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Purari河電力開発計画調査の

推移

付 録 A

調 査 の 推 移

- 1974年 5月 在日豪州大使館から口上書にて日本政府へ協力要請。
- 1974年 9月 日本政府は、三国間で業務分担等につき合意する条件として参加する用意がある旨、口上書を在京豪州大使館に提出。
- 1974年10月 日豪政府会議開催（於：東京）。
（業務分担、調査内容等について協議、調査期間等については三国で交渉する旨豪側から提案）
- 1974年11月 三国政府会議開催（於：ポートモレスビー）。
（F/Sのスケジュール、作業範囲、本調査の責任等について議論、調査期間33か月、部門別作業スケジュールの決定）
- 1975年 2月 日本工営とSMEGにより、公式に調査を開始。
Wabo地域の地形調査と水文調査、さらにGulf地域の海洋調査を開始。同時に、主ダムと発電施設の最適地点選定、および水力発電計画のための水文解折に関する机上スタディをPort Moresbyで開始。
- 1975年 4月 第1回合同技術会議（Joint Technical Board（JTB）Meeting）開催。Wabo地域の地質調査開始。
- 1975年 6月 海洋調査完了。
- 1975年 7月 第2回JTB会議開催。
第1回政府間会議（Inter-Governmental Committee（IGC）Meeting）開催。
Wabo地域の建設材料調査開始。
- 1975年 9月 地形測量の現地作業完了。
- 1975年10月 第3回JTB会議開催。
水力発電計画に関するオフィススタディ開始。
- 1975年12月 建設材料調査完了。
- 1976年 1月 港湾および都市開発計画に関するオフィススタディ開始。
Wabo地点の水文調査完了。
- 1976年 2月 第4回JTB会議開催。
第2回IGC会議開催。
地質調査が完了し、Waboキャンプを閉鎖。

1976年 3月	Gulf 地域で海洋地質調査を開始。
1976年 4月	工事用道路のルート選定スタディおよび選定ルートに対する現地調査を開始。
1976年 6月	第5回JTB会議開催。
1976年 9月	第6回JTB会議開催。 第3回IGC会議開催。
1976年10月	工事用道路に対する現地調査完了。 第二次海洋地質調査開始。
1976年12月	水力発電計画に関する主要オフィススタディ完了。 第二次海洋地質調査完了。
1977年 2月	JTB会議の検討用として暫定的なドラフトレポートを提出。
1977年 3月	第7回JTB会議開催。 港湾および都市開発計画に関する主要オフィススタディ完了。
1977年 6月	パプアニューギニア、オーストラリアおよび日本の三国政府にドラフトレポートを提出。 Port Moresby の日本工営と SMEC の合同オフィスを閉鎖。
1977年10月	第8回JTB会議開催。 第4回IGC会議開催。
1977年12月	パプア・ニューギニア、オーストラリアおよび日本の三国政府にファイナルレポートを提出。

付録B

パプア・ニューギニア政府記録保管所に保管されている

調査試料および調査記録

1. 調査試料

Hydroelectric Study

Diamond drill cores from the areas of Wabo Main Dam and Saddle Dams.

Representative bagged samples of mudstone and gravel-sands from trench and auger hole investigations.

Port Study

Ocean Sediment samples.

2. 調査記録

(1) Topographic Survey for Hydroelectric and Access Road Study, (Transparencies).

AREA	SCALE	NO. OF SHEETS
1. Main Dam	1 : 500	21
2. Main Dam	1 : 2000	6
3. Saddle Dams	1 : 500	37
4. Saddle Dams	1 : 2000	16
5. Aure	1 : 2000	24
6. Access Road *	1 : 5000	26

* together with field data for Access Road Study

(2) Aerial photographic prints, Main Dam Area.

PHOTO SCALE	DATE	COURSE NUMBER	PHOTOGRAPH NUMBER	NUMBER OF PHOTOGRAPHS
1 : 6000	Aug. 1975	C1	1 to 8	8
		C2	1 to 8	8
1 : 13000	Aug. 1975	C1	1 to 6	6
		C2	1 to 4	4
		C3	1 to 5	5

(3) Aerial photographic prints

SADDLE DAM AREAS

PHOTO SCALE	DATE	COURSE NUMBER	PHOTOGRAPH NUMBER	NUMBER OF PHOTOGRAPHS
1 : 6000	Aug. 1975	C1	1 to 6	6
		C2	1 to 7	7
		C3	1 to 8	8
1 : 13000	Aug. 1975	C1	2173 to 2179	7
		C2	2208 to 2213	6
		C3	2060 to 2063	4
		C4	2092 to 2099	8
		C5	2084 to 2090	7

