

and other public buildings adaptable to hospitals. In June hospitals started operating in Rome and in smaller towns to the north. During the latter months of the campaign, hospital construction centered in the Leghorn-Florence area; of the twenty-three hospitals built north of Anzio by mid-March 1945, five were in Rome, six in Leghorn, and four in Florence.

For a long time the largest general construction assignment was hospitals, but toward the close of 1944, with the end of the war in sight, another program loomed for PBS engineers: preparing training and staging areas for redeploying troops and building enclosures for prisoners of war. By mid-February 1945 tentative redeployment plans called for eight 25,000-man training areas, two 5,000-man training areas, and two 20,000-man staging areas. Also in prospect was a major construction program to accommodate liberated Russians and another for Nazi prisoners of war. The two 20,000-man staging areas were then well toward completion, but MTOUSA and the War Department delayed the POW enclosures. Repeated changes in instructions for the Florence redeployment training area also made it difficult for the Engineer Service to allocate construction equipment, personnel, and material. By mid-April construction had started on four POW camps: one at Aversa for 10,000 men, another at Florence for 13,000, and two at Leghorn for 60,000. Construction for redeployment and for POWs continued beyond V-E Day. When Germany surrendered, 20,000-man redeployment training areas at Francolise, Montecatini, and Florence, as well as three 30,000-man POW camps, were still under construction.

On nearly every PBS engineer job, mine clearing had first priority—even in areas once held by Fifth Army troops. To remove mines in areas into which Allied troops moved, PBS relied on base section engineers, British as well as American, who got some help from attached Italian engineer troops and at the end of the war from volunteer Italian prisoners of war. Mine clearing took considerable time; for example, in June 1944 at Scauri the 345th Engineers spent 22,405 man-hours during an eighteen-day period searching a building to be used by the 49th Quartermaster Group. At a hospital site north of Naples the same unit found 230 Teller mines and 47 other mines and booby traps. At Leghorn, one of the most heavily mined areas in Italy, base section engineers, with the help of two British bomb disposal units, removed 25,000 mines. Other mine removal was a responsibility of the Allied Military Government Labor Office, which recruited and trained civilian volunteers for the work. By mid-April these volunteers had found 69,000 mines, bombs, and projectiles in and around Florence alone.

In addition to the large body of PBS engineers working on construction—the general service regiments, combat battalions and regiments, port construction companies, separate battalions, construction battalions, and petroleum distribution companies, which built ports, roads, bridges, railroads, camps, hospitals, stockades, depots, and other installations—were a number of the small special units such as water supply and mapping. In August 1943 the War Department abolished water supply battalions in favor of separate companies and left reorganizing the battalions to

by PBS engineer job, and first priority—even by Fifth Army troops. In areas into which PBS relied on base units, British as well as got some help from engineer troops and at times from volunteer Italian. Mine clearing took time; for example, in June the 345th Engineers worked 24 hours during an eight-day search for a building. The 49th Quartermaster located a site north of Naples and 230 Teller mines and booby traps. One of the most heavily mined areas in Italy, base section engineers, with the help of two British units, removed 25,000 mines. Mine removal was a real Allied Military Government project, which recruited Italian volunteers for the job. In April these volunteers removed 100 mines, bombs, and other ordnance around Florence.

The large body of PBS units on construction—engineer regiments, combat engineer regiments, port construction battalions, separate battalions, and petroleum companies, which built bridges, railroads, camps, depots, and other facilities—were a number of the units such as water supply units. In August 1943 the War Department assigned water supply battalions of separate companies and reorganized the battalions to

the theaters' discretion. Fifth Army chose not to reorganize its 405th Engineer Water Supply Battalion until after V-E Day. PBS had to reorganize the 401st Engineer Water Supply Battalion in August 1944 to furnish units for ANVIL and redesignated Companies A and B the 1513th and the 1514th Engineer Supply Companies, respectively. The former took over water supply work in PBS, and the 1514th went to southern France.

The 405th Water Supply Battalion provided 74 percent of the 454,765,000 gallons of water the army drew through the campaign.²³ When the rear section of Company C entered Naples from the land side on 1 October, the city had been without fresh water for more than a week, for the retreating Germans had destroyed the 53-mile-long aqueduct bringing spring water from Serino. Sewer lines were clogged and overflowing, and the danger of a typhoid or typhus epidemic threatened a half million people. At first the rear section could accomplish little, for all purification equipment was out in the harbor aboard ship with the main section; but the following morning the rear section discovered within a hundred yards of the headquarters they had established in the Poggioreale area, the undamaged Bolla aqueduct, which brought industrial water to the city. With meager equipment the section pumped this water into tankers, purified it, and set up four water points in the city. Crowds

of civilians with containers gathered, the press so great that armed guards had to keep order. By curfew the same day, 60,000 gallons of water had been distributed. After the arrival of the main section of the company and eleven days and nights of work, fresh water reached Naples by 13 October.

