Hotel Vancouver

VANCOUVER, BRITISH COLUMBIA, CANADA

October 14, 1966

Dear Robert -

Apropos our brief discussion last week, I enclose two copies of a photograph which will be of interest to you.

They show the plaque honouring Karl Terzaghi, through the re-naming of the former Vigario dam, an essential element in the scheme by which Paraiba R. water is diverted at Santa Cecilia, pumped to the Santana reservoir and again pumped into the Vigario reservoir thence flows to Lages reservoir, and is "turbined" in the Nilo Peçanha power plant of Rio Light.

L. to r. the individuals are Sra Santos, Mme C. A. Dagenais and Dr Adolfo Santos Jr.

Sincerely,

Fred Lawton

Canadian Consulate General

Consulat Général du Canada

Rio de Janeiro,
22 of July of 1983.

102-1

Mr. Robert F. Legget
531 Echo Drive,
Ottawa, Ontario
Canada K1S 1N7

✓ 20. VIII.83

Dear Mr. Legget:

Many thanks for your letter of June 17, which only came to hand on July 07.

We have contacted LIGHT - Serviços de Eletricidade S.A. in your behalf and we shall inform you that your assumption that Rio-Light has been absorbed into the national power system, Eletrobras, is quite correct.

Mr. Arthur Cohen, LIGHT's Operator Director, informed us that although the Vigario Dam had been renamed of Terzaghi Dam, it remains well-known by its original name.

We are sending to you, herein below the name and address of the engineer to whom you should write for information and photograph, as requested:

Mr. Valter Stuckenbruck
Light - Serviços de Eletricidade S.A.
Superintendência de Geração
Av. Marechal Floriano, 168 - 1º andar
Rio de Janeiro, CEP 20.080
Brasil

We remain at your disposal for any further information you may desire.

Yours faithfully,

Sergio Serero
Commercial Officer

SS/mcp.

As from:

20 August 1983

Mr. Walter Stuckenbruck,
Light - Servicos de Electricidade S.A.,
Superintednedencia de Geracao,
Av. Marechal Floriano 168 - i° andar,
Rio de Janeiro CEP 20,080,
Brasil.

Dear Mr. Stuckenbruck,

I take the liberty of addressing to you this somewhat unusual request, sorry only that I must do so in English instead of the language of Brasil.

I am the retired Director of Building Research of our National Research Council, and a civil engineer. I have been connected with the development of Geotechnique in Canada from the time of its inception before the war of 1939-1946.

Because of this interest, I knew Dr. Karl Terzaghi very well and know Mrs. Terzaghi. When a great Canadian Dam was renamed the Terzaghi Dam (about 1965), one of my friends who had visited Brsil told me that he thought the Vigario Dam of your organisation, had also been named the Terzaghi Dam.

If this is the case, North American engineers would be most interested to know this and to see a photograph of the "other" Terzaghi Dam.

And so I write to ask you if the report given to me is correct; if so, when was you name named after Terzaghi; can you give me main statistics of the dan; and could you oblige me with a photograph of it and of the plaque with Dr. Terzaghi's name on it? If you can so oblige me, may I have your permission to write a short account, based on the information you send me, and have this published, with the photographs, in Geotechnical News, published in Canada bu international in scope? I shall value your help.

Yours sincerely,

Light
Serviços de Eletricidade SA

Av.Marechal Floriano, 168 Rio de Janeiro RJ Brasil CEP.2008
Cx. Postal 0571 End. Telegr. CATALON Telex:(021) 2327

No.

Data September 19, 1983.

Mr. Robert F. Legget
531 Echo Drive, Ottawa
KIS IN7, Ont., Canada

✓ 29/11/83

Dear Mr. Legget,

I am very pleased to send the informations you requested in your letter dated August 20, 1983.

The report given to you by one of your friends who had visited Brasil is correct: our Vigário Dam was renamed the Prof. Karl Terzaghy Dam in 1964. On the attached photograph of the plaque, which measures 280 mm x 530 mm, you can read:

Prof. KARL TERZAGHI DAM
The LIGHT GROUP's homage
to its illustrious consultant
1964

The Terzaghi Dam is situated about 70 Kilometers north-west of the city of Rio de Janeiro. The reservoir (the Vigário Reservoir) formed by this dam is at 398 m above sea level and has a storage capacity of 38 millions of cubic meters of water. The water for this reservoir is pumped by the Vigário Pumping Plant, which has four pumps of 40 m^3/s capacity cach, under a head of 37,5 m. The Vigário Reservoir supplies water, under a head of 300 m, to the Nilo Peçanha Generating Plant, which is a underground plant having a maximum output of 380 MW.