(4) Aerial photographic prints

AURE AREA

PHOTO SCALE	DATE	COURSE NUMBER	PHOTOGRAPH NUMBER	NUMBER OF PHOTOGRAPHS
1 : 13000	20 July 1975	C1	1035 to 1047	13
		C2	1077 to 1091	15
		C3	1064 to 1069	6
		C4	1060 to 1063	4
		C5	1115 to 1132	18
		C6	1147 to 1159	13
		C7	1100 to 1114	15
		C8	1160 to 1182	23

(5) Aerial photographic prints

RIVER BED ON THE PURARI RIVER

PHOTO SCALE	DATE	COURSE NUMBER	PHOTOGRAPH NUMBER	NUMBER OF PHOTOGRAPHS
1 : 20000	July 1975	C1	1291 to 1297	7
		C2	1300 to 1307	8
		C3	1312 to 1318	7
		C4	1320 to 1330	11
		C5	1331 to 1339	9

(6) Aerial photographic prints

OROKOLO AREA

PHOTO SCALE	DATE	COURSE NUMBER	PHOTOGRAPH NUMBER	NUMBER OF PHOTOGRAPHS
1 : 10500	Aug. 1975	Run 1	3135 to 3142	8
		Run 2	3114 to 3124	11
		Run 3	3106 to 3113	8
		Run 4	3143 to 3155	13
1 : 10800	Aug. 1975	Run 5	2892 to 2899	8

(7) Aerial photographic prints

THE BLUFF AREA

PHOTO SCALE	DATE	COURSE NUMBER	PHOTOGRAPH NUMBER	NUMBER OF PHOTOGRAPHS
1 : 10500	Aug. 1975	Run 1	3051 to 3082	32
1 : 10000	"	Run 2	2968 to 2995	28
1 : 10400	"	Run 3	3083 to 3099	17
1 : 10000	"	Run 4	2929 to 2938	10
1 : 10400	"	Run 5	3014 to 3024	11
1 : 12200	"	Run 6	2954 to 2965	

(8) Aerial photographic prints

HALL SOUND AREA

PHOTO SCALE	DATE	COURSE NUMBER	PHOTOGRAPH NUMBER	NUMBER OF PHOTOGRAPHS
1 : 13000	July 1975	Run 1	1033 to 1019	17
		Run 2	2478 to 2498	21
		Run 3	2448 to 2474	27
		Run 4	2523 to 2550	28
		Run 5	2576 to 2599	24
		Run 6	2551 to 2575	25
		Run 7	2638 to 2658	21
1 : 14000	July 1975	Run 8	2601 to 2623	23
		Run 9	2624 to 2637	14
		Run 10	2734 to 2744	11
		Run 11	2745 to 2750	6
		Run 12	2659 to 2675	17
		Run 13	2676 to 2693	18
		Run 14	2700 to 2712	13
		Run 15	2713 to 2719	7

(9) Aerial photographic prints

ACCESS ROAD

PHOTO SCALE	DATE	COURSE NUMBER	PHOTOGRAPH NUMBER	NUMBER OF PHOTOGRAPHS
1 : 30000	22 Oct. 1976	C-1	1 to 7	7
		C-2	1 to 8	8
		C-3	1 to 16	16
		C-4	1 to 19	19
		C-5	1 to 23	23

(10) Flight Course Diagram of Aerial Photographic Survey (Transparencies).

(11) An Aerial Photograph mosaic covering the area bordered by the lower Reaches of the Purari and Vailala Rivers (Scale: 1 to 130,000, Printed Photograph).

(12) Aerial Photographic Prints - Miscellaneous Runs of Gulf Province Coastline over the Years

DATE	LOCATION	NO. OF RUN	NO. OF SHOT	SCALE	NO. OF BOX CONTAINED
21.11.'56	Port Romilly	2	53-66	1/40,000	A
21.11.'56	"	3	67-81	"	"
21.11.'56	"	4	83-94	"	"
27. 2.'57	Kerema	4	36-52	1/50,000	"
27. 2.'57	"	5	17-35	"	"
21.11.'56	Kaimari Island	1	95-105	1/40,000	"
21.11.'56	"	2	106-112	"	"
9. 5.'57	Vailala	3	12-26	1/40,000	"
24. 4.'58	"	4	01-11	"	"
13.12.'55	Bevan Sound	2 East	226-235	1/40,000	B
24.12.'55	"	2 West	331-338	"	"
13.12.'55	"	3 East	215-225	"	"
24.12.'55	"	3 West	368-377	"	"

