Declassified E.O. 12356 Section 3.3/NND No. 785019

ACC V/1 10000/150/803

GENERATING PLANTS & SUBS
LIMA (...) LEGHORN
DEC. 1944 – SEPT. 1945

Declassified E.O. 12356 Section 3.3/NND No. 785019

ERATING PLANTS & SUBSTATIONS OF VALDARNO,
A (...) LEGHORN
1944 - SEPT. 1945

SOCIETÀ ELETTRICA SELT - VALDARNO

Working plant and substation

of "Rotabile" Tower mills

Lima - Nera Montoro - Forcelle

Galleries - Plans della Rena -

Orfino - Model mills - Airplane

photos

Declassified E.O. 12356 Section 3.3/NND No. 785019

Embassy - Lisbon
Lima - Bern Madrid - Montevideo
Quito - Paris Rio de Janeiro
Santiago - Stockholm - Vatican
Asuncion

Secretary Rio Pact OAS FIAC &
Subsidiary Matters

1000 / 190 / 803

Opened - 21. Dec. 1944
Closed - 23- Apr. 1945

5

THIS FOLDER
CONTAINS PAPERS
FROM DEC 44
TO SEPT 45
CATALOGUE -

Se -2 - A. Lumini - Firenze - 2000

Declassified E.O. 12356 Section 3.3/NND No. 785019

FIELD ENGINEERS REPORT.

TAVARNUZZE Sub-station
Selt-Valdarno
23rd April 1945

a) EMPOLI line was energized 22nd April 1945
b) 6000 KVA, 33.3 KV - 6 KV transformer has been repaired for use of 4 1500 KVA, 5 4 KV static condensers that are now being installed.
This work is expected to be completed by 10th May 1945.

c) Foundation and cooling equipment for 20,000 KVA, 120 KV to 36 KV transformer are ready. Transformer is now under oil test. Installation will be complete by 15th May 1945.

FLORENCE

ADVANCED SECTION
SIG-COM
OFFICE
ONE
ELECTRICAL UNIT

3/68

Clarence S. Wilcox
Major Ord.
Field Engineer

Comments.

This substation receives power at 60 KV from TSRNI (120 KV) transmission line. Power is furnished to PRATO (120 KV) transmission

Declassified E.O. 12356 Section 3.3/NND No. 785019

e) Foundation and cooling equipment for 20,000 KVA, 120 KV to 36 KV transformer are ready. Transformer is now under oil test. Installation will be complete by 15th May 1945.

3468

Clarence S. Wilcox
Major Ord.
Field Engineer

FLORENCE

ADVANCED SECTION
ELECTRICAL DIVISION
SOS - ETO
OFFICE
DATE

Comments.

This substation receives power at 60 KV from TERNI (120 KV) transmission line. Power is furnished to PRATO (120 KV) transmission line at 60 KV. A 6000 KVA transformer at this substation operates from 60 KV to 31.5 KV. Power is furnished at 30 KV to EMPOLI over the (120 KV) transmission line. Two 30 KV lines also lead to Florence, PERETOLA substation.

Copy to: Lt-Col. Lapper
Major Crowther
Major Wilcox
File

Declassified E.O. 12356 Section 3.3/NND No. 785019

Declassified E.O. 12356 Section 3.3/NND No. 785019

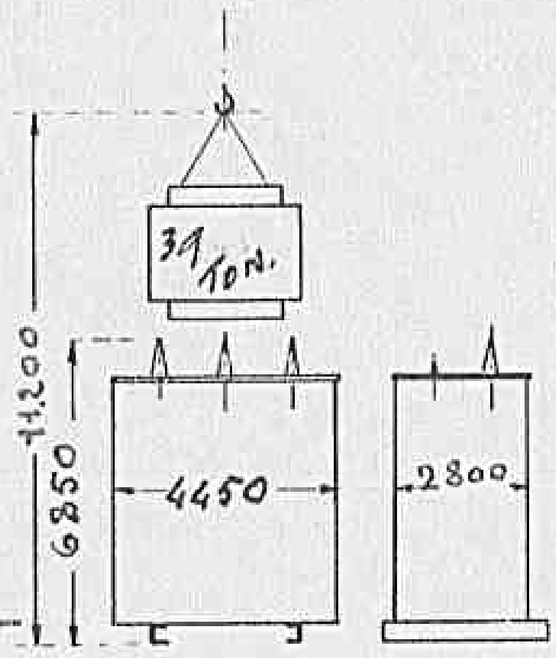
F Tavarnuzze 1 2 3

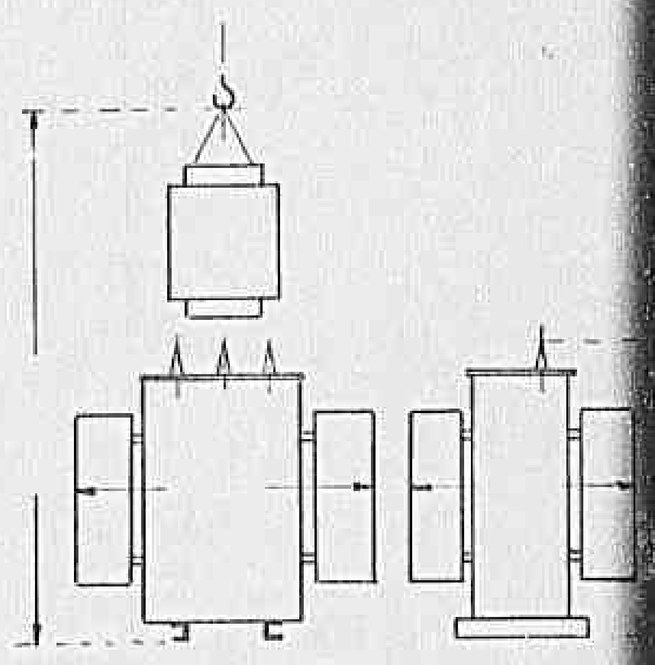
S. E. V. SCHEDARIO TRASFORMATORI ESERCIZ

Trasformatore { Trifase / Monofase } *In olio* *installato nella cabina di* Tavarnuzze

Casa costruttrice Bronw Boveri *Tipo* TUW 650/12300 V. n21782 Sev. 1858 *Anno* 1967

per installazione { all'interno / all'esterno } circolazione olio { naturale entro il cassone / naturale in organi refrigeranti esterni / forzata in organi refrigeranti esterni } raffredda





Peso cassa ad olio . . .	*Kg.*	8.000
Peso dell'olio.	*Kg.*	17.750
Peso della parte estraibile	*Kg.*	39.300
Peso totale del trasformatore	*Kg.*	65.050
Recipiente espansione acc.		700
Refrigerante e moto pompa		1.250
	kG;	67.000

CARATTERISTICHE ELETTRICHE

Potenza continua 20.000 *KVA riferita al rapporto* 121.600/36.000 *Sovraccarico*

Collegamenti *Primario* Stella *Secondario* Stella

Rapporto di Trasformazione { a vuoto 121.600/44.000 - 42.000 - 40.000 - 38.000 - 36.0 / a pieno carico e cos φ = }

Tensione di Corto Circuito 7,73 % alla temperatura di 75° cioè 9465 V./9440 V. alla te

Perdite { nel ferro 56,5 KW alla tensione 36.000 resistenza ohmica alla temperatura { di una bobina primaria / di una bobina secondaria } / nel rame 110 KW riferite al rapporto 121.600/36.000 a 75° di 75° }

Mod. 415 - Giarrano & Morelli - 1500 - 1-64

Declassificato E.O. 12356 Section 3.3/NND No. 785019

E. V. SCHEDARIO TRASFORMATORI ESERCIZIO

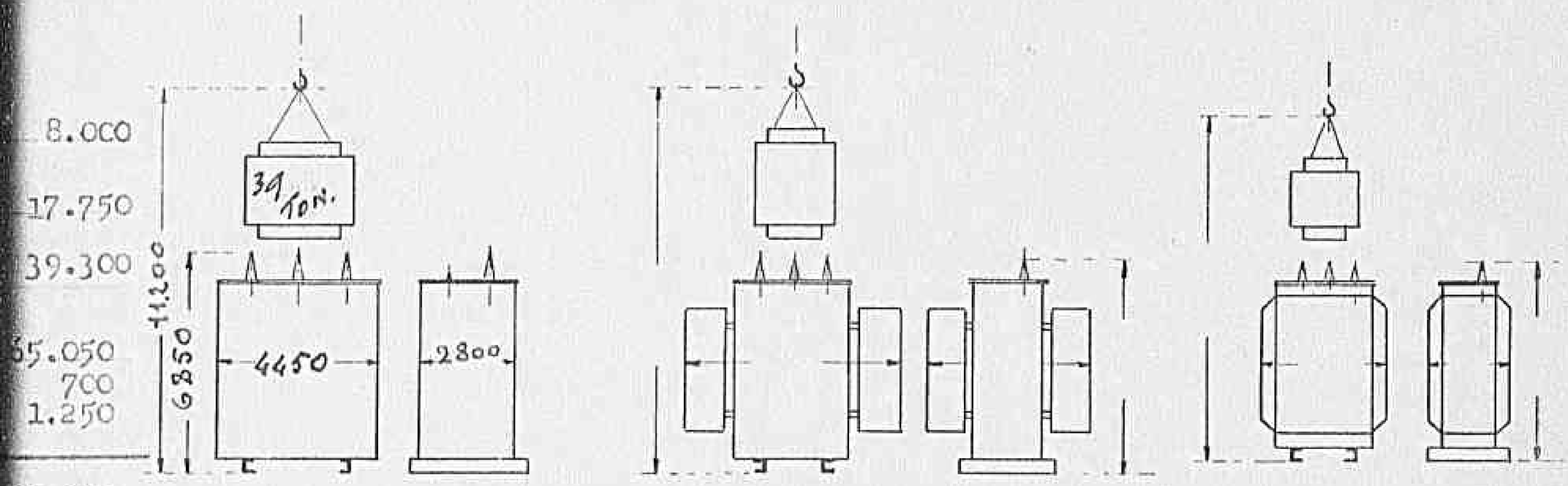
2 via

lio *installato nella cabina di* Tavarnuzze

ci *Tipo* TUW 650/12300 V. n21782 Sev. 1858 *Anno di fabbricazione* 1934

circolazione olio: naturale entro il cassone / naturale in organi refrigeranti esterni / forzata in organi refrigeranti esterni

raffreddamento: ventilazione naturale / ventilazione forzata / acqua litri 250 minuto



CARATTERISTICHE ELETTRICHE

A riferita al rapporto 121.600/36.000 *Sovraccarico*

ella *Secondario* Stella

a vuoto 121.600/44.000 - 42.000 - 40.000 - 38.000 - 36.000

ono carico e cos φ =

73 % alla temperatura di 75° cioè 9465 V./9440 V. alla temperatura di 19,5°

KW alla tensione 36.000 — resistenza ohmica alla temperatura: di una bobina primaria 2,07 ohm riferiti alla presa 121.600

KW riferite al rapporto 121.600/36.000 a 75° di 75° — di una bobina secondaria 0,1242 ohm riferiti alla presa 36.000

Declassified E.O. 12356 Section 3.3/NND No. 785019

ADVANCED SECTION
ELECTRICAL DIVISION
PUBLIC WORKS & UTILITIES SUB-COMMISSION
ALLIED COMMISSION

Florence, 6 Via Cerretani
Telephone nº 1153
9th April 1945

Information to Lt-Col. Renton.

Perversions inspection 9th April 1945 - Capt. Lowdon.

32 oil drums left this morning for filling at San Romano and return to Sub-station.

Vacuum pump is now ready for service after having been stripped and repaired.

Cement. There is again a hold up with cement, but we are getting releases and transport laid on today, in liason with S.O. 77 C.M.S.

The core of the transformer is now in the tank and the top plate should be in position tomorrow evening.

The engineer in charge stated that the transformer will not be ready until after the 15th April.

Major
P.A. to C. S/O, A.C. El.Div.

3466

Declassified E.O. 12356 Section 3.3/NND No. 785019

File Folder II

TAVARNUZZE SUB-STATION

29th March 1945

The core will be inserted in the tank today and final assemblies made.

Unit will be moved to permanent site as soon as bed now being prepared is ready.

Cement supplies may hold up the work. Every possible angle to expedite is being pursued.

Further quantities of transformer oil are required. Transport is being arranged within the next few days.

A vacuum pump has been traced and delivered to the Valdarno Co.;after slight repair will be put to work drying out the transformer.

Progress on all work is satisfactory.

Declassified E.O. 12356 Section 3.3/NND No. 785019

Curtis

Capt Warren Tobey comp 23 Inf
of command for some unexplained reason
relieved by him from his status of status
from this date forward. - This will when
it can be transmitted up from South -
If we are in a position to get them any -
do so and let him know
much so he can submit this
from his allotment to them

Lt
7/29

Lieut Colonel does this cover.

Has any such request
been

3:64

Declassified E.O. 12356 Section 3.3/NND No. 785019

PRO MEMORIA PER IL Sig. Magg. BELL

Lavori di Tavarnuzze.

Materiale urgente Qli 226 di cemento

Li 9/3/1945

Ottenuti 12/3/45

1525

Declassified E.O. 12356 Section 3.3/NND No. 785019

VISIT AND INSPECTION OF TAVARNUZZE SUB-STATION.

~~March 22nd 1945~~

The crane is in position but not operating. Pignone have completed repairs, these are being fitted. Crane will be able to take load within 2 days.

The core of nº 1 120 KV 20,000 KVA transformer is under the crane and ready to assemble to tank.

As soon as this is done the transformer will be dried out (a vacuum pump has not yet been found).

The core of the second transformer 120 KV, 20,000 KVA will be removed to Tavarnuzze as soon as nº 1 is assembled and space available.

Work in progress.

1. Transformer repairs.
2. Crane repairs and structural repairs to transformer repair house.
3. Assembling a static condensor battry total capacity 6,000 KVA to be in service in 20 days.
4. preparation for the reception of the following 30 KV lines:

Ema I - Ema II - Monte alle Croci - Varlungo - Empoli - Prato I - Prato II.

These lines are at present energized directly from the 30 KV line Castelnuovo dei Sabbioni - Tavarnuzze, but will be later energized by cable from the 120 KV transformer.

Materials.

Cement (very urgent), required to prepare foundation for:

a) -120 KV transformer
b) - 60 KV transformer

Oil from San Romano: a further 15 tons required (this is arranged).

A. Crowther, Major.

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ADVANCED SECTION
ELECTRICAL DIVISION
PUBLIC WORKS & UTILITIES SUB-COMM.
ALLIED COMMISSION

Florence, 6 Via Cerretani
Telephone n° 1153
22nd March 1945

SUBJECT: Transport transformers oil.

Ref. : V/1 AC/ab

TO : O.C. 135 M.E. Coy.
Royal Engineers.

1. Can you assist by collecting a further load of transformer oil from San Romano to Tavarnuzze sub-station?

2. It is not possible to wait untill the barrels are filled and complete the trip in one day.

3. I suggest, if convenient to you, that a truck collects the barrels from Tavarnuzze during the afternoon and parks with load in camp, leaving Rovezzano early in the morning to San Romano. Barrels can be filled in time to get back within the day with load to Tavarnuzze.

4. Max load is only 3 Tons. A small lorry, if possible.

[signature], Major.
P.W. & U. S/C, A.C. El.Div.

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INSPECTION TAVARNUZZE SUB-STATION

March 13th 1945.

Transformers.

Insulation complete, resistances are now being assembled and the whole unit to be ready for assembly by Wednesday 14th inst.

I inspected very closely the mounting of the crane and trolley track. Good progress has been made; the position is:

The power take off will be in position within the next 40 hours, the motor necessary for this is still under repair, having a slightly distorted shapt; this is now under repair and every effort is being made to have this unit in position by the 15th.

Filter unit is now in first class order and in position for operation. It is intended to begin filtering into stand by tank located near the transformers house; this will go on during the assembly of group to tank; on completion oil will be pumped in to assembled transformer. Much time will be saved.

Oil.

The barrals transported from Castelnuovo to San Romano are reported filled and ready to be moved to Tavarnuzze.

Arrangements are in hand to provide the necessary transport on Wednesday 14th inst.

Question.

Transformers at Prato; what is the intention; 10,000 KVA 60/30 KV, is this a 77 C.R.E. responsibility or do we carry on with the request made to arrange movement?

A. Crowther, Major.

NOTE:

Phoned Capt. Mason-Tolby. 3461

77 C.R.E. E/O, who would appreciate assistance, is moving transformer from Prato to Tavarnuzze on or about 17th. This is laid on.

A.Crowther, Major

Declassified E.O. 12356 Section 3.3/NND No. 785019

FILE.

INSPECTION OF TAVARNUZZE SUB-STATION

March 2nd 1945

Transformer nº 1.

20.000 KVA. The tank for this unit has been repaired satisfactorily.

Repairs to the core are in progress and will be completed by the 15th March.

The possibility of employing another team of workmen at this stage is not considered advisable; it was suggested and agreed that a more sustained effort be made by working during saturday afternoon and a full day on Sunday.

The crane is now repaired and ready to be mounted within the transformer repair shop; structural work on this house has reached a stage were it is now possible.

Arrangements for drying out this unit are complete, transport has been obtained to bring to Tavarnuzze the "sharpeless" machine from Pian della Rocca. Transport has been arranged to collect oil from San Romano and Rifredi.

Transformer nº 2.

20.000 KVA. Repairs to the tank are completed. Damage to the core in my opinion is excessive; the windings will have to be striped to base to replace insulating rings on two banks.

Materials required for this work are being collected. All available technicians will be organized to get this unit up to standard as soon as Nº 1 is finished.

Transformer nº 3.

20.000 KVA. Repairs to tank completed. The windings and insulation completely destroyed. Only the iron cores remain;these will have to be stripped and re-set. In all a factory job.

Transformer Nº 4.

20.000 KVA

The core of this transformer is in Florence at present each bank in a separate store for security reasons. This can also be moved up to Tavarnuzze and assembled if an emergency exists or developes it would be advisable before repairing nº 2. Tank here is available.

3/10

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Transformer n° 5.

6.000 KVA, V.36700 - 35000 - 33300 Repaired. Without oil.

Transformer n° 6.

Same as N° 5.

Considerable repair necessary, owing to explosion of mine directly underneath the unit.

Transformer n° 7.

Same as n° 5. Damaged as N° 6.

Transformer n° 8.

80 KVA, V.3500 - 150 - 260. Used for internal services of sub-station.

A.Crowther, Major.

Declassified E.O. 12356 Section 3.3/NND No. 785019

Tel. 478.906

VSR/ms

HEADQUARTERS ALLIED COMMISSION
APO 394
Public Works and Utilities Sub-Commission

Immediate action

File

158/PWU

24 February 1945.

SUBJECT : Rehabilitation of Tavarnuzze - Rifredi Transmission Line.

TO : Advanced Section Electrical Division Public Works and Utilities Sub-Commission.

1. Reference your letter dated 19 February 1945, Subject: Rehabilitation of Primary Line, Tavarnuzze - Rifredi.

2. Your understanding as to the intended use of the line is correct, namely that it will be used to feed the railroad at Bologna, as well as the city of Bologna.

3. As was suggested to Major Vallero of your office on 23 February, it would be appreciated if plans were made whereby this line can be energized if necessary from the 120 KV Valdarno line running north from Chiusi.

4. In a conversation with Captain Harry Best today, Major Frank Kubale stated that he will require 3,000 kilowatts at Ca' di Landino (on the Rifredi - Bologna line) by 1 May 1945. He would prefer it at 60 KV but can use 120 KV.

W.M. LAPPER
Lieut-Colonel
Chief Electrical Div.

Major Barrett
See report of Wed 28 Feb.

3458

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ADVANCED SECTION
ELECTRICAL DIVISION
PUBLIC WORKS & UTILITIES SUB-COMM.
ALLIED COMMISSION

Florence, 6 Via Cerretani
Telephone 1153
19th Feb. 1945

RAB/ab

TO: Lt-Col. Lapper
P.W. & U. Sub Commission
Allied Commission APO 394

SUBJECT: Rehabilitation primary line
Tavarnuzze - Rifredi

Please forward answer to attached to this Office. As I understand it, this line is primarily for the Florence - Bologna Railway and later for service to Bologna.

3457

Major.
P.W. & U. SC, Electr. Div.

1 enclosure

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Translation

MINISTERO DELLE COMUNICAZIONI
Ferrovie dello Stato

Firenze, 14 Febr. 1945

A/1

SUBJECT: Rehabilitation
primary line Tavarnuzze-Rifredi

TO: On. Servizio Lavori e Costruzioni
R o m e

TO: P.W. & U. Sc, A.C.
F l o r e n c e

The above mentioned works have been achieved on Friday 9th February 1945.

We are awaiting to know - in due time - how the ends of the line must be put in action.

3456

Chief of Signals &
Electric Plants Office
(signed illegible)

Declassified E.O. 12356 Section 3.3/NND No. 785019

Inviata 12 cop L.S.

MINISTERO DELLE COMUNICAZIONI
FERROVIE DELLO STATO

COMPARTIMENTO DI .....

(1) .....

Firenze 14 Settembre 1943 - A

N. B2/1769/1 L.P.IO

Al N. ..... del .....

OGGETTO: Ripristino linea primaria Tavernuzzo Rifredi

ON. SE VIZIO LAVORI E COSTRUZ
R O M A

Allied Commission Pubblic Works and Utilities
Via Tornabuoni 16
FIRENZE

I lavori in oggetto sono stati ultimati venerdì 9 c.m.
Si attende solo di sapere - a suo tempo-come dovranno essere attivati i terminali della linea.

IL CAPO DELL'UFFICIO
Impianti Elettrici e di Segnalamento

3455

(1) Sezione - Ufficio - Stazione, ecc.

Ord. 1st - Comitato Reale

Declassified E.O. 12356 Section 3.3/NND No. 785019

April 9th 1945

FILE

For information.

On Sunday April 8th the Lima unit was damaged on the synchronous discharge. Due to the above, the plant suspended operation.

The unit has been repaired on Monday April 9th at 14.00 hours.

The Pian della Rocca unit did not operate due to lack of water as the Turrite Cava output does not admit the plant operation without a decrease of the intake basin hydraulic level - and the P.B.S. orders for operation do not admit any decrease in the above level.

About 20.30 hours on Sunday April 8th, as the Larderello steam plant's load was too high, the Siena load has been disconnected from the Leghorn grid and connected on the Terni-Florence grid.

On Monday April 9th, as the Lima plant started operation, the Siena load was connected on the Leghorn system.

dr. eng. M.Errera

Declassified E.O. 12356 Section 3.3/NND No. 785019

STATION: Giardinetto (Lima)- Sheet Map Ref.

OPERATING SOCIETY: SELT-VALDARNO

RESIDENT ENGINEER: Sig. Lione

WATER SUPPLY: Lima Reservoirs cap.
Head 75 m.

GENERATORS: 3 x 2600 KVA
1 x 1500 KVA

TURBINES: 3 x 2440 HP (Francis)
1 x 1670 HP "

Reports available

Nº	Date	Report by:	Detail - Conclusions
1.	15/3/45	VALDARNO	SLE. REPORT.

5 sic V/4

15/2/44

LIMA HYDRO PLANT

Characteristics — Water supply from LIMA RIVER, open canal maximum flow 10m³/sec, head 75 M, power 6400 KW, average production 25.000.000 KWH per year.

Installed plant — Three horizontal units, Francis Turbines 2440 HP, 500 R.P.M. directly coupled to three phase alternators 2000 KVA, 5000 Volts, 50 cycles/sec.
One horizontal unit, Francis Turbine 1670 HP, 500 R.P.M. directly coupled to three phase alternator, 1500 KVA, 500 Volt, 50 cycles.
Two separate units 75 HP for separate exciting.

Present Condition — Water head, canal, reservoirs are undamaged, penstock is under repair, Buildings are heavily damaged. Hydraulic and electrical machinery has been destroyed, with the exception of one group 2000 KW, and transformar which had been hidden and are safe, now being reassembled, and will be ready for operation by the end of february.

3/52

Rehabilitation programme — Ruins and debris have been cleared reconstruction of temporary roof is in progress.
By using parts from other Turbines, casting other parts that cannot be replaced, re-winding generator etc.; It is anticipated that another 2000 KW unit will be ready for operation within four months.
Sux tons of coke is required for castings. Arrangements are in hand for a supply.
Cement and timber for structural repairs etc. may be made available through Ind & Com. at an early date.-

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Declassified E.O. 12356 Section 3.3/NND No. 785019

TO: Col. Renton June 7th 1945

The hydraulic regulation of Piediluco lake in order to secure a bigger flux of water to Nera Montoro in the maximun peak hours - from 07.00 to 10.00 - did not bring any remarkable result in all the several times repeated tests.

This is partly due to the limited flux of the rivers, and partly to the characteristics of the hydraulic works at Marmore, which do not enable to dispose, as promptly as required, of an accumulation (?) of water in some hours of the day in Piediluco lake, and on the other hand do not allow to empty rapidly the same in other hours.

I will supply you more details when you are back in Rome, as I am quite aware of all ~~characteristics~~ hydraulic characteristics of the mentioned plants.

Eng. Pietromarchi.

