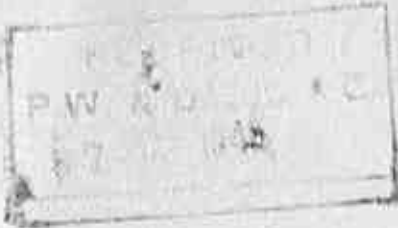


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REGION IX, GENERAL
APR., MAY 1945



RPW/ga

2 May, 1945

Ref. : CIBO - E/4

SUBJECT : Engineering Report No. 2

TO : Lt.Col. E.M. Holmgren
S.C.A.O., A.M.G., City of Bologna.

1. Transmitted herewith summary report on status of Public Works and Utilities for the City of Bologna for the period 26 April to 2 May 1945 inclusive.

2. Progress:

a. WATER: The water situation in the city has improved considerably. Due to the increase of electric power brought into the city (see para. 2, b.), on Tuesday A.M., 29 April, the available city water supply was increased from 12000 cbm per day to 29000 cbm per day and the city is now back to about 55% of the normal prewar water consumption. Water is used both from the "Setta" aqueduct and the "Tiro a Segno" plant.

The repair of the damaged section of the 500 m/m water main at Viale Giov. Vicini (MR 8765, 4875), which will be completed by P.M. 3 May ' 45, will permit the following water distributions:

in low pressure zone	from 6 to 20 hours
" " the medium pressure zone	from 6 to 20 hours
" " " high " "	from 6 to 17 hours

The reestablishment of the regular normal water service will take place slowly but continually. Repair work on the partly damaged 500 m/m water main collector from the "Borgo Panigale" aqueduct to the city is in progress. All repair work to-date is done entirely by

- 2 -

civilian labor under direction of the City Water Department. It is a competent organization and will be fully able to complete the repair work, without Army personnel assistance, provided necessary circulation permits, some critical materials and fuel for transport is made available. Only at Ponte Lungo (MR 849,504) it is planned to ask Army to make temporary pipe connections over the river Reno (2 sections of 200 m/m steel pipes for 300 m) in connection with the Bailey bridge erection there. Most of necessary pipe sections probably can be found in the city or its vicinity. A complete report on the city water supply installations, with list of materials needed, will be submitted shortly.

b. ELECTRICITY: Reference para. 1, b, of last report, 30,000 KW was the prewar power consumption of the zone (all of Bologna Province) served by the "Società Bolognese di Elettricità", whereas the City of Bologna itself only had a normal prewar load of 15,000 KW/day. Two months ago the city used from 7 - 8,000 KW per day.

The power situation for the city of Bologna has changed completely, and for the better, since submitting report of 22 April 1945. Then only 500 KW from the Battiferro sub-station, or 3.3% of the normal electrical power supply was available. Yesterday, 1 May '45, during the peak consumption 7,400 KW were consumed or about 50 % of the prewar load.

The power supply comes from the hydropic Electric plant at Farnetta, 30 Km. SW of Modena, which plant is the only one out of four in that vicinity, which were not destroyed by the Germans. After employees of electric company had repaired 22 breaks on a 15 Km. section of the power line Bologna - Crevalcore to Modena, at 1700 hours 28 April '45, 4,500 KW could be brought into the city. Having completed the repair of a second power line section running from Modena directly to Bologna, by 1900 hours April 30th, 7,500 KW were

2218

- 3 -

available. All repair work was and is being done by the employees of the "Bolognese Electric Company", except for one or two NCO's, who had to accompany the civilians trucks in order to by-pass the restriction forbidden civilian movement on high way E° 9.

The Battiferro turbines have been closed down, and it is planned to set up there as a stand-by plant two stationary 500 KW generators, which are available in the city and which will be operating on fuel oil and not on coal.

The three 400 KW portable Army generators did arrive in the city but were not needed anymore and are disposed of by Army for more essential use at a different locality.

The 8000 KW, which were to be brought up from the Riferdi station on near Florenz after repair of the line Castiglione to Bologna will not be needed in this area and this power undoubtedly can be used to much greater advantage at Toscani Region.

Repair on the power line to the flour-mill at Corticella is in progress and it is expected to have this principal flour mill in operation by evening of 4th May.

From the closed down plant of Battiferro, 100 tons of coal have been allotted to local bakers, which are urgently in need of fuel.

A local power allocation board for the city has been formed and has met; allocation will be made on the basis of 7500 KW, which Military requirements (at present about 3500 KW) having of course first priority.