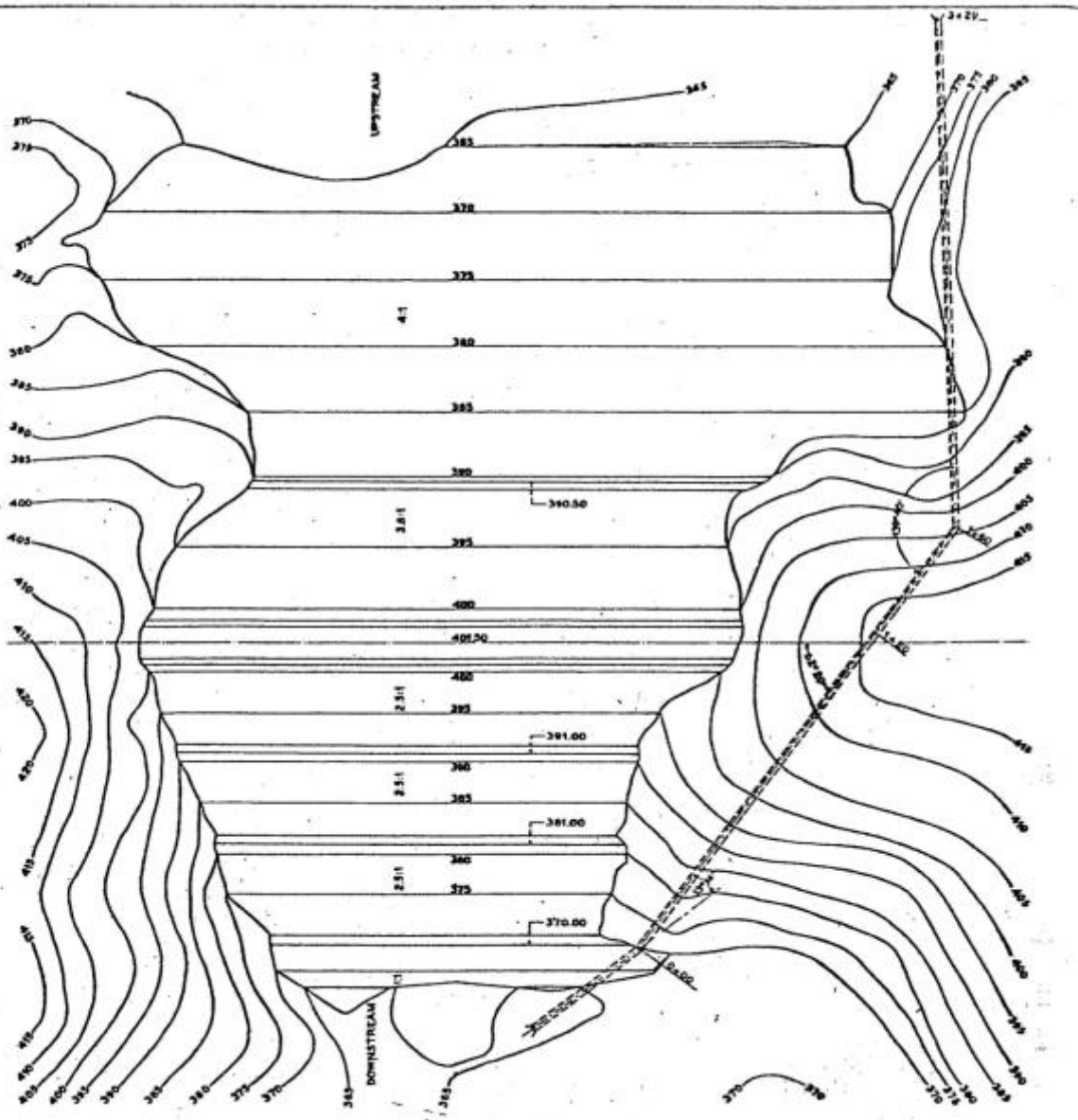
Two photographs of the Terzaghi Dam and two of the plaque are being attached to this letter. I am enclosing also one drawing of the dam as well as a short description of it, written by our geologist Mr. P. P. Fox at the time the Vigário Reservoir was filled.

The Company for which a work for does not make any objection against publishing the informations I am passing to you in any technical review either in Canada or in any other country; therefore you can use those informations in the way you please. I just hope that the data I am giving to you are enongh for the purpose you have in mind.