DATE	LOCATION	NO. OF RUN	NO. OF SHOT	SCALE	NO. OF BOX CONTAINED
28.12.'55	Bevan Sound	4	427-437	1/40,000	B
28.12.'55	"	5	438-445	"	"
28.12.'55	"	6	391-397	"	"
24. 4.'58	Vailala	3	5017-5013	1/40,000	C
24. 4.'58	"	4	5001-5012	"	"
24. 4.'58	Murua	2	5093-5100	"	"
24.12.'48	Vailala-Kerema	--	77-85	1/55,000	"
24.12.'48	"	--	80-85	"	"
29. 6.'74	Kikori	--	1.3.5.7.9	1/95,000	"
29. 6.'74	"	--	99.101.103.105	"	"
21. 5.'64	Warsong Point Kerema	1	142-145	1/46,000	"
16. 8.'73	Matupe River	50	128.130.132	1/104,000	"

(13) Computer Printouts, The Purari River at Wabo, Estimation of Runoff (1951 to 1974) by Tank Model, October 1975.

(14) Computer Printouts, The Purari River at Wabo, Generation of Synthetic Runoff Records, November 1975.

(15) Pluviograph Records (1962-1974) at Wabo Dam site and Clock Hour Analysis of the Pluviograph Records.

(16) Report on Site Investigation for Proposed Wabo Dam Purari River, George Wimpey & Co. Ltd., Central Laboratory, Hayes, Middx., December 1960.

(17) Report on Further Geological Investigations, Wabo Dam Project by Keith R. Miles, D. Sc., F.G.S., M. Aust. I.M.M. Geological Consultant, 25 January 1960.

(18) Wind Recording Charts from Kerema Station

May 17 '75	-	May 24 '75
May 26 '75	-	June 16 '75
June 24 '75	-	Aug. 25 '75
Sep. 29 '75	-	Oct. 6 '75
Oct. 13 '75	-	Jan. 11 '76
May 27 '76	-	June 1 '76

(19) Specification and Operation Manual of Anemometer for Kerema

(20) Wave Direction Observation Data

1975 { July 29, 31
 { Aug. 1, 3, 4, 5, 7, 8, 9, 10, 11, 13, 18, 19,
 { 21, 22, 23, 24, 25, 26, 28, 29, 31
 { Sep. 1, 3, 5, 6, 9, 13, 19, 20, 23, 25, 26, 27, 30
 { Oct. 1, 3, 10, 11, 13, 14, 15, 16-24, 26, 30
 { Nov. 4, 5, 7, 10, 11-15, 19-22, 25-29

 1976 { Feb. 4, 6, 7, 8, 13, 14, 26, 27, 28
 { Mar. 1, 2, 5, 12, 20, 24, 26, 27, 29, 30, 31

(21) Sonostrator Recorder Charts (6 Rolls)

NO.	LOCATION	DATE OF SOUNDING
1	C-49 C-50	May 25 1975
2	C-46 C-47 C-48	May 28 1975
3	C-42 C-43 C-45	June 1 1975
4	C-37 Check-14	June 2 1975
5	C-40 C-41-(1) C-44	June 3 1975
6	C-38 C-39 C-41-(2) Check-15	June 5 1975

(22) Permanent Marks - Skeleton Plan (Gulf Site)

Peg No. 13,561 ~ 13,575

Peg. No. 13,614 ~ 13,623

The above pegs are the basic points for further beach profile survey.

(23) Back-up Reports (1 set each)

WABO HYDROPOWER PROJECT REPORT ON OCEANOGRAPHICAL
SURVEYS OF THE OROKOLO-KEREMA AND HALL SOUND AREAS
December 1975 NIPPON KOEI CO., LTD.

(24) WABO HYDROPOWER PROJECT

REPORT ON SUBMARINE GEOLOGICAL SURVEY OF THE BLUFF AREA,
GULF DISTRICT, P.N.G.

December 1975 SNOWY MOUNTAINS ENGINEERING CORPORATION

Drawings (original) attached to the Back-up Reports listed
on ITEM (23) and (24):

(25)

NK REPORT

No. 1-1	TRACK CHART in Orokolo-Kerema Area
No. 1-2	TRACK CHART in Orokolo-Kerema Area
No. 2-1	DEPTH CHART in Orokolo-Kerema Area
No. 2-2	- do -
No. 3-1	BATHYMETRIC CHART in Orokolo-Kerema Area
No. 3-2	- do -
No. 4	TRACK CHART in Hall Sound Area
No. 5	DEPTH CHART in Hall Sound Area
No. 6	BATHYMETRIC CHART in Hall Sound Area

(26)

SMEC REPORT

No. 1	TRACK CHART
No. 2	ISOBATH MAP
No. 3	ISOPACK MAP OF A AND B MEMBERS

(27) Maps, Land Categories for Port, Industrial and Urban Study (transparencies).