Outlook for increased power for this area, if it should be allocated, is extremely favorable. It is known for certain, that the power stations at Liguria, Piemonte and Lombardia, as well as the necessary transformers, are still intact except for power line interruptions over Po river. Apparently a similar favorable picture existed still on 1th May for the regions Venezia and Trentino.

c. GAS-COKE: Permission has been granted by ALCON, Message 2217 N°6280, to use the 300 tons of coal now at Crevalcore for the local gas plant at a rate of eight tons per day, thus giving a two hours daily gas service to the city. The transportation of this coal to the

- 4 -

plant has been initiated.

d. GAS-NATURAL : Re. making use of the natural gas supply at Malabergo and Castel dell'Alpi, it is understood that Regional Transportation and Industry & Commerce Officers are investigating these plants; hence no further action of this office on this matter.

e. TRANSPORT-TRAM: No change since last report. The 243 Signal Corps Co. is working on cleaning the many Army telephone lines from the power cables. As soon as completed, the streetcars will be returned to their proper car barns. Reopening of the tram service on a limited scale is being considered by the power board.

f. SEWAGE DISPOSAL: Due to the increased city water supply, as well as considerable rainfall during the past week, the sewage disposal picture for the city is at present more favorable. A survey of the damaged Reno canal section has been made and it was found to be of absolute necessity to have heavy earthmoving equipment brought in to expedite the canal repair work, which would take with civilian labor at least 6 weeks. Army City Command Section has been approached for such military assistance and it is expected to have a dragline and a D-6 bulldozer on the job shortly, with the city supplying all the necessary civilian labor.

g. STREETS AND DEBRIS CLEARING: Not much change since last report; work is progressing slowly. Difficulty at present primarily lack of fuel for transport, city streets crowded by civilians and strict pass regulation as to civilian movement including workers out of the city.

h. BUILDINGS: Same conditions as in para. g above. Genio Civile has been handling the repair of civilian buildings in the city and a report on the exact status of repair work is being prepared by them.

i. BRIDGES: Work is in progress in repair to the slightly damaged bridge Galliera (MR 891,498). Old cement of a poor quality is available in the city, but good cement, which is lacking, is urgently

- 5 -

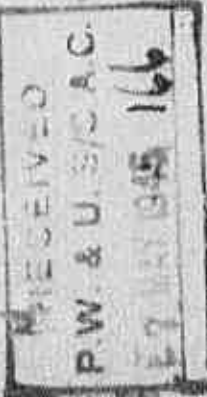
needed.

3. GENERAL: Progress made during the past week is due primarily to increase of electric power available to the city. To obtain such speedy results, special mention must be made of the extreme cooperation and assistance given by the chief engineer of the Electric Power Company, Ing. Aldo Righi and his group of foremen and workers, who, under extremely difficult weather conditions worked alone, and without Army assistance, long hours to have the power line to Modena repaired in record time.

Richard P. Weeber
Major, C.E.
Engineering Officer.

Copy to : Chief Engineer, AMG 5th Army.
PC, AMG Bologna Province
CAO, AMG, City of Bologna
Regional Engineer, AMG Emilia Region
Engr. O., 5 th Army City Command Section, Bologna City.

2215



ALLIED MILITARY GOVERNMENT

City of Bologna

25 April 1945

SUBJECT : Engineering Report

for the period 22 April to 25 April '45 inclusive.

TO : Lt/Col. K.M. HOLMGREN S.C.A.O.

I - Arrived in the city of Bologna 22 April 1945.

A short summary of conditions of Public Utilities as found on arrival is given in the "24 hour report" of 22 April 1945. Herewith follows a condensed report on status of Public Works and Utilities as of this date. A more detailed report will be submitted on Water, Electricity and Sewage, after a complete survey of these installations has been completed.

a- WATER: Normal water consumption was 55000 cbm/day (14.5 Million gallons per day). Present water supply available from aqueduct between 10 to 12000 cbm/day (2.6 to 3.2 M G D, or equal 20 % of normal). Water in city pipe system obtained now only from "Setta" aqueduct, which is about 30 % out of action; damage done mainly to instruments, also 8 motors for water pumps, were stolen by the Germans. Of the other main water intake plants, damage to "Borgo Panigale"-aqueduct (13000 cbm/day) is about 25 %; "Tiro a Segno" (17000 cbm/day) is fully intact except for necessary electric power, and the "San Ruffillo"-aqueduct is apparently completely destroyed. There are also 580 wells in city area, of which however only 23 have potable water.