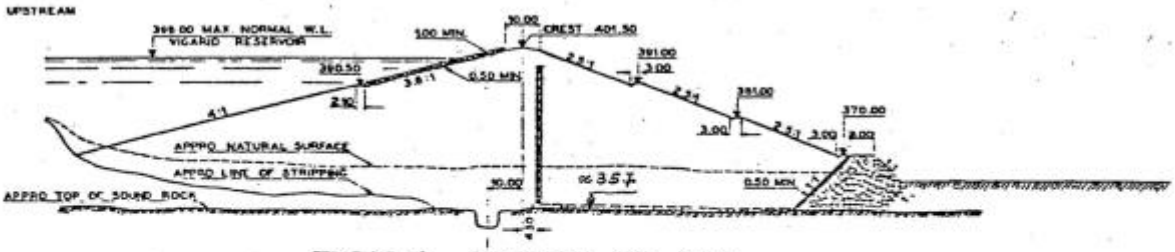
PS- The rainy weather during the last three weeks delayed taking the photograph of the plaque. That was the reason for not having answered your letter sooner.

Your truly,

Walter Stuckenbruck



PLAN



TYPICAL SECTION OF DAM

CIA. DE CARRIS, LUZ E FORÇA DO RIO DE JANEIRO LTDA
RIO DE JANEIRO

PROGRESS DRAWING

PARAIBA-PIRAI DIVERSION

VIGARIO DAM

WORK PERFORMED PRIOR TO PERIOD BEING REPORTED

WORK PERFORMED DURING PERIOD BEING REPORTED

PERIOD FROM ..... TO .....

PROJECT MANAGER

DATE: AUG 1, 1948

Nº 41096

VIGARIO DAM (Terzaghi Dam)

INTRODUCTION

The excavation for this earth dam on Vigario creek was not started until June, 1950 after work on the dike had been underway more than one year. The placing of the earth materials were started in August, 1950 and were completed on August 31, 1951. The riprap placing was completed a few weeks later.

Over 150,000 cubic meters of organic clay and sand, were removed from the foundation area for the dam before any compacted fill was placed. The dam required 913,697.00 cubic meters of rolled earth, 8,800 cubic meters of sand for the horizontal and vertical filters, and 32,000 cubic meters of rock for riprap and downstream rock toe.

DESIGN FEATURES

The dam has a maximum height of 44.70 m and a length of 180.0 m The crest width, up and downstream slopes are the same as the dike excep that the downstream slope is 2.5 to 1 thru out. The drainage system of a horizontal and vertical sand filter is the same except that the vertical filter is directly under the downstream shoulder of the crest of the dam instead of under the 391 berm as at the dike. The details of this design are shown by exhibit 11. The foundation excavation for the

upstream half of the dam is shown by exhibit 2.

DIVERSION

After considerable study it was decided to construct a diversion tunnel thru the left abutment rather than place a diversion pipe thru the foundation or base of the dam. The excavation of the soft, organic clays under the proposed diversion pipe would have presented many problems not encountered with the tunnel. The diversion tunnel perhaps cost somewhat more than a pipe but there were many advantages of having the pipe out of the way when placing earth materials.

This tunnel was started in February and completed in July, 1950.

The tunnel has a length of 308.02 m and a horse-shoe section of 2 x 2 m. It was located largely in decomposed rock, except for about 60 m of hard rock near the middle of the tunnel. The closure of the tunnel is described below.

PERMANENT SUMP

This sump was completed to the same dimensions as at the dike with the weir at elevation 363.95 m. It was constructed in 1950 and was kept pumped down to near the bottom thru out the construction of the dam for 24 hours a day after December 7, 1950 with minor interruptions. Between January 24, 1951 and September 12, 1952 the water level was maintained below elevation 359.30 m and normally as low as 358.50 m.

After September 12, 1951 the water level was allowed to raise to elevation 363.20 and by December 19, 1951 it had raised to 363.65 m. Continued pumping kept it from overflowing until late January 27, 1952 when 20 liters per minute was reported. It increased to 90 liters per minute on February 14, 1952.

During 1951 the field estimated the amount of water entering the sump by the 12-inch cast iron pipe many times. These estimates varied between 45.45 and 27.52 liters per minute.

