE 7. . . . INCLINATION OF HOLE Vartical MACHINE DATE OF DRILLING PROJECT ASUS HYDRIFEWIR ELEVATION OF GROUND SURFACE DIAMETER OF HOLE MACHINE LOGGED BY CORE RECOVERY 73 ¥. DRILLED BY 11 YAKO CORE 4 K CORE RECOVERY ROD UNIT LUGEON COLUNN ELEVA DESCRIPTION DAT DEPTH ROCK TYPE X TION SACTION (=) (m) ag ar alate Gragente 610 ú 1 11.11 -44 6300 Ľ 11 14 15 4 -31.11 14 Fine south fire Rector fino growed gog = 4 Store Budding phone is not 16.45 $\{i\}$ chir. α Partly cases and programmed Ċ, 67 K (Cn) -22.423 6R4-198 Russeral cases are Grywers . * 5.1%) 5.1%) ously forgrantel. ٦ A 11.11 Creeks and happe de l đ. Hirts (CA) 24 7.10 -25.63

14 30 17 10 19 19

GEOLOGICAL RECORD OF BORING HOLE No. A1 - 79 - 13 (DDH-11), 111 PROJECT AGOS HYDROELECTRIC LOCATION AGOS DAMUTE &-L.M. X 111.246 / Y200.919 ELEVATION OF GROUND SURFACE PARSE DEPTH OF HOLE FRANCIENTION OF HOLE Vertical DIAMETER OF HOLE 76 % MACHINE JOY RAMARD DATE OF DRILLING A JULY 11 ANA. 1779 CORE RECOVERY URILLED BY LOGGED BY M YAKO 71% CORE N ANA RQD LUGEDN ONIT COLUNN **SLEVA** LECOVEN DESCRIPTION DEPTH ROCK TYPE TION SECTION ím (m) Mt 11 Ay. dal Light herman soul soil estants No care recovery 111 29.33 Ub M Dert gray sold rat, very Gray macks やけ Partly finctured interesty. Creeks with railed planes . inchang more than 84 day 120 . sense the care receiving 14 12 White putches of cate to mine . Stepty method cracks with cost of RU-BUT No case recovered (CM) 1 1.00 Sound out, party crech and revel proves and die cutate The state of the series of the series (SM) , tu Givily nelined create along and wins Multy ytales by come (CH-B) 11. 65 برقو وور continung smill sige Second case with rather by sys salangaker collebs subingalos as sé la s 13,11 1175 - 125 and carey : 18. Cellb: and her approved very char Starty included russil cracts accur away yorm. 1331 ~ MIN No care recovery N.N (8) <u>// N</u> 27 partly pretived and raided White patels of auto to series ×44 (CA) 21 13.00 Rishd epick phones in colait wan his about sim thickness (Cm) Arith fractional in deep hard creeks appar in every 2.11 Contro and ragelly raised solores at more caring partly prochaid. Freque CA) ×4.17 CA Fregant calado yean. Open courty aits rest of phones which have also estimate inclusion astrong and the core sciences (1997) <u>- 1</u> NH. W 66 N.47 11-1 Correr are some from the former with any cakes rand. x14 st the > (Cn) 27.21 ł Heathersd your sid rested crosts shiel are staply in clinad. 22.55 - 28.12 the con record 11.1 About in provid is do i.t. ۰. enche as associates das more very hard (Ch

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GEOLOGICAL RECORD OF BORING HOLE No. A1-11- A (DOH - A) , (1) PROJECT A GUS ALTANELS (TRIC POWER LOCATION LASS DAMAGITE LINE & X STRAFT Y AGE DANS ELEVATION OF GROUND SURFACE AR 442 DEPTH OF HOLE SAPES INCLINATION OF HOLE YIELD DAMETER OF HOLE 24% MACHINE JOY RAMAD DATE OF DRILLING 17 AND 20 Das. 1979 LOCGED BY DRILLED BY CORE RECOVERY 41 % 577 0 ~ 12 2m COLE COVERY LUGION UNIT ELEVA COLUMN RECOVERY DESCRIPTION ROCK TYPE DEPTH TION RADIX SECTION -(m (m) Over hardon Seaphs in partly taken Ray had soil by SPT. Red home chapsy sort water 3,00 185 stain 1 Dark home , dry soil , 12.00 Dayt brown, dry syst with why small fragment 1. . Ŀ 15.15 0 Ċ, ŊΖ 4 1 \hat{C} \sim 120 bark brown, soundy dry soul with anony forgrant. Q 114 n H K 13 117.177 0 late of small paths of alamos 11.00 - 6 himester frogrant See cit 1211-1200 Fing & dut ytalin an is remared. <u>()</u> Can recong . Mr. 74 P 215 out and m Virtual a stop in about create with raited phones. 2 118 l P -----sta-stat that of the cars is not they sydeniac corrections 45.2 4 174 (C1 ~ Cm)