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Società Elettrica Selt - Valdarno

Dispaccio telefonico
di servizio

Ufficio

RICEVUTO il dall' Ufficio di ... ore ... L' Impiegato	TRASMESSO il dall' Ufficio di ... ore ... L' Impiegato

DESTINAZIONE	PROVENIENZA	Numero	Data della presentazione: giorno e mese	Data della presentazione: ore e minuti	Indicazioni eventuali d' Ufficio
Firenze	Rocca	40	7-6	1956	

Colonello Rentoni - Come già precedentemente altre volte, la regolazione del lago di Piediluco può ottenere un rifornimento alle sue di punta della centrale di Galleto, 10 mm maggiori dell'uso di acqua a Nera Montoro non può portato oltre ogni limite più volte segnalato.

3449

Se 15 - Tip. P. Rossi - 20.000 - 445.

Declassified E.O. 12356 Section 3.3/NND No. 785019

Società Elettrica Selt - Valdarno

Dispaccio telefonico
di servizio

Ufficio .....

RICEVUTO il ..... ore ..... dall' Ufficio di ..... L' impiegato		TRASMESSO il ..... ore ..... dall' Ufficio di ..... L' Impiegato		
DESTINAZIONE	PROVENIENZA	Numero	Data della presentazione: giorno e mese	ore e minuti	Indicazioni eventuali d' Ufficio

risultato affluenza buona
per la giornata portata dei
fiumi ma per le condizioni
delle opere idrauliche nello
complesso che non permettono
di poter disporre come lo
desiderata portata per un
accumulo in alveo 3448 m.c
nel lago di Penne m.

Se 15 - Tip. P. Rossi - 20.000 - 4-45.

Declassified E.O. 12356 Section 3.3/NND No. 785019

Società Elettrica Selt - Valdarno

Dispaccio telefonico
di servizio

Ufficio

RICEVUTO il ... ore ... dall' Ufficio di ... L' Impiegato ...	TRASMESSO il ... ore ... dall' Ufficio di ... L' Impiegato ...				
DESTINAZIONE	PROVENIENZA	Numero	Data della presentazione		Indicazioni eventuali d' Ufficio
			giorno e mese	ore e minuti	

Ho avuto ordine da un altro ufficio
Potrò intrattenerlo più dettagliatamente
sul argomento al mio ritorno a Roma che prevedo
per la prossima settimana. Della questione
[redacted] degli
interessati vi abbiamo
già Pietrasanta.

3447

Se 15 • Tip. P. Rossi - 20.000 - 445.

Declassified E.O. 12356 Section 3.3/NND No. 785019

COPY

FILE

SOCIETA' ELETTRICA SELT-VALDARNO

Florence, March 15th 1945

SUBJECT: Power rehabilitation programm. Nera Montoro plant.

TO : Advanced Section Electrical Division
Public Works & Utilities Subcommission
Allied Commission

We take a chance to bring to your attention our plan for creating in the shortest lapse of time an hydroelectric plant of about 20-10-6 HWH, which plan we might only fulfil through your help.

It would be question of increasing the Nera Montoro output, which presently uses the Nera river supply between Recentino and Nera Montoro through one single tunnel 2900 m.long, carrying a maximum load of 80 cubic meters per second. In the plant are installed 4 turbo-alternator units, each for 6000 KVA (4500 Kwatt 50 period).

Only three of these should normally work, while one should be left for emergency. As a matter of fact, power absorbed by each unit is of 26 cubic m. per sec., amounting altogether to:

cm 26 x Nº 3 = cm 78 + 2

the latter necessary for the separate exciter, equal 80 cm per second, meaning the maximum capacity of the tunnel.

The river average output is of 80 cubic meters per second, which shows that during several months of the year, there is plenty of power available from the Nera river besides the one coming through the Nera Montoro plant. So water supplys at present reaches the dam summit without being used. This, considering also the several important hydraulic works are ready (having been carried through these last years) on the upper course of the river (Salto & Tarano reservoirs) which brought considerable increase in water supply.

Considering the above facts, the Selt-Valdarno Company, in 1941 planned and carried out a programm for enlarging the Nera Montoro plant allowing it to use all of the Nera water released by the northern plants.

Following program was settled for the purpose:

1) Changing the Recentino outlet structures.
2) Building a second tunnel, parallel to the first one carrying 80 cubic meters per sec.)
3) Installing at Nera Montoro a new vertical unit, capable of absorbong 50 cubic m. per second, and produce 14000 HP through a 23 m fall.

3446

Altogether, the Nera Montoro power factor should thus

Declassified E.O. 12356 Section 3.3/NND No. 785019

have reached 22000 KW with average annual output of 160.000.000 KWH.

The works on the second tunnel, begun in May 1942n were interrupted in November 1943; about a third of the tunnel was finished; 2000 m are now still missing.

Owing to the fact that the turbo-alternator unit is still in Northern Italy, it is impossible to think of installing a new unit. We believe, however, in carrying out the job on a reduced scale, with no more reasonable expense, so being able in a short while to produce around 20.000.000 KWH through the year.

We would plan to finish the second tunnel (without a new outlet structure, nor any new reservoir or unit), so using for the moment water through the new tunnel by the emergency unit which might produce 4500 KW for more than 4500 hours a year, totalling more than 20 millionKWH.

For carrying out this programme, we only need to finish the tunnel works, bring a few changes to the Recentino outlet works and connect the new tunnel at its outlet with the main reservoir: no other hydraulic work is necessary as the unit has already a transformer and line.

For carrying through the 2 km long tunnel works, three solutions are forthcoming:

1) To finish the whole tunnel in cement
2) To finish the whole tunnel using hydraulic mortar and partly cement
3) To build only the upper part of the tunnel in cement considering that it would be sufficient for our programme to build just a 25 cubic m capacity tunnel.

We would need Allied help in getting an assignement of following materials:

	1st solution	2nd solution	3rd solution
Cement	4180 tons	1800 tons	1800 tons (+)
Dinamite	10000 Kg	10000 Kg	10000 Kg
Nitrogen explosive	30000 Kg	32000 Kg	16000 Kg
Slow-match	150000 mm	160000 mm	67000 mm
Detonators	132000	140000	60000
Naptha	80 tons	200 tons	45 tons
Trucks	2	5	2

Cement should be provided from Spoleto (already regurarly connected by railway with Nera M.) This should be most important in reducing transport needs. The Spoleto cement factory has at present plenty of cement which was frozen by 5 Army. We believe, however, be possible to obtain cement from the above factory. In case of shortage of naptha, petrol might be used.

We are ready to give you all direct, detailed information regarding our programm, as you will notice from the above facts,

3445

Declassified E.O. 12356 Section 3.3/NND No. 785019

we should be in condition, with a slight effort, to produce for next year at least 20 millions extra KWH power. All we need is your kind help and best cooperation.

Yours sincerely

Società Elettrica Selt-Valdarno

(+) 2 railway cars per week.

Declassified E.O. 12356 Section 3.3/NND No. 785019

Forward
File
Lots

VSR/lam

13 Feb. 1945

SUBJECT: Storage Batteries for Oil Circuit Breaker,
Nera Montoro - Papigno Transmission Line.

TO : Major Price.

1. Returned herewith is the correspondence relating to the releases for storage batteries for an oil circuit breaker on the Nera Montoro - Papigno transmission line, and also needed for the Rome Radio Station.

2. Major Bell went to the Dolfi & Giovannini establishment in Florence, where the batteries were reportedly located. He was told that the stores of batteries had been sold several months ago.

3. Is these any other place where these items might be obtained, please ?

Vinal S. Renton
Major Infantry,
Operation and Transm. Dept.
Electrical Division

C.C. Major Bell
Capt. Vannoy

3143

SPERANDO Power Station m.r. L 4103

SEIT-VALDARNO

25th April 1945

The walls of the station have been rebuilt up to roof level and timbering was in progress for the roof.

The overhead crane will be erected shortly. One Pelton unit of 5500 KVA was hidden together with alternator, transformers and switchgear. This Pelton is in order, but the alternator was destroyed. A suitable alternator is dismantled at Gallicano, this alternator requires a considerable amount of insulating material before putting into service.

40 workmen are employed at the present moment.
30 Tons cement required within 2 weeks to complete roof.

FLORENCE

H. Best
Captain R.E.

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The overhead crane will be erected shortly. One Pelton unit of 5500 KVA was hidden together with alternator, transformers and switchgear. This Pelton is in order, but the alternator was destroyed. A suitable alternator is dismantled at Gallicano, this alternator requires a considerable amount of insulating material before putting into service.

40 Workmen are employed at the present moment.
30 Tons cement required within 2 weeks to complete roof.

FLORENCE

H. Best
Captain R.E.

3/12

Copy to: Lt-Col. Lapper
Capt. Best
2 File V/S

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Declassified E.O. 12356 Section 3.3/NND No. 785019

Extract 13 March 1945

SITUATION OF TURBINE REPAIRS.

Sperando Plant.

Works are in progress for the reconstruction of walls and of crane's running surfaces.

For recontructing the buindings foof - 400 sqm - we are gathering timber, tiles, iron bars for enforced concrete, gravel and sand. 400 quintals of cement have been applied for but not received as yet for this work.

As soon as the ceiling is ready, a 5500 HP turbine, saved from German destruction, will be assembled, and coupled to a 6000 KVA generator from Gallicano plant.

To repair thewinidings of this generator, the following materials are necessary:

Compound mica and paper ribbon	8000 m
Cotton ribbon	4000 "
Sterling ribbon	3000 ""
Mica and paper sheets	75 Kg
Black insulating varnish	50 "
Super bol varnish	20 "
Presspan cardboard	30 "
Twisted thread	10 "
Bakelite boards	50 "
Evaporated beech-wood	0,2 mc
Paraffin	30 Kg

(from report in Pian della Rocca file)

3141

Declassified E.O. 12356 Section 3.3/NND No. 785019

Clowther
Lo B 246

Marradi

5 Febbraio 1945

Oggetto: PRODUZIONE ENERGIA ELETTRICA
DELLA CENTRALE DI MARRADI

Al Maj. D.M.GAITHER
Engineer Division A.M.G. 5° Army

La centrale elettrica di Marradi, attualmente produce circa Kw. ora 40, sufficenti per fornire l'energia a Marradi e dintorni.

E' però capace di produrre 140 Kw. per ora, ed ha pure un'altra piccola turbina da Kw.30 che non può funzionare mancando della cinghia di trasmissione (ml.11 x cm.32).

Fra una settimana si presume terminata la riparazione della linea Marradi-Fantino-Palazzuolo, e si darà energia a queste ultime località, consumando, circa, altri Kw.30 per ora.

La linea Fantino-Borgo S.Lorenzo risulta come molto danneggiata e la riparazione non è stata ancora intrapresa.

PROSPETTO

Marradi può produrre: con turbina grande			Kw.ora	140
" " piccola			" "	30
				170
Marradi consuma		Kw.ora	40	
Palazzuolo-Fantino, consumano		" "	30	70
Potrebbero essere disponibili			Kw.ora	100

S.Ten.Cantone Paselini

1st Ind.
Engineer Division, AMG Fifth Army. February 5, 1945
TO: Regional Engr - Toscana

1. Forwarded.
2. It is suggested, that if practicable the line Fantino-Borgo San Lorenzo be repaired so that the 100 Kw surplus could be utilized in Prato or Pontassieve.

3446

For the Commanding General:

D.M. Gaither, Major?
Engr. Officer, AMG 5th Army.

Copy to: Major Wooster
Major Bell ✓ Valdarno Elec Co

Declassified E.O. 12356 Section 3.3/NND No. 785019

STATION: Sperando - Sheet XI Map Ref. 4104

OPERATING SOCIETY: SELT-VALDARNO

RESIDENT ENGINEER: Sig. Urli

WATER SUPPLY: Lima Reservoir cap. c.m. 350 Head 56 m
Volata Verdiana " " " " 180 " 271 m

GENERATORS: 2 a 5500 K.V.A. Max. load 11000 K.W.
2 a 2100 K.V.A.
1 a 2750 K.V.A.

TURBINES: H.P.
H.P.
H.P.

Reports available

N°	Date	Report by:	Detail - Conclusions
1	8 JAN. 45	MAJOR. TUCKET.	Salvaged: 1 Turbine for 5500 K.V.A. set with governor 1 transf. 5500 KVA 5000 to 60000 V. 1 " 2500 KVA 5000 to 60000 V. 1 " 1200 KVA 60000 to 120000 V. Switch Gear 5500 K.V.A. " " 60000 to 120000 Volt Transformer Main Engine Room Crane

3/39

Declassified E.O. 12356 Section 3.3/NND No. 785019

REPORT. NO. 1

Report by Major F.W.H.Tuckett. R.E. on Hydro Electric Station at SPERANDO ITALY Road Map 1/200,000 Sheet 11 Map Ref. 4.104 and ANDRIORI ITALY Road Map 1/200,000 Sheet 11 Map Ref.4.103 on 8 January 1945.

SPERANDO.

This station has been considerably damaged by enemy deliberate demolitions. Prior to being demolished the station consisted of 5 horizontal turbines.

2 Sets each generating 3500 KVA and one set of 2750 KVA are fed by a pipe line coming from VOLATA VERDIANA situated on high ground due EAST of the station. The remaining 2 sets of 2100 KVA are fed from the LIRA river from a dam above the station. Station transformers fed out at 60,000 and 120,000 VOLTS.

Demolitions.

Enemy demolitions consisted of destroying all turbines and all generators in the station beyond complete rebuilding by original manufacturers or a firm of equal size, destroying the Engine Room building to ground level, and rendering the transformer and switch gear building unsafe. Both pipe lines and both head-works, dams etc., are reported undamaged.

Salvage.

Prior to enemy demolitions the Station operators dismantled the following items and hid them under ground and in local caves. These are intact or sustained only superficial damage as indicated.

1. One turbine for 5500 KVA Set complete with governor (less generator) intact. This Set was run from the VOLATA VERDIANA pipe at 300 metres head, consuming 2000 cubic litres per second at 500 R.P.M.
2. One transformer 5500 KVA. 5000 to 60,000 volts.
" " 2500 KVA. 5000 to 60,000 "
" " 12000 KVA.60,000 to 120,000 volts was stored in a cave with the centre winding damaged and insulators missing, spare insulators are reported to be on site but were not seen.
3. Switch gear

Switch gear for one 5500 KVA reported undamaged and buried underground.

Switch gear for 60,000 to 120,000 Volt transformer reported undamaged and buried underground.

4. Cranes

Main engine room crane buried underground and reported to be intact.

5. Instruments a considerable number of the main panel instruments are reported safe and buried underground.

It is impossible to inspect any of the items reported buried underground without ordering an excavation party to remove it from deep hard frozen earth, until this is done the information will have to be accepted only as information supplied by civilian employees of the company, this however should be fairly accurate.

Repairs by Company.

The Company is at present rebuilding the main engine room which is a separate building from the transformer and switch gear house, and have already reached an average all round height of 6' 0' above floor level.

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Reconstruction. Re-erect the dismantled turbine and find any generator of 500 RPM of a reasonably correct size and install it.

ANGHIORI. 3 hydro electric horizontal Sets.

Two Sets 450 KVA 1000 RPM feeding direct onto line at 6.5 KV.
One Set 920 KVA 750 RPM " " " " " " "

This plant is completely intact and all three Sets were on the line when visited. The control engineer reported that due to lack of water at present, full output was not possible.

The station is tied in to San Michele at 6.5 KV where transformers step it up to 20 KV.

The two small Sets run from 0800 hours until 1700 hours on local distribution and from 1700 hours to 0800 hours to Pistoia.

The large set supplies Pistoia for 24 hours a day.

/s/ F.W.H. Tuckett
Major R.E.
O.C.543rd F. & H. Coy, R.E.

Added note,
Gini supplies Pistoia and not ANGHIORI,
Total output as to local distribution.
Confirmed by Valdarno.
Gini supplies Pistoia
Local Dist in connection with
Pistoia per S/

Ref. 3.

Declassified E.O. 12356 Section 3.3/NND No. 785019

CONFIDENTIAL

Capt Dawson
Check with this
Lab
1/31/45

Major Bell

HEADQUARTERS
ALLIED MILITARY GOVERNMENT
TOSCANA REGION
PUBLIC WORKS AND UTILITIES DIVISION.

3436

SUBJECT : Recce of Hydro Plants

TO : Public Works and Utilities Sub-Commission
Attention (Major Renton).

Based on the inspections it has been possible to make, and from other sources of information it is estimated that the undermentioned plants could give an output within three months of their occupation of approx:

STATION	ESTMATED K.W.	PRESENT POSITION	REMARKS
LIMA	2000 2000	WORK IN PROGRESS. " " "	Repairs within the Station may be ready end of February. Turbine under repairs in Florence. Ready end of March.
SPERANDO	4000	WORK IN PROGRESS.	Installing one 6000 KVA. Alternator saved from Gallicano, repairs necessary. Estimate will be ready end of March.
GALLICANO	12000	IN NO MANS LAND.	Latest information was before the recaptured of this area by the Germans. At that time this group was safe.
CORFINO	2000	IN NO MANS LAND.	Group hidden anticipate it will be saved

Signed
Major Crowther.

Continued.....

Declassified E.O. 12356 Section 3.3/NND No. 785019

STATION	ESTIMATED K.W.	PRESENT POSITION	REMARKS
SILLANO	500	IN NO MANS LAND.	Group hidden hope it will be saved.
SESTATIONE	3000	IN NO MANS LAND.	Group hidden, Penstock damaged.
CASTELNUOVO	3000	IN ENEMY HANDS	This Group is hidden but can be mounted in two months after occupation. Penstock believed OK.

(Signed) A. Crowther Major

FOR THE REGIONAL ENGINEER:

A. CROWTHER MAJOR R.E.
ELECTRICAL OFFICER -
TOSCANA REGION

Declassified E.O. 12356 Section 3.3/NND No. 785019

Report by Major F.W.H. Tuckett R.E. on Hydro Electric Station at SPERANDO ITALY Road Map 1/200.000 Sheet 11 Map Ref. 4104 and ANGHIONI ITALY Road Map 1/200.000 Sheet 11 Map Ref. 4103 on 8 January 1945.

SPERANDO.

This station has been considerably damaged by enemy deliberate demolitions. Prior to being demolished the station consisted of 5 horizontal turbines.

2 Sets each generating 5500 KVA and one set of 2700 KVA are fed by a pipe line coming from VOLATA VERDIANA situated on high ground due EAST of the station. The remaining 2 sets of 2100 KVA are fed from the LIRA river from a dam above the station. Station transformers fed out at 60,000 and 120,000 VOLTS.

Demolitions.

Enemy demolitions consisted of destroying all turbines and all generators in the station beyond complete rebuilding by original manufacturers or a firm of equal size, destroying the Engine Room building to ground level, and rendering the transformer and switch gear building unsafe. Both pipe lines and both head-works, dams etc., are reported undamaged.

Salvage.

Prior to enemy demolitions the Station operators dismantled the following items and hid them under ground and in local caves. These are intact or sustained only superficial damage as indicated.

1. One turbine for 5500 KVA Set complete with governor (less generator) intact. This Set was run from the VOLATA VERDIANA pipe at 300 metres head, consuming 2000 cubic litres per second at 500 RPM.
2. One transformer 5500 KVA 5000 to 60,000 volts.
" " 2500 KVA 5000 to 60,000 "
" " 12000 KVA60000 to 120,000 " was stored in a cave with the Centre winding damaged and insulators missing, spare insulators are reported to be on site but were not seen.
3. Switch gear
Switch gear for one 5500 KVA reported undamaged and buried underground.

Switch gear for 60,000 to 120,000 Volt transformer reported undamaged and buried underground.

4. Crane
Main engine room crane buried underground and reported to be intact.
5. Instruments a considerable number of the main panel instruments are reported safe and buried underground.

It is impossible to inspect any of the items reported buried underground without ordering an excavation party to remove it from deep hard frozen earth,

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until this is done the information will have to be accepted only as information supplied by civilian employees of the company, this however should be fairly accurate.

Repairs by Company

The Company is at present rebuilding the main engine room which is a seperate building from the transformer and switch gear house, and have already reached an average ell round height of 6' 0' above floor level.

Recommendation. Re-erect the dismantled turbine and find any generator of 500 RPM of a reasonably correct size and install it.

ANGHIORI. 3 hydro electric horizontal Sets.

Two Sets 150 KVA 1000 RPM feeding direct onto line at 6.5 KV.
One Set 920 KVA RPM 750 " " " " " " "

This plant is completely intact and all three Sets were on the line when visited. The control engineer reported that due to lack of water at present, full output was not possible.

The station is tied into San Michele at 6.5. KV where transformers step it up to 20 KV.

The two small Sets run from 0800 hours until 1700 hours on local distribution and from 1700 hours to 0800 hours to Pistoia.

The large set supplies Pistoia for 24 hours a day.

/s/ F.W.H. Tuckett
Major R.E.
O.C.543rd E. & M. Coy, R.E.

3433

GALLICANO hydro-plant (map sheet 11,I.1604)
SELT-VALDARNO
April 25th 1945

This plant was badly damaged during German occupation. The diversion dam consisted of four large gates, two of which were completely destroyed. The remaining two and their lifting equipment are in good condition. Two conduits lead to the plant headworks. The entrance to the tunnels has been blocked with stone and mined. A portion of one conduit has serious breaks in a canal section. The headworks and two penstocks have been damaged by shell fire. Two overflow pipes have also been damaged by shell fire. The tail race and overflow canal are undamaged. This flow floods directly into the Pian della Rocca intake conduit. The power house was demolished; substation only slightly damaged. Power house crane can possibly be repaired. Substation crane id undamaged.
The station originally contained one vertical and three horizontal 6000
////////////////////////////////////
KVA units as well as one 3200 KVA unit. The vertical 6000 KVA unit appears to be undamaged. The turbine had been sealed in by wall. One horizontal 6000 KVA unit had been dismantled and hidden without being damaged. The other units had been very nearby demolished by demolition charges. Two 60-5 KV, 6000 KVA transformers had been hidden underground. One 30-5 KV, 6000 KVA transformer in good condition. One 60.30-5 KV, 6000 KVA transformer some damage. One 30-5 KV, 3200 KVA transformer in good condition.

3) - Matters requiring attention.
Valdarno Company are clearing débris from plant. P.B.S. electrical engineer has initiated work of making temporary repairs to diversion dam and hydraulic line including overflow pipes at headworks. This work
////////////////////////////////////
should be completed within 15 days. Present flow of Sarchio that would be made available to Pian della Rocca plant is estimated as not over 8 cubic meters per second.

FLORENCE

Clarence S. Wilcox
Major Crd.
Field In[illegible]

3426

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The remaining two and their lifting equipment are in good condition. Two conduits lead to the plant headworks. The entrance to the tunnels has been blocked with stone and mined. A portion of one conduit has serious breaks in a canal section. The headworks and two penstocks have been damaged by shell fire. Two overflow pipes have also been damaged by shell fire. The tail race and overflow canal are undamaged. This flow floods directly into the Pian della Rocca intake conduit. The power house was demolished; substation only slightly damaged. Power house crane can possibly be repaired. Substation crane is undamaged.

The station originally contained one vertical and three horizontal 6000 KVA units as well as one 3200 KVA unit. The vertical 6000 KVA unit appears to be undamaged. The turbine had been sealed in by wall. One horizontal 6000 KVA unit had been dismantled and hidden without being damaged. The other units had been very nearby demolished by demolition charges. Two 60-5 KV, 6000 KVA transformers had been hidden underground. One 30-5 KV, 6000 KVA transformer in good condition. One 60.30-5 KV, 6000 KVA transformer some damage. One 30-5 KV, 3200 KVA transformer in good condition.

3) - Matters requiring attention.

Valdarno Company are clearing débris from plant. P.B.S. electrical engineer has initiated work of making temporary repairs to diversion dam and hydraulic line including overflow pipes at headworks. This work should be completed within 15 days. Present flow of Serchio that would be made available to Pian della Rocca plant is estimated as not over 8 cubic meters per second.

FLORENCE

Clarence S. Wilcox
Major Ord.
Field Engineer

3432

Copy to: Lt-Col. Lapper
Capt. Marshall, 15 Army Group
Major Wilcox
2 File

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Declassified E.O. 12356 Section 3.3/NND No. 785019

Florence, April 16th 1945

MEMO - GALLICANO Plant.

As soon as the Serchio Valley is accessible, the Gallicano and Castelnuovo Garfagnana the Pian delle Rocca output may be improved.

As no intake works are available in Gallicano, on the Serchio River (the Gallicano discharge is 4 mt higher than the River water level) the water must be carried through the Gallicano galleries and discharge, and collected on the Gallicano intake works, located in Castelnuovo Garfagnana.

The Valdarno Co. Engineers know that the intake works have been damaged by shells, the gates are bhown up.

It is proposed to replace the gates with provisionnal walls, whose size will be 10 mt length, 3.50 high, size 0.50 to 2.30 mt each. Total volume of each wall 50 cu m, of the four walls 200 cu m.

It will be necessary to have on hand 20 tons of cement. Probably one of the two galleries (the largest one, having 18 cu m carrying capacity) will be undamaged.

As the Gallicano plant will not be in operating condition in a first period, the discharge may be repaired.