CASAGRANDE PIEZOMETER PIPES

Five Casagrande type of piezometer pipes have been recently completed in the dam as shown by exhibits 13 and 14. Holes G-1 to G-4 are located along the upstream crest of the dam at elevation 401.30 m. Depth of these holes and their relation to the original surface are shown by drawing No. 51-670. All of the holes were shifted from location requested toward the right abutments for some unknown reason and hole G-4 may be located in original ground instead of on the earth embankment. Hole G-5 is located in the rolled fill downstream of the vertical filter at the 391 berm. The water levels in these pipes have been determined as follows on the dates given:-

Hole No. Date	El.of Water G-1	El.of Water G-2	El.of Water G-3	El.of Water G-4	El.of Water G-5
30/12/51	393.60	363.52	369.18	375.17	-
13/ 1/52	389.50	368.55	369.42	Dry	-
27/ 1/52	387.72	368.65	369.44	375.29	-
3/ 2/52	387.73	368.65	369.45	375.30	369.48
Bottom of tube	375.60	368.10	368.90	375.16	367.18

Evidently excess water was left in the tube at G-1 since the water level declined several meters after the first measurement.

STANDARD PIEZOMETER PIPES

Six 2-inch pipes (A-1 to A-3 and B-1 to B-3) have been placed in the downstream portion of the right abutment for the dam as shown on exhibit 13. These holes are also shown in the geologic sections on exhibit 14.

Five holes (E-1, E-2, D-1, D-2, and C-1 were completed in the downstream portion of the left abutment as shown by exhibit 13. Holes S-1 to S-5 were drilled in 1949 and 1950 for locating the diversion tunnel. The logs of these holes are given on exhibit 16. The field was requested to clean out holes S-1 and S-3 in 1951 for piezometer pipes, but they preferred to redrill them instead. The redrilled holes were numbered S-1-A and S-3-A as shown on exhibits 13 and 14. Geologic sections thru these holes are represented by exhibit 18. The water levels for these pipes as well as for the Casagrande pipes are shown as continuous graphs for each pipe since the hole was completed by exhibit 19

BENCH MARKS

Several permanent bench marks have been placed on top and on the downstream slope of the dam for reference as for the dike. There has been no unusual difference in elevation observed. A few millimeters of settlement of the earth embankment has been noted which is normal.

EROSION ON UPSTREAM SLOPE

The same type of erosion has occurred on the upstream of the dam as the dike. The erosion ditches were not in general as deep as on the dike since the exposure had been of a shorter duration. There was one, however, about 20 m from the right abutment between the 394.50 m berm and 385.0 m that was rather large and deep. It had a depth of 3 meters just below the 394.50 berm. A pipe was installed in it several weeks ago to reduce the erosion. These gullies are being backfilled as the reservoir approaches.

CLOSURE OF THE DIVERSION TUNNEL

Work was started on October 19, 1951 to place temporary stoplogs about midway of the tunnel at station 123 m from the downstream portal. A cofferdam of earth was built upstream of the tunnel intake in order to permit the placement of the temporary stoplogs at station 123. The place for the concrete plug in the tunnel was cleaned of all loose material and sound rock was exposed.

On October 22, 1951 a key plug consisting of a little concrete

of about 0.10 m thick and 1.00 m in length was built against the tunnel walls and bottom to hold the stoplogs of 6 x 8 inch wooden beams. The rock, downstream from the stoplogs, was then excavated for the large concrete plug as shown on exhibit 17.

Before the final concrete plug was placed, the tunnel upstream of the plug was filled with clayey, silty sand as follows:- Water was again allowed to flow thru the tunnel while the silty sand was pushed into the stream at the upstream portal. After it had filled to the top of the first stoplogs inside the tunnel near the permanent plug, another stoplog was added until the top was reached. Some of the clay was carried away by the water overflowing the stoplogs. An opening was also made, about 20.0 m from the upstream portal in order to insure the complete filling of this area. The area was later completely covered by compacted filled by a bulldozer and roller. The backfilling was completed on November 23. The area for the final concrete plug was cleaned on November 24, and concreting started. All of the concrete for the plug was completed on November 27, 1951. The final concrete plug has a length of 5 meters as shown on exhibit 17. Eleven pipes were left in and thru the plug prior to concreting into which 342 bags of cement were later injected to fill any voids at the top and back of the plug.

The tunnel downstream from the plug is to be left open for the time being. If excessive breakage occurs, grout holes may be drilled thru the plug to force more material in any voids upstream. I have some

doubt if the tunnel upstream of the plug is 100% full but the field forces seem to think it is full.

The gunite lining downstream of the plug is to be punctured by jackhammer holes and later backfilled with rock for a drainage tunnel.