TITLE

- . General Terrain, Catchment Areas & Traverses 1: 25 000
for Proposed Townsite - Orokolo Bay Area -
Gulf Province
- . General Terrain, Catchment Area & Traverses 1: 25 000
for proposed Townsite - Vailala and The Bluff
Areas - Gulf Province
- . Additional Investigation Traverses for 1: 25 000
proposed Townsite - Vailala Area - Gulf
Province
- . Land Categories - Orokolo Bay Area 1: 25 000
- . Land Categories - Vailala and The Bluff 1: 25 000
Areas
- . Stripline Layout - DASF Survey 1: 25 000
- . Longitudinal Sections along Striplines -
DASF Survey
- . Longitudinal Sections along 'A' & 'E' Traverses
- . Longitudinal Sections along 'W', 'A', 'B' & 'C'
Traverses
- . Longitudinal Sections along 'D' & 'H' Traverses
- . Longitudinal Sections along 'N', 'L', 'P' & 'F'
Traverses
- . Longitudinal Sections along 'W' Traverse
- . Longitudinal Sections along 'AG', 'D', 'E' & 'F'
Traverses
- . Hall Sound - Land Category Plan 1: 25 000
- . Hall Sound - Vegetation Overlay Plan 1: 25 000
- . Hall Sound - Level Traverse Overlay 1: 25 000
- . Hall Sound - Contour & Catchment Plan 1: 25 000
- . Hall Sound - Additional Contours at 5m 1: 25 000
Intervals over Selected Area - 6 No. Sheets

(28) Waverider Buoy Data.

- (1) Ink chart recordings, Nos 2A to 51A, (3 May 1976 to 25 April 1977) from the Waverider Buoy receiving unit located at Kerema.
- (2) 4 No. digitised tapes with data transferred from magnetic tapes Nos 2A to 51A. The magnetic tapes were sent to Australia for processing, erased and returned to PNG for reuse.
- (3) Computer printout of wave data.
- (4) Computer data cards.
- (5) Weekly report sheets relating magnetic tape and ink chart recordings to date.

(29) Wave height observations, from Kerema Beach, over the period of the study.

(30) Report on Feasibility Study of Waverider Buoy System for Purari Port Study at Kerema Papua New Guinea. Department of Harbours and Marine, Queensland. March 1976.

(31) Tide Gauge records, Kerema.

Original of Foxboro tide gauge results held by Institute of Oceanographic Sciences (refer Volume 7). Copy held by Executive Officer, Navaid, PNG Department of Transport.

3. 報告書オリジナル

- (a) Original Text of the Feasibility Reports.
- (b) Original full size transparencies of Figures used in the Reports.
- (c) Geological Mapping Compilation Plans (Hydroelectric Study)
- (d) Feasibility Study Progress Reports

4. JTB会議議事録 Ⅷ 1 ～ Ⅷ 8

付録C

本報告書に使用された技術用語

略語および単位系

1. 技術用語

Accretion : 堆積

As used in this report, the building up or deposition of material on a beach, as apposed to erosion

active fault : 活断層

a major fault along which displacement is possible within the life of a structure contemplated in its vicinity

active storage : 有効貯水容量

the volume of the reservoir, above the inactive storage and between FSL and MOL, available for release for power generation

See also dead storage

air slacking : 気中弛緩

the breakdown of normally wet solid material upon drying out

alumina : アルミナ

aluminium oxide, a whitish powder refined from bauxite and from which aluminium is extracted electrically

approach channel : 接近水路

the open-cut excavation, immediately upstream of the spillway, through which floodwaters flow from the reservoir

anchor block : アンカーブロック

a concrete block on a hillside for supporting and fixing a penstock

assembly bay : 組立て室またはアセンブリーベイ

an area within the power station on which turbine and generator components may be placed for assembly or maintenance