Steel plates and cement will be required.

It is requested that 1.900 Kg of 15 mm steel plate and 7.800 KG of 10 mm steel plates, existing at Lucca in the Lenzi store, may be released and that about 30/40 tons of cement are released, and stored ready to be used.

The Valdarno Engineers have supplied the timber for the work. The steel plates 7.800 KG, 10 mt are the property of Valdarno Co.

Declassified E.O. 12356 Section 3.3/NND No. 785019

ENGINEER SERVICE
PENINSULAR BASE SECTION
APO 782

CC/fa

Copy

SUBJECT: Inspection of Serchio River Dam at Castelnuovo and Flow Lines to Piano della Rocca hydro electric Station.

1. - Inspection was made on 25 April 1945.

2. - The dam and headworks at Castelnuovo di Garfagnana which is required to divert water from the Serchio River through Gallicano to Piano della Rocca was damaged from Allied bombing. Two of the four "Tainter" gates were blown out but all piers are in good condition. Arrangementa have been made to erect temporary masonry walls (11.½ x 32 ft) across these two gate openings. Adequate control of water diversion can be effected by operation of the two undamaged gates.

3. - There are two tunnels leaving the headworks to carry water to Gallicano. The entrances to these tunnels had been blocked with stone and mined by the Germans to prevent persons from going through the lines. One tunnel having a capacity of 18 cubic meters per second (equivalent to 10,000 KW at Piano della Rocca) is intact to Gallicano. The other tunnel opens into a canal near Gallicano. Sections of this canal have been damaged by shell fire. Arrangements have been made to block off this canal at the exit to the Gallicano forebay. The entrance to the large tunnel is being cleared.

4. - The forebay and control gates at Gallicano have suffered superficia l damage from shell fire which will not interfere with its operation. The two penstocks and the two spillway pipes (which can be used to by-pass the Gallicano station to provide water for Piano della Rocca) have several breaks from shell fragments. Arrangements have been made to repair the breaks in the spillway pipes.

5. - It is estimated that the temporary work and repairs will be completed by 10 May 1945.

6. - It should be noted that the present stream flow of the Serchio River at Castelnuovo is at present about 7 cubic mt. per second, which is exceptionally low. This is equivalent to an average load of but 4,000 KW at Piano della Rocca. The temporary work and repairs will probably provide for full use of the stream flow until October, by which time permanent repairs will have been made.

3430

G.COOLEY
Lt-Col. Corps of Eng.
Electrical Section
Construction Branch

Declassified E.O. 12356 Section 3.3/NND No. 785019

Translation (m.r.)

WORK PROGRAM TO REPAIR THE HYDROELECTRIC PLANTS IN GARFAGNANA

1) Calavorno (Piano delle Rocca) plant.

In order to convey water in Piano della Rocca (Calavorno) plant the following works are requested:

a) Castelnuovo intake - building of two masonry walls to close the "tainter" gates damaged.

b) Clearing of the débris at the entrance of the two derivation galleries.

c) To close with masonry work the old gallery in the locality "Tre Canali" and to open the by pass with the new gallery.

d) To close with masonry the old gallery at the surge basin, to close with masonry the Turrite di Gallicano gallery, always at the surge basin.

e) To repair the discharge pipes damaged by shells.

f) Repair of the canal of Piano della Rocca (Calavorno) plant damaged in several places by shells.

Time scheduled for this works one month.

To rehabilitate the Turrite di Gallicano derivation it is necessary to repair the canal bridge at S.andrea, much damaged, time scheduled 5 months.

For a provisory repair of the Turrite Gallicano derivation with steel pipes, time scheduled 2 months.

2) Gallicano Plant.

To rehabilitate the Gallicano plant with 2 6,000 KVA groups it is requested:

a) To repair the penstock Ø m.2.50 damaged by 13 shells - reconstruction of the dilatation joint destroyed in the underpass of the main road Gallicano - Castelnuovo. Repairs of the section of the pipe damaged by explosion, length mt.10.50 (work to be done in Lucca workshop).

b) building of two barracks to protect the two salvaged groups.

c) Assembling of the horizontal group and transformers.

d) Repairs of the command room and rooms for the substation. time scheduled 6 months.

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3) - Castelmuovo plant.

To rehabilitate the plant with two 3000 KVA groups it is necessary:

a) Clearing débris and materials recovering.

b) Repair the underpression gallery damaged at Castiglione and Cavatina (damages still unknown).

c) Reconstruction of the machine room building and substation building.

d) Repairs of the crane.

e) Assembling of the salvaged group and transformer.

f) Repairs of the electric installation for the operation of the plant.

Time schaduled 8 months.

4) - Corfino Plant. (trans.m.c.)

One 2400 KVA unit may operate as soon as the 60 KV transmission lines may be repaired.

In order to drive the plant at its full capacity the two hidden units and transformers must be reassembled.

The Castiglione intake, now not operating, must be repaired; the gallery is broken in many points because the population used it as shelter during the bombardments.

Repairs schedule 1 month.

5) - Sillico - Campori plant!

The 1600 KVA hidden unit and transformer must be reassembled The electric swithhes must be repaired.

Repairs schedule 2 months.

6) - Sillano plant.

The above plant - 1560 KVA capacity - is undamaged. Three units : 1 x 930 KVA, generator burned before the emergency; 1 x 440 KVA in operation; 1 x 60 KVA in operation.

The plant operates for the local supply with very reduced load, and may be connected with the grid as soon as the 60 KV transmission lines may be repaired.

The 910 KVA generator repairs require special stranded copper wire - not available.

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MATERIALS REQUIRED FOR THE MOST URGENT WORKS

Plant	Cement qls	Corrugated steel plate sqm	Purpose
PIAN DELLA ROCCA	100	——	Intake canal
GALLICANO	100		Intake dam (gates replacement)
	20		Damages repairs to galleries
	230		Two provisional barracks for the 2 6000 KVA units salvaged
		350	
CASTELNUOVO	300		Repairs to the gallery
			Provisional units & transformers roof
		100	
CORFINO	100		Repairs and Castiglione intake.
		100	Roof on the operating unit.
Total	qls 850	sqm 550	

3427

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PROGRAMMA DI LAVORO PER IL RIPRISTINO DEGLI IMPIANTI IDROELETTRICI DELLA GARFAGNANA

I) IMPIANTO DI CALAVORNO

Per poter immettere le acque del Serchio nell'impianto di Calavorno, occorre eseguire i seguenti lavori:

1) Presa di Castelnuovo, costruzione di due muri per chiudere le luci delle due paratoie distrutte (mc. 100 di muratura).
2) Sgombero delle macerie e del pietrame posto all'imbocco delle due gallerie di derivazione.
3) Muratura della galleria vecchia in località "Tre canali" e apertura del Baypas con la nuova galleria.
4) Muratura della galleria vecchia, alla vasca di carico, e muratura della galleria della Turrite di Gallicano sempre alla vasca di carico.
5) Riparazione delle due condotte di scarico danneggiate dalle artiglierie.
6) Riparazione del canale a pelo libero dell'impianto di Calavorno colpito in più punti da colpi di artiglieria.

Tempo occorrente per l'esecuzione dei lavori sopra indicati, un mese.

Per il ripristino della derivazione della Turrite di Gallicano occorre riparare il ponte canale di S.Andrea, molto danneggiato, tempo occorrente cinque mesi.

Per la riattivazione provvisoria della derivazione della Turrite di Gallicano con tubazione di ferro tempo occorrente due mesi.=

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II) IMPIANTO DI GALLICANO

Per riattivare la Centrale di Gallicano con due gruppi da 6000 KVA ciascuno, occorre:

1) Riparare la condotta forzata Ø m. 2,50 colpita da 12 colpi di artiglieria - ricostruzione ex nuovo del giunto di dilatazione spezzato in corrispondenza del sottopassaggio della strada provinciale Gallicano-Castelnuovo - riparazione del tronco di tubazione ovalizzato dalle esplosioni, lunghezza m. 10,50, (lavori da eseguirsi in Officina a Lucca).-
2) Costruzione di due baracche in muratura a protezione dei due gruppi salvati.
3) Montaggio del gruppo orizzontale ed i relativi trasformatori.
4) Riparazione del locale quadro e dei locali della sottostazione di trasformazione.

Tempo occorrente - sei mesi.

III) IMPIANTO DI CASTELNUOVO

Per riattivare la Centrale con due gruppi da 3000 KVA, rimasti occorre:

1) Sgombero delle macerie e ricupero del materiale.
2) Riparazione della galleria in pressione danneggiata nelle località, Castiglione e Cavatina. (Ancora i danni non sono stati precisati).
3) Ricostruzione del fabbricato della sala macchine e della cabina di trasformazione.
4) Riparazione del carro ponte e della grue.
5) Montaggio del gruppo salvato e del relativo trasformatore.
6) Riparazione delle attrezzature elettriche necessarie per la Centrale.

Tempo occorrente - otto mesi.

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IV) IMPIANTO DEL CORFINO

La Centrale può subito entrare in servizio con un gruppo da 2400 KVA, non appena saranno state riattivate le linee elettriche a 60.000 Volt, di trasporto dell'energia.

Per portare la Centrale in piena efficenza occorre montare i due gruppi nascosti con i relativi trasformatori.

Occorre inoltre riparare la derivazione del Castiglione, attualmente inattiva, la galleria è stata rotta in diversi punti dalla popolazione per servirsene come rifugio durante i bombardamenti.

Tempo occorrente per la riattivazione della Centrale, mesi uno.

V) CENTRALE DI CAMPORI

Per riattivare questa Centrale, della potenza di KVA 1600, occorre rimontare il gruppo nascosto e il relativo trasformatore, occorre inoltre riparare le attrezzature elettriche della Centrale.

Tempo occorrente mesi due.-

VI) CENTRALE DI SILLANO

Questa Centrale, della potenza di 1560 KVA, è rimasta intatta. Si trovano installati tre gruppi uno da 910 KVA con l'alternatore bruciato prima dell'emergenza, un gruppo da 440 KVA in funzione e un piccolo gruppo da 60 KVA pure in funzione.

La Centrale attualmente funziona per la distribuzione locale con piccolo carico, potrà entrare in parallelo nella rete, non appena saranno state riparate le linee a 60.000 Volt da Corfino a Sillano.

N.B. : Per la riparazione del gruppo da 910 KVA occorre del filo di rame avvolto che non si trova.-

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MATERIALE NECESSARIO PER I PRIMI URGENTI LAVORI

Impianto	Cemento ql.	lamiera ondulata zincata mq.	Scopo
Pian della Rocca	100		riparazione canele di derivazione.
Gallicano	100		Opere di presa chiusura luci
	20		Muratura gallerie danneggiate
	230		Costruz.due baracche provvisorie per i due gruppi da 6000 KVA salvati.
		350	
Castelnuovo	300		Roparazione galleria in pressione.
		100	Copertura provvisoria tre gruppi e tre trasformatori
Corfino	100		Riparazione e derivazione Castiglione
		100	Copertura gruppo funzionante.
Totale	ql. 850	mq.550	

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PIANO DELLA ROCCA (map sheet 11, 02496)
SRLT-VALDARNO
25th April 1945

Plant originally contained three 14,000 KVA units. One unit had been dismantled. One unit has been repaired and the other is under repair. The turbine from the disassembled unit was used to repair the other two units. The intake canal has been damaged in five places by artillery fire.

Approximately 10 tons of cement needed for repairs. This work is being done by the P.B.S. engineers. Repairs to second unit will be completed in one month.

FLORENCE

Clarence S. Wilcox
Major, Ord.

Declassified E.O. 12356 Section 3.3/NND No. 785019

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FLORENCE

Clarence S. Wilcox
Major, Ord.
Field Engineer

3422

Copy to: Lt-Col. Lapper
Capt. Marshall, 15 Army Group
Major Wilcox
2 File

Declassified E.O. 12356 Section 3.3/NND No. 785019

Firenze, 13 Marzo 1945

STATO LAVORI RIPARAZIONE TURBINE

II° Gruppo Calavorno

Cassa Michell - coperchio - anello appoggio eccitatrice già fusi, si trovano attualmente in lavorazione presso le Officine VERACI.

Si ritiene che il lavoro sarà terminato per il giorno 24 corr.

L'eccitatrice principale e secondaria del gruppo sono già pronte nell'Officine SIMB; il materiale potrà essere ritirato per il giorno 16 corr.-

II° Gruppo Lima

Turbine

Un anello del distributore e l'anellone guida pale, già fusi e passati per la lavorazione alle Officine VERACI.

Il secondo anello del distributore, la curva di scarico, passati in fonderia per la fusione.

Si sta lavorando per la costruzione dei modelli della mezza chiocciola della turbina e del cuscinetto.

Detti pezzi dovranno essere portati alle Officine Veraci per la lavorazione.

Si ritiene che tutti i pezzi della turbina saranno pronti per la fine del mese di aprile.-

Alternatore

Per la riparazione delle bobine dell'alternatore del gruppo,

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VERACI.

Si ritiene che il lavoro sarà terminato per il giorno 24 corr.

L'eccitatrice principale e secondaria del gruppo sono già pronte nell'Officine SIEE; il materiale potrà essere ritirato per il giorno 16 corr.-

IIº Gruppo Lima

Turbina

Un anello del distributore e l'anellone guida pale, già fusi e passati per la lavorazione alle Officine VERACI.

Il secondo anello del distributore, la curva di scarico, passati in fonderia per la fusione.

Si sta lavorando per la costruzione dei modelli della mezza chiocciola della turbina e del cuscinetto.

Detti pezzi dovranno essere portati alle Officine Veraci per la lavorazione.

Si ritiene che tutti i pezzi della turbina saranno pronti per la fine del mese di aprile.-

Alternatore

Per la riparazione delle bobine dell'alternatore del gruppo, occorrono i seguenti materiali:

- nastro mica carta compaudato m. 3.000
- nastro cotone m. 2.000
- nastro sterlingato m. 2.000
- mica carta in foglio Kg. 50
- vernice isolante nera Kg. 40
- vernice super bol Kg. 15

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- cartone Prespann Kg. 20
- spago ritorno " 5
- lastra bachilite " 30
- legno di faggio evaporato mc. 0,10
- paraffina Kg. 20

La riparazione potrà essere effettuata entro un mese dalla consegna del materiale.

III° Gruppo Lima

La chiocciola della turbina del III° Gruppo del Lima sarà pronta per la fine del mese di marzo.

Detto gruppo sarà montato ma non potrà funzionare fino a che non sarà liberata Castelnuovo di Garfagnana ove si trova nascosta sotto terra la ruota con l'albero della turbina.

Trasformatore 5000 KVA - Rapporto 5000/60000-Impianto Lima

Per la riparazione di detto trasformatore occorrono i seguenti materiali:

-cilindri in bachilite n.1,Ø m/m 496-514, h m/m 1318 spess.m/m 9
n.1,Ø m/m 707-725, h m/m 1318 spess.m/m 9
-rame m/m 12x5,45 spigoli arrotondati raggio m/m 0,5 Kg. 395
-n.1 collare in bachilite Ø m/m 422-470, h m/m 80
-n.1 collare in bachilite Ø m/m 736-768, h m/m 90
-Prespann in fogli m. 1x2 da 30/10 Kg. 150
-Prespann in fogli m. 1x2 da 15/10 Kg. 150
-[illegible] Ø m/m 30 m/m c. m. 4000

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dalla consegna del materiale.

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n.1,Ø m/m 707-725, h m/m 1318 spess.m/m 9
-rame m/m 12x5,45 spigoli arrotondati raggio m/m 0,5 Kg. 395
-n.1 collare in bachilite Ø m/m 422-470, h m/m 80
-n.1 collare in bachilite Ø m/m 736-768, h m/m 90
-Prespann in fogli m. 1x2 da 30/10 Kg. 150
-Prespann in fogli m. 1x2 da 15/10 Kg. 150
-nastro cotone medio da 30 m/m - m. 4000
-nastro cotone medio da 20 m/m - m. 2000

Tempo occorrente per la lavorazione un mese.-

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Impianto di Gallicano

Di questo impianto due gruppi da 6000 KVA sono stati salvati dalle devastazioni tedesche. Dalle ultime notizie risultano ancora buoni. Per poter mettere in servizio l'impianto non appena la situazione militare lo permetterà, occorre riparare subito le condotte forzate colpite in più parti da granate e schiacciate per un tratto di m. 15 in corrispondenza del sottopassaggio della strada provinciale Gallicano-Castelnuovo.-

Occorre ricostruire due giunti di dilatazione distrutti.

Per detto lavoro è utile fin d'ora predisporre tutto il materiale necessario già richiesto ma non avuto:

- lamiere ferro spess. m/m 15, Kg. 1900
- lamiere ferro spess. m/m 10, Kg. 7800

da sbloccare presso la Ditta LENZI di Lucca.

Per poter immettere l'acqua nell'impianto occorre riparare le seguenti opere:
il pontecanale o sfioratore (non sappiamo ancora quali delle due opere siano state distrutte) sulla derivazione dal Serchio.
il pontecanale di S.Andrea sulla derivazione della Turrite di Gallicano.

Per detti lavori sono stati richiesti i seguenti materiali:

- cemento	ql. 400
- abetelle da ponti	mc. 20
- regoli abete 8x8	mc. 5

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condotte forzate colpite in più parti da granate e schiacciate per un tratto di m. 15 in corrispondenza del sottopassaggio della strada provinciale Gallicano-Castelnuovo.-

Occorre ricostruire due giunti di dilatazione distrutti.

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il pontecanale o sfioratore (non sappiamo ancora quali delle due opere siano state distrutte) sulla derivazione dal Serchio.
il pontecanale di S.Andrea sulla derivazione della Turrite di Gallicano.

Per detti lavori sono stati richiesti i seguenti materiali:

- cemento ql. 400
- abetelle da ponti mc. 20
- regoli abete 8x8 mc. 5
- tavole sottomisura spessore 2 cm. ½ mc. 10

Impianto dello Sperandio

Sono in corso i lavori per la ricostruzione dei muri della Centrale e per il getto dei piani di scorrimento della grue.

3/19

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Per la ricostruzione del tetto della Centrale mq. 400, stiamo approvvigionando il legname necessario, il materiale laterizio, il ferro da cemento armato il ghiaietto e la rena, per eseguire il getto occorrono ql. 400 di cemento già richiesti ma che non abbiamo ancora ottenuti.

Appena costruito il solaio di copertura, verrà montata la turbina da 5500 HP, salvata dalle devastazioni tedesche, turbina che dovrà essere accoppiata ad un alternatore da 6000 KVA della Centrale di Gallicano.

Per rifare l'avvolgimento di detto alternatore occorrono i seguenti materiali:

- nastro mica carta compandato	ml.	8.000
- nastro cotone	ml.	4.000
- nastro sterlingato	ml.	3000
- mica carta in fogli	Kg.	75
- vernice isolante nera	Kg.	50
- vernice super bol	Kg.	20
- cartone Presspann	Kg.	30
- spago ritorto	Kg.	10
- lastre bachilite	Kg.	50
- faggio evaporato	mc.	0,20
- paraffina	Kg.	30

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FILE V/O

Five units were installed at Fallecaico.
It appears that 2 can be repaired, the others are broken, except for an alternator which we hope might be repaired.
As only one turbine is available at Gerando plant, of model which fits with the Fallecaico alternator, we consider advisable to move the repairable alternator of Fallecaico to Gerando in order to connect it to the existing turbine. This provided further information might be available.

Engr. Berardi is still at Gallicano, further info on his return

cable this info to Dept 3417
7 Sept

Declassified E.O. 12356 Section 3.3/NND No. 785019

ADVANCED SECTION
ELECTRICAL DIVISION
PUBLIC WORKS & UTILITIES SUB-COMM.
ALLIED COMMISSION

5th Febr. 1945

TO Dr. Harnisch

SELT-VALDARNO

In rehabilitation program for months of January-February it is stated that you proposed to move a generator from Gallicano to Sperando.

Is this more practic than repairing Gallicano turbine?

Please, write this up in a form that can be submitted - justification.

Major.

Electrical Division P.W. & U. Sub-C
Allied Commission

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Wed. Feb. 21st

Interview with Lt. Davis 243 E & M. Coy R.E i/c detachment of Engineers working on Town Station forward.

GALLICANO.

The station is forward of our present Lines, the German Lines may be a mile away. no work is going on at present.

Pian della Rocca,

One set 14000 K.V.A is in servis output at present to LIVORNO (MAX 7.000 K.W)

A second set may be ready in 6 weeks 14.000 K.V.A but lines will not be supplement water until CASTELNUOVO is taken.

Two transformers two 10000 K.V.A in servis.

6600/60 4200 V. South span is OK.

LIMITI, (Carabacciano,) about 20 men working, one set is running on Short Circuit (2.000 K.V.A) will be through for servis in about 36 days. Men working on a second set and lines down lines.

Uccanda, No instructions to work here as owners are rebuilding Town House.

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21/2/45

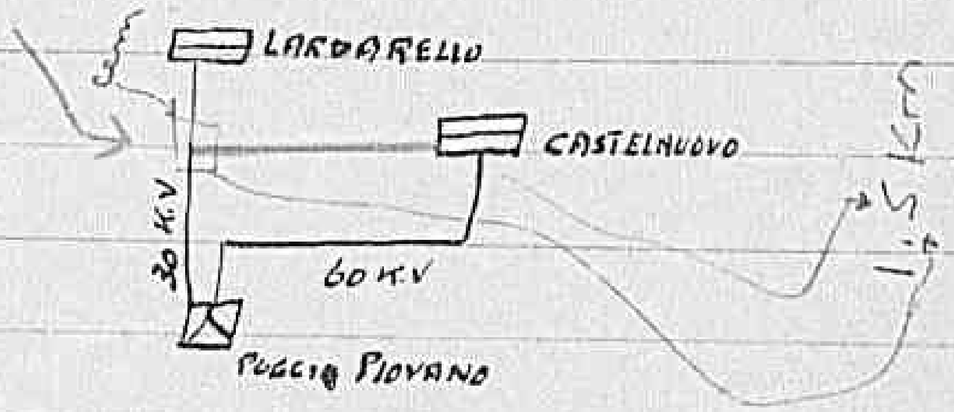
Liaison with Viddemo. Note:

120 K.V. Lais San-Romano-Tavarnuzze will be in service on Feb. 28th, repairs completed.

120 KV. Lais - Tavarnuzze - PRATO, all damaged Towers are now repaired, 5 have yet to be raised new conductor and Insuls fixed, estimate ready for March 10th.

Proposals.

(1) To build a 30 K.V. Lais Castelnuovo - Val di Cecina - Poggio - Piovano (8 K.M).



(2) To repair the 30 K.V. Lais Tavarnuzze - Empoli - Santa Croce - San. Romano - Fondaco - Fornaci Turchi.
(Fondaco - Fornaci - Turchi under the Superv. 3/615 Fl. Col. Coorey).

(3) To repair Lais Fondaco - Allopaccio

(4) To repair line 120 K.V (Rail Lais) Lardarello - Cecina)

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(5) Repair work on line Foggia Termoli

(6) Material required to carry out this work
50 mm² Copper wire or 75-90 mm² TELALCO (Aluminium Wire)
Telalco is available in Furnaci Dei Barga
(Metallurgic Plant).
Also from the line Termoli-Castelnuovo Dei
Sabbioni which is not in Termoli.

Koestler

(4).* Rail Engineer state that awaiting Ref.
work from HQ S. Railway direction.

D

File V/6

PIAN DELLA ROCCA PLANT

Charateristics

Derivation from Serchio river at discharge from Gallicano Plant. Artificial reservoir on Turrita Cava river. Maximum flood 40m^3/sec, avarage head 65m., maximum power 20.000 KVA. avarage production 75.000.000 KWH per year.

Installed machinery

3 vertical units, Francus Turbines, flood 17m^3/sec. each, 14000 HQ, 375 r.p.m., directly coupled to three-phase alternators, 14000 KVA, 6000 Volts, 50 cicles/sec.

Actual conditions

Water head, dams, canals, galleries, penstock and building are sare. This plant uses water coming from discharge of Gallicano plant, the water head of which is still in enemy hands.

Derivations from rivers Serchio and Torrita di Gallicano have been interrupted by enemy action, so that water supply comes only from river Torrita Cava.

2 units have been damaged very severely by the Germans, one unit has taken fire.

Transformer substation is safe.

Rehabilitation programme

One 14.000 KVA unit, damaged at bearings, exciters, and turbine regulator, has been repaired and is now in operation.

Repairs are in progress for another 14.000 KVA unit, using also pieces of third unit, ometting new pieces, reconstructing exciters, atc. These repairs shall be over in three months.

We are assembling in Pian della Rocca all materials necessary for reconstructing two bridge-canals on Serchio and Turrita di Gallicano derivations, in order to be able to start working as soon as military situation allows it.

For the a/m repairs the following materials are needed:

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14000 KVA, 6000 Volts, 50 Cycles/sec.

Actual conditions

Water head, dams, canals, galleries, penstock and building are safe. This plant uses water coming from discharge of Gallicano plant, the water head of which is still in enemy hands.

Derivations from rivers Serchio and Torrita di Gallicano have been interrupted by enemy action, so that water supply comes only from river Torrita Cava.