RESERVOIR FILLING

The diversion tunnel was closed on November 23, 1951 and the storing of water commenced on this date. By January 17, 1952 natural run-off had filled the reservoir to elevation 381.69 m.

The first filling by No. 1 pump was started on January 7, 1952 at 11.50 P.M. and continued for 30 minutes. The pump was operated for 1-3/4 hours on January 20 and 21, 1952 to raise the water level from 382.35 m to 382.84 m. Additional pumping on January 26 and 27 raised the reservoir water level to 384.50 m. The reservoir level was raised from 384.85 m at 7:00 A.M. on February 3, 1952 to elevation 388.77 at 6:30 A.M. on February 4, 1952. Several hours of pumping was also accomplished during the nights of February 5 and 6 but exact water levels during pumping are not available. The approximate level may be determined from the accompanying graph on exhibit 3. Because of difficulty with one of the valves, there was no pumping between February 8 and 21. The level rose to elevation 390.00 m on February 20 by run-off of rainfall. Pumping was resumed on February 21, 1952.

P. P. Fox

PPF/MR.

29 September 1983

Walter Stuckenbruck Esq.,
Light Servicos de Electricidade S.A.,
Superintedendencia de Geracao
Av. Marechal Floriana 168 1°andasc,
2080 Rio de Janeiro R.J.,
BRASIL.

Dear Mr. Stuckenbruck,

Thank you so very much for your letter of 19 September and its splendid enclosures; it got here very quickly and safely. And thank you also for the trouble to which you have so clearly gone in getting the photographs of your Terzaghi Dam which you have so kindly sent to me. It was good of you, also, to write to me in such perfect English; I am only sorry that I can not return this courtesy and write in your language. But be assured, please, through my language, of my great appreciation of your kindness. Mr. friend was, after all, correct in his remembering hearing of your Terzaghi Dam, so named before the Canadian Dam which also carries this great man's name (he was a great friend of mine). With the information you have sent, I can now write a short article about your Dam and this will be published in the Canadian Geotechnical newsletter - but probably not until early in 1984. As soon as it appears, I will send you printed copies for your records.

With my kind regards,

Gratefully,

RUTH D. TERZAGHI 3 ROBINSON CIRCLE WINCHESTER, MASSACHUSETTS 01890

October 30, 1983

W X Ca

Dear Robert:

Thank you for sharing your note on "The Other Terzaghi Dam." I am happy to learn of your note, and I wouldn't change a thing in it.

I attended the Pan-Am conference in Vancouver in June, and was very pleased when they read your message at the Memorial Luncheon. I had a great time at the conference, playing hookey when I felt like it, and thereby acquiring some lovely examples of Indian and Eskimo stone carvings. Both Milton Vargas and Victor de Mello were there (Victor chaired the luncheon); consequently I learned of the other T. dam.

Following the meetings, Charlie Ripley took a small group of us on a tour through the mountains, including, of course, the Terzaghi Dam. It was all extremely interesting and great fun in addition.

Early this past week I spoke at another 100th Anniversary meeting at the Rochester Institute of Technology. One of the Exhibits at this meeting was a Terzaghi postage stamp issued by the Austrian P.O. I plan to acquire a batch of these and will send you one when they arrive.

Otherwise I've had a beautiful, busy summer: six weeks in our cabin in Maine, another week in mid-October when I celebrated my 80th birthday with some swims in our pond. Nobody ever told me that it would be so much fun to be eighty!

With warm regards to you and Mary,

Sincerely

Ruth

as you may imagine, I'm foaming at the mouth at every fresh report of crimes committed by "our" President. He'll get us out of the frying pan into the fire yet.

R

HARVARD UNIVERSITY

GRADUATE SCHOOL OF ENGINEERING

Pierce Hall
Cambridge 38, Massachu.

December 8, 1949

Prof. Ralph B. Peck
College of Engineering
University of Illinois
113 Talbot Laboratory
Urbana, Illinois

Dear Ralph,

Our telephone conversations gave me the impression that you don't have much more information concerning Fighting Island than I have. Since, in addition, Schubring appeared to be in a great hurry, I prepared the memorandum without waiting for further news from you. A copy of the memorandum is enclosed. If you have to make any comments on the basis of your knowledge of the situation, please communicate them to me at your earliest convenience. I am sorry that I did not have your Denver address. Otherwise I would have informed you on my decision to prepare the memo myself. This would have saved you some trouble.