Aure Beds : Aure 層

geological formation of Tertiary age (Upper Oligocene to Middle Miocene) sediments consisting of mudstone, siltstone and sandstone beds. Located in Wabo project area as described in Section 2.3.1 and in more detail in Volume 5A

bank (left or right) : 左岸または右岸

riverbank, as seen when looking downstream

batter : 傾斜または斜面

the degree of steepness of a side face of an open cut excavation, expressed in terms of a vertical distance to a horizontal distance, alternatively the face itself

bauxite : ボーキサイト

a natural ore containing aluminium oxide, from which alumina is prepared

- bellmouth : ベルマウス

refers to large-radius rounded edges of an opening, in a concrete structure, for improving the flow of water into a conduit
- benchmark : ベンチマークまたは基準点

in survey, a permanently constructed marker point, of established position and elevation, used as a survey reference in the vicinity
- berth occupancy : ベース占有率

the ratio of the annual total of ship service time to the annual total of the time that the berth would be available to vessels
- blanket grouting : ブランケットグラウト

a pattern of drilling and pressure grouting to limited depth, usually with cement, over a proportion of the excavated foundation area of an embankment core in order to render the foundation surface impervious to seepage either into the rock from the core or vice versa
- break bulk cargo : パラ荷 (袋物, 樽詰等)

bulk and general cargo in drums, sacks or containers, as distinct from loose bulk commodities
- breakwater : 防波堤

a structure constructed to form an artificial harbour with a water area protected from the effect of sea waves
- bulk cargo : パラ荷

cargo in a loose form, as coal, grain or alumina for example
- capacity factor : 発電設備の利用率

the ratio of average load on a generating unit or power station to its capacity (excluding standby capacity in the case of a power station)
- capital cost : 資本

the estimated total cost of providing a structure, including engineering and administration costs, a contingency to cover present unknowns, and the cost of construction facilities, but excluding interest during construction. See also construction cost
- catchment area : 流域 (面積)

the area drained by streams upstream of either the point at which the dam is located or the point being investigated
- caterpillar roller (coaster) gate : キャタピラー・ローラーゲート

in which the gate leaf is fitted with roller trains which bear and run against embedded track plates; used in certain

applications where the total load against the gate is more than can be sustained by a fixed wheel arrangement. See also gate, fixed wheel gate

- . causeway : コーズウェイ
a road embankment built up across low ground, swamp or shallow water
- . caustic soda : 苛性ソーダ
chemical feedstock for a wide range of the chemical industry
- . chute : シュート
of spillway; concrete channel conveying spillway discharges from the crest to the river downstream of the dam
- . closure : 閉塞または締切り
the act of terminating river flow through the damsite by diverting inflow through the diversion tunnels; after constructing the dams, the act of closing the tunnels to commence reservoir filling
- . closure (bulkhead) gate : 閉塞ゲート (バルクヘッド・ゲート)
a large gate to be lowered in front of a tunnel portal, closing off flow when reservoir filling commences
- . cofferdam : 仮締切堤 (またはダム)
a structure protecting all or part of the construction area so that work can be carried out in the dry
- . common user berth : 共用バース
a berth with specialised plant handling similar commodities for more than one industry, thereby avoiding unnecessary duplication, for example, unloading of carbonics
- . compaction : 締固め
the process whereby a soil mass is reduced in volume, for instance by rolling, with a reduction in voids between particles but usually without appreciable expulsion of water present in these voids
- . consolidation : 圧密
usually a time-dependent process whereby the application of pressure causes the reduction in volume of a soil sample by progressively forcing out the water present in the voids
- . construction cost : 建設費
the estimated total amount of payment to the Contractors for all items of work; excludes engineering design and supervision costs, the cost of construction facilities provided by the PNG Government, administrative costs and interest during construction. See also capital cost

- construction facilities : 建設施設

facilities provided by the PNG Government in advance and available for use by the contractor or his agents during the course of the construction work. Refer Section 6.3
- container : コンテナ

a standardised, enclosed lockable container having approximate dimensions of 6.1 m x 2.4 m x 2.4 m with a maximum load capacity of about 20 t; commonly referred to as 20 ft (6.1 m) equivalent units (TEU). Also available in 40 ft (12.2 m) units and some other smaller sizes
- contingency : 予備費またはコンティンジェンシー

a cost provision for various purposes as set out in Volume 2, Section 9
- conversion rate : 換算レート

as used in this report

K 1.00 = US\$ 1.306

= \$A 1.048 = ¥ 374

as at September 1976
- crest (of dam) : (ダム) 頂またはダムクレスト

top of dam
- crest (of spillway) : (余水吐) 越流部またはクレスト

the uppermost portion of the overflow section
- datum : データムまたは標高基準点

in this report the datum and designation of offshore levels differ from those applicable to onshore levels as follows:

Elevation (onshore levels for port and universally for hydroelectric project) : 標高

height above mean sea level; designated 'EL' and expressed in metres (refer also Volume 2 Appendix A and Volume 7 Section 6.3.2)

