

MINE AND COUNTERMINE OPERATIONS IN THE GULF WAR (DESERT STORM)

INTRODUCTION

The Persian Gulf war of 1990-1991 was one of the major international crises since the end of World War II. For the first time a member state of the United Nations was not merely attacked but completely occupied and annexed by another country. The crisis displaced hundreds of thousands of people from Kuwait and Iraq and created worldwide economic and financial uncertainty. The diplomatic and military coalitions which were formed to confront the Iraqi challenge had a truly global breadth, involving countries from North and South, East and West. Thirty-seven countries eventually contributed forces to the liberation of Kuwait.

The war was a large operation. For the United States the 500,000 troops involved meant that it was larger than the Vietnam war at its peak. For both the British and the French, each of which furnished an armored division plus supporting troops and combat aircraft, this was the largest operation since World War II. The coalition assembled a vast air armada of 4,753 aircraft. There were more tanks in the theater of operations than in the largest tank battles of World War II -- almost 5,500 on the Iraqi side alone -- and the technologies involved were far more advanced than those in the Arab-Israeli war of 1973. Even though the ground campaign lasted a mere 100 hours, the combat was quite destructive. The U. S. Central Command estimated that 3,847 tanks, 1,450 armored personnel carriers, and 2,917 artillery pieces were destroyed or captured during the campaign and more than 86,000 prisoners of war captured.

Countermining operations for 2-D mobility were essential to the success of the ground campaign. While the members of the coalition were building up their forces in the area, the Iraqis were constructing formidable barriers, with extensive minefields along the coastline of occupied Kuwait, along its entire southern border, and some 60 km. farther along the southern border of Iraq. In order to attack into Kuwait, it was necessary to breach these minefields quickly and with minimum losses.

B. GLOBAL STRATEGIC SITUATION IN SUMMER 1990

During the years of the Cold War virtually every local or regional conflict became part of the global confrontation between the Soviet Union and the United States. Thus the Soviets supported communist guerrillas in El Salvador and Guatemala, for example, while the U. S. supported existing governments. Though by no means a communist country, Iraq was definitely on the eastern side of this great divide. The Soviet Union was the principal supplier of military equipment and maintained a large force of technical advisers in the country. In the summer of 1990 there were more than 7,800 Soviet citizens working in Iraq. By the ground rules of the Cold War, therefore, Iraq could expect at least diplomatic support and resupply of military equipment in any regional conflict.

But the disintegration of communism which followed the fall of the Berlin wall in November 1989 produced a dramatic change in international relations. The new governments of the Soviet Union and Russia put a higher priority on cultivating good relations with the West and securing vital loans than on supporting former client states. Therefore, despite some domestic opposition, the Soviet Union supported each of the United Nations Resolutions on Kuwait, from Resolution 660 on August 2, 1990, through Resolution 678 on November 29, which authorized "all means necessary" to enforce previous resolutions if Iraq did not withdraw from Kuwait by January 15, 1991. Soviet support, or at least acquiescence, was a prerequisite for the United Nations action against Kuwait. As Tariq Aziz, the Iraqi Foreign Minister, complained on January 9, 1991, "If the Soviets had not collapsed, we would not be in this position....They would have vetoed every one of the Security Council Resolutions."

C. THEATER SITUATION

1. The Iraqi Invasion of Kuwait

The end of the indecisive war against Iran (1980-88) left Iraq with the strongest military forces in the area. Its army was the fourth largest in the world, with more than twice as many tanks as Britain and France combined. Its air force was one of the most well-equipped in the

world, and its sophisticated air defense network rivaled that of any developed country. Iraq was within reach of deploying nuclear, biological, and chemical weapons of mass destruction, which could be delivered by ballistic missiles as far away as 300 miles from its borders. Its military strength was potentially overwhelming to its neighbors, and its strategic reach threatened the entire region from Israel, Syria, and Egypt in the west to Iran in the east to Saudi Arabia and the Persian Gulf states in the south, and to the Soviet Union and Turkey in the north.

But the end of the war with Iran had left Iraq not only with large armed forces but also with \$80 billion of foreign debt -- much of it to Kuwait and Saudi Arabia, who had supported Iraq's war with generous funds. Saddam Hussein had neither the ability nor the desire to repay these debts. Instead, he demanded additional loans or gifts to compensate Iraq for the low price of crude oil. When the additional funds were not forthcoming, he intensified his threats against Kuwait and began to mass troops just north of the border. The Kuwaitis, the Saudis, and most other governments regarded these as mere bargaining tactics. They did not expect Iraq actually to attack.

Just after midnight on August 2, 1990, however, Iraq invaded Kuwait. As Figure 1 shows, the Hammurabi and Nebuchadnezzar Republican Guard Divisions attacked from the north down the Basra highway, while the Medina and Tawakalna Republican Guard Divisions attacked from the west across the Wadi al-Batin. Iraqi infiltrators and Special Forces attacked the Dasman Palace in an attempt to capture or kill the Emir and the Royal Family. The operation was planned in detail and well organized.