In the future, it would be advisable if you would write a few lines into your note book concerning our arrangements about division of labor as I do. Considering the number and variety of our engagements an occasional slip of memory is inevitable. According to the entries in my notebook you have consented to prepare the memo on Fighting Island in Urbana, but you have said that you cannot start on it until a week after your return to Urbana. You have also promised to prepare a draft for the summary report on the settlement situation and send it to me for comments and revision, but we both agreed that there is no hurry about this one.

As far as the Fighting Island memo is concerned no harm was done, because the blame for the delays rests exclusively on Schubring's shoulders. If the airplane photos had been promptly ordered and delivered he could have gotten the memo ten days ago.

In your letter of November 23 you inquired about the type of pressure gage I installed in the Vigario Dike in Brazil. This inquiry is based on some misunderstanding. I have not yet installed any pressure gage, and I merely mentioned to you

that I intend to install a few piezometric tubes of the Casagrande type. According to your description of the Chewalah slide the entire upper part of the mountain consists of fault gouge. That is rather unlikely. The term fault gouge commonly refers to a relatively narrow zone of crushed rock located between two masses of intact or jointed rock. Possibly there is a wide fault zone in which large fragments of rock are separated by seams of gouge. If the sliding movement has already passed into creep, a Casagrande installation or equivalent may do the trick.

Enclosed you will find my general comments on Zeevaert's thesis. A copy of these comments goes to Zeevaert directly. The copy of the thesis containing the detailed comments in red pencil follows by separate mail. Please return the marked copy after you have used it. There is no hurry about it. In the meantime, please send me an unmarked copy for my files. Arthur will read it after revision. In my opinion the thesis is still far from being ripe for publication.

A copy of my letter to Zeevaert concerning his thesis is attached. The letter is self-explanatory. Zeevaert is not yet self-critical and straight-thinking, but he has improved considerably during his sojourn in Urbana. Revision of his thesis may further advance his education provided he does it conscientiously.

As soon as I have completed my digest of Zeevaert's work on New Haven I will send you a set of comments concerning it.

Very sincerely yours,

K. Terzaghi

KT/s

RBP

RALPH B. PECK CIVIL ENGINEER: GEOTECHNICS

31 October 1983

Dear Robert,

✓ 17.XI.83

Your draft on The Other Terzaghi Dam will be of interest to many readers. Evidently your correspondent, Sr. Stuchenbruck, is well informed about it. He must, however, have transposed a couple of letters, as the original name was Vigario, not Viragio. I thought I might have some correspondence with Terzaghi about the dam (or dike, as he sometimes called it), but only one reference turned up, in a letter of Dec. 8, 1949. It at least confirms the spelling, as does the announcement of a lecture about it at Illinois (year unknown).

Terzaghi dealt on these jobs with Adolph Ackerman, who I think is still active at 1250 Sherman Ave, Madison, Wisconsin 53703.

With best regards,

Ralph

1101 WARM SANDS DRIVE, S.E. ALBUQUERQUE, NEW MEXICO 87123 505-293-2484

17 November 1983

To Ralph Peck

Thank you for your encouraging letter of 31 October, delayed in reaching me as is now standard for our P. O.

(Mrs. Legget said, when she saw your script, "Now why can't you write nicely like that?". I wish I knew)

Your correction in the name of the other Terzaghi Dam may have been my slip; I must check my notes and my letters from Rio ... but it will be changed in the final version. I am glad to say that Ruth also approves.

Thank you also for the copies of most interesting papers from your files; their effmiciency puts mine to shame. It was so interesting to "hear" Karl "Talking" again through his letter, as he did in all his writing.

I have often meant to ask you - and today I remember to do so - if you ever came into contact with a man who is now a good friend of mine when he was a graduate student at Illinois. This is Ed Misiaszek, now Associate Dean at Clarkson College, Potsdam N.Y., an absolutely first class place as you may know.

For his thesis work, he studied all the records of test borings on the campus which he could trace and, by analysing them carefully, was able to show by means of penetration rest results (and, I think, mositure contents of samples) the boundary between the two tills that underlie the campus.

He has never written up this significant work for publication. I "badger" him to do so and one day hope to be successful - since I know of no comparable work reported in the literature (although I may have missed one). I thought you might like to know that there is this possible paper on the horizon.

RBR

Light

Piraí, December 2, 1983.

Mr. Robert F. Legget
531 Echo Drive, Ottawa
K1S 1NT, ONT., CANADA.

Dear Mr. Legget.