Water depth (offshore seabed levels) : 水深

depth below chart datum which may be lowest astronomical tide level or lower; to ensure that depths shown on charts are always 'positive' or do not change sign at extremes of low water; 'm'
- dead storage : 無効貯水容量

the volume of water below the designed minimum operating level (MOL) of the reservoir
- design stage investigations - refer Section 6.3 : 設計段階での調査
- dip - the true angle, to the horizontal, at which the plane of a geological bed lies : 傾斜 (角)

• Discounted Energy Cost : 割引電力コスト

a cost of energy used for comparing alternatives. Derived as set out in Section 2.5 and in more detail in Volume 2, Section 6

• diversion tunnel : 仮排水トンネル

a tunnel driven to bypass river flows while the dam is under construction

• drawdown : 水位急降下

the fall in a reservoir surface as water is withdrawn at a faster rate than the river inflow from upstream

• embankment dam : 土堰堤

any dam, constructed of natural excavated materials placed without binding materials with either zones involving areas of selected rock, gravel and earth or a homogeneous non-zoned embankment

• emergency spillway : 非常用余水吐

an additional spillway provided as a contingency measure to assist in discharging flood flows greater than that for which the primary spillway is designed. See also spillway

• energy received at industrial site : 工業地点の受電端電力

output from Wabo generators less transformer and transmission losses. See also output. Unit GWh, GWh/a

• Era Beds : Era 層

geological formation of Tertiary age (Pliocene to Pleistocene) sediments consisting of thick sandstone beds with lesser siltstone and mudstone. Located in Wabo project area as described in Section 2.3.1 and in more detail in Volume 5A

• ethylene dichloride : 二塩化エチレン

chemical feedstock for the plastics industry

• expansion joint : 伸縮継ぎ手

in a penstock, a sliding watertight joint permitting movement with temperature changes

• ferroalloys : フェロアロイ

alloys used in the refining of iron and steel to produce

- | | |
|---------------------|--------------------|
| • ferronickel | • ferrosilicon |
| • ferromanganese | • metallic silicon |
| • silicon manganese | • ferrochrome |

• firm energy : 常時電力

at Wabo, annual energy available with 100% reliability during a drought equivalent to that of 1972 for which the return period is estimated at about 1 in 70 years

- **firm continuous power : 常時電力**
 at Wabo, the power available at 100% load factor when the reservoir is at Minimum Operating Level and the inflow corresponds to that for firm energy
- **Financial Power Cost : 財務電力コスト**
 derived from unescalated analysis such that the discounted costs of the project equal the present value of the revenue it generates over the life of the project
- **fixed-wheel gate : ローラーゲート**
 in which wheels are fitted to axles fixed at the sides of the gate leaf to bear and run against embedded plates. See also gate
- **flip bucket : フリップバケット**
 a concrete structure, terminating the spillway chute and intended to guide the fast-flowing discharges into an upward trajectory, the water falling well downstream of the chute into a plunge pool
- **Full Supply Level (F.S.L.) : 常時満水位**
 the designed maximum storage retention level
- **fuse plug : ヒューズプラグ (堤)**
 small embankment designed to fail when overtopped, functioning as a type of emergency spillway
- **gate : ゲート**
 any mechanical device to control the flow of water in intakes, outlets or on spillway crests by raising and lowering
- **general cargo : 一般貨物**
 cargo in a packaged form, as containers, pallets, barrels or crates
- **gross head : 総水頭**
 the vertical difference between reservoir level and tail-water level at the power station
- **gross storage : 総貯水量**
 the total volume of the reservoir when filled to the Full Supply Level, equivalent to dead storage plus active storage
- **grout curtain : カーテングラウト**
 an impervious barrier into the dam foundations created by means of drilling and pressure grouting, usually with cement
- **grout take : グラウト注入量**
 in pressure grouting, the volume pumped into a drill hole