In order to avoid anything that could be considered a provocation, the Kuwaiti Government had ordered its armed forces to take no alert measures. A few minefields would have slowed the Iraqi invasion, but no mines were laid. Many of the Kuwaiti officers and troops lived off base and were not able to rejoin their units after the attack. Hence Kuwaiti resistance to the invasion was piecemeal and uncoordinated. A few units fought well. The 35th Kuwaiti Brigade with its Chieftain tanks, for example, attacked the second echelon of the Hammurabi Division and destroyed a number of Iraqi armored vehicles. After exhausting its tank ammunition, the brigade withdrew in good order to the frontier and crossed into Saudi Arabia. Similarly, the Kuwaiti Air Force put up a spirited, though brief resistance. The Kuwaitis shot

Figure 1. Iraqi Invasion of Kuwait and Kuwaiti Defense

August 2, 1990

down some 20 Iraqi helicopters and continued to operate from perimeter roads when their runways were destroyed. When resistance was no longer possible, most of the aircraft flew to Saudi Arabia -- 15 of the 23 Mirages, 20 of the 30 A-4s, and 3 of the 4 C-130s, for example. Thus a considerable portion of the Kuwaiti Armed Forces escaped to Saudi Arabia and prepared to fight again another day.

The Emir of Kuwait, the Crown Prince and key members of the government also managed to escape. The Emir left Dasman Palace just minutes before Iraqi Special Forces attacked. (His younger brother, Sheikh Fahd Al-Ahmad, was killed in the attack.) The escape of the Emir and the government was extremely important. This made it possible to set up a government in exile with unquestioned legitimacy which could help to organize the coalition and encourage resistance in occupied Kuwait. Moreover, this government in exile was not without resources. In addition to the military personnel who escaped, some 360,000 Kuwaitis (out of a population of two million) also took refuge in Saudi Arabia. In addition, a considerable portion of the population had been outside the country on vacation at the time of the invasion. The government in exile also controlled extensive financial resources. Most of the large government investment portfolio was invested abroad, and just before Kuwait City fell, the government bank accounts were transferred electronically out of the country.

2. Forming the Coalition

Apparently Saddam Hussein estimated that his seizure of Kuwait would produce a few resolutions or declarations but no real action. He was wrong. The governments of Saudi Arabia and Egypt were not only outraged by the aggression against Kuwait they were also quick to grasp the geopolitical implications. If Saddam Hussein were able to get away with the seizure of Kuwait, the independence of Saudi Arabia and of the whole Gulf would be threatened. The combination of

Iraqi military power and Kuwaiti oil would be so powerful as to dominate the Gulf and, indeed, the whole Middle East. In addition, both King Fahd and President Mubarak felt that Saddam Hussein had personally lied to them by stating that he would not attack Kuwait. Saudi Arabia and Egypt called for an emergency meeting of the Arab League. On August 4, the League passed a resolution condemning the Iraqi invasion and calling for restoration of the prewar Kuwaiti government. On August 10, the League voted to send an Arab force to Saudi Arabia and other Gulf states to protect them from attack. These were historic votes -- for the first time the Arab League took a firm position and sent troops in an intra-Arab conflict.

At the United Nations action was also proceeding. The invasion of Kuwait was a clear violation of the U. N. Charter. The Security Council met in emergency session on August 2 and unanimously passed Resolution 660 condemning the invasion and demanding Iraqi withdrawal. The United States and the United Kingdom took the lead in passing this resolution, but, as Section B indicated, Russian support was critical. The Security Council passed the resolution by an unanimous vote of 14 to 0. A week later by another unanimous vote the Security Council declared the Iraqi annexation of Kuwait null and void.

Thus the coalition forming to oppose Saddam Hussein's seizure of Kuwait had the support both of the Arab League and of the United Nations. This was very important from both the political and legal point of view. Although the military forces required could come only from the great powers and, as a practical matter, primarily from the United States, opposition to Saddam Hussein was sponsored by the United Nations, not a unilateral American action.

3. The Coalition Buildup

The resolutions by the Arab League and the United Nations, in spite of their long-term importance, provided no immediate assistance to the Saudis as Iraqi units occupied Kuwait and massed troops on the border with Saudi Arabia. Saudi armed forces were quite small. The Royal Saudi Land Forces, for example, included only two armored and four mechanized brigades. The National Guard added two more mechanized brigades. But these units, though well equipped and reasonably well trained, could not be expected to stop the Iraqi armored divisions. The Saudis had 550 main battle tanks, for example; the Iraqis 5,500. Fearing an Iraqi invasion, King Fahd made the unprecedented "historic decision" to request the U. S. to send forces.

The United States responded quickly and massively to this request. The initial order to deploy forces to the Gulf was issued on 6 August, and CENTCOM (Central Command) began to move forces the next day. Tactical Fighter squadrons of the 1st Tactical Fighter wing flew nonstop from Langley AFB, Maritime Prepositioning ships sailed from Diego Garcia and Guam, and the ready brigade (the 2nd Brigade) of the 82nd Airborne Division deployed from Fort Bragg, the first ground forces on the scene. This brigade was followed by the first brigade 8 days later, and the 101st Airborne Division (Air Assault) began deploying on 12 August. Two days later the 7th marine expeditionary brigade began arriving in Saudi Arabia by air and joining up with its equipment from the Maritime Prepositioning Squadron. "In three weeks CINCENT had 7 brigades, 3 carrier battle groups, 14 tactical fighter squadrons, 4 tactical airlift C-130 squadrons, a strategic bomber squadron, and a Patriot air defense umbrella 8,000 miles from the U. S."