I got your letter dated 17 October 1983 only on 20 November 1983, the day I came back to work after my one month vacation.

I am enclosing a xerox copy of your draft with a minor correction; the rest looks OK to me.

With regard to the title of your paper please permit the following satement:- our Vigário Dam was built in 1951, several years before Mission Dam, as far as we know. Both dams were renamed as the Terzaghi Dam, the Vigário Dam in 1964 and the Mission Dam in 1965. Therefore, it seems to me that the "other" dam would be the Mission Dam, rather than the Vigário Dam. Why don't you change the title to "There are two Terzaghi dams"?

As I feel that you were really a great friend of Dr. Terzaghi I think you would be very happy to know that here in Brazil we did not leave the day of 2 October 1983 to go by without rendering a homage to him. On this day a ceremony was held in memory of Dr. Terzaghi's birth centennial. The ceremony was sponsored by LIGHT, Engineering Club and Brazilian Association of Soil Mechanics, and took place at the Dam and at the Recreation Hall in presence of the LIGHT's Board of Directors, Professors and Engineers of Soil Mechanics (about 150 persons). A bronze plaque (two photographs of which being enclosed) with the following inscription (when translated) was unveiled:

In memory of
KARL VON TERZAGHI
Homage of Brazilian Engineering
Piraí, RJ, 2 October 1983
Year of the 1st Centennial of Birth
LIGHT - Engineering Club - ABMS

Piraí, RJ stands for Piraí County, State of Rio de Janeiro.

ABMS stands for Brazilian Association of Soil Mechanics.

The ceremony was followed by a barbecue.

I am very pleased to pass to you the aforementioned comments and informations.

Yours sincerely,

Walter Stuckenbruck

531 Echo Drive, Ottawa K1S 1N7; 13 January 1984

W. J. Eden Esq., Editor,
Geotechnical News,
c/o DBR/NRC, Ottawa.

I have much pleasure in submitting to you, as a possible contribution to Geotechnical News, a long-planned Note on the Terzaghi Dam in Brazil, dedicated before the Mission Dam was so named in 1965. You can well imagine how sorry I now am that we did not know about the "other" Terzaghi Dam in 1965 - sorry, too, that it has taken me so long to dig up the necessary information. But here its is at last, approved by Mrs. Terzaghi, Ralph Peck and Walter Stuckenbruck.

Robert F. Legget

A Note
for submission to:
The Editor, GEOTECHNICAL NEWS. 15 January 1984.

THERE ARE TWO TERZAGHI DAMS

One of the highlights of the Sixth International Conference on Soil Mechanics and Foundation Engineering, held in Montreal in September 1965, was the unveiling by Mrs. Ruth Terzaghi of a plaque in honour of her late husband's work on the Mission Dam in British Columbia. The British Columbia Hydro and Power Authority marked in this way the renaming of the dam as the Terzaghi Dam. The plaque then unveiled in Montreal, on 8 September 1965, is now fixed to a block of pink granite on the crest of the dam itself, amid the beauty of the mountains of the Coast Range. (The unveiling is described and illustrated on pp. 12 and 13 of the third volume of the Proceedings of the Sixth Conference.)

In discussing this happy event some time later with the late Fred Lawton of Montreal, a valued friend for many years he told me that he thought there was also a Terzaghi Dam in South America. I made a note of this at the time but the pressure of official duties in those busy years of the late sixties prevented me from following up this lead. The note got mislaid but recently came to light again. I found that Fred Lawton had told me that the dam was a part of the system of Rio Light, the name of the utility then supplying power to the city of Rio de Janeiro in Brazil.

Through the kind offices of Sr. Sergio Severo, the Commercial Officer in the Canadian Consulate General in Rio de Janeior, I got into touch with Sr. Walter Stuckenbruck who is in charge of the operation and maintenance of the generating and pumping plants of LIGHT Servicos de Electricidade S.A., at Rio de Janeiro, the LIGHT organisation being the national public utility of Brazil. Not only did Sr. Stuckenbruck kindly supply me with information about the Vigario-Terzaghi Dam but he had photographs specially taken, some of which accompany this Note. It is a privilege to share them with readers of Geotechnical News

It was at the end of March 1947, just after he had returned from a visit to India, that Dr. Terzaghi was called upon to make his first visit to South America. This was in response to an appeal from the Chief Engineer of Rio Light (as the private company was ~~still~~ then known ; it was later nationalised), to advise on a serious landslide that was threatening the penstocks of a large water power station. "Within ten days (of his arrival) all operations required for the control of the movement were organized and started" Arthur Casagrande has reported. This was the start of an important consultancy which took Dr. Terzaghi to Brazil at least twice every year until 1950. His advice was sought in connection with a number of major projects, including the design and construction of two earth dams.