- guide vanes : ガイドベーン

in hydroelectric turbines, movable vanes which control turbine power by regulating and directing the flow of water
- head : 水頭

at a point in a fluid under gravity flow, gross head is the vertical distance below an upstream free surfaces; net head is gross head less the headloss to that point. Unit m
- headloss : 損失水頭

the loss in head incurred by a fluid in overcoming frictional resistance to flow
- headrace channel : 導水路

the open cut excavation, upstream of the intake structure, through which water is drawn from the reservoir to the intake structure
- installed capacity : 設備容量

the total rated power output of the generators installed in a power station (including standby units)
- intake : 取水口

a structure within the reservoir for the purpose of withdrawing water into a confined conduit such as a tunnel or pipeline
- levels (onshore or offshore) : 標高

see datum
- load factor : 負荷率またはロードファクター

the ratio of average load to peak load on a generating unit or power station
- littoral drift : 漂砂

movement of sediment along a coastline due to current, wave and tidal action
- longshore drift : 沿岸方向漂砂

see littoral drift
- Lowest Astronomical Tide (L.A.T.) : 最低天文水位

the lowest level which can be predicted to occur under average meteorological conditions and under any combination of astronomical conditions; this level will not be reached every year. LAT is not the extreme low level which can be reached, as storm surges may cause considerably lower levels to occur
- Maximum Flood Level (M.F.L.) : 最大洪水位

to which the reservoir surface will rise during the design flood with spillway gates operating in accordance with a predetermined rule

- Mean Sea Level (M.S.L.) : 平均海水面

the average level of the sea surface over a long period, preferably 19 years, or the average level which would exist in the absence of tides
- Minimum Operating Level (M.O.L.) : 低水位

the lowest designed level to which the reservoir can be drawn down and still perform the functional operation for which the dam is required
- net head : 純水頭

the remainder of the gross head, after deducting losses, which is directly available for the turbines
- Orubadi Beds : Orubadi 層

geological formation of Tertiary age (Upper Miocene to Pliocene) sediments consisting of primarily mudstone and siltstone beds with only minor sandstone). Located in Wabo project area as described in Section 2.3.1 and in more detail in Volume 5A
- output : 出力

electrical energy available at Wabo generator terminals; energy received at industrial site is output less transformer and transmission losses. Unit GWh, GWh/a
- overconsolidated : 過圧密

the state of an in-situ soil or rock which historically was overlain by and compressed under the weight of overburden since removed by either natural processes or excavation
- overtopping : 越流

reservoir waters spilling over the crest of a dam, or river flow over a weir or cofferdam, during flood
- peak power demand : ピーク電力需要

the maximum instantaneous requirement for power at each stage up to full industrial development
- penstock : 水圧管路またはペンストック

a conduit for conducting water from the reservoir to the hydroelectric turbines
- penstock bench : 水圧管路ベンチ

the open cut excavation on the floor of which the penstock supports are founded
- permeability : 透水性

of a material such as earthfill, the relative ease with which water under head can be forced to pass through. Unit cm/s

- plunge pool : プランジプール

the tailwater area downstream of the spillway into which the discharge is thrown, dissipating its energy
- power demand growth : 電力需要の伸び

the assumed rate or period of buildup of peak power demand, corresponding to progressive development of energy-consuming industries. See also peak power demand
- power factor : 力率

the ratio of active to apparent power; the power factor of a purely resistive load is 1.0, and of inductive loads is less than 1.0
- queueing time : 待ち時間

the delay a vessel experiences between the time it arrives at a port and the time it berths
- radial gate : ラジアルゲート

a gate having radial arms pivoted on a horizontal axis, particularly suited to spillway applications. Refer Figure 10 for details. See also gate
- rated output (generator) : 発電機定格出力

the continuous output of a generator as declared by its manufacturer
- rated output (turbine) : 水車定格出力

the mechanical power delivered by the turbine shaft when running at rated net head, rated speed and full guide vane opening
- reactive compensation : 無効電力保障

static or rotating plant supplying reactive power into the transmission network to improve voltage control in the system; particularly under low load conditions
- remoulding : こね返し

the process of reworking a soil or rock, destroying its in-situ fabric and inevitably modifying some of its characteristics
- return period : リターンペリオドまたは回帰年

the statistically estimated average frequency at which an event of given magnitude may occur within a long time span, usually extrapolated from a short period of record with a given degree of probability; expressed in years
- ring girder : リングガーダー

a substantial structural element surrounding a penstock at each of the supports

- runoff : 流出

applies to portion of rainfall draining off the ground surface
- run-of-river scheme : 流れ込み式開発計画

involving a low dam with minimal reservoir storage, the power output varying with fluctuations in streamflow
- secondary energy : 2次電力

energy in excess of that which can be guaranteed with 100% reliability but nevertheless is available for a considerable proportion of the time. See also firm energy
- ship service time : 荷役時間

the total time a berth is allocated to a particular vessel, comprising the total time a vessel is alongside the berth plus the time involved in handling the vessel off the berth
- silicon carbide : シリコンカーバイド

a material used as an abrasive compound
- speed : 回転数

of a turbo-generating unit, the rotational speed in revolutions per minute
- spillway : 余水吐