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We are assembling in Pian della Rocca all materials necessary for reconstructing two bridge-canals on Serchio and Turrita di Gallicano derivations, in order to be able to start working as soon as military situation allows it.

For the a/m repairs the following materials are needed:

3.13

For bridge-canal on Turrita di Gallicano 12,5 m. large (in masonry)	cement 170 quintals hydraulic lime 160 qls. cut and Copped Fir-10m^3 rules 8x8 - 5m^3
For bridge canal on Serchio at Tre Canali 15m.large (in reinforced concrete)	cement 150 quintals cut and Copped Fir 10m^3 Fir board 2,5 cm.-10m^3
For casting Mitchell bearing tank, and exciter ring	Koke 4 tons. (Ilva Piombino)

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ADVANCED SECTION
ELECTRICAL SECTION
PUBLIC WORKS & UTILITIES SUB-COMM.
ALLIED COMMISSION

Florence, 6 Via Cerretani
2nd February 1945

SUBJECT: Report

TO : Selt-Valdarno Elett. Co.

Attached herewith is a copy of a report on the two transformers at Piano della Rocca, submitted after inspection by Ing. Di Pirro of M.A.T.E.R. Co, Rome.

Major.

Electrical Section P.W.&U. Sub.Com
Allied Commission

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Sect Clan ca ing this ✓
Sect to be dissol fin this

Piano della Rocca 11 Jan. 45

No.2 three phase oil immersed transformers for outside natural cooling. Construction B.B.
Primary 6000 volts (intermediate)
Secondary 67000 ± 5% (internal)
2 " 135000 ± 5% volt (external)
Maximum total power 14000 Kva — frequency 50
Connections

This Report Made by Eng Di Pierro of MATER Co Rome

1st transformer (Target No.33560)

Visible damages.

Looking at the transformer from the side opposite to the 135000 volts (and 6000 volts) leading out terminals, a discharge mark between the first coil (the superior the top one) of the central column and the corresponding coil of the right side column is to be observed. This discharge has partially bored the insulating rings toward the yoke, and has afterwards propagated itself along the insulating flanges which starting above the top coils, join themselves to the parting screen of the coils columns. The discharge has consequently run along chiefly horizontal surfaces and has arced between points of maximum difference of potential (135000 V). Looking instead at the transformer from the side of the 135000 volts leading-out terminals, spoors of a discharge are to be observed between the leading-out terminals of the same columns. This discharge too has runned a chiefly horizontal way through the metallic mass (the tank, probably) Slight spoors of a discharge are to be seen along the bakelite covering of one of the leading-out terminals of the 67000 V winding. this discharge probably started from the "passante" to run to the transformer lid.

This are the visible damages. I think very probably that no other damages should exist. However it is not possible to exclude altogether that during the dementling of the windings no other discharge marks are to be discovered in other parts of the windingw.

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Causes.

Damages as those observed in this transformer are occasioned by low oil level or by very wet oil (which is practically the same thing if not worse). The powerhouse foreman (Mr. Dallan) maintains that the oil level was enough and that however british soldiers in charge thinking that the oil was scarce added more oil taken from a reservoir tank, oil that contained much water. This filling up was made about 4 hours before putting in tension the transformer. Observing that the water contained in great quantity by the added oil, before reaching the bottom has soaked the upper parts of the transformer especially on horizontal surfaces and observing that the discharge has rumed principally along these surfaces and that the discharge happened approx. 90 min after that the transformer was put in tension (if the oil had been scarce, the discharge would have happened much sooner) one can infer that the damage cause was the oil humidity.

Responsability.

The transformer which had been several months out of service and to whom oil had been added that at least was not known if dry or wet, should have not put in tension before proofing with the "spinterometro" (which is to be found at the Powerhouse) an oil sample taken from the bottom (operation during in total a few minutes). Certainly someone acquainted with the job would have taken this elementary precaution. Consequently in order to determine responsabilities it is necessary to ascertain who has put in tension the transformer or has given orders for this operation. If this person is competent then one can think of sabotage or at least of lamentable carelessness. If the person is not competent then the thing is to be ascribed to incompatible throughtlessness.

Damage repair.

In order to repair the damage it is necessary:

1) to dismantle the lid.
2) to dismantle the upper yoke
3) to unweld the winding star center
4) to extract the nine windings columns.

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5) to repair by addition of copper the two top coils
6) to substitute the carbonized insulating parts. If the pieces were made in section only the damaged sections are to be changed, otherwise it will be more expedient to substitute the whole pieces.
7) To inspect carefully the nine windings columns and the interposed bakelyte cylinders.
8) To set up the windings, the yoke, the lid and to make the connections with preferably material of the same nature of that employed by the constructing firm.
9) To dry apart the oil and proceed as told for the other transformer.

Workmanship.

The work can be done on the premises under survey of a specialized technical man. The outside 125,000 volts winding is of the type without souldering and therefore the separation of the two top coils and the following setting with solderings not existent before will need particular care and nicety. The same is to be said for the substitution of the damaged insulant especially of that toward the mass (yokes) of the outside columns. A five men squad (a technical foreman, two workmen, and two aids) can do the work in 45 days (unless naturally, that other work should result necessary after inspection of the inside windings.

Materials

The necessary materials will be exactly determined only after the complete diamantling of the transformer, excepted the material needed for eventual damages to the internal columns, the following amounts may be beforehand rougly estimated necessary:

1) Sterling tape Kg. 30
2) Cotton tape width 25 mm. 1000 meters
3) Pressapan cardboard of various thickness and bakelyte thin sheet Kg. 50
4) Sterling varnish Kg.5
5) Tin compound 50% Kg.2

3409

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2nd transformer (Target No. 32581)

The transformer seems sound at sight. The oil that was contained in it holds much water and at the powerhouse they are proceeding at the separation of the oil from the water with a centrifuge. In order to make a good work of it, it is necessary to observe the following instructions already partially given to the powerhouse personnel.

1) It is advisable, beyond the centrifugation, to heat the oil in the special tank with the resistances, at 105° (and not be satisfied with 90°).
2) To proof cold each amount of already treated oil before pouring it in the transformer tank.
3) To wash windings, connections and yokes of the transformer splashing them with hot oil.
4) The clean carefully the tank taking away every residue of water or oil mud.
5) To heat for several days the oil contained in the tank (with the resistances already setted in the bottom of the tank) and with the extractible part of the transformer (windings, cores) dipped in the oil and raised from the bottom for about 20 cm. in order to give a free way to escaping steam. The oil temperature has to be keeped very near to 105°. This operation will be considered concluded when the foam on the oil surface will desappear.
6) If the Valderno Co. has a filter presse of greater size (at least the double) of the one that I have seen at the powerhouse, it will be advisable to filter cold the oil in order to remove the suspended extraneous particles which the centrifuge was not able to remove.
7) To close the transformer and to finish the filling, through the "conservatore" with perfectly dishydrated oil till the level is reached - wait till the oil has taken the room temperature and proof with the "spintero-metro" three samples of oil taken from the tank bottom and, if the three tests gave good results, put the transformer gradually in tension.

115

CORFINO hydro-plant (map ref.sheet 11
SELT-VALDARNO L12,12)
25th April 1945

This station was not damaged by German occupation. One unit was in operation at time of inspection. Generator characteristics: 5500 volts, 252 Amps, 2400 KVA, 750 RPM, 50 cycles, 0.7 power factor.
A similar unit had been entirely disassembled and the alternator, turbine and governor hiddes underground. A smaller unit was in place but had been covered by a mound of rocks cemented together. All transformers had been removed to underground locations and sealed in. These included two 4500 KVA, 5.5-62 KV and one 2500 KVA, 66-30 KV unit.

The plant engineer was ordered to unearth and assemble all equipment that had been removed from the power house. Slight damage to the power house roof from shell fire will require tiles for repair. The P.B.S. electrical engineer is investigating the condition of transmission facilities both to the north and the south of this station.

Unknown.

FLORENCE

Clarence S. Wilcox

3407

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FLORENCE

Clarence S. Wilcox

3407

Copy to; Lt-Col. Bapper
Capt. Marshall, 15 Army Group
Major Wilcox
3 File

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DESERTOLI-CORFINO transmission line
SELT-VALDARNO
25th April 1945

Two 50 KV lines are mounted on pin type insulators on one tower. This line connects Piano della Rocca, Galliciano, Castelnuovo and Corfino plants. Approximately seven towers are down and a good deal of the wire. Probably enough wire could be salvaged to rebuild on circuit.

FLORENCE

Clarence S.Wilcox
Major, Ord.
Field Engineer

3706

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FLORENCE

Clarence S.Wilcox
Major, Ord.
Fie[illegible]Engineer

3406

Copy to: Lt-Col. Lapper
Capt. Marshall, 15 Army Group
Major Wilcox
2 File

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CASTELNUOVO hydro plant (map sheet 11,I1409)
SESTO-FALDANNO
25th April 1945

This plant was badly damaged during German occupation. The diversion dam on the Serchio River was not damaged. The hydraulic operated gates are now able to function through power supplied by the Corsine plant. The intake tunnel from the dam to the headworks has been damaged in two places and will require 10 tons of cement for repair. The headworks and penstock are undamaged. The power house and substation have been completely demolished.

The plant contained three 2400 KW vertical generating units. Unit nº 1 has sustained considerable damage to the exciter and governor, and slight damage to the alternator due to the crane falling across the unit. The turbine appears undamaged.

Unit nº 2 has been dismantled and hidden underground. The alternator, governor and turbine should be in good condition, with the exception of the alternator cover plate. The cover plate had been left in the open and was damaged by bombing. A section of the cast rim had been blown out, but as the spider and bearing were undamaged, it appears useable.

Unit nº 3 was damaged by the falling power house and other nearby demolitions. The exciter and governor were badly damaged. Bolts holding the generator and turbine shaft were sheared with possible internal damage to both machines. Crane was badly damaged. The transformer had been hidden; of other two one was slightly damaged by falling débris, the other more seriously.

3) - Matters requiring attention. Clearing up rubble is in progress. Valdarno Company is to submit a report on proposed rehabilitation schedule. This station was verbally released by P.W.B. for our action. (Lt-Col. Cooley to Major Wilcox).

FLORENCE

Clarence S. Wilcox
Major, Crd.
Field Engineer.

Copy to: Lt-Col. Lepper

Declassified E.O. 12356 Section 3.3/NND No. 785019

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FLORENCE

Clarence S. Wilcox
Major, Ord.
Field Engineer.

Copy to: Lt-Col. Lapper
Capt. Marshall, 15 Army Group
Major Wilcox
2 File -

3405

ADVANCED SECTION
ITALIAN BASE

Val 16 Submitted to Hqs Comdg Gen Mediterr. Bn.

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ANGHIARI Power Station m.r. L 4101
SEAB.IND. TOSCANA & CARTIERA CINI
25th April 1945

This power station is completely intact and the station is operating to maximum water capacity.
Installed are: 1 x 920 KVA Francis turbo-alternator
2 x 450 KVA " " "
The present output of 1000 KW is fed to the Valdarno network around Pistoia, and the paper mill consumes about 150 KW during the daytime.
The headrace canal requires some repairs needing 3 Tons of cement, but this is not urgent.

FLORENCE

H. Best

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H. Best
Captain R.A.

FLORENCE

3404

Copy to: Lt-Col. Lapper
Capt. Best
2 TileV/4

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STATION: ANGHIARI - Sheet XI Map Ref. 4103

OPERATING SOCIETY: SELT-VALDARNO

RESIDENT ENGINEER:

WATER SUPPLY: Ania Reservoir cap. c.m.

GENERATORS: 2 a 450 K.V.A.
1 a 920 K.V.A.

TURBINES: 1 - 625 H.P.
1 - 180 H.P.

Reports available

N°	Date	Report by:	Detail - Conclusions
1	8 JAN 45	MAJOR TUCKET. R.E.	SEE REPORT.

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Report n° 1

Report by Major R.W.F. Tuchett R.E. on Hydro Plant at ANGHIORI, ITALY, Road Map 1/200.000, sheet 11, Map Ref. 4103 on 8th Jan. 1945.

ANGHIORI - 3 hydro electric horizontal Sets.

Two sets 450 KVA 1000 RPM feeding direct onto line at 6.5 KV.

One set 920 KVA 750 RPM feeding direct onto line at 6.5 KV.

This plant is completely intact and all three Sets were on hte line when visited. The control engineer reported that, due to lack of water at present, full output was not possible.

The station is tied in to San Michele at 6.5 KV where transformers step it up to 20 KV.

The two small Sets run from 0800 hours until 1700 hours on local distribution, and from 1700 hours to 0800 hours to Pistoia

The large set supplies Pistoia for 24 hours a day.

Cini supplies Pistoia and not Anghiori. Total output is to local distribution.

February 3rd 1945
Confirmed by Valdarno.

/s/ F.W.R. Tuckett
Major R.E.
O.C.543rd E. & M. Coy,R.

3402

SITUATION IN THE LEGHORN GRID May 15th 1945
Information received from Eng. Musi May 15th 1945 1700 hours

Piano della Rocca not operating for lack of water. The repairs to get water from Castelnuovo will be completed tomorrow or the day after tomorrow.

Lima output 1,800 KW

Piaggione output 800 KW

Larderello output 12,000 KW

Rosignano steam plant - not operating

Leghorn Diesel generators not operating.

Larderello machinery are in condition to give to the Valdarno grid the double of the power given at present.

During the night, between 2200 hours and 0530 hours Larderelle has about 10,000 KW available.

The record of May 14th are:

Larderello 38,700 KWH

Castelnuovo 101,340 KWH
and it is possible to have:

Larderello 70,000 KWH

Castelnuovo 200,000 KWH

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file

TO: Florence
FROM: Leghorn

June 11th 1945

Please, require that Office to procure allottment of 3 tons new cast-iron (type "ematite" or SERVOLA) to the Orlando Shipyard for castings concerning the boilers in the "Alberto Lodolo" Plant.

Capo Doveri

Eng. Rossettini - Firenze

Prego interessare codesto Ufficio perchè vengano assegnate ai Cantieri Odero-Terni-Orlando Kg. 3000 ghisa nuova, tipo ematite o servola, per fusioni interessanti le caldaie centrale "A.Lodolo".

Saluti Doveri

3409

Capt Dutton
File.

MEMORANDUM

Inspection to "Alberto Lodolo" Steam Plant Leghorn -

June 5th 1945

Cement: 50 tons

The bricks and tiles needed for the roofing and walls building are secured for the greatest part. For masonry work 50 tons cement are urgently required.

Truck

A truck to be at the entire disposal of the plant is urgently needed to carry on the works. One truck has been promised to be available By June 8th and it is hoped it will be obtained, otherwise the present difficulties due to a long lasting lack of transport would get worse and worse.

Water

The necessity is here pointed out that the Plant be connected with the mains of Leghorn aqueduct as soon as possible. Water is at present being supplied with a small barrel, but it is hardly sufficient for the workpeople for drinking. Now and then the P.B.S. takes care of sending a tank-truck to make a reserve, which is scarcely sufficient for transformers cooling.
As soon as the boilers, that are now being repaired, are in a condition to be filled for a test of the holding capacity, a considerable amount of water will be required, moreover because it is quite likely that the boilers must be filled various times according to the leaking that will be shown at any hydraulic pression test, and will be little by little repaired.

Orlando Works.

Repairs of the boilers are in good stage by the Orlando Shipyard under command ot Royal Navy. Parts in good condition have been taken from the boilers in the front of the damaged ones, and the job is goin on satisfactorily. It is whished that the Orlando Works (now repairing the boilers pressure parts) may repair as well the parts concerning the iron suspensions of accessory pieces (pipes etc and take care of the rehabilitation of coal drying

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Skilled workmen are required for plates cutting and oxyacetylenic weldings; these kind of workers are to be foûnd in the Orlando Works and are already being employed in our boilers repairs; so we only need that the Royal Navy give orders accordingly to the Orlando staff.
3399
Also the construction of a plate reservoir to recover the oil shed in the underground, and some more little weldings, should be committed to the same workpeople.

Copy to Col. Cooley
Orig. in Italian in F.le.

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Refractory materials. The two combustion chambers of the boilers under repair have been emptied of the refractory materials. The metal suspensions, put out of form by explosions, need repairs, and then a new masonry work must be made. Refractory bricks are required. Maton Works are up to day still occupied by the Army, and cannot start working.

Machinery at A.N.I.C. Due to lack of transport, the equipment taken by the Germans to the A.N.I.C. factory has not been removed as yet. The crane is functionning in said factory and pieces may be lifted and loaned on trucks.

Circulation pump. As already reported, a circulation pump for the available parts of machinery is also missing. In connection with the aseembling of this particular type of turbines, we point out that at present it is possible to contact in north Italy Eng.Fazzari, general agent for Italy of the Swedish Co. Stahl-Asea.

Repairs to alternators The repairs of two of the four damaged alternators may be committed to Ansaldo Works, Genova, provided that the Ansaldo workshops on the Riviera are functionning. Alternators may be shipped to Genova by sea.

Thermo insulation. The boilers therno insulation may be done by Riva-Mariani Co., Milan, specialist for this kind of job.

Glasses We remind the need of glasses for skylights and windows.

Leather belting. We also remind the missing leather belting for transmission.

Transf. services in the plant. Two transformers for services in the plant are also needed (for about 1,000 KVA)

Necessity of assistance Considering the good condition of electric plants in north Italy which will be soon connected with Tuscany, all above works, as inspected to-day, may be henceforth developed on more economic and better organized projects, as the job is no longer so urgent, and some help may be obtained from the workshops in the north.

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ter organized projects, as the job is no longer
so urgent, and some help may be obtained from the
workshops in the north.
It is however necessary that the work accomplished
up to-day should not be damaged by lack of transport
or of cement.
Assistance is strictly and urgently needed, even
though the assembling of the turbo-alternator
be postponed in the near future.

- 3 9 -

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P R O - M E M O R I A

6 Giugno 1945 - Visita Centrale"Lodolo"

CEMENTO 50 TONN.-

— Il materiale lateriqio necessario alla copertura della sala macchine ed alla costruzione dei muri rovinati dalle esplosioni è stato in gran parte approvvigionato.-

Occorre provvedere senza indugio 50 Tonn. di cemento assolutamente necessario per eseguire tutti i lavori di muratura.-

CAMION.-

— Per la continuazione dei lavori in Centrale si rende indispensabile un camion completamente a disposizione. Si spera che il camion promesso per Giovedì 8 Giugno non abbia a mancare; altrimenti si aggraverebbe la difficile situazione odierna creata dalla mancanza di mezzi di trasporto per oramai troppo lungo tempo.-

ACQUA.-

— Si richiama l'attenzione sulla opportunità di collegare al più presto la Centrale con le tubazioni dell'Acquedotto di Livorno.- Oggi l'acqua è approvvigionata a mezzo di una piccola botte, ma essa è ora fornita in quantità appena sufficiente per servire da bere agli operai.- Ogni tanto il P.B.S. provvede a mandare una autobotte che serve a stabilire una scorta appena sufficiente al raffreddamento dei trasformatori.-

Non appena le caldaie che sono ora in riparazione saranno in condizioni da essere riempite per provarne la tenuta, sarà necessario avere una notevole quantità di acqua, tanto più che è molto probabile che ad un primo riempimento delle caldaie debba

./.

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seguirne un secondo e forse un terzo od un quarto a seconda delle perdite che ad ogni prova sotto pressione idraulica verranno poste in evidenza e poi man mano eliminate.-

- Il Cantiere Orlando agli ordini della Royal Navy sta eseguendo il lavoro di riparazione delle caldaie che è a buon punto.- Sono stati tolti elementi in buono stato dalle caldaie poste prontalmente a quelli in riparazione e le cose procedano regolarmente.-

Poichè il Cantiere Orlando esegue soltanto, per ora i lavori della parte in pressione delle caldaie si desidererebbe che estendesse la propria opera anche al ripristino delle parti delle caldaie che si riferiscono alle carpenterie in ferro di sostegno delle opere accessorie; passerelle, tubazioni ecc. Del pari potrebbe occuparsi del ripristino di alcune tubazioni per l'aria calda di essicazione del carbone nell'impianto di polverizzazione.-

LAVORI DEL CANTIERE ORLANDO.-

Si tratta di lavori per i quali occorrono operai pratici di taglio di lamiere e di saldatura delle medesime mediante la fiamma ossiacetilenica.- Operai e attrezzature che il Cantiere già possiede in Centrale perchè occupati negli attuali lavori della parte in pressione.-

Per ottenere questo non occorre altro che incaricare la Royal-Navy di dare ordini in proposito ai dirigenti del Cantiere.-

Si desiderebbe anche che ai detti saldatori fosse affidato l'incarico della costruzione di un serbatoio in lamiera da servire per il ricupero dell'olio sparso nel sottosuolo e di altri piccoli lavori

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di saldatura che man mano durante lo svolgere dei la= vori possono occorrere.-

- Per quanto riguarda la costruzione delle due camere di combustione delle due caldaie in riparazione si osserva che esse sono state già vuotate dal materiale refrattario che vi era contenuto.- Si tratta ora di procedere a rimettere in sesto la carpenteria metal= lica deformata dalle esplosioni e di eseguire successi= vamente le nuove murature.- Per far ciò è necessario l'approvvigionamento del materiale refrattario.- Fino ad oggi, nonostante il molto tempo trascorso, non è stato possibile ottenere che la Ditta Maton specialista per la costruzione di detti materiali refrattari si accingesse al lavoro perchè lo Stabi= limento è anche totalmente occupato da reparti di truppe Alleate.-

MATERIALE REFRATTARIO.-

- Il macchinario portato dai tedeschi allo Stabilimento ANIC presso Livorno non ha potuto ancora essere tra= sportato in Centrale a causa della mancanza del mezzo di trasporto.- Nello Stabilimento ANIC è ora in gra= do di funzionare la grue per il sollevamento di pezzi ed il loro caricamento sul camion.-

TRASPORTO MACCHI= NARIO ANIC.-

- Come è già fatto presente in precedenti relazioni man= ca per gli ehementi del macchinario disponibile, la pom= pa di circolazione.-

POMPA CIRCOLAZIONE SOCIETA'ITALIANA STAL-ASEA.-

A proposito del montaggio di questo tipo spe= ciale di turbine (STAL-LJUNGSTROM) si fa presente che ora, con la liberazione del Nord Italia, è possibile

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riallacciare comunicazioni con l'Ing. Saverio Fazzari Agente Generale per l'Italia della Società Svedese Stahl-Asea.-

- La riparazione di due dei quattro alternatori danneggiati che ancora esistano in Centrale potrebbe essere affidato ad esempio alla Ditta Ansaldo di Genova sempre che questo sia in grado di funzionare con le proprie Officine sulla Rivera Ligure.- Gli alternatori potrebbero essere trasportati a Genova via mare.-

RIPARAZIONE ALTERNATORI AD ANSALDO.-

- L'isolamento termico delle caldaie potrà essere eseguito dalla Ditta Riva-Mariani di Milano specialista in tale genere di lavoro.-

ISOLAMENTI TERMICI.-

- Fra il materiale necessario alla ricostruzione del fabbricato si ricordano i vetri che occorrono per i lucernari e per le finestre.-

VETRI.-

- Come memoria si fa presente anche la mancanza di cinghie di cuoio per le varie trasmissioni di cui si è fatto cenno in precedenti relazioni.-

CINGHIE CUOIO.-

- Occorronb anche due trasformatori per le Cabine servizi interni per la potenza di circa 1.000 KVA.

TRASFOR. SERVIZI INTERNI.-

o o o

- Tenendo conto della situazione favorevole degli impianti elettrici dell'Alta Italia con i quali la rete elettrica Toscana sarà presto collegata..

NECESSITA'DI AIUTI URGENTI.-

tutti i lavori descritti e di cui è stato constatato la presente situazione nella visita odierna alla Centrale 'Alberto Lodolo" potranno d'ora in avanti essere

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sviluppati secondo criteri più economici ed organici data la minore fretta e la possibilità di aiuto che potrà venire dalle Officine del Nord Italia.-

Occorre però che il lavoro già fatto non venga guastato dalle difficoltà dipendenti dalla mancanza di mezzi di trasporto e da quella del cemento.-

L'aiuto in questo campo è assolutamente necessario e dovrebbe essere dato senza indugio anche nel caso si pensasse di rimandare a un tempo futuro il montaggio del turbo-alternatore.-

Firenze, 5 Giugno 1945

3393

LEGHORN Steam Plant
SELR-VALDARNO
27th April 1945

a) Work on first boiler by Orlando Shipyard. Tubes nearly complete. 12 men employed on project.

b) Masonry construction on power house walls by Nicolai. 70 men employed on project. Roof over generating room not started because of lack of cement and tile.

c) Work on generating unit by Valdarno Company. 15 men employed on project. Turbine has not been brought from ANIC. No work started on damaged generator.

a) The Al. Com. truck in use at Leghorn has been withdrawn. It is very necessary that transport be provided to continue work.

b) 50 tons of cement are needed for masonry construction. Request made some time ago and not filled.

c) Insulating materials needed to repair generator stator.

d) Final negotiations for manufacture of refractory brick must be completed without delay.

At present rate of rehabilitation this plant will not be available for at least six months.