One of these was the Vigario Dam, located 70 km northeast of the city of Rio de Janeiro. It is an essential

element in a pumped storage water power project in which water of the Paraiba River is diverted at Santa Cecilia, pumped to the Santana Reservoir thence again to the reservoir formed by the Vigario Dam and a smaller dam across a saddle. From this reservoir, water is conducted under a head of 300 m to the Nilo Pecanha generating plant, an underground installation with a maximum output of 380 megawatts.

Surface level of the Vigario Reservoir is 398 m above sea level; the reservoir has a capacity of 38 million cubic metres. The dam which creates it has a maximum height of 44.7 m and a length of 180.0 m. The upstream slope is 4:1 and the downstream slope 2.5:1 913,697 cubic metres of compacted soil were placed in the dam, 8,800 cubic metres of sand being used for horizontal and vertical filters and 32,000 cubic metres of rock for rip-rap and the downstream toe. Excavation was started in January 1950, after work on the adjoining dyke had been in progress for more than a year. All earth and rock placement was completed by September 1951, since when the dam has been in steady service.

Dr. Terzaghi advised on essential aspects of the design of the Vigario Dam. In recognition of this, the dam was renamed the Terzaghi Dam at an impressive ceremony in 1964. An accompanying photograph shows the plaque that was then installed, the inscription (when translated) reading:

Prof. Karl Terzaghi Dam
The Light Group's homage
to its illustrious consultant
1964

Looking back across the years, it is greatly to be regretted that the Canadian Committee responsible for the 1965 Conference did not know of the earlier naming of the Vigario Dam as the Terzaghi Dam, so that the naming of the two dams could have been appropriately linked. It is, therefore, good to know that the current President of the International Society, Dr. V. F. B. de Mello of Brazil, was enabled to visit the Canadian Terzaghi Dam in the summer of 1983, following the Pan-American Soil Mechanics Conference in Vancouver. Few will have the privilege of following his example of visiting both dams but it is good to know that two of Dr. Terzaghi's notable projects now carry his name, even though both are in relatively isolated locations.

Brazilian workers in Geotechnique have done further honour to the founder of our discipline for; not only do they have a binennial Terzaghi Prize, but they had a special ceremomy at the Vigario-Terzaghi Dam on 2 October 1983, the centenary of his birth. Sponsored by Light, the Engineering Club and the Brazilian Association of Soil Mechanics, the ceremony was attended by about 150 and another plaque was unveiled, this one reading (in translation):

In memory of

KARL VON TERZAGHI

Homage of Brazilian Engineering

Piai, R J, 2 October 1983

Year of the 1st. Centennial of Birth

LIGHT - Engineering Club - ABMS.

13 January 1984

Sr. Walter Stuckenbruck,
LIGHT Servicos de Electricidade S.A.,
Superintendendencia de Geracao,
Av. Marechal Floriana 168 1° andasc.
2080 Rio de Janeiro R.J.,
BRASIL.

Dear Sr. Stuckenbruck,

Thank you very much for your welcome letter of 2 December; it reached here just before Christmas and this must explain the slight delay in this reply. Mayb I offer you, please, my best wishes for 1984, the New Year which is already disappearing fast!

And to this I must add a sincere and unqualified apology for the lamentable title which I had used for my little Note on your Terzaghi Dam. The nuances of the (strange) English language are such that neother I, Mrs. Terzaghi not Ralph Peck (both of whom read the Note for me and approved of it) had noticed the implied denigration in the title!

Just as soon as I read your letter, I looked at it again and say, then, quite clearly how absolutely wrong it was! It has been changed - to the title which you so kindly and correctly suggest - THERE ARE TWO TERZAGHI DAMS. Even though it may not be necessary, let me assure you that no thought of any precedence in that title, my Note being a very long-delayed tribute from a Canadian to your pioneer efforts in Brazil in honouring Dr. Terzaghi.

I have added a small note about your Centenary celebration (again, we "missed the boat"), of which I read with the greatest interest.

It will be some time before my Note can appear in GEOTECHNICAL NEWS but as soon as I get printed copies one will come immediately to you. I am glad that we are now within sight of rectifying a big gap in Canadian geotechnical knowledge of geotechnical interests in your country.

Yours sincerely,