Company C of the 405th remained in the Naples area until the 401st Water Supply Battalion arrived in mid-November 1943 to handle water supply in the PBS area. Thereafter the 405th employed a company for supplying army installations, particularly hospitals. During the winter of 1943-44 not all of the 401st was needed in the PBS area, and at least one company was generally available for well drilling, water hauling, and general construction.

In the north at Leghorn the main source of water was a series of wells at Filettolo pump station, some fifteen miles north of Pisa. When Leghorn fell these wells were still in German hands, but engineers were able to furnish water from other sources. When the Filettolo station was captured, engineers found that the Germans had destroyed all the pumps, and restoring the facility appeared hopeless. Closer inspection, however, showed that new pumps could make the station operational. This job was undertaken by Company F of the 338th Engineer General Service Regiment, aided by civilian workers. Also required to reopen the line to Leghorn were repairs to a twenty-mile-long, sixteen-inch cast-iron pipeline that had been broken in many places, the worst at the 550-foot Arno River crossing, the 300-foot Serchio River crossing, and a 100-foot canal crossing.

The most difficult repair job was at the Arno River crossing. In September

²³ Capt. William J. Diamond, "Water Supply in Italy," *The Military Engineer*, XXXIX (August 1947), 332; Rpt, Functions of the Base Engr, prepared by PBS Engr, 25 Oct 43; Extracts from Rpt on Peninsular Base Section, NATOUSA, 10 Feb 44, sec. VIII, Engr Service; PBS Engr Hist, pt. I, 1943-45, sec. I, Chronological Summary, pp. 27-30; *Engineer History, Mediterranean*, app. K.

Company F tried to put a pipe across the Arno on bents built on the trusses of a demolished bridge, but flood waters washed it out before it was finished. Company F then tried to put a welded pipe across the river bottom, but the pipe broke on 23 October. In the meantime a new Serchio River crossing had to be raised six feet to get it above flood stage. In November a third attempt to get a line across the Arno succeeded, and water began to flow through to Leghorn. Many leaks showed up in the pipeline, and repairs and improvements continued well into 1945. Over 96,000 man-hours, divided about equally between several engineer units and Italian civilians, ultimately went into the restoration.

At both Naples and Leghorn, as well as in other cities, the municipal water systems were badly damaged, but not destroyed. The Germans had needed to use municipal water supplies until the last minute, and civilians had frustrated some destruction.²⁴ Engineers were able not only to restore water for public use in a remarkably short time but also to provide railroad engineers with water for locomotives and to send tank trucks to engineer fire-fighting platoons.²⁵

The War Department first authorized fire-fighting units for the Corps of Engineers in August 1942, and by the end of 1943 six platoons of thirty-eight men each were in Peninsular Base Section. Several more were formed in June 1944 from the 6487th Engineer Construction Battalion, and five Italian fire-fighting units were organized and equip-

ped; just before ANVIL, PBS had nineteen fire-fighting platoons. The new platoons trained at a fire-fighting school in Aversa, each equipped and organized to operate in four sections. The main job was not to fight fires but to prevent them by inspecting for fire hazards and by keeping fire extinguishers filled and in good working order. Despite such precautions a number of fires broke out. One fire-fighting platoon assigned to Fifth Army averaged three fire calls a week for several months, and at the Anzio ammunition depot fifty fires broke out during April 1944 alone. Tankdozers and armored bulldozers, used to scatter burning ammunition boxes and then smother them with dirt, were effective against dangerous ammunition dump fires.²⁶

A less familiar task in Italy was real estate operations. In the AVALANCHE plans the responsibility for procuring properties for American agencies went to the engineers. The Real Estate Branch of the PBS Engineer Service processed all requests by American units for property in the base section area. It also took control of real estate records for property that Fifth Army released to Peninsular Base Section. In the combat area when Fifth Army troops damaged property they occupied (and their occupancy was a matter of record) the owner was entitled to compensation. Damage that occurred before occupancy was charged to "fortunes-of-war," for which no compensation was paid. Careful records had to be kept to separate the two categories. For these purposes photographic records showing the condition

²⁴ Chf Engr, 15th Army Gp, Notes on Engr Opns in Italy, no. 8, 1 Feb 44.

²⁵ Diamond, "Water Supply in Italy," p. 332.

²⁶ Fred K. Shirk, "Engineer Fire Fighters in the March on Rome," *The Military Engineer*, XXXVII (April 1945), 147-48.