FLORENCE

ADVANCED SECTION
SUB-COMM
OFFICE
DATE
A.C.
ELECTRICAL DIVISION

Clarence S. Wilcox
Major Ord.
Field Engineer

3392

Declassified E.O. 12356 Section 3.3/NND No. 785019

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FLORENCE

Clarence S. Wilcox
Major Ord.
Field Engineer

3392

Copy to: Lt-Col. Lapper
Lt-Col. Cooley
File

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Declassified E.O. 12356 Section 3.3/NND No. 785019

Tel. 478.906

VSR/lem

MEMORANDUM

31 March 1945

SUBJECT: Operation Date for Leghorn Grid

TO : Distribution List

In a telephone conversation with Col. Cooley this morning he told me the following:

a. The generation for the first 15 days of March averaged 150.000 KWhr/day; for the last 15 days, it averaged 200,000 KW-hr/day.

b. The peak load of each plant has been the nameplate capacity.

c. Rosignano (Solvay) is not operating.

d. The second unit at Lima (1500 KVA) is expected to be ready by 30 April. The second unit at Piano della Rocca is expected to be ready by 15 April.

e. The peak on the Leghorn systems is about 15,000 KW.

f. Colle Val d'Elsa ans Siena are presently being fed from the Leghorn system. It may be necessary to cut them off when the supply to Pistoia is started.

Lt. Col. V.S. RENTON
Chief Operation and Transm.Dept.
Electrical Division

Distribution
Major Burry
Major Bell
J/C King
Valdarno File
Ing. Asta
Ing. Pietromarchi

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Copy for file

ADVANCED SECTION
ELECTRICAL DIVISION
PUBLIC WORKS & UTILITIES SUB-COMM.
ALLIED COMMISSION

Florence, 6 Via Cerretani
Telephone nº 1153
15th March 1945

A. LODOLO

SUBJECT: Repairs to ~~Nerviano~~ Power Station

Ref. : V/3 ARD/ab

TO : Naval Officer in charge
Navy House - Leghorn

1. It is requested that the rehabilitation of subject generating station be undertaken as a project of the Royal Navy in accordance with the conditions contained in your letter of 13th March 1945, File nº 132/9.

2The terms as stated have been discussed with Valdarno officials and are entirely satisfactory to them and to the Allied Commission. The Valdarno Company and Cantiere Orlando having previously been in accord with regard to boiler repair, it is suggested that this work begin as soon as possible. Upon receipt of your advice as to when it is most convenient, arrangements will be made for representatives of this office and Colt-Valdarno to meet with your own representatives to determine the full extent of work to be undertaken.

3. Central Italy being largerly dependent on water-power which decreases considerably toward the end of summer, it is hoped that this power plant will be able to play an important part in supplanting the electric power available for military and other essential needs at that critical time. Liaison as required will be maintained by this office and its full and complete co-operation in any way possible extended.

ADVANCED SECTION

Robert A. Bell
Major S.C.
Officer in charge

Copy to: Lt-Col. Lapper
Lt-Col. Cooley
Colt-Valdarno Co.

3390

Office of the Naval Officer in Charge,
LEGHORN.

13th March, 1945.

No. 132/9.
Public Works and Utilities Sub Commission,
Allied Commission,
Advanced Section - Florence.

A.10010

REPAIRS TO MARZOCCO POWER STATION (MESSRS SELT-VALDARNO)
LEGHORN.

With reference to the visit of your representative concerning the Marzocco Power Station repairs can be effected under the following conditions:-

(a) Work to be undertaken by the Royal Navy employing the resources of the Oderc-Terni-Orlando Shipyard.

(b) Unskilled labour to be supplied by Selt-Valdarno.

(c) Work will not be allowed to prejudice operational needs.

(d) Assistance to obtain supply of any controlled material necessary to effect repairs may be required from Allied Commission.

(e) No guarantee of completion will be given, though every effort will be made to expedite and complete work undertaken. Seven days notice would be given should the Royal Navy, for any reason, have to withdraw its labour. In the event of such a position arising, Messrs Oderc-Terni-Orlando would be in the position to complete the work as private contractors.

(f) Work to be undertaken to be agreed upon site by interested parties.

(g) The accounting to be done on the basis of:-

(1) Effective working hours workmen are employed. Allied Forces wage scale rates are paid.

(2) Cost of materials used.

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(f) Work to be undertaken to be agreed upon site by interested parties.

(g) The accounting to be done on the basis of:-

(1) Effective working hours workmen are employed. Allied Forces wage scale rates are paid.

(2) Cost of materials used.

(3) Overhead expenses calculated on actual outgoings incurred.

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(h) Messrs Selt-Valdarno to be liable for repairs effected.

CAPTAIN.

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Atto - Leghorn

VB

TELEPHONE DISPATCH

From: LEGHORN
To : FLORENCE

February 8th , 1945

TO: Ing. Legnaioli - Florence

~~As for as~~ this morning I have not been told anything about the truck.

I inform you that an American Captain, some days ago, with the permission of Col. Cooley, requisitioned and took away an AGEA 40 HP motor of the only concasseur and principal coal transporter, as well as one 12,5 HP"Marelli" motor by one of the two elevators of pulverized coal, leaving us a requisition certificate.

signed: Doveri 3388

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Spare
Spare QD 1
F de F (Leghorn Plant) Note
Leb

Leghorn Plant.

Some plant is hidden in the Tunnel di QUIESA, near MAGGIANO - MAP REF. O.1080 - on rail line Viareggio - Lucca.

Valdarno Co. request that Eng. Doveri be allowed to accompany the inspecting officers.

It is pointed out that the plant is loaded on trucks, that many Booby Traps may have to be removed.

Inspection lamps or flash lamps will be necessary.

Sent Mon 12 Feb
8-30 Sat Col Cantrell (Bar) PCE 1212
Piazza Unita d'Italia.
Ph. 1325 or 1451 ext 5

Maj George.

Copy sent info to Lucca
4 cds 5th
Reb J.J.

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Dimond -

Col Kimbrell ???
at 1325 Ext 5

Called that he cannot make the trip but that Major Beauge, his assistant will go with you in your tramp at 8 30 monday morning Feb 12th Pick him up at his office & call him if these arrangements not satisfactory

Lms

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Where is the file copy of Cavallaro
To Capt Dineen 7-Feb-42 GED
Brown
Maj Reynolds
2 - Gibson, Col Caffey
1 - L. Col Cooley
3385

(4)

16-2-1945

PRO-MEMORIA LAVORI CENTRALE TERMICA ALBERTO IODOLO -LIVORNO-

Il personale reclutato per i lavori di smassamento delle macerie e riordinamento dei materiali è ora costituito da 75 operai avventizi in aggiunta al personale in organico della Centrale che è di circa 20 persone.-

A causa della mancanza di mezzi di trasporto, delle difficoltà di alloggio e di vitto, si notano giornalmente numerose assenze fra gli operai avventizi. Il giorno 14 Febbraio u.s. per esempio si sono presentati al lavoro soltanto 58 persone delle 75 reclutate.- La situazione diventerà sempre peggiore se non si provvederà a mettere a disposizione della Centrale un camion che permetta di dare agli operai la possibilità di raggiungere almeno ogni settimana le proprie famiglie che per un gruppo di individui risiede in paesi lontani da Livorno (es:Torre del Lago).-

L'autocarro è pure indispensabile per l'approvvigionamento dei materiali: calce cemento mattoni, necessari alla riparazione dell'edificio.-

Occorre pure provvedere al trasporto delle parti di un turbogeneratore che si trovano ora presso lo Stabilimento Anic.-

X | Se non sarà possibile avere a disposizione questo mezzo di trasporto dovremo rinunciare alla prosecuzione dei lavori nella Centrale di Livorno.-

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[illegible] al personale in organico del=
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Occorre pure provvedere al trasporto delle par= ti di un turbogeneratore che si trovano ora presso lo Stabili= mento Anic.-

X Se non sarà possibile avere a disposizione questo mezzo di trasporto dovremo rinunciare alla prosecuzione dei lavori nella Centrale di Livorno.-

o
o o

Abbiamo avviato trattative con il Cantiere Orlan= do di Livorno per il ripristino di 2 caldaie delle quattro esisten= ti.- Il Cantiere assumerebbe l'incarico ed accetterebbe la respon=

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sabilità di mettere in perfetto ordine le due caldaie anzidette mediante la prestazione di personale specializzato e mettendo a disposizione le proprie officine.-

Per potere eseguire il lavoro il Cantiere Orlando richiede:

a) Un permesso da parte delle Autorità Alleate che consenta al Cantiere di lavorare per terzi poichè tutta la sua maestranza e la sua Officina sono oggi requisiti dalla Marina inglese per riparazioni di navi.-

b) Di ottenere la assegnazione di elettrodi per saldature elettrica di ossigeno e di carburo per i lavori di taglio o saldatura ossiacetilenica.-

c) Di avere a propria disposizione un mezzo di trasporto anche di portata limitata per potere portare ogni giorno gli operai al lavoro dal Cantiere alla Centrale, provvederli del vitto a mezzogiorno, trasportare i diversi pezzi da lavorare o lavorati dalla Centrale alle Officine del Cantiere e viceversa; questo mezzo di trasporto dovrebbe essere ad esclusivo servizio del Cantiere per tutta la durata del lavoro alle caldaie e dovrebbe essere quindi in aggiunta all'altro, già indicato prima, destinato agli altri lavori della Centrale.-

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Da un esame del materiale esistente in Centra=

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Da un esame del materiale esistente in Centrale e presso lo Stabilimento ANIC si ritiene di potere rimontare un gruppo Turboalternatore STAL-ASEA.-

Come si è già detto accorre però riunire in un solo locale tutte le diverse parti di tale gruppo che sono sparse quà e là e per questo - insistiamo ancora - è necessario un autocarro a disposizione.-

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Per completare questo gruppo occorre:

a) Approvvigionare le due pompe per la circolazione dell'acqua refrigerante del condensatore che sono andate distrutte. Le caratteristiche delle due pompe sono le seguenti: Acqua necessaria alla refrigerazione 3120 m^3 per ora con 11 metri di prevalenza. Ciascuna pompa era accoppiata con un motore elettrico di 102 kW 5000 Volt e 960 giri .

b) Approvvigionare due pompe per la estrazione del condensato capaci complessivamente di estrarre 68.000 kg. di condensato all'ora con 30 metri di prevalenza.-

c) Rifare completamente l'avvolgimento agli statori dei due alternatori del gruppo - procurando il materiale isolante necessario.-

° ° °

Mentre da parte della Società si è provveduto ad avviare i lavori di riordino, assumendo allo scopo numeroso personale con onere finanziario non indifferente, si è costretti a far rilevare alle Autorità Alleate che da parte di militari si è provveduto alla requisizione di elementi essenziali per il funzionamento dell'impianto.- Si tratta di due motori che sono stati ritirati dal Capitano Vernon Adam del 98th Eng. Regt per essere destinati crediamo ad una miniera nelle vicinanze di Grosseto.-

Il primo di questi motori da 40 HP. azionava il

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Il primo di questi motori da 40 HP. azionava il frantoio del carbone greggio insieme al trasportatore principale del carbone stesso.-

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Il secondo della potenza di 12,5 HP. azionava una delle due coclee che trasportano il carbone polverizzato dai cicloni sovrastanti ai molini al serbatoio di spedizione del

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combustibile dall'impianto di polverizzazione alle caldaie.-

E' necessario che questi motori ritornino al più presto in Centrale per evitare che il loro uso da parte di estranei procuri ad essi dei danneggiamenti difficilmente riparabili nei momenti attuali e tali quindi da mettere in pericolo la possibilità di far funzionare l'impianto a ripristino ultimato.-

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Si richiama l'attenzione sulla necessità di avere sollecitamente l'assegnazione del materiale edile necessario alle riparazioni del fabbricato ed alla copertura dei locali nei quali il tetto è stato asportato dalle esplosioni.-

Questo materiale è stato già indicato e si riassume in :

N° 65.000 mattoni pieni
" 7.000 mattoni forati
" 20.000 embrici marsigliesi
" 9.000 tavelline
" 500 qt. di cemento
Sabbia
Ghiaia
Ferro tondo Ø 16 ÷ 18 mm.
" " Ø 6 " 8 "
" " Ø 7 " 8 "
per complessive 5 Tonn.
mq. 1250 asfalto spessore di cm. 1,5
Vetri per lucernari mq. 850 spessore 7 ÷ 8 mm.

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sibilità di far funzionare l'impianto a ripa...

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Si richiama l'attenzione sulla necessità di avere sollecitamente l'assegnazione del materiale edile necessario alle riparazioni del fabbricato ed alla copertura dei locali nei quali il tetto è stato asportato dalle esplosioni.-

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Ghiaia
Ferro tondo Ø 16 ÷ 18 mm.
" " Ø 6 " 8 "
" " Ø 7 " 8 "
per complessive 5 Tonn.
mq. 1250 asfalto spessore di cm. 1,5
Vetri per lucernari mq. 850 spessore 7 ÷ 8 mm.
Vetri per finestre mq. 1000

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Si ricorda la necessità di far funzionare un Reparto della Società Italiana Mattoni Refrattari di Livorno per la

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fabbricazione pezzi speciali di refrattario che occorrono per la ricostruzione delle volte sospese delle due caldaie che si progetta di riordinare.;

o o

Nell'impianto polverizzazione del carbone e nella Officina meccanica mancano e debbano di conseguenza essere approvvigionate tutte le cinghie di cuoio necessarie all'avviamento di tutto il macchinario.-

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Si sono iniziate trattative con una ditta capace di rimettere in ordine l'impianto di preparazione del combustibile polverizzato, e le camere di combustione del medesimo, ma poichè anche questa Ditta come il Cantiere Orlando richiede mezzi di trasporto, assegnazione di ossigeno, carburo, elettrodi e materiale vario, è necessario potere sapere se tali aiuti potranno essere concessi per potere portare a buon fine le trattative stesse.-

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Firenze, 16 Febbraio 1945 Ingl. Legnaioli

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T R A N S L A T I O N

REPORT ON PRESENT CONDITIONS OF MACHINERY AND BUILDINGS OF THERMO-GENERATING PLANT "A. LODOLO" IN LEGHORN OF "SELT-VALDARNO" COY.

8 Jan. 1946

1).- PULVERIZING PLANT

Leather transmission belts are totally missing; slight damage on building and on some of the tubes of one of the mills; for the remainder, general condition is normal, but prudence is needed before starting this department, on account of danger from hidden mines.

2) - SEA-WATER SUPPLY

Pipes entrance in dock are obstructed on account of the docks having been destroyed; the vans and gates are safe. All the canal from the dock to the plant is safe. Discharge canal to the sea is also safe.

3) - INDUSTRIAL WATER

Water reservoirs and filtres are intact. Pipes for transformers, turbines and converting units are almost intact. In pumping station, only two pumps are left, which are induffficient for operation. The following pumps have been taken away:

- n.3 "Marelli" 20 HP electric pumps (which appear to be at Leghorn Municipal Aqueduct);
- n.1 "Marelli" 2 HP electric pumps
- n.1 "Marelli" 5 HP " "

Besides, one electric motor, taken from a pump, is also missing.

4) - DIESEL

The Diesel motor, coupled to a 260 Volt 150 KW generator for starting of Plant, is completely destroyed: the generator is seriously damaged.

5) - AUXILIARY SUBSTATION

Three 500 KVA 5000/260 Volt transformers are half-destroyed. High tension and low tension equipment are badly damaged, but can be repaired.

6) - WORKSHOP

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N.1 lathe, n.1 saw, n.2 drills, n.2 grinders and transmissions, n.2 motors, all is safe, only leather belts are missing.

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7) - BATTERY AND CHARGING UNITS

No damage; they are in operation.

8) - BOILERS DEPARTMENT

In good condition:
steam pipes
five feeding pumps
two ungreasing tanks
four economisers
four primary air aspirators
two evaporators and condensers
four cylinders and valves
four chimneys and ventilators
four..... and four bunkers with their coal distributors
four combustion rooms, exdept suspended vaults and fore walls some of which are damaged.

All four boilers have been mined in the inferior zone of the boiling tubes, in front.

Overheaters and boiling tubes in the upper parts seem to be intact, but further investigation is needed.

Screens and their collectors for boilers 1, 2 and 4 are safe, whereas Breda screen tubes of boiler 3, between cylinder and collector, on the left side, are damaged from outside.

Half-destroyed:

almost all the foot-bridges
pulverized coal pipes
coal burners
part of primary air pipes
insulated planking for four front walls of boilers.

9) - CRANES : 25 TONS IN ENGINE DEPARTMENT - 50 TONS IN TRANSFORMERS DEPARTMENT.

No damage, they are in operation.

10) - S.F.A.L. UNITS

Turbine n.2 was shipped at A.N.I.C. factory on 14 railway trucks to be forwarded to Trieste - Miniere dell'Arsa: 4 of these trucks, containing one condenser, two circulation pumps, one extracting pump, and other materials, seem to have been forwarded on Pisa-Lucca-Viareggio line and that, after a bombardment north of Viareggio, train has been blown up in the Monte di Quiesa gallery.

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The following parts of the other two turbines are in plant:

2 condensers
4 stators, damaged but repairable
4 rotors
2 exciter poles
1 exciter rotor
2 turbine wheels, damaged
1 oil cooler
2 turbine bearers
1 regulator
basements, caps and covers for one unit
water, steam and oil valves
1 turbine oil electric pumps
1 bearing, regulator side
1 shaft extension
2 bearings, exciter side
2 speed indicators
1 turbine manometer board
1 void automatic tank (?)
1 group of steam auxiliary valves
3 steam valves
Manometers, springs, screws, etc. appear to be sufficient for one unit

The following are located at A.N.I.C. factory:

2 turbine wheels, with steam chambers, for one turbine
1 ejector for one tubbine void
1 steam filtre
1 discharge automatic valve
1 exciter rotor
2 electric pumps for circulation of condensed water (destroyed)
4 turbine bearings
1 turbine auxiliary steam valves
1 centrifugal regulator
1 regulator connection
3 turbine main steam valves
1 discharge steam diffuser, upper part
2 500 mm valves for condenser circulating water
2 steam pipes for connection of main valve and steam filtre
2 curved pipes for discharge of two condensers
1 curved pipe for atmosphere discharge
1 straight pipe as above
4 curved pipes for condenser circulating pumps (for two units)

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4 curves and 8 bits of 500 mm pipe for connecting condenser pumps for two units
2 electric substitutions for 5 KV circulation pumps
23 special screws for turbine fixing
2 aspirating pumps cages (?)
2 Ammeters for extracting pumps
Inspection doors for turbine and alternator
Bearings, valves, wheels, gears, and other small pieces
Circulation pumps (2 of which were destroyed at A.N.I.C. factory) are entirely missing, as well as condensed steam extraction pumps.

One of the latter was in the Plant when the Germans retired, and shall be searched.

11) - ASEA SYNCRONOUS MOTORS

6000 KVA unit. Stator and rotor windings are damaged on exciter side: bearing destroyed, exciter missing, cap damaged, insertor and basement safe.

4000 KVA unit. Stator and rotor windings damaged, bearing destroyed, exciter missing, insertor and basement safe.

12) - ANSALDO CONVERTING GROUP

Syncronous 50 cycles motor:

Stator damaged (repairable)
Motor " "
Exciter " "
Bearing destroyed

4000 Volt 16 cycles generator:
Stator damaged (repairable)
Rotor " "
Bearing and exciter destroyed

13) - C.G.E. CONVERTING GROUP

2 rotating rephasers destroyed
1 dissyncronous machine damaged (repairable)
1 scherbius machine " "
1 induction motor 9650 HP, 50 cycles stator, rotor, bearings, caps, repairable
1 alternator 9500 KVA, 16 cycles stator, rotor, bearings and cap repairable, exciter destroyed
1 resistor and controller in good condition
Electrical equipment can be recovered

14) - AIR CONDUCTS

Destroyed. Air filtres good.

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15) - OUTDOOR SUBSTATION (half destroyed)

1 switch PO 76 (60 KV) good
2 switches RO 8,5 (60 KV) good
1 coil 16-50 cycles(60 KV) good
Part of framework, sectionners etc., good

16) - C.G.E. 16 CYCLES TRANSFORMER

Tank damaged (repairable)
Coils burnt "
Core - good
Refrigerator broken
Pump "
Motor missing

17) - ANSALDO 16-50 CYCLES TRANSFORMER

Tank damaged
Coils burnt and damaged
Core probably good

18) - ANSALDO BOOSTER TRANSFORMER for starting converting group

Intact

19) - ASEA 18000 KVA TRANSFORMER

Repairable
Tank damaged
Central coil damaged in the lower part, the others burnt
Core probably good

20) - 60/30 KV WESTINGHOUSE TRANSFORMER

Tank not repairable
Coils burnt
Core damaged

21) - TRANSFORMER REFRIGERATORS

2 ASEA dismantled - good
2 ANSALDO - good

22) - SAN GIORGIO 5/30/60 KV - 6500 KVA TRANSFORMER

In operation

23) - C.G.E. 6500 KVA TRANSFORMERS WITH REFRIGERATORS

In operation

24) - SAN GIORGIO 5/30/60 KV - 6500 KVA TRANSFORMER (Padula Substation)

Damaged - repairable

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25) - E.D. 60/30 KV - 6000 KVA TRANSFORMER (Tombolo substation)

Good

26) - 1/1 (5300/5300 V.) 6000 KVA TRANSFORMER (in Plant)

Half destroyed

27) - BUILDINGS

Main structures are good.

The following have to be reconstructed:

Pulverizing plant: external wall at 2nd floor with concrete column.

Boilers: roof, part of glasses, north wall complete

Diesel: south wall

Offices and storehouses: doors and windows

Engines department: all the roof, glass and tiles. Only reinforced concrete frame is good.

Transformers department: sky-lightdestroyed. On concrete frame the Military Engineers have laid zinc sheets.

28) - SUBSTATION AND SWITCHBOARDS.

About half of north wall, on switchboard floor, has been blown down by mines. Switchboard of C.G.E. group, switches, bars, etc. on 5 KV and 60 KV are damaged.

Outside wall on 30 KV side is damaged. 5 KV Leghorn equipment, and half of bars up to first engine are safe. All 30 KV, and a good part of 60 KV equipment are safe. Only one reduced oil switch for 60/30 transformer has suffered: the others are good.

29) - OIL RESERVOIR

Good, with about 3 tons of oil.

30) - 2 PRESS FILTRES WITH "VERONESI" HEATER

In operation.

31) - IRON AND FIRE-BRICKS STORES

Roof and doors damaged. Materials safe.

32) - PORTER'S STORE

No damage.

33) - PLANT'S STORES

Half empty. Doors and windows damaged.

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34) - PORTER'S HOUSE

Slight damage.

35) - PLANT CHIEF'S HOUSE

Doors and windows missing or damaged. All what was left (furniture, etc.) has been taken away.

36) - MAIN ENTRANCE

Gates from porter's house to Plant Chief's house has been damaged for passing of military trucks.

37) - FENCING WALL

Completely destroyed from cable station to water supply, and for 20 mt. on Moto Fides side.

38) - COAL

In July 1944 approximately 7000 Tons were in stock. It has been almost entirely spread on the open ground from the farmer's house to the dock. This coal is under control of P.B.S. which allocates it.

CONCLUSION

As far as it can be foreseen, under condition that located machinery pieces are in good state or easily repairable, and with no responsibility as to time and success, in consideration of the important and difficult task which has been bestowed upon me, and which is above my ordinary appointment, I state hereby what I think necessary for setting in operation one generating unit and two boilers:

PULVERIZING PLANT:

Revision of electric power equipment, and of 260 Volt cables between auxiliary substation and pulverizing plant.

Provide all the missing leather belts, i.e

n° 2 for compressors
n° 6 for pulverizing distribution
n° 2 for pulverized coal screw transporters
n° 2 for coal elevators
n° 1 for coal mill
n° 2 for coal transporter to mill

Repairs of part of building and of reinforced concrete structures.

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Repairs of some of the pipes on mill n.3.

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AUXILIARY SUBSTATION

A) - Repairs of at least two of the three 500 KVA 5200/260/130 Volt transformers.

B) - Repairs of all the high and low tension switchboards.

C) - Construction of a 5 KV transmission line for feeding this station, as the high tension cables have been cut.

LIGHTNING

Reconstruction of the lightning equipment in engine room, substation, offices, etc.

260 VOLT POWER EQUIPMENT

This equipment must be repaired, especially for engine room, substation, etc.

SIGNALS

Equipment must be reconstructed between switchboard and boilers and between boilers and pulverizing plant.

COOLING WATER RESERVOIRS

3 elevating pumps must be installed at the place of the three missing.

Instalment of one pump for elevating distilled water.
Revision of boiler water depurator plant.
Repairs of industrial water pipes from Municipal Aqueduct for feeding Plant.
Repairs 6" double pipes between reservoir and plant, substation stock.

SEA WATER

Repairs on pipe head at dock.
Revision of underground cement pipes to Plant.

ENGINE ROOM

Re-mount engine nº 1 with parts at A.N.I.C. and in Plant.

Principal missing parts:
2 pumps for condenser water
1 pump for condensated water
1 motor for parallel control

Repairs of two statore.
Other repairs.