a weir, conduit, channel or other structure designed to discharge flood flows safely past a dam; may have control gates
- spillway crest : 余水吐越流部

see crest
- storage scheme : 貯水地計画

in which the capacity of the reservoir is designed as being sufficient to regulate fluctuations in streamflow
- strike : 走向

the compass bearing of the intersection line between a sloping geological bed and a horizontal surface
- tailbay : 放水庭

the channel constructed at the turbine discharge side of the power station
- tailwater : 放水位または下流水位

the water downstream from any hydraulic structure, in this case the power station and spillway
- tracking trial : 走行試験または盛立て試験

an elementary test to roughly assess the performance of a natural material under construction processes by subjecting

a sample to the passage of a dozer track, inducing breakdown and some compaction

. trashrack : 防塵スクリーン

a screen placed across an intake to prevent ingress of timber or other debris

. trestle : トレッシェル

an overwater structure carrying an access roadway and/or conveyor(s) connecting an offshore berth to the shore. Structure is usually supported at regular intervals by pairs of inclined piles

. water depth (offshore) : 水深 (沖合)

see datum

2. 略語

ARK Adopted River Kilometres, designated position along a P N G river, expressed in number of kilometres distance from coast along the river

B.C.L. Bougainville Copper Limited

C.A.C. Commonwealth Aluminium Corporation

CSIRO Commonwealth Scientific and Industrial Research Organisation (Australia)

D/S Downstream

d.w.t. dead weight tonne

EL Elevation, the level at an onshore point, expressed in metres; see Glossary under 'Datum'.

ELCOM Electricity Commission of Papua New Guinea

F.S.L. Full Supply Level. See 'Glossary'.

LAT Lowest Astronomical Tide; see 'Glossary'.

LNG liquified natural gas

M.F.L. Maximum Flood Level. See Glossary.

M.O.L. Minimum Operating Level. See Glossary.

MSL Mean Sea Level; see Glossary

NK Nippon Koei Co., Ltd

POA Purari Development Authority

p.f. power factor. See Glossary

P N G Papua New Guinea
 PISM Purari Industrial Survey Mission. Refer Section 3.3.2
 SMEC Snowy Mountains Engineering Corporation
 SE South East Trade (wind) season
 season
 U/s Upstream

3. 单位系

a annum, year
 d.w.t. dead weight tonne (laden vessel mass)
 g gram, mass; alternatively acceleration due to gravity
 giga factor of 10^9
 GW.h gigawatt hour, 10^9 watt - hours of energy
 GW.h/a gigawatt hour/annum; for example 1 GW.h/a is the energy generated in a year of 8 760 hours if the continuous power output is -

$$\frac{1 \text{ GW.h} \times 10^3}{8\,760} = 0.11416 \text{ MW (see megawatt MW)}$$

 ha hectare (area) ($1 \text{ ha} = 10^4 \text{ m}^2$)
 h hour
 kilo factor of 10^3
 kg kilogram, base unit of mass ($1 \text{ kg} = 10^3 \text{ g} = 2.20 \text{ lb}$)
 km kilometre, 10^3 metres
 kPa kilopascal, 10^3 pascals pressure, strength or stress
 ($1 \text{ kPa} = 0.145 \text{ pounds per square inch} = 495.5 \text{ kg/m}^2$; normal atmosphere pressure = 101.325 kPa or approximately 100 kPa)
 kV kilovolt, 10^3 volts
 kW kilowatt, 10^3 watts of power
 l litre, fluid volume ($1 \text{ l} = 10^{-3} \text{ m}^3$)
 l/d litres/day (water supply)
 m metre, base unit of length ($1 \text{ m} = 3.28 \text{ ft}$)
 m^3 cubic metres, volume
 m^3/s cubic metres per second, fluid flow

mega	factor of 10^6
MPa	megapascal, 10^6 pascals of pressure, strength or stress
Mt/a	million tonnes/annum
MW	megawatt, 10^6 watts of power; 1 MW generated continuously for 1 year (365 days or 8 760 hours) is 10^6 watt x 8 760 hours = 8 760 x 10^6 watt hours/annum = 8,760 GW.h/a (see GW.h/a)
milli	factor of 10^{-3}
mg/l	milligrams per litre, sediment or chemical concentration of mass in a fluid
mm	millimetre
mm/a	millimetre per annum (rainfall)
Pa	pascal, unit of pressure, strength or stress
s	second, base unit of time
t	tonne (1 t = 10^3 kg)
t/a	tonnes/annum
t/h	tonnes/hour (conveyor)
V	volt, unit of electrical voltage
W	watt, unit of power