Outlook in water situation is rather favorable; with more electric power expected to have available soon, the "Tiro a Segno" plant will shortly be put into operation. At the "Setta" aqueduct it is planned

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to install a steam engine on one of the damaged wells; which would increase the output there by 5000 cfm. Under favorable conditions, depending primarily on the granting of necessary travel permits to civilian key workers and Army bringing in three - 400 generators, it is hoped to increase the available water supply by the 7th of May to about 34000 cfm/day about 60% of normal.

b - ELECTRICITY: Power power consumption for the city was 30000 KW. Source of power came from the North and South. Present power supply obtained from an old stand-by power station of Battiferro, 1.5 km North of the city. Plant consists of a group of alternating turbines of 1800 KW capacity; however due to internal defects (heating of bearings), the power produced at Battiferro is now only 500 KW, i.e. only 1.7 % of the normal power supply is available at present for the city. The coal stock at Battiferro is sufficient for about 4 more weeks at the present consumption of 10 tons/day; for operating at full capacity, (1800 KW after necessary repairs), 60 tons of coal per day are required. The power now available is used primarily to operate the city water pumps and to furnish current to essential public buildings and hospitals. From 8 to 10,000 KW would be needed to supply to city with all essential services.

The 5th Army City Command Section has made the necessary arrangements to bring into the city three 400 KW G M alternating current generators (500 KVA each), which produce energy at 42 cycles and a potential power factor of 0.80. The "Società Bolognese di Eletticità" has the required transformers available 229

transform the current produced to the voltage required for the distribution system of the city. Power from these Army generators would be used primarily to augment the present water supply; however necessary power should also be available (180 KW) to operate the 7 urgently required city flour mills at least at night time.

After these three generators have been installed (expected date 30 April), it is planned to close down the alternating turbines at Sestiferro for necessary repairs, which will take about two weeks. The power situation as of to-day is as follows:

22 April to 30 April	-	500 KW
1 May to 15 May	-	1200 KW (Army)
15 May to 15 June	-	3000 KW (provided coal is brought in)

It is known that one power line from Rifredi (Florenz) to Castiglione dei Pepoli has been repaired by 5th Army, with which current of 8000 KW at a tension of 60 KV and a potentiality of 45 cycles can be brought up. Between Castiglione dei Pepoli and Bologna (65 Km), considerable destruction was caused to the existing power line, apparently about 20 % of the towers and 10 % of the cables are lacking. Repair work is already in progress with the means and by the workers of the local Electric Company on the Section up to 8 Km South of Bologna. Work on this Section to be completed in about a week. It is planned to carry on the repair work on this line by civilian labor from Bologna Southerly as fast as transportation, materials and worker's travel permits are made available.

Other possibilities for additional power for Bologna may come from Modena, where is located a reserve station of 3000 KW.

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Connections with Reggio Emilia and Parma also exist, and in these parts are waterworks and power stations of notable size.

c - **TELEPHONES:** The central exchange was severely damaged by the Germans prior to their departure from the city, however sufficient equipment was hidden by the employees so that 1020 phones can be put service within 20 days. Army Signal Corp personnel has already initiated switchboard repair work aided by personnel of the Telephone Company. Major R. Ayres, Region IX Communications officer, who has taken over the A.M.G. phase of this repair work, states that 50 tons of cement are urgently needed for repair of the telephone building.

d - **GAS-COKE:** The gas plant is in complete working order, but no gas for cooking purposes is being distributed due to lack of coal. There is only sufficient coal left, without generating gas, to keep the ovens hot for about 20 days. The shortage of fuel is acutely felt by the population, since only little charcoal and salvaged timber is available for cooking purposes. However the gas company has a stock of 300 tons of coal at the railway station at Crevalcore, 30 Km NE of Bologna, which could be brought to the city, as soon as travel restriction to civilian traffic N from Bologna is lifted.

Two tons of coal per day are needed at present to keep the ovens hot; 7 tons of coal will give 2 hours gas service, but gas would be of poor quality and operation not economical. With 20 tons per day a good quality gas could be produced for 4 hours per day. For normal service 240 tons coal per day had been used at the gas plant.

e - **GAS NATURAL:** Natural gas fields of the Methane type are located at Pietramala in the Province of Florenz, and in ²²¹pro -

- 5 -

vince at Castel dell'Alpi (4 Km NW of Pietramala) and at Malalbergo, 30 Km NE of the city of Bologna. Output at Pietramala is 10,000 cbm per day, at Castel dell'Alpi 20,000 cbm/day and at Malalbergo 10,000 cbm/day. A pipe line exists between Florenz and Pietramala, but there is no pipe connection from any of these fields to the city of Bologna.