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Besides, it is needed to:

Reconstruct roof
Repair wall towards pulverizing plant
Repair windows and doors, glass and iron
Remount alternator resistances in air filtre gallery
Repair or rebuild part of conducts for alternator cooling air
Repair filtres and alternator air galleries
Change over of 5 KV cables from 2nd unit to 1st unit, or make a temporary connection with copper bars (2000 Amp.)

BOILER FEEDING PUMPS

Iron straw for the two ungreasing devices must be changed, therefore 2600 Kg. of such straw are necessary, Kg. 1400 of which are in stock.

Revision of feeding pumps, of two evaporators, and of the condensers.

Setting of one electric pump for the above condenser, instead of the missing one.

Revision of pipes to boiler.

BOILERS

Boiler nº 1 has always worked normally, and is better than boiler nº 2, both manufactured by Tosi.

Boiler nº 1 needs changing of some of the boiling pipes, and half of the mud reservoir which have to be taken from boiler nº 2. It also needs reconstruction of suspended vault and, partly, of front wall. Probably ash box will have to be repaired too, owing to fall of materials.

In boiler nº 2, besides change of boiling pipes sections, and of half of mud reservoir, only suspended vault has to be reconstructed, and probably ash box has to be repaired, but this boiler during operation has proved not to be very reliable on account of cylinder and some of the boiling pipes on the left side.

Babcok-Wilcok boilers nº3 and 4 have always worked satisfactorily. In Nº 3 the side screens in combustion chamber, recentely constructed by Breda, have given good results but, in consideration of damage in boiling pipes, in mud reservoir, collectors, screens, etc. ir seems preferable to repair boiler nº 4.

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Boiler nº 3. Besides the a/m changes and repairs, it is necessary to reconstruct suspended vaults, about half of combustion chamber front wall, and probably ash box will need repairs.

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Boiler n°4.As already said, this boiler has to be reconstructed with materials taken from boiler n°3: besides boiling pipes, and half of mud reservoir, reconstruction of suspended vaults, of all the front wall, and of part of the right wall is needed.

It is besides necessary to repair 20 coal burners for 2 boilers. To repair, and partly reconstruct, 20 pipes for transportation of coal from distributors to burners.

Repairs of suspended vault frames.

Repair of foot-bridges and iron stairs in front of boilers.

Repair and partly reconstruct primary air pipes.

Install two combustion control devices.

Repair sky-light and roof.

Reconstruct north wall with bricks and concrete.

FIRE-BRICKS

Materials in stock are estimated to be sufficient for repairs of one combustion chamber. For insulating purpose, it is foressen to recover broken materials. 3000 Kg. of fire-proof (?) cement are needed.

For repairing another combustion chamber, it is estimated that the following materials are needed:

n.	400	bricks type "A"	27% allum.	for suspend vault
"	200	" " "B"	27% "	" " "
"	200	" " "C"	27% "	" " "
"	100	" 22,5x22x5,6	42% "	" front wall
"	120	" 28,5x22x6	42% "	" " "
"	150	" 22 x 6x5,5	42% "	" " "
"	1000	" 22x11 x 3	42% "	" ash box
"	2500	" 22,5 x 1 x 6 - Diatonite (many of these may be recovered)		

Considering what is presently in stock, for a second combustion chamber types A,B,C, are necessary for suspended vault, and 3000 Kg of fire-proof cement. For the rest, it depends on amount of materials which can be recovered.

Switchboards

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Tension regulators, current limitators, registrators, amp meters, volt meters, frequency meters, relais, boards, etc. for one unit need repairs.

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Main swtiches, voltage and current reducers, sectionners and 5 KV bars must be revised.

Leghorn, January 8th 1945

signed: Ing. DOVERI Giuseppe

NOTE - January 9th 1945

While writting this report, the fire bricks and other materials for repairing one of the combustion chambers have been taken away by American Troops, who will use them for repairs on a road for two new Diesel engines.

I must therefore alter what I have said, and make reservss for other facts of the same kind. I recommend that instruction should be given that all materials presently located in Plant, storehouses, and A.N.I.O, to be respected.

signed: Ing. DOVERI Giuseppe

PROGRAM OF REHABILITATION WORKS OF LIVORNO GENERATING PLANT

A) - Cléaring ruins - lowering dangerous parts of building and of machinery - dismantling damaged parts and collecting them in special enclosure.

B) - Works to be committed to a firm managed by a specialized industrial engineer:

Repairs on coal pulverizing plant and on powder transport plant.

Reconstrucion of two combustion chambers, for one "Tosi" boiler and one "Babcok-Wilcok" boiler.

Revision and repair of water refrigerating plant, of water feeding plant, of smoke conducts, etc.

Reconstruction of water supply from canal for cooling the turbine condenser.

C) - Works to be committed to "Cantiere Orlando" (shipyard) in Leghorn:

Repairs of two boilers (one "Tosi" one"Babcok-Wilcok").

Reconstruction of thermic isolation of the a/m boilers.

Revision and repairs of steam pipes for the a/m boilers, including valves, separators, etc. up to admission (inlet) valve on turbine.

Thermic isolation of steam plant/

D) - Works to be committed directly to Chief of Plant:

Collecting pieces of machinery belonging to a STAL-ASEA turbo-alternator.

Repairs on various elements.

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Thermic isolation of steam plant/

D) - Works to be committed directly to Chief of Plant:

Collecting pieces of machinery belonging to a STAL-ASEA turbo-alternator.

Repairs on various elements.

Studies on possibility of assembling one unit with materials available.

E) - To be committed to a building firm:

Reconstruction of roof over engines boilers and transformers departments.

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Reconstruction of blown down walls in coal pulverising department, in boilers engines departments, in electrical department.

Repairs in Offices: pavements, walls, stairs, etc.

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Repairs and reconstruction of doors and windows.

F) - To be committed to a dependant of Plant Chief:

Repairs and reconstruction of high tension electrical equipment for the generating unit, for three 6000 KVA transformers, and 60 KV, 30 KV and 5 KV lines.

WORKMEN

For the a/m works, local workmen have been employed in addition to Plant personnel. It is very difficult to enlist workmen, also if not specialized, for clearing mines and for preparatory work.

Enquiries have been extended to neighbouring villages, and some workmen have been found at Torre del Lago, at about 20 km. from Pisa.

These workmen must be lodged in Plant, and need to go home at least once a week to see their families, to change their clothing, etc. To lodge these people (total 33) in Plant, materials are needed such as timber, glass for shutting oppenings; lighting; also straw is needed for the people to lie on.

Finally transport means are necessary from Torre del Lago to Leghorn.

When all these materials (straw and timber) will be available, 75 workmen will be ready besides the Plant personnel.

It must be noted that nowdays people come to work only if they are sure to get food: it is therefore necessary to provide 33 daily rations for the Torre del Lago workmen, and a midday ration for these resident in Leghorn and for the Plant personnel. On the while, 59 rations for one meal and 33 rations for two meals are needed.

It must be pointed out that to work in the area of Leghorn Harbour a special permit is necessary which is not easy to get. This is another difficulty to start working in the Plant.

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TRANSPORT.

For transportation of workmen, of materials, of pieces of engines shattered here and there, of pieces of machinery which must be worked in Cantiere Orlando and in other Factories, two 30 quintals trucks will be necessary; for transport of heavy pieces, larger trucks might be needed.

These trucks are necessary at once for collecting all the parts of a STAL-ASEA unit which has been shattered not only in Leghorn Plant, but also in A.N.I.C. Factory, and

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also, it is supposed, in a railway gallery near Quiesa on the Viareggio-Lucca line. It is known as a matter of fact that the Germans removed all machinery of one unit loading it on railway trucks, which afger an air bombing remained blocked in the a/m gallery. It must now be found out if this information is true, and in the affirmative provide to recover the machinery and transport it to Leghorn. A special permit is required for people having to go to Quiesa.

MATERIALS REQUIRED.

Timber, boards, cut and lapped fir, girders, thin boards for shutting premises for lodging and for stores.

Poles and barbed wire to make an enclosure for collecting dismantled and damaged materials.

Glass or flexible glass for windows.

Straw for workman dormitory.

Block and ropes for heighting pieces.

Carbine and oxigen for soldiering and cutting.

Electrodes for electric welding.

Leather belts for pulverizing plant and implements: dimensions will be given later.

Pumps for industrial water, which are missing; it is supposed that two of them are at the Comune Pumping Station in Leghorn.

Electrical insulating materials for repairs on alternators (which must be completely re-wound) and transformers.

Fire-bricks for combustion chambers, on which a note follows hereafter.

Non-conducting materials for thermic isolation.

Building materials, as follows:

650.000 bricks
7.000 air-bricks
20.000 tiles "marsigliesi"

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Non-conducting materials for thermic isolation.

Building materials, as follows:

650.000 bricks
7.000 air-bricks
20.000 tiles "marsigliesi"
9.000 covering tiles (?)
500 quintals of cement
sand
gravel
iron bars ø 16-18 m/m
" " ø 6-8 " "
" " ø 7-8 " " total 5 tons
glasses for sky-light:
Engines dept. 350 m^2 7-8 m/m thick
Boilers " 300 " " " " " "

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Transformers Dept.	200 m^2	7-8 m/m thick
Windows	1000 "	

NOTE ON NON-CONDUCTING MATERIALS

Such material, necessary for combustion chambers, is made of special pieces, shaped so as to fit in the vaults and walls.

These bricks were formerly made in a Factory in Leghorn "Società Italiana Materiale Refrattario" located near the harbour. This factory has been damaged by air-bombardments, but can partially be repaired and start working under condition that their premises should be cleared of Allied Forces of the X Corps. The Factory managers state that they have raw materials in sufficient quantity for making the bricks required for the combustion chambers, and that they are able to supply them within 3 months starting from when the Factory is handed over to them.

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PROGRAMMA LAVORI DI RIPRISTINO DELLA CENTRALE DI LIVORNO

A) Sgombro delle macerie - deponizione delle parti di fabbricato e di macchinario pericolante - smontaggio delle parti avariate e loro raccolta in locale apposito in recinto chiuso.

B) Lavori da affidare ad un Impresa gestita da un Ingegnere industriale specializzato.

Riparazione impianto di polverizzazione del carbone e trasporto della polvere.
Rifacimento di due camere di combustione una per caldaie Tosi ed una per caldaia Babcok - Wilcok.
Revisione e riparazione impianto acqua di refrigerazione e di alimento - condotte aria di combustione ecc.
Ricostruzione della presa di acqua sul canale per la refrigerazione dei condensatori delle macchine.

C) Lavori da affidare al cantiere Navale Orlando di Livorno
ripristino di due caldaie una Tosi ed una Babcok - Wilcok
Ricostruzione dell'isolamento termico delle due caldaie anzidette.
Revisione e riparazione delle condotte di vapore relative alle due caldaie precedenti comprese le valvole i separatori ecc. fino alla valvola di ammissione alla turbina.
Isolamento termico delle tubazioni di vapore.

D) Da affidare alla cura diretta del Capo Centrale
Raccolta delle parti di macchinario relative all'impianto di un turbo alternatore STAL - ASEA
Riparazione di diversi elementi

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industriale [illegible]

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Studio della possibilità di ricomporre un gruppo con il materiale a disposizione.

E) Da affidare ad un Impresa Edile.
Copertura del tetto della sala caldaie della sala macchine e della corsia dei trasformatori.
Ricostruzione delle pareti demolite dell'impianto di polverizzazione del carbone nella sala caldaie nella sala macchine e nella parte relativo all'impianto elettrico.
Riparazioni varie all'Ufficio: pavimenti murature scale ecc.
Riparazione e ricostruzione degli infissi.

F) Da affidare alla cura di un dipendente del Capo Centrale.
Riparazione e ricostruzione della parte elettrica ad alta tensione per quanto riguarda un gruppo turbo alternatore, tre trasformatori della potenza di 6000 KVA cadauno e le linèe uscenti a 60 KV, 30 KV e 5 KV.

MANODOPERA

Per eseguire i lavori anzidetti si è reclutata mano d'opera locale in aggiunta al personale della Centrale. Si incontra molta difficoltà nella ricerca di operai anche non specializzati da adibire allo sgombero delle macerie ed a tutti i lavori preparatori.

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Si è dovuto estendere le ricerche nei paesi vicini e si sono trovati operai a Torre del Lago a circa 20 Km. da Pisa.

Questi operai debbono essere alloggiati in Centrale e debbono recarsi almeno una volta alla settimana a casa loro per visitare la famiglia e per il cambio della biancheria. Per l'alloggio in Centrale di tali persone reclutate a Torre del Lago, che sono 33 occorrono materiali come legname e vetri

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per chiudere aperture e avere la luce nei locali disponibili in Centrale ma devastati dalla guerra; occorre anche della paglia come giaciglio per le persone.

Vi è infine la necessità dei viaggi a Torre del Lago e per questo occorrono mezzi di trasporto.

Se si avranno a disposizione tali mezzi e tali materiali (paglia e legname) avremo sollecitamente al lavoro 75 persone oltre il personale proprio della Centrale.

Da notare che gli operai non vengono oggi al lavoro se non hanno la possibilità di trovare il vitto, quindi occorre provvedere a 33 razioni giornaliere sufficienti per due pasti per gli operai provenienti da Torre del Lago ed a razioni per solo mezzogiorno per gli operai reclutati a Livorno oltre ad altrettanti razioni semplici per quanti sono gli operai della Centrale. In tutto occorrono 59 razioni semplici e 33 doppie.-

Si vuol fare rilevare che per lavorare nella zona del porto di Livorno occorre un permesso speciale che si ottiene con pratiche non brevi. Pertanto ciò costituisce un altro ostacolo per porre operai al lavoro nella Centrale termica di Livorno.

MEZZI DI TRASPORTO

Per il movimento degli operai, per il trasporto dei materiali occorrenti in Centrale, per il trasporto dei pezzi di macchinario sparsi quà e là, e per il trasporto dei pezzi di

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li (paglia e legname) avremo sollecitamente [illegible]
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I mezzi di trasporto sono necessari subito perchè oltre ai lavori di avviamento deve essere ricuperato tutto il macchi-

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nario costituente un turbo alternatore STAL - ASEA che è stato sparso oltre che in Centrale anche nello Stabilimento A.N.I.C. e anche (a quanto si ritiene) in un tunnel presso Quiesa sulla linea ferrata Lucca - Viareggio. Infatti si sa che i tedeschi asportarono il macchinario di un turbo alternatore caricandolo su vagoni ferroviari i quali in seguito ad un bombardamento aereo rimasero bloccati nel tunnel anzidetto. Si tratta di andare a vedere a Quiesa se la notizia corrisponde a verità e in caso positivo provvedere per il ricupero di questo materiale ed il suo trasporto a Livorno. Occorre anche un permesso speciale per le persone che si debbono recare in località Quiesa per accertare e predisporre il ricupero.

MATERIALI OCCORRENTI

Legname vario in tavole abetelle e travi per punteggi legname in tavole sottili per chiusure locali alloggio personale e raccolta materiali.

Paletti e filo spinato per stabilire un reginto di raccolta all'aperto per riunire i materiali smontati e avariati della Centrale.

Vetri o meglio rotoli di vetro flessibile per chiusura di affissi dai quali si vuol far passare la luce nei dormitori operai e nei Magazzini.

Paglia per dormitorio operai.

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Paglia per dormitorio operai.

Taglia funi ecc., per sollevamento pezzi.

Carburo ed ossigeno per tagli e saldature ossiacetileniche.

Elettrodi per saldature elettriche.

Cinghie di cuoio per l'impianto di polverizzazione e per le macchine di Officina ancora esistenti; di tali cinghie di cuoio ci riserviamo di comunicare le dimensioni.

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Pompe per il servizio di acqua industriale che risultano mancanti: Si ritiene che due di esse si trovino presso l'acquedotto comunale di Livorno.

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Materiale isolante elettrico per la riparazione degli alternatori che debbono essere completamente riavvolti e per la riparazione di trasformatori.

Materiale refrattario per le camere di combustione di cui si parla in una nota a parte.

Materiale coibente per isolamento termico.

Materiale edile costituito da:

- n. 650000 mattoni pieni
- " 7000 " forati
- " 20000 embrici marsigliesi
- " 9000 tavelline per copertura sotto le marsigliesi
- ql. 500 di cemento
- sabbia
- ghiaia
- ferro tondo Ø 16 - 18 m/m
- " " Ø 6 - 8 m/m
- " " Ø 7 - 8 m/m

per complessive 5 tonnellate

Vetri per lucernaio:

- sala macchine mq. 350 spessore 7-8 m/m
- sala caldaie " 300 " 7-8 m/m
- corsie trasformatori mq. 200 spessore 7-8 m/m
- vetri per finestre mq. 1000.

NOTA SUL MATERIALE REFRATTARIO

Il materiale refrattario necessario alle camere di combustione è costituito da pezzi speciali, gettati in mo-

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si parla in una nota a parte.

Materiale coibente per isolamento termico.

Materiale edile costituito da:

- n. 650000 mattoni pieni
- " 7000 " forati
- " 20000 embrici marsigliesi
- " 9000 tavelline per copertura sotto le marsigliesi
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per complessive 5 tonnellate

Vetri per lucernaio:

- sala macchine mq. 350 spessore 7÷8 m/m
- sala caldaie " 300 " 7-8 m/m
- corsie trasformatori mq. 200 spessore 7-8 m/m
- vetri per finestre mq. 1000.

NOTA SUL MATERIALE REFRATTARIO

Il materiale refrattario necessario alle camere di combustione è costituito da pezzi speciali sagomati in modo da adattarsi alle esigenze delle volte sospese e delle pareti verticali e tali da consentire gli ancoraggi.

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Questi mattoni sono stati costruiti in passato da una Ditta di Livorno: Società Italiana Materiale Refrattario, che ha il proprio Stabilimento in una località della città prossima al porto. Questo Stabilimento è stato danneggiato

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dai bombardamenti aerei ma per una parte suscettibile di sollecite riparazioni sarebbe in grado di riprendere la lavorazione a condizione che i locali fossero liberati dalla occupazione di truppe Alleate dipendenti dal Comando del X° Corpo. I Dirgenti dello stabilimento interpellati dichiarano di avere a loro disposizione la materia prima sufficiente e necessaria alla costruzione dei mattoni refrattari che occorrono per le camere di combustione e di potere fornire i pezzi speciali dopo tre mesi dalla messa a loro disposizione di quella parte dello Stabilimento che deve essere riattivata.

28-1-45

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la materia prima sufficiente e necessaria alla costruzione dei mattoni refrattari che occorrono per le camere di combustione e di potere fornire i pezzi speciali dopo tre mesi dalla messa a loro disposizione di quella parte dello Stabilimento che deve essere riattivata.

28-1-45

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Cavaliere
Copia a Duncan
Matthews
Vallauri
Tice
Rath

FR/lam

"LODOLO" STEAM PLANT - LEGHORN

The coal pulverising equipment did not suffer big damages and may be repaired with electric welding. Steel plates and electrodes are needed. Belts are not at all availables and must be supplied. The pulverising equipment building suffered only little damages. The boilers equipment has been badly damaged by mines, the arch roofs the firing chambers are destroyed, the frontal walls are also damaged and many pipes are bent.

The refractories are badly damaged and the spare materials have been stolen. If it will be possible to be supplied with new refractory materials, consisting in special sizes, we suppose to be able to rebuilt 2 boilers (1 Babcock - Wilcox and 1 Tosi).

The Stal-Asea turbogenerators are severely damaged as they are both destroyed by mines and taken away. It is not sure at all if it will possible to rebuilt one set, with the parts availables, as we are not sure to be able to have all the parts, and it is not sure at all if they will give a balanced set in operating conditions. The generators stator windings are destroyed, new conductors and insulating materials are needed. The 1 set reconstruction work may be put underway only with the help of a competent factory and if the materials needed may be supplied. We consider that it should be very useful to install a new turbine - generator instead of one of the Stal- Asea.

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The new set should be installed on the existing foundations and should have approx the same load, in order not to surcharge the ground. Considering the unitary weight of the Stal units the new set should be only of 7000 KW capacity and be planned as following:

- At the admission valve pressure 88 Kg/sqcm.
- do do temperature 875°
- Cooling water temperature 15°
- Generators tension 5400 V.

The building is not badly damaged in the main reinforced concrete frame if some towers are not included.

The roof and some brick walls are detroyed. All the glasses are broken. On the electric equipment the Asea 18000 KVA transformer may not be considered repairablewith the availables means, as it is badly damaged, the coils are totally burned and it will not be possible to be supplied with the materials required for the rehabilitation. The operation may be given with the two transformers availables.

* S. Giorgio 6500 KVA 5/30/60 K.V.
* C.G.E. 6500 KVA - 5/60 K.V.

and with a second S. Giorgio 6500 K.V.A. similar to the above available elsewhere damaged only in normal electric operation and through one transformer 5.4/5.4 for the generator protection only so that the generating unit may not be connected with the towns grid.

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In order to admit the accomplishment of the above mentioned program the following materials and machinery are required:

a) Leather belts for the pulverising equipment:

No. 2 for the compressors
" 6 for the pulverising distributors
" 2 for the pulverized conveyers
" 2 for the pulverised transporters motors
" 2 for the coal elevators
" 1 for the coal breaker
" 2 for the coal transportation to the breaker

All the leather belts for the mechanical factory.

b) Pumps for the water supply.

3 motor - pumps 20 HP (probably available at the Leghorn Aqueduct).

1 motor - pump 2 HP

1 motor - pump 5 HP

c) 2 transformers 500 KVA - 5000/260 for the local substation.

d) Refractory material

Arches: 800 bricks - type A - 27% Alum.
400 bricks - type B - " "
400 bricks - type C - "

Frontal Walls:

200	bricks	28.5 x 22 x 5,6	Alum.	42%
250	"	28.5 x 22 x 6	"	do
300	"	22 x 8 x 5,5	"	do
800	"	special anchorage size		do

2000 bricks 2 x 11 x 8 Alum. 42%

Insulations firing chambers

No. 2500 "diatomite" bricks.

If a request may be submitted we should give the draftings of the special briks and the measures should be tested.

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e) Electrodes for electric welding and steel plates for pulverising equipment repairs. Coke for cast iron castings.

f) One turbine - generator, 7000 KW unit.

The circulating pumps must be supplied with the same tension of the generator (5400 Volt). If this is not possible it will be necessary to have special transformers in addition to the above mentioned 2 x 500 KVA units.

- One transformer, same capacity of the set ratio 1/1 in order to admit the connection of the set on the Leghorn grid.

- Connection cables between Generator and transformer - 10 KV tension.

g) Masonry materials.

No. 85.000 bricks
" 7.000 air bricks
" 20.000 tiles (roof)
" 9.000 tiles
50 tons cement - sand - gravel

Steel ∅ 16 - 18 mm.
" ∅ 6 - 8 mm.
" ∅ 7 - 8 mm.

5 tons. total

1250 sq.m. asphalt - size 15 mm.

Glasses

Machines hall sqm.	350	size	7 - 8	mm.
boilers hall	200	"	"	"	"
transformers	200	"	"	"	"
windows	1000	"	"	"	"

h) Staff

In the plant 40 men are busy (the skilled workmen included) on the wreackages recovery. In Leghorn it is not easy to have skilled workers. The workers wishes to have high wages and the food supply If the food may be supplied we could increase the number of workers and their efficiency.

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TRANSPORTATION MEANS.

To collect the materials of the Ital-Asea turbine that the Germans have disassembled and transferred at the Anic plant in the Quiesa Gallery we need transportation means.

The same are also required for the works in the plant and for the transportations to the factories.

Note: For the roof repairs we have scheduled the materials required for a final work. A provisional roof may be constructed with lumbers and corrugates plates in order to admit the works.

January 15, 1945

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PRATANTICO PLANTS

Intake from the Chiana canal, max flow.10 cu.m. head m. 14,50 - max power 1000 K.W. - average yearly generation 2.500.000 KWh.

Power

1 Francis doble horiz shaft head 14,50 m. - flow 7 cu.m. HP 1125 r.p.m. 375 - generator KVA 1100 - V. 6000 - 50 cycles 375 r.p.m.
2 Francis units horiz. shaft H. 14,50 - Q. 1,15 - HP 200 - r.p.m. 600 - generators 150 KVA - 3600 V. - 50 cycles.

Present condition Intake works partially damaged. Canal destroyed on 100 m. - penstock totally destroyed - unit nearly destroyed.

Program We may try to repair one turbine of the 1100 HP unit - cannibalizing the second in order to rehabilitate one 550 HP set and repair the generator - repairing both windings and mechanical side. We may also try the rehabilitation of 1 x 200 HP set - some castings are needed and one generator 600 r.p.m. The hydraulic works rehabilitation would require a big job - many materials - one year of work and it would be necessary to displace one pile of the Pratantico bridge provisionably; and built by the Army.

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LIMA PLANTS

Characteristic.

Intake from the Lima River, max flow 10 cu.m." Head m. 75 - max.power 6000 KW - average yearly generation 25000.000 KVh.

Machinery

3 orizontal shaft sets Francis 2440 HP -500 r.p.m. 2000 KVA generators 5000 V - 50 cycles - 1 oriz. shaft Francis 1670 HP - 500 r.p.m. - generators 1500 - KVA;5000 V - 50 cycles - 3 little sets - 75 HP each for eretation.