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GEOLOGICAL RECORD OF BORING HOLE No. A1-71-14 (DDH-14), (2) PROJECT AGOS HYDROELECTRIC ELEVATION OF GROUND SURFACE LOCATION POWER SAAR INCLINATION OF HOLE DEPTH OF HOLE Vertical DIAMETER OF HOLE MACHINE CORE RECOVERY DRILLED NY LOGGED BY YAXO 41 34 M CORE 4 M 800 LUGEN UNIT COLUMN RLEVÁ DEPTH ROCK TYPE DESCRIPTION 1100 % ă SECTION (m) (m) Ma **T**ARMA 46.07 Durk prog programs associates with many catal mains, mail of young sourt of cakib onin Gryanche 114 are included instial 210 Sould hele in claib 30.90 tinit. 5 33.76 1615 ~ i the the United crost aby ratio mas , toching is some ¥ <u>4.4</u> 外 Ì, to every plane , Fry le . 46 14, 373 - 329* stight of il contract 17 Hesmit. 27.10 4 34 11 11 (Cm) リッシャト 46947 1.4 Parties for good beyon goongly payil, and any cutab vouns Key Such See Arren milste W. m.d <u>66 (</u> 39.6-1962 £ RIGHTAN 41.11 145.197 C fry with Dirt 17 17 ¥ is herd. ft. 6 41 CMA white a đ 4 " Smith called cognites and along catalo revas . aUntil soon core a 11 in good condition 11.0 41.1-50.0 No 10 50 MET ÿ.× (Circa) 136.66 11 50.00

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GEOLOGICAL RECORD OF BORING HOLE No. A1-10-15 (DDH-15)
 PROJECT
 AGOS
 HYDROPOWER.
 LOCATION
 AGOS
 DAMST IE

 ELEVATION OF GROUND SURFACE
 12 4.50
 DEPTH OF HOLE
 30.0 m
 INCLINATION OF HOLE
 VERTICAL

 DAMETER OF HOLE
 76 HM
 NACHINE
 DATE OF DRILLING
 9.409 - 30.409.172

 DAMETER OF HOLE
 76 HM
 NACHINE
 DATE OF DRILLING
 9.409 - 30.409.172
 x 1625163 837 / Y 557006.017 DATE OF DRILLING 9 AUG - 30 AUG. 1980 LOGGED BY S. NISHIOKA 10 CORE 4 M COLUMN water pressure lest RQD ELEVA DESCRIPTION DEPTH ROCK TYPE TION % Lugeon unit SECTION (4) (=) No oore N#L MC. Soil 121.20 .7¢ Containing slaty fragments NQ and calcareous debris. рC Fresh hard and massive Cracks at 3.8 - 4.1 m. dipping at 70° and water-stained Bedding place, discerned by intercalating thin ÷, slate layers in 8.0-1.7m, dips 40' - 45' Greywacke 5.0H~ 18.25M Cracks are frequent at places, all waterstained; i.e. at 5.70M, 6.7~6.8 A, 7.0~7.8 A, 10 6 ~ 11.85 M (C4-C4) 162.2 Dark grey, homogeneous. dense. Fresh and hard. 12.3 # ~ 18.7# Cracky. Recovering cores are fragmental. Slaty Below 13.7 + are solid fine tock. sandstone Bedding plane dips 45. (C_{H}) 7.4 1+21 Fresh, hard, solid. Cracks are water-stand and at toca intervals. Greywacke (CH) 153.16 Fresh, hard, solid. Fine grained graywacke Same stoke. Badding dips 40° Sandstone 151.21 Fresh, hard. Solid rock. Subwrtical cracks al 220 24.70 M, 25.10 M, 23.95 M. 26.45 M, 28.15 M. Greymacke (9)