Contrary to the vehicle situation at Florenz, a large number of the 800 available automotive vehicles in this area have been converted to operate on natural gas. Hence fullest use should be made of these natural gas resources as soon as the present restriction to civilian traffic on routes 04 and 05 is lifted, thus permitting the gas to be transported to the city. Sufficient tanks apparently are to be found in Bologna for bottling purposes.

f - TRANSPORT: The city tram system is in good working order and can be operated again as soon as necessary power can be released. At present streetcars are scattered over various city streets, where they were disbursed against bombing. Plans are underway to have them moved to their proper car parks as soon as the necessary cleaning of Army telephone lines over the cables has been completed. About 200 KW are needed for this job, which will be done at nighttime. For a limited tram service, 1500 KW would be required.

g - SEWAGE DISPOSAL: The entire sanitary sewage from the city is collected through a communal sewage disposal pipe system, which relies entirely on gravitational flow for its pipe discharges. The main water sewage collectors are 5 natural waterways and canals, which cross the

city in a South to North direction. No pumps are used ore required for the sewage disposal system. In general there are not many private sumps (black wells) in the city.

Considerable damage had been done by previous bombings to the sewage system. The city has already expended 20 Million Lires for reconstruction purposes while still under German occupation. It is estimated that an additional 100 Millions Lires will have to be spent for the repair work.

In view of the rapidly approaching hot season, the general situation as regard to the city sewage disposal must be considered as serious. Many basements apparently are already stagnant with sewage since the lack of water prevents proper flushing of the pipes and some of the main collectors are not functioning, being either partly damaged or carry at present no natural waterflow. The situation is aggravated by the fact that the main sewage disposal canal, the "Canal Reno" was heavily damaged by recent bombings and no water is flowing at present from this canal through the city.

The Reno Canal is a diversion from the river Reno and enters the city from the West, flows through the center of the town and then branches Northwestly to form the "Neville Canal". Two very important installations, The Battiferro power station and three large flourmills are located on this canal and had been partly depending on the water from this now dry canal for generating power.

Extensive reconstruction work has been initiated to have the damaged canal sections repaired with civilian labor so as to permit reentry of water from the river Reno into this canal and ²⁰⁹space though

the city. The job is being "pushed", as well as the repair on the other sewage collector, the "Savanna Diversion" on which flour-mills are also located and where a similar condition exists as to non-flow of water. Army may have to be called on for heavy earthmoving equipment to expedite these canal repair jobs.

J - STREETS AND DEBRIS CLEARING: The mainpart of the city has not been much damaged by the recent Allied offensive, however the outskirts to the North and South suffered heavily. Debris clearing and street repair work there on the principal thoroughfares is being handled by the Army. The city administration has not been able to organize properly any repair work on the outer parts of the city due to the existing pass regulations & lack of fuel for transport. All damage to main streets resulting from previous Allied bombing has been temporarily repaired. Major repair work with civilian labor will be started at an early date provided the present strict pass regulations are lifted.

I - BUILDINGS: Similar conditions exists in regard to extend of damage to buildings and initiated repair work as were cited in the last paragraph. The percentual damage to buildings by war action is about as follows: Totally destroyed 15 %, one half destroyed 10 %; slightly damaged 20 % and untouched buildings 55 %.

K - BRIDGES: No bridges were blown by the retreating Germans within the inner city. Three bridges were destroyed over the Reno river West of the city including Ponte Lungo on via Emilia, where the Army has now put up a bailey bridge. Three railroad bridges on the

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2 - GENERAL: In general the conditions as to Public Works and Utilities were found to be much better than expected. Urgently needed are more electric power and cannot for repair of Utilities. Most of the necessary piping material to repair the aqueduct is available except for 2.5 Km of 3 inch pipe and $\frac{1}{2}$ Km of 20 inch pipe. The Italian city engineering office is functioning excellently, with a highly qualified man in charge of the Waters supply department; the same applies to the chief of the electrical company. Offices of Genio Civile, Provincial engineer and State Road organization are also working exceptionally well.

Richard P. WEBBER
Major, C.E.
Engineering Office.

Copy to: Chief Engineer, 5th Army, AMG;
P.C., AMG Bologna Province;
Reg'l Engr. Emilia Region;
5th Army City Command Section, atten.: Engineer O.
C.A.O., AMG, City of Bologna.
CO, 1338 Engr. Regt.

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