Condition

Hydraulic works - intake, canal intake basin, O.K., penstock to be repaired, building damaged by mines and fire. "ll the machines mined in both hydraulic and electric side, only one set 2440 HP with trensformer was hidden and is O.K.

Program of works.

Program of works. Having cleaned the wreckages the roof rehabilitation is underway, so the repairs to the salvaged turbine and generator - damaged by bombing.
The above set may be in operation at Febr.'48 Cannibalising the others sets and with new castings we hope to rehabilitate a second 2400 HP unit 4 months after the coke, for castings supply.

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RIAN DELLA ROCCA HYDRO PLANT

Characteristics

Plant under pressure with artificial storage on the Turrite Cava, with intake from the Serchio River at the discharge from the Gallicano plant - max. flow 40 cu.m."- average head 65 m. - max power generated 20.000 KVA average yearly generation 75.000.000 KWh.

Power

3 vertical shaft units - Francis turbines - 13 cu.m." - 66 m. head - HP 14000 r.p.m. 375 coupled to generators KVA 14000 - V. 6000 cycles 50.

Plants condition:

Hydraulic works - dams - canals - gallery - penstocks O.K. As the plant works with the discharge of the Gallicano plant - always in enemys hands - whose intake works on the Serchio river and Torrite di Gallicano, have been broken by the enemy the intake is now operating on the Turrite di Cava only.
Two sets have been damaged, but not severely, one set is burned, the substation is O.K.

Works program

We have repaired one set 14000 KVA damaged on the mitchell suspension, on the exciters and governer. The above mentioned set is now in operation.
Repairs to the second set are underway. One turbine and exciter, through parts of the No. 2 turbine and with new casting supply for the mitchell and exciter. We foresee 2 months of work. For the dydraulic repairs we are assembling all the materials for the 2 canal - bridges on the Turrite di Gallicano and Serchio and the works will be undertaken, as soon as the war condition will admit the works.

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MONTEDOGLIO HYDRO PLANT

Characteristic.

On the Tiber River - max. flow 3.50 cu·m· "
Head 19 m. - max. power 540 KW - average
yearly generation 2.000.000 KW_h.

Power

1 Francis horiz· shaft, H. 19 - Q. 2,9 cu·m· -
HP 600 - r.p.m. 750 - generator 640 KVA -
5200 V - 50 cycles.
2 Francis horiz, shaft - H. 19 - HP 150 -
750 r.p.m. - generator 130 KVA - 750 r.p.m.
50 cycles - V. 5200.
1 Francis H. 19 - HP 75 - r.p.m. 750 -
Gener° 90 KVA - V. 5100 - 50 cycles - 750 r·p·m·

Present condition

Hydraulic works repairables. Plant and
Substation building totally destroyed -
generators - turbines - transformers totally
destroyed.

Program

No spare units availables.

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SPERANLO HYDRO PLANT.

Characteristic.

a) Intake from the Lima river - max flow 6.5 cu.m. head 54 m. max power 2700 KW - average yearly generated - 9.000.000 KWh.

b) Intake from the Volata - Verdiana river - max flow 4 cu.m." head 260 m. yearly gener.16.000.000 KWh max - power 8000 K.W.

Machinery

Lima intake.

2 units - Francis horizontal -
H. 54 - Q. 4 cu.m. - HP 2300 - r.p.m.750 -
generator KVA 2100 - V. 6000 - cycles 50.
Volata Verdiana intake.
2 Pelton units HP 5500 - H. 260 - Q. 2 cu.m.
500 r.p.m. - Generators 5500 KVA - 6000 V.
500 r.p.m. - 50 cycles.
1 Pelton unit 2750 HP - H. 265 - Q. 1 cum.
r.p.m. 750 - generator 2750 KVA - 6000 V. -
750 r.p.m. 50 cycles.

Present condition.

Hydro works - dams - water intake - canals O.K. - penstock to be repaired - building totally damaged - Lima units totally destroyed - Volata Verdiana units destroyed with the exception of 1 turbine 5500 HP - 500 r.p.m. with governor and transformer.

Program of works.

Machines hall building repairs are underway, so that the crane may be repaired and the hidden turbine mounted. It is planned to operate the above with an undamaged generator 6000 KVA 500 r.p.m. from the Gallicano plant. After the last war events we have no information on the above mentioned generator. The repair works on the machines hall, and the mountage of the (if the generator is always O.K) will require 10 months.

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NUSSA HYDRO PLANT

Characteristic.

Intake from the Arno River. Max flow 20 cu.m. Head 7,50 m. - max power 600 KW - average yearly generated 2.500.000 KWh.

Power.

1 Kaplan turbine vertical shaft, flow lo cu.m. head 7.50 HP 800 r.p.m. 375, generator 800 KVA - 6000 V. - 50 cycles.

Present conditions

The germans have destroyed 50% of the Arno dam., the intake gates are nearly destroyed, the building is totally destroyed, the turbine rooms and the Kaplan discharge syphons may be repaired, the unit and transformer are totally destroyed.

Program

We have no spare sets availables. The hydraulic works repairs require 8 months, the work on the dam must be undertaken during the summer season.

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DICOMANO PLANT

Intake from S. Lorenzo river flow 1,8 cum - head m. 18 - power 230 KW - average yearly generated KWh. 1.000.000

Power

No. 1 Francis unit - horiz. shaft flow 1.6 cum - head 18 HP 300 r.p.m. 500 - carrying 2 generators KVA 125 each V. 5000 - cycles 50.

No. 1 Francis unit 60 KP 750 r.p.m. generator - 50 KVA 4000 V - cycles 50.

Present condition

Intake works - intake basin - penstock O.K. - canal destroyed on 50 m. - lenght. Building completely wrecked. The 2 units and transformers completely destroyed.

Program

We have no sets availables.

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MAREMMANA ELECTRIC COMPANY

VALPIANA PLANT (Massa Marittima)

Head m. 68,50 - max flow cu'm. 1 - 1 set Francis turbine (River - Brown Boveri) - generator 1000 KVA 750 r.p.m. - 2000 V. 1 transformer 1000 KVA 3/15 KV.

The machinery has been mined by the germans; the transformers oil burning burned the total building. The generator coils are burned. The unit suffered also mechanical damages.

The turbine screw cage distributor and governor are broken and destroyed. The transformer is burned.

The penstock is not badly damaged by guns.

Until now we have undertaken the following works.

a) repaired the building and the crane rails

b) repaired the crane

c) Underway the machinery dismounting, in order to ascertain the damages and try the repairs.

d) Known that in the Ilva Portoferraio Plant(Elba Island) one 1000 KVA - 750 r.p.m. generator is available and easily repairable (not badly damaged by bombing) - only in one month the above mentioned generator may be transferred, when the wreckages recovery will be ended and the crane may be operated.

At present time it is not possible to submit a final estimate. We suppose that the plant may be put in operation next June.

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LATERINA HYDRO PLANT.

Charactéristic.

Intake from the Arno River - flow 15 cu.m." - Head 7 m. - max power 700 KW - yearly generation 3.000.000 KWh.

Power — 1 Kaplan vertical shaft - l. 11 cu.m. - head 7 m. - 300 r.p.m. - generator KVA 800 - V. 5000 - cycles 50. 1 Francis vertical shaft HP 120 - generator KVA 80 - V. 380 cycles 50.
1 Francis horiz. shaft HP 215 - generator (drived through belt) 125 KVA - 4000 V - 50 cycles.

Present condition

Hydraulic works O.K. - building totally destroyed - the three sets and transformers destroyed.

Program — We will install one old 200 HP turbine - 200 r.p.m. - horiz. shaft to drive through belt one 125 KVA - 5000 V - 500 r.p.m. generator saved. Time foreseen for the building reconstruction and units repairs: six months.

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RAVACCE HYDRO PLANT

On the Lima river - max. flow 5,50 cu.m." - head m.10,70 max power KW 340, yearly gener. K.W.h 2.000.000.

Power

1 Francis horiz. shaft HP 290 r.p.m. 375 - generator K.V.A. 290 - 5000 V - 50 cycles.

2 Francis HP 140 - 500 r.p.m. - Generators - 140 KVA - 5000 V - 50 cycles.

Present condition

Hydraulic works, intake, canal, intake basin easily repairables. Building destroyed. All the units and the transformers totally destroyed.

Program of works.

No spare units availables. We are now studying the one set rehabilitation, Cannibalising the others and asking some new castings.

RICOMEDDO Power Station, m.r. L 3917
S.F.I.A.C. (Subsidiary of Valdarno Co.)
25th April 1945

This station is situated a few hundred yards from Sestaione on the opposite side of the River Lima.
Originally installed where: 1 x 400 HP Francis turbo-alternator
2 x 200 HP " " "
Enemy demolition on 26th Sept. 1944 destroyed the building and all machinery, except one turbine of 200 HP (shaft bent, otherwise O.K.)
One governor and one exciter could be repaired if required.
Hydraulic works in order, except penstock dented by falling building. No rehabilitation work is as yet planned.

ADVANCED SECTION
SUB-C
O-FIC
DATE

FLORENCE

H. Best
Capt. R 3343

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One governor and one exciter could be repaired if required.
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H Best

FLORENCE

H. Best
Capt. R3343

Copy to: Lt-Col. Tapper
Capt. Marshall, 15 Army Group
Capt. Best
3 File S/1

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SESTAIONE Power Station m.r. L 3917
S.P.I.A.C. (subsidiary of Valdarno Co.)
25th April 1945

The condition of the power station is similar to that mentioned in Valdarno's report submitted immediately after its destruction on 26th Sept.1944. Valdarno are submitting a detailed report on plans and material required for immediate rehabilitation.

The generator room is completely demolished together with 2x1775 KVA Pelton units. The Coy had previously dismantled 1x1775 KVA unit and 1x3550 KVA unit, together with sufficient transformers and switchgear for an output at 60 & 30 KV.

The top of the steel penstock has been damaged, but can be repaired with reinforced concrete. A large bridge (40 m span) on route 12 across the River Sestaione just south of the power station has been demolished, and the only by pass available is fit for jeeps or mules.

The outgoing 60 & 30 KV lines have not been badly damaged.

15 workmen were clearing débris and the Coy hope to increase this number.

Approx. 3 months to erect 1 x 1773 KVA unit in provisional building.

FLORENCE

H. Bent
Capt. R.A.

3342

ADVANCED SECTION

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FLORENCE

H. Best
Capt., R.A.

3342

ADVANCED SECTION
SUB-COMM.
OFFICE
DATE
ELECTRICAL DIVISION

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Captain Marshall, 15 Army Group
Capt. Best
3 File S/1

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SOCIETA' FORZE IDRAULICHE APPENNINO CENTRALE - S.F.I.A.C.
SESTAIONE Power house

Translation (m.e.)

Building reconstruction and program of works for 1 x 1775 KVA unit rehabilitation.

This power house - 75% destroyed by German mines - must be totally demolished before the reconstruction work starta as many walls are in danger.

Other parts must be demolished - also if not in danger - as they have been displaced by the explosion and the walls are damaged.

The salvaged machinery recovery and assembling require the 10 tons machine hall and 20 tons transformers crane repairs.

The transformers hall may be used - in a first period - for the switches and 5 KV circuits connecting the 1775 KVA unit with the transformer and transmission line.

Through a provisional mechanical workshop - located in a barrack to be built in the plants yard - the 30 KV outdoor substation may be repaired. As soon as the repaired unit may start operation, the power available will be sent at 30 KV to San Marcello and Pistoia, and at 60 KV to Pistoia and connected with the central Italy grid.

The first reconstruction program will include the area where the unit to be repaired at first is located. The second part may be rebuilt during the operation.

. WORK SCHEDULE:

1) Débris clearing on the yards and machines hall, salvaged switches recovery, dangerous walls demolition. Part of the machines hall reconstruction.

2) Transformers crane hall repairs and roofing repairs - repairs to the hydraulic works - repairs to the panstock - repairs to the switchex - repairs to the lines starting from the plant.

3) 1775 KVA unit mountage - 30/60 outdoor switches mountage - provisional connections completion - one 30 KV transformers mountage.

4) Mechanical testings - generator drying out - transformers oil treatment - electric testings - start of generation.

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Materials required for the reconstruction and their transportation.

The Sestaione bridge destruction on hte highway will be a bottle-neck of the work.

It the above brige will not be rebuilt, the materials may be transferred - with packmules - as the provisional road does not admit any cars transit.

A provisional aerial railway through the Sestaione River may be built. If the materials transfer on the river left banck will not start very soon, the works may be delayed for lack of the transfer capacity.

Intake works and basin.

cement 500 Kg/sqm	Tons	2
steel, diam. 10 mm	"	0.3

Penstock

cement 500 Kg/sqm	"	6
steel diam 14 mm	"	0.1
" " 12 "	"	1.5
" " 10-8 mm	"	0.5

Building.

cement 500 Kg/sqm	"	20
cement 300 Kg/sqm (hydrate lime)	"	30
lime	"	10
bricks	n.	20,000
air bricks	"	10,000
tiles	"	10,000
perret tiles	sqm	540
asohalt cardboard	"	360
steel 6 mm tiles	Tons	0.5
roofing tiles	sqm	400
calcium carbide	Tons	0.3
exygen	bottles	12
electrodes per arc welding	n.	3,000
steel for oxyacetylen welding	Kg	50

Pistpia, April 27th 1945

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FORZE IDRAULICHE DELL'APPENNINO CENTRALE

Centrale del SESTAIONE

Programma di ricostruzione del fabbricato e dei lavori necessari a conseguire il ripristino in servizio del gruppo da 1775 kVA.

Il fabbricato della Centrale, per tre quarti distrutto dalle mine tedesche, presenta parecchi tratti di muro pericolanti che vanno demoliti prima di iniziare la ricostruzione.

Altre parti del fabbricato vanno pure demolite, sebbene non presentino pericolo di ruina, causa lo spostamento subito per effetto dell'esplosione, che ha inclinato le murature, prodotto difetti di allineamento, di orizzontalità ecc.

Per il recupero ed il montaggio del macchinario salvato alla distruzione è necessario ricostruire o rafforzare innanzitutto quella parte del fabbricato che sostiene la grue da 10 t. per le sale macchine e quella da 20 t. per il sollevamento dei trasformatori.

Il locale prima assegnato alla officina riparazioni può in un primo tempo essere impiegato per monterVi gli apparecchi di controllo ed i circuiti a 5 kV inerenti al collegamento elettrico del gruppo da 1775 kVA col trasformatore e la linea. Durante la prima fase dei lavori una piccola officina meccanica, montata in una baracca che costruiremo sul piazzale della Centrale, permetterà la riparazione delle apparecchiature esterne a 30 kV, cosicchè all'entrata in servizio del gruppo salvato avremo la possibilità di trasportare l'energia prodotta mediante la linea a 30 kV

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Il fabbricato della Centrale, per tre quarti distrutto dalle mine tedesche, presente parecchi tratti di muro pericolanti che vanno demoliti prima di iniziare la ricostruzione.

Altre parti del fabbricato vanno pure demolite, sebbene non presentino pericolo di ruina, causa lo spostamento subito per effetto dell'esplosione, che ha inclinato le murature, prodotto difetti di allineamento, di orizzontalità ecc.

Per il recupero ed il montaggio del macchinario salvato dalla distruzione è necessario ricostruire o rafforzare innanzitutto quella parte del fabbricato che sostiene la grue da 10 t. per le sale macchine e quella da 20 t. per il sollevamento dei trasformatori.

Il locale prima assegnato alla officina riparazioni può in un primo tempo essere impiegato per montarvi gli apparecchi di controllo ed i circuiti a 5 kV inerenti al collegamento elettrico del gruppo da 1775 kVA col trasformatore e la linea. Durante la prima fase dei lavori una piccola officina meccanica, montata in una baracca che costruiremo sul piazzale della Centrale, permetterà la riparazione delle apparecchiature esterne a 30 kV, cosicchè all'entrata in servizio del gruppo salvato avremo la possibilità di trasportare l'energia prodotta mediante le linee a 30 kV per S. Marcello e Pistoia, nonchè con le linee a 60 kV direttamente per Pistoia e per il funzionamento in parallelo con la Selt-Valdarno.

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La prima parte delle murature ricostruite sarà quella interessante l'area riservata al macchinario che ci proponiamo di rimettere al più presto in efficienza; la restante parte potrà essere ricostruita durante il funzionamento di tale macchinario.

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Successione dei lavori

1) Sgombero delle macerie per liberare l'area dei piazzali e delle sale macchine; recupero degli apparecchi decentrati e ricovero di essi in un locale provvisorio; demolizione delle murature pericolanti.
2) Ricostruzione di una porzione della sala macchine; rafforzamento e copertura del locale gruppi-trasformatori; riparazione delle opere idrauliche; riparazione della condotta forzata; riparazione delle apparecchiature; riparazione delle linee partenti dalla centrale.
3) Montaggio del gruppo da 1775 kVA; montaggio delle apparecchiature esterne a 30 e 60 kV; esecuzione dei collegamenti provvisori; montaggio di un trasformatore a 30 kV.
4) Prove meccaniche; essicazione dell'alternatore; trattamento dell'olio isolante del trasformatore; prove elettriche del macchinario; inizio della produzione.

Materiali non reperibili sul posto, necessari alla ricostruzione, e loro trasporto e più d'opera.

La grave interruzione stradale rappresentata dalla demolizione del ponte sul Sestaione, costituirà un serio inconveniente per il trasporto dei materiali da costruzione necessari.

Se tale ponte non verrà tempestivamente ricostruito dovremo

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particolari.

2) Ricostruzione di una porzione della sala macchine; rafforzamento e copertura del locale gruo-trasformatori; riparazione delle opere murarie; riparazione della condotta forzata; riparazione delle apparecchiature; riparazione delle linee partenti dalla centrale.

3) Montaggio del gruppo da 1775 kVA; montaggio delle apparecchiature esterne a 30 e 60 kV; esecuzione dei collegamenti provvisori; montaggio di un trasformatore a 30 kV.

4) Prove meccaniche; essicazione dell'alternatore; trattamento dell'olio isolante del trasformatore; prove elettriche del macchinario; inizio della produzione.

Materiali non reperibili sul posto, necessari alla ricostruzione, e loro trasporto e più d'opera.

La grave interruzione stradale rappresentata dalla demolizione del ponte sul Sestaione, costituirà un serio inconveniente per il trasporto dei materiali de costruzione necessari.

Se tale ponte non verrà tempestivamente ricostruito dovremo trasportare a soma questo materiale, poichè la strada di fortune esistente non consente il transito di mezzi di trasporto per il suo tracciato ripido, lungo i costoni scoscesi del Sestaione.

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Occorrerà quindi approntare una teleferica di fortune attraverso il Sestaione per il trasferimento dei materiali dalla sponda destra alla sponda sinistra di esso.

Questa complicazione comporterà certamente una perdita di tempo se i materiali non perverranno al più presto, in modo da cominciare subito il trasferimento preventivo e l'accantonamento di essi in un locale che affitteremo presso la riva sinistra del fiume.

./.

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Opere di presa e vasca di carico

Cemento da 500 kg./cmq	q.li	20,==
ferro Ø 10 mm	"	3,==

Condotte forzate (manicotto di cemento armato lunghezza metri 8)

Cemento da 500 kg./cmq	q.li	60,==
ferro Ø 14 mm	"	1,==
" Ø 12 mm	"	15,==
" Ø 10 - 8 mm	"	5,==

Centrale e locali provvisori

Cemento da 500 kg/cmq	q.li	200,==
" " 300 kg/cmq	"	300,==
calce macinata	"	100,==
Mattoni comuni	N°	20.000.=
" forati	"	10.000.=
embrici alla marsigliese	"	10.000.=
tavelline da plafoni (perret)	mq	540.=
cartone catramato	"	360.=
ferro Ø 6 mm	q.li	5.=
tavelloni comuni per copertura	mq.	400.=
carburo di calcio	q.li	3.=
ossigeno bombole	N°	12.=
elettrodi per saldatura ad arco	"	3.000.=
ferro di apporto per saldatura ossiacetilenica	kg.	50.=

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Cemento da 500 kg./cmq	q.li	60,==
ferro Ø 14 mm	"	1,==
" Ø 12 mm	"	15,==
" Ø 10 – 8 mm	"	5,==

Centrale e locali provvisori

Cemento da 500 kg/cmq	q.li	200,==
" " 300 kg/cmq	"	300,==
calce macinata	"	100,==
Mattoni comuni	N°	20.000.=
" forati	"	10.000.=
embrici alla marsigliese	"	10.000.=
tavelline da plafoni (perret)	mq	540.=
cartone catramato	"	360.=
ferro Ø 6 mm	q.li	5.=
tavelloni comuni per coperture	mq.	400.=
carburo di calcio	q.li	3.=
ossigeno bombole	N°	12.=
elettrodi per saldatura ad arco	"	3.000.=
ferro di apporto per saldatura ossiacetilenica	kg.	50.=

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Pistoia 27-4-45-

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The Sestaione powerhouse (Central Appenin Hydraulic Forces Co.) had:

A) No.3 generators with Pelton turbines (H-220 int) of 1775 Kva and No.3 transformers (ration 5/30 Kv) of 1775 Kva.

Two of these generators and two transformers are totally destroyed. One generator and one transformer were dismantled in time and have been preserved.

B) No.1 generator of 3550 Kva and two transformers ratio 5/60 Kv 3550 Kva. The alternator is partially destroyed, one of the transformers is totally destroyed, the other is in good conditions.

The engine room is completely destroyed. The overhead crane can be repaired. The rest of the powerhouse building is without roof.
Small damages were inspected to the manifold of the penstock. The duct itself was destroyed for a length of about 10 meters.
It looks as if the other intake structures did suffer only light damages.

PAVANA Railroad Powerhouse
Dam: intact at normal level; powerhouse completely destroyed.

SUVIANA Railroad Powerhouse
Dam: intact. One gate was blown up; also the three butterfly valves of the intake were blown up.
Powerhouse: Completely destroyed.

All the drawings and records and records of these two plants were taken by Capt Fosson on occasion of his inspection of the works the 19 October 1914.

S. Maria Powerhouse: We have no information.

Courtesy Check with Ransone if necessary to determine status these drawings

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RELATION OF THE DAMAGES CAUSED TO THE HYDROELECTRIC PLANTS OF ALTO RENO AND LIMENTRA BY WAR

(1) DAM OF ROLITO DEL FALLONE

This Plant has suffered no damage, except a small leak in the centre of the shutters, that can be easily repaired.-
Even the Tunnel-Canal Rolino del Fallone-Siviana is intact.-

****

(2) HYDROELECTRIC PLANT OF PAVANA.

The Dam and relative accessory woks, intake of water, delivery, pressure Pipe and the Tunnel-Canal Pavana-Suviana, are intact.-

****

The Central Station instead, has been completely destroyed by charges, the 25th September 1944.-
The two groups Turbine-Alternators, the Four Transformers, the switch-Board the Switches, the Set of Accumulators and relative generator for charging and the accessory works have been destroyed.-
Even the Generator for auxiliary emergency services has been destroyed. On the other hand the crane in the Station is only lightly damaged.-
As for the Station building itself, the roof does no more exist, part of the walls have been destroyed and those that are still standing are not safe.-

OBSERVATIONS ON THE RETAINING OF THE PLANT

The Pavana plant is essentially hydraulic, it gatheres and raises the water of the River Reno and of the River Lamentra of Sambuca, sending it in the Reservoir of Suviana.-
The central Station itself was built to supply electric power to the works of Suviana, during construction, and in the mean-time supply the railways, after the Suviana Station was finished, Pavana lost all her importance, infact we had already planned to dismantel it.-
On the other hand the generator is indispensable, as no power is available for moving the shutters.-

(3) HYDROELECTRIC PLANT OF SUVIANA.

(A) DAM - has not been damaged

(B) ACCESSORY WORKS.-

(I) INTAKE WORKS:- No damage has been caused to the intake mouth, control Cabin and to the pressure pipes that lead to the valve chamber.-
Instead, the valves of the three principal pipes, and that of the auxiliary services, have been destroyed.-

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Pressure Pipes, damaged the superior end of the principal one for the stretch of 10 meters, and the one for the auxiliary services for a stretch of 14 meters.-

(2) OVERFLOW :- No damage.

(3) LIGHTENING DELIVERY. No damage.

(4) DEPTH DELIVERY.

Explosion in the Tunnel have completely dismantled the right hand side Verriana Valve.-
The same explosions have damaged the left hand side one.-
The concrete works between the two valves has cracked, damaging the shutters control, that nevertheless isstill operating the shutter.-
The distribution of the right hand side valve has caused the escape of all the water of the Suviana Lake. The high bank of which are now been escavated at the base by the river, placing the overlooking houses in a dangerous position. In the mean-time we are trying to close the hole left open by the dismantled valve this work when finished will enable us to refill the lake.

CENTRAL STATION

The Central Station of Suviana has been destroyed, by charges the 26th September. The distribution has been particularly heavy, concerning the machinery or the building itself nothing has been saved.
I) Machinery and Electric accessories destroyed :-

The 3 principal groups of Turbine-Alternators and their accessories.
The Turbine-Alternators group and accessories for the auxiliary services.
The frequency convertor-group.
The Station Mobile Crane.
The Transformer for the auxiliary services.
The switch Board and control bench with all the instruments.
The secondary switch board with all the instruments.
The set accumulators, with the two generators for the charge.
The Workshop with all the tools, except a lathe that is only lightly damaged.
The Warehouse with nearly all the spare parts.

****

(2) The building of the Central Station, the roof does no more exist, the walls are badly damaged and deformed, with the danger of their fallingin. All the glass panes are smashed, all the iron works of the doors and windows are useless.

****

(3) The delivery canal of the central station, has not been damaged.

D) OUTLOOK TRANSFORMATION SECTION
Eaven the transformation section has suffered very heavy distruction.

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The following have been destroyed by charges or by fire.
The 130 KW Transformer.
The 60 KW Transformers (3 in all)
3 Switches with controls, R.O. type of the 130 KW section.
6 Separators with hand controls of the 130 KW section.
6 Tension reducers of the 130 KW section.
8 Switches with controls, normal oil type, of the 60 KW section.
3 Tension reducers of the 60 KW section.
7 Current of the 60 KW section.

Damaged nearly all the 36 separators of the 60 KW section.

****

N O T E S

Even the motor-pump group, used for raising the water from the river, has been destroyed.
The following have been damaged by airburst.
- a strech of the principal lines and telefones line
- a distruction of the roof, glass panes and iron works of the lodging and offices building. The first is uninhabitable, the second has been partly repaired.
- finally the germans, before leaving, took with them the truck of the central station.

****

RESULTS OF THE DESTRUCTIONS AND THEIR PROVISIONS

Because of the above-mentioned destructions, the Suvian Pland is no longer working and will not be able to supply electric power for a long period.
The renewing of this service involves the substitution of all the machinery and accessories and the reconstruction of the building..
Another serious consequence is the emptying of the lake caused by the destruction of the depth valves, with danger of a landslip.
At present we are trying to close the holes left open by the dismantled valve, the replacing of the damaged valves is nevertheless most urgent.
The population of Suviana and of the Castel di Casio are completely without electricity, which was supplied by the destroyed central station.
Works have also started for the renewing of this service. But for the solution of the problem a Turbine-Generator is needed.
All the the telefono service between Pavana and Suviana are interrupted, works had already started for renewing these services but could not be finished on account of an Allied necessity.
Beside we inform this Command, that Allied Troops are taking away from this Plant materials that are needed for military purposes, damaging our reconstruction plants.

/s/ J.M. McCALLUM Capt
Engineer A.M.G. IV CORPS.

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11/12/1944

The removal of material of any description from damaged Electric Plants is a direct contravention of Administrative Directive, Number 56, SECRET - Ref.HQP/ RHT/CJR dated 25 September 1944 - This is one clear case where Unit Commander in the Area, has not complied with the above directive.-

/s/ J. M. McCALLUM Capt
A.A.G. IV CORPS.

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O 17th Ward

Inclosed with Dispatch Records
Mayor Bell asking him to submit
a project for rehabilitation which
he would like to make a survey

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STATION: PORRINO Sheet Map Ref.

OPERATING SOCIETY: S.F.I.A.C. (Società Forze Idrauliche Appennino Centrale)

RESIDENT ENGINEER:

WATER SUPPLY: Sestaione 2020 Reservoir cap. cm 20.000
Lima, Rio Botro 2750 " 15.000

GENERATORS: 3 x 1775 K.V.A.
1 x 3550 K.V.A.

TURBINES:

Reports available

N°	Date	Report by:	Detail - Conclusions
1.	!	SELT-VALDARNO.	SEE - REPORT.

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This from Col Crowley
handed me by Foster Feb 10th

PORRINO.

SESTAIONE POWERHOUSE - PRINCIPAL DATA OF THE PLANT

Intake on the Sestaione with section gates } 785 m
on the Lima, "Tainter" type } above the sea
on the Rio Botro, " " }

Derivation channels
(completely underground)
Derivation from the Sestaione:
length of the gallery m. 1,739
maximum capacity l/sec 2020
Derivation from the Lima and Rio Botro:
Length of the gallery m. 1,485
Capacity l/sec 2750

Reservoirs
in the open (forebay, capacity m3 20,000)
in gallery (for the derivations from the Lima and Rio Botro capacity m3 15,000)

Penstocks
maximum diameter m. 1,3
minimum " m. 0,86
type: Rivited steel, lapped (rivited iron sheets, telescope type, with alternate variation of the internal diameter)
length: m.860
maximum static head: m.226
two automatic butterfly valves are inserted in the ducts, one at the forebay and the other about midway.

Powerhouse
No.3 Pelton/San Giorgio sets, 1775 Kva
600 rpm, 5000 ÷ 5500 V.
No.1 Francis Tosi/San Giorgio set 3550 Kva
1000 rpm, 5000 ÷ 5500 V.
No.2 Threephase, San Giorgio transformers, immersed in oil, natural cooling. Volts secondary 66000; 3550 Kva.

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No.3 Threephases San Giorgio transformers, immersed in oil, natural cooling, volts secondary 33000, 1775 Kva.
No.1 Autotransformer threephase Brown Boveri, immersed in oil, natural cooling, 5200/6500 V., 1000 Kva.

5,33 and 66 Kv Boards

Principal apparatus:
No.2 circuit breaker, 3 pole, indoor, "oil less" type PO 20 Scarpa & Magnano, 600 A. 10,000 Volts service.
No.12 potential transformer } for 5 Kv metering
No.8 current " }
No.1 oil circuit breaker, 3 pole outdoor, Brown Boveri single tank, 400 A. 37000 V. service.
No.1 oil circuit breaker 3 pole, outdoor CGE, 3 tanks 200 A. 37000 V. service
No.3 Disconnecting switches, 3 pole, outdoor, rotating type, 200 A, 40000 V. service
No.2 circuit breaker, 3 pole, outdoor, "oil less" type Scarpa e Magnano PO 75,600 A, 75000 V service
No.3 Disconnecting switches, 3 pole, outdoor, rotating type 200 A 80000 V. service
No.3 Potential transformers 66000/110 V
No.2 Current transformers 100/5 A. 80 Kw service
No.2 Potential transformers 33000/110 V.
No.2 current transformer 120/5A 35 Kv service

Sestalone Powerhouse

Conditions of the plant after demolitions of the 26 September 1944.

Powerhouse

The part above ground level is completely destroyed, only the floor and parts of walls on the south and west side are remaining. The fundations of the perimeter walls can be used. The switch boards and the machines that were in place were destroyed.

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The rest of the building can be used again but for some floors and internal walls that have to be demolished

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and rebuilt because they are very damaged. Also one of the jutting aisles (south west side) has to be partially demolished and rebuilted. The roof is completely destroyed but for some trusses that can be used again. The overhead crane of the engine room (10 tons) is damaged and can be repaired on place that of the transformer repair workshop is intact but can not be used before having repaired the walls that bear it.

Penstocks

The manifold collector and a portion of the ducts nearby was hit by the falling stones of the destroyed walls. The damages will be ascertained when the wreckage will be removed but it has been possible to ascertain that the pipe holds the normal pressure but for some small leakages in the riveting that has to be inspected by a specialized workman.

In the locality "La Perla" a little under the forebay the germans have blown up a portion of the pipe of a length of about 8 meters. As the pressure in this point is small (about 25 meters pressure) it is possible to repair it with a reinforced concrete sleeve.

Forebay, derivation channels and intake works

They were not damaged by the germans, these works have been after wards exposed to artillery fire and have been probably been hit in several points especially the forebay and the intakes on the Lima and Rio Botro.

Undamaged apparatus and machines

No.1 Pelton turbine 1680 HP complete
No.1 1775 Kva alternator complete
No.1 Francis turbine 4160 HP complete but for the draft tube
No.1 1775 Kva transformer 5000/33000 V (dismantled)
No.1 3550 Kva transformer 5000/66000 V
No.1 1000 Kva autotransformer 5000/6800 V
All apparatus for the above said machines
No.2 66000 volt 3 phase oil circuit breaker, outdoor type.
No.4 66000 volt outdoor instrument transformers
No.2 66000 volt disconnecting switches, outdoor, rotating type.

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No.1 33000 volt 3 phase oil circuit breaker indoor
No.2 6500 volt 3 phase oil circuit breaker indoor
Insulators and bus supports 6500, 33000 and 66000 V.

Damaged but repairable apparatus and machines

No.1 3550 Kva alternator (difficult repair, has to be done in a specialized workshop)
No.2 33000 volt 3 phase oil circuit breakers, outdoor (can be repaired on place)
No.4 33000 volt instrument transformers (can be repaired on place)

The apparatus and the machines that have been undamaged are in part underneath the powerhouse, in parts walled off in a building nearby, or concealed in the forests around the powerhouse.

Before recovering these materials it is necessary to remove the wreckage and to provide a provisional recover (hut).

Repair workshop

Beside the damaging of the room a lathe and a drilling machine have been destroyed. The quick substitution of these machines is important as they have to be used for all the work that has to be done to start again the powerhouse.

The lathe has to be of medium size and must have at least 1000 m/m between the pivots.

The drilling machine must be able to bore holes up to 30 m/m diameter.

Plan for Restoring service

As it would be too long to wait for the rebuilding of the engine room with the bearing structures of the overhead crane, especially for the difficulties coming from the winter weather it is thought more expedient to build on the engine room floor a wooden shed of such size as not to hinder the erection of the masonry walls and erecting the 1775 Kva set without the use of the crane and therefore using temporary or improvised handling equipment.

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Afterwards when the building will be ready, the wooden shed should be demolished and the 3550 Kva should be erected. The alternator would have been in the mean time repaired. During the second phase of the works the powerhouse would produce a maximum 1200 Kw while when the works will be finished the maximum would encrease to 3700 Kw.

The program of the work would be as follows:

1) Removal of the wreckage in order to free the surface of the engine-room and of the yard, erection of the shed for the machines and provisional workshop.

2) Recovery of the machines (less the 3550 Kva transformer) and of the materials from their shelters, transportation to the erecting place of the heavy pieces.

3) Erection of the 1775 Kva set and of the apparatus necessary for it is functioning; erection of a provisional switch board at 33000 V.

4) (Contemporary to the No.2 and No.3 operations) repair of the penstock and of the hydraulic works that are damaged. Start Producing power.

5) Repair of the building reconstruction of the demolished parts and dismantling of the wooden shed in the engine room.

6) Recovery of the 3550 Kva transformer, erection of the 4160 HP turbine and of the ultimate circuits at 5000, 33000, and 66000 V.

7) Erection of the repaired 3550 Kva alternator and reinstating of the supply of 3700 Kw.

Materials that can not be found on place and that are necessary for the repairs.

Intake works and load reservoir:

Cement, amount of which is to be specified after that the damages has been ascertained.

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Penstock (reinforced concrete sleeve)

cement	Kg.	5,000
Iron Ø 14	"	100
" Ø 12	"	1,500
" Ø 10 ÷ 8	"	500
wood	m3	2

Powerhouse

Cement	Kg.	50,000	
commun briks	"	15,000	
hollow briks	"	10,000	
tiles, roofing	"	5,000	(shed covering)
tiles ceiling	m2	540	(Engine room roof)
tar paper	"	360	
iron Ø 6	Kg.	400	
asphalt mastic	"	360	
tiles, flooring	m2	400	(building,workshop)
tiles, roofing half round and flat	"	400	(services roof)

Enclosures:

a) Photographies showing the conditions after the explosion.
b) Rooms scheme with indication of the destroyed parts.
c) Plan and section of the powerhouse after aggrandizement.
d) Engine room plan after aggrandizement.
e) Plan and sections of engine room fundations after aggrand.
f) South side view.
g) East side view.
h) East side view variant.
i) North side view.
l) High voltage circuits - scheme of connections.

Prepared by Selt-Voldarno

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SESTAIONE POWERHOUSE - PRINCIPAL DATA OF THE PLANT

Intake on the Sestaione with section gates
on the Lima "Tainter" type
on the Rio Botro " " } 785 mt above the sea

Derivation channels

(completely underground)
Derivation from the Sestaione:
lenght of the gallery mt 1,739
maximum capacity 1/sec 2020
Derivation from the Lima and Rio Botro:
lenght of the gallery mt 1,485
Capacity 1/sec 2750

Reservoirs

in the open (forebay, capacity m^3 20,000)
in the gallery (for the derivations from the Lima and Rio Botro capacity m^3 15,000)

Penstocks

maximum diameter m. 1,3
minimum " m. 0,86
type: Rivited steel, lapped (rivited iron sheets, telescope type, with alternate variation of the internal diameter)
lenght: mt 860
maximum static head: mt 226
two automatic butterfly valves are inserted in the ducts, one at the forebay and the other about midway

Powerhouse

No. 3 Pelton/San Giorgio sets, 1775 KVA
600 rpm, 5000 + 5500 V.
No. 1 Francis Tosi/San Giorgio set 3550 KVA
1000 rpm, 5000 + 5500 V.
No. 2 Threephase, San Giorgio transformers, immersed in oil, natural cooling. Volts secondary 66000; 3550 KVA.
No. 3 Threephases San Giorgio transformers, immersed in oil, natural cooling, volts secondary 33000, 1775 KVA.

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No. 1 Autotransformer threephase Brown Boveri, immersed in oil, natural cooling, 5200/6500 V., 1000 KVA.

5,33 and 66 KV Boards

Principal apparatus:
No. 2 circuit breaker, 3 pole, indoor, "oil less" type PO 20 Scarpa & Magnano, 600 A. 10,000 Volts service.
No. 12 potential transformer
No. 8 current " } for 5 KV metering
No. 1 oil circuit breaker, 3 pole outdoor, Brown Boveri single tank, 400 A. 37000 V. service.
No. 1 oil circuit breaker 3 pole, outdoor C.G.E., 3 tanks 200 A. 37000 V. service
No. 3 disconnecting switches, 3 pole, outdoor, rotating type, 200 A., 40000 V. service
No. 2 circuit breaker, 3 pole, outdoor, "oil less" type Scarpa & Magnano PO 76,600 A., 75000 V service
No. 3 disconnecting switches, 3 pole, outdoor, rotating type 200 A 80000 V. service
No. 3 potential transformers 66000/110 V
No. 2 current transformers 100/5 A. 80 KW service
No. 2 potential transformers 33000/110 V.
No. 2 current transofrmers 120/5A 35 KV service

Sestaione powerhouse

Conditions of the plant after demolition of the 26 September 1944.

Powerhouse

The part above ground level is completely destroyed, only the floor and parts of walls on the south and west side are remaining. The foundations of the perimeter walls can be used. The switch boards and the machines that were in place were destroyed.

The rest of the building can be used again but for some floors and internal walls that have to be demolished and rebuilt because they are very damaged. Also one of the jutting aisles (south west side) has to be partially demolished and rebuiltdd. The roof is completely destroyed but for some trusses that can be used again. The overhead crane of the engine room (10 tons) is damaged and can be repaired on place; [illegible] of the

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transformer repair workshop is intact but can not be used before having repaired the walls that bear it.

Penstocks

The manifold collector and a portion of the ducts nearby was hit by the falling stones of the destroyed walls. The damages will be ascertained when the wreckage will be removed but it has been possible to ascertain that the pipe holds the normal pressure but for some small leakages in the riveting that has to be inspected by a specialized workman.

In the locality "La Perla" a little under the forebay, the Germans have blown up a portion of the pipe of a lenght of about 8 meters. As the pressure in this point is small (about 25 meters pressure) it is possible to repair it with a reinforced concrete sleeve.

Forebay, derivation channels and intake works.

They were not damaged by the Germans, these works have been afgerwards exposed to artillery fire and have been probably been hit several points especially the forebay and the intakes on the Lima and Rio Botro.

Undamaged apparatus and machines.

No. 1 Pelton turbine 1680 HP complete
No. 1 1775 KVA alternator complete
No. 1 Francis turbine 4160 HP complete but for the draft tube
No. 1 1775 KVA transformer 5000/33000 V (dismantled)
No. 1 3550 KVA transformer 5000/66000 V
No. 1 1000 KVA autotransformer 5000/6800 V
All apparatus for the above said machines
No. 2 66000 volt 3 phase oil circuit breaker, outdoor type
No. 4 66000 volt outdoor instrument transformers
No. 2 66000 volt disconnecting switches, outdoor, rotating type
No. 1 33000 volt 3 phase oil circuit breaker inddor
No. 2 6500 volt 3 phase oil circuit breaker indoor
Insulators and bus supports 6500, 33000 and 66000 V.

Damaged but repairable apparatus and machines

No. 1 3550 KVA alternator (difficult repair, has to be done in a specialized workshop)
No. 2 33000 volt 3 phase oil circuit breakers, outdoor (can be repaired on place)
No. 4 33000 volt instrument transformers (can be repaired on place)

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The apparatus and the machines that have been undamaged are in part underneath the powerhouse, in parts walled off in a building nearby, or concealed in the forests around the powerhouse.

Before recovering these materials it is necessary to remove the wreckage and to provide a provisional recover (hut).

Repair workshop

Beside the damaging of the room a lathe and a drilling machine have been destroyed. The quick substitution of these machines is important as they have to be used for all the work that has to be done to start again the powerhouse.

The lathe has to be of medium size and must have at least 1000 m/m between the pivots.

The drilling machine must be able to bore holes up to 20 m/m diameter.

Plan for restoring service.

As it would be too long to wait for the rebuilding of the engine room with the bearing structures of the overhead crane, especially for the difficulties coming from the winter weather, it is thought more expedient to build on the engine room floor a wooden shed of such size as not to hinder the erection of the masonry walls and erecting the 1775 KVA set without the use of the crane and therefore using temporary or improvised handling equipment.

Afterwards, when the building will be ready, the wooden shed should be demolished and the 3550 KVA should be erected. The alternator would have been in the meantime repaired. During the second phase of the works the powerhouse would produce a maximum 1200 KW while when the works will be finished the maximum would encrease to 3700 KW.

The program of the work would be as follows:

1) - Removal of the wreckage in order to free the surface of the engine-room and of the yard, erection of the shed for the machines and provisional workshop.

2) - Recovery of the machines (less the 3550 KVA transformer) and of the materials from their shelters, transportation to the erecting place of the heavy pieces.

3) - Erection of the 1775 KVA set and of the apparatus necessary for it is functioning; erection of a provisional switch board at 33000 V.

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4) - (Contemporary to the n.2 and n.3 operations) Repair of the penstock and of the hydraulic works that are damaged. Start producing power.

5) - Repair of the building reconstruction of the demolished parts and dismantling of the cooden shed in the engine room.

6) - Recovery of the 3550 KVA transformer, erection of the 4160 HP turbine and of the ultimate circuits at 5000, 33000 and 66000 V.

7) - Erection of the repaired 3550 KVA alternator and reinstating of the supply of 3700 KW.

Materials that can not be found on place and that are necessary for the repairs:

Intake works and load reservoir:

Cement, amount of which is to be specified after that the damage has been ascertained.

Penstock (reinforced concrete sleeve)

Cement	Kg.	5,000
Iron Ø 14	"	100
" Ø 12	"	1,500
" Ø 10 ÷ 8	"	500
wood	m^3	2

Powerhouse

Cement	Kg.	50,000	
common bricks	"	15,000	
hollow bricks	"	10,000	
tiles, roofing	"	5,000	(shed covering)
tiles ceiling	m^2	540	(Engine room roof)
tar paper	"	360	
iron Ø 6	Kg.	400	
asphalt mastic	"	360	
tiles, flooring	m^2	400	(building, workshop)
tiles, roofing half round and flat	"	400	(services roof)

(Prepared by Selt-Valdarno) Date, ?

POWER STATION OF S E S T A I O N E

CONDITION OF THE PLANT AFTER DEMOLITIONS CARRIED OUT

BY THE ENEMY

POWER STATION.

The room where the machines were installed is completely destroyed, the floor and part of the southern and western walls are all that is left. The switch boards and the machines which were installed are also destroyed.

The remaining part of the building can be used again, except some ceilings and inner walls, which will have to be demolished before reconstruction.

The 10 ton mobile craned used for the machines, is damaged and can be repaired on the spot; the one osed for the transformers is intact (20 tons), but cannot be used until the walls are repaired.

PRESSURE PIPE.

The intake and the nearby part of the pressure pipe are buried under the fallen building, so that damage cannot be seen, but it was verified that the pipe bears normal pressure.

Not far from the reservoir, at La Perla, the Germans blew up 8 metres of pipe. Owing to the low pressure of this point (approx 25 metres of water) the pipe can be repaired with a concrete coupling box.

Reservoir, Derivation canal and intake works.

Have not been damaged by the Germans; but having been exposed to artillery fire, they have been damaged probably in several parts expecially the reservoir.

Machinery and instruments saved.

No. 1	1680 HP Pelton turbine, complete	
" 1	1775 KVA alternator, complete	
" 1	4160 HP Francis turbine, complete delivery pipe missing only.	
" 1	1775 KVA transformer 5000/33000 V.	(dismantled)
" 1	3550 " " 5000/66000 V.	
" 1	1000 " autotransformer 5000/3500 V.	

The above machine are complete with all controls, which are:

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" 1	3550 " " 5000/66000 V.	
" 1	1000 " autotransformer 5000/6500 V.	

The above machine are complete with all controls, which are:

Nr. 2	Outdoor oil switches, 66000 V.	
" 4	" transformers 66000 V.	(Instrument transformers)
" 2	" Isolating Links for 66000 V.	
" 1	Indoor switch for the 33000 V.	(3φ OCB)
" 2	Indoor switches for 6500 V.	(1φ OCB)

Several insulators for 6500, 33000 and 66000V.
& bus supports.

Machinery and instruments damaged, repairable. 3319

	KVA	
Nr. 1	3550 alternator	(this can only be repaired in a specialised workshop)

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Nr. 2 Outdoor 33000 V switches (can be repaired on the spot)

" 4 Transformers 33000 V (as above)

The machinery and instruments saved are now hidden, part in the cellars of the Central Station, part walled in a nearly building and part hidden in the woods near the station. Before removing these materials it will be necessary to build a temporary hut for them.

WORKSHOP FOR REPAIRS

Beside the damage suffered by the building itself the lathe and drill have been destroyed; the substitution of these machines is most urgent, as they are essential for repair of the damaged machinery.

The lathe must be a medium size one, at least a space of 1000 mm. between centres. The drill must be capable of drilling 20 mm holes.

REHABILITATION PLAN.

The reconstruction of the central station, with the supports for the mobile crane, especially owing to the incoming winter season, is considered too long, it is more convenient to build a wooden hut on the foundations of the old machine room, and install in it the 1775 KVA Group, the mobile crane not being used. The hut will be build so that when possible, brick walls can be built around it.

When the building is completed, the wooden hut will be taken down and the 3550 KVA group installed. During this second stage of work the station would produce KW of power, and when the work is finished the power would rise to 3700 KW.

The progress of the works would be as following.

(1) Clearing of the debris from the area where machinery is to be installed; building of the hut and the temporary workshop.

(2) Removal of the machinery, less the 3550 KVA transformer, from their hiding place, and transport of the heavy parts.

(3) Installation of the 1775 KVA group and the necessary accessories, fitting of a temporary 33000 V switch board.

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(2) Removal of the machinery, less the 3550 KVA transformer, from their hiding place, and transport of the heavy parts.

(3) Installation of the 1775 KVA group and the necessary accessories, fitting of a temporary 35000 V switch board.

(4) Repair of the pressure pipe and the hydraulic works. COMMENCEMENT OF PRODUCTION,

(5) Repair of the building, reconstruction of the demolished parts and removal of the wooden hut. 3318

(6) Removal of the 3550 KVA transformer, installing of the 4160 HP turbine and of the 5000,35000 and 66000 V circuits.

(7) Installation of the 3550 KVA repaired alternator and commencement of production with 3700 KW of power.

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NECESSARY MATERIALS FOR REPAIR.

Intake works and reservoir.

Cement, the quantity will be stated after damage has been ascertained.

Pressure pipe.

Cement	Kg.	3000
iron ⌀ 14	"	100
iron ⌀ 10 - 8	"	500
iron ⌀ 12	"	1500
timber	Cu.m.	2

Power station

Cement	Kg.	50.000
Bricks	Nr.	15.000
Tiles (for walls)	"	10.000
Tiles (for marsigliese)	"	5.000
Ordinary tiles	Sq.m.	540
Tarred cardboard	"	360
Iron ⌀ 6	Kg.	400
Asphalt mastic	Sq.m.	600
Ordinary tiles	"	400
Tiles Marsigliese	"	400

21 December 1944

Lieut. R.E.
Engineer A.M.G. IV Corps.

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Iron ⌀ 12	"	1500
timber	Cu.m.	2

Power station

Cement	Kg.	50.000
Bricks	Nr.	15.000
Tiles (for walls)	"	10.000
Tiles (for marsigliese)	"	5.000
Ordinary tiles	Sq.m.	340
Tarred cardboard	"	360
Iron ⌀ 6	Kg.	400
Asphalt mastic	Sq.m.	360
Ordinary tiles	"	400
Tiles Marsigliese	"	400

31 December 1944

Lieut. R.E.
Engineer A.M.G. IV Corps.

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