This was certainly a major achievement. Nevertheless, the "window of vulnerability" took nearly two months to close. The ground forces were essentially light brigades -- not the best forces for stopping and defeating an Iraqi armor-heavy attack. Heavier mechanized and armored units had to move their equipment by sea and thus were slower to arrive. By early October, with the U.S. Army 24th Infantry Division (Mechanized) and the 3rd Armored Cavalry Regiment in position, the 1st marine division complete, and the 1st Cavalry Division arriving, General Schwarzkopf was satisfied that the "window of vulnerability" had narrowed and that he could conduct a successful defense of Saudi Arabia.

Although these forces were sufficient to deter an attack on Saudi Arabia, they did not appear sufficient to attack and drive the Iraqis out of Kuwait. To provide the forces necessary for such an offensive, the President announced on 8 November the deployment of additional forces into the theater. The USAF sent more than 400 additional aircraft. The additional ground forces included the U.S. Army VII Corps from Germany with two armored divisions and an armored cavalry regiment, the 1st Infantry Division (Mechanized) and an armored brigade from the U. S., and the 2nd marine division. This roughly doubled the size of the U. S. ground forces in Saudi Arabia. Figure 2 clearly shows the magnitude of this increase. Other members of the coalition similarly increased their forces -- both the British and the French increased their ground forces from

brigade-sized to division-sized units, the Egyptians added the 4th Armored Division, and the Syrians sent the rest of the 9th Armored Division. By the middle of January 1991 the forces needed for the offensive were available.

Figure 2. Buildup of U. S. Ground Forces within the Theater

D. ABBREVIATED GROUND ORDER OF BATTLE AS OF 24 FEBRUARY 1991

1. Coalition Ground Order of Battle

For political reasons, the Coalition decided to forego unity of command for the ground forces. Instead, the CENTCOM Commander, U.S. Army General Schwarzkopf, exercised operational control over the U. S., the British, and the French ground units only. The remainder of the ground forces were under the operational control of the Joint Forces Commander, HRH General Khalid bin Sultan. Unity of effort was maintained through detailed coordination in the Coalition Coordination, Communication, and Integration Center (C3IC), which was formed under ARCENT's lead. In addition, liaison officers were exchanged at all levels. Command, minus operational control, remained under national headquarters. Both the British and the French, for example, set up national headquarters in Saudi Arabia to command their forces.

(LTG HRH Khalid bin Sultan)

JOINT FORCES COMMAND EAST (JFC-E) (MG Sultan 'Adi al-Mutairi)

Task Force Abu Bakr

2nd Saudi Arabian National Guard (SANG) Brigade

Qatar Mechanized Infantry Battalion

Task Force Othman

8th (Saudi Arabian) Mechanized Brigade

Kuwait Al-Fatah Brigade

Bahrain Infantry Company

Task Force Omar

10th (Saudi Arabian) Mechanized Brigade

Oman Motorized Infantry Battalion

Task Force Tariq

Saudi Arabian Marine Task Force (two battalions)

Senegal Infantry Battalion

6th (Moroccan) Mechanized Infantry Regiment

JFC-E Troops

Qatar Mechanized Infantry Battalion

United Arab Emirate (UAR) Motorized Infantry Battalion

1st (East Bengal) Infantry Battalion

Combat Aviation Battalion (Kuwait/UAE)

14th (Saudi Arabian) FA Battalion (155mm, Towed)

18th (Saudi Arabian) FA Battalion (MLRS)

Engineer Force 5 Saif Allah (Saudi Arabian)

JOINT FORCES COMMAND NORTH (JFC-N) (MG Sulaiman al-wuhayyib)

II (Egyptian) Corps (MG Salah Mohammed Atia Halabi)

3rd (Egyptian) Mechanized Division (BG Yehia)

4th (Egyptian) Armored Division (BG Nabeel)

1st (Egyptian) Ranger Regiment

II Corps Artillery

9th (Syrian) Armored Division (MG Ali Habib)

Syrian Special Forces Regiment (Attached)

Task Force Muthannah

20th (Saudi Arabian) Mechanized Brigade

35th (Kuwaiti) Mechanized Brigade

Task Force Saad

4th (Saudi Arabian) Armored Brigade

15th (Kuwaiti) Infantry Brigade

JFC-N Troops

Niger Infantry Battalion

1st (Saudi Arabian) Aviation Battalion

15th (Saudi Arabian) FA Battalion

FORWARD FORCES COMMAND 'AR'AR

King Faisal Saudi Arabian National Guard (SANG) Brigade

7th (Pakistani) Armored Brigade

5th (Saudi Arabian) Airborne Battalion

CENTRAL COMMAND (GEN SCHWARZKOPF)

U.S. ARMY COMPONENT, CENTRAL COMMAND (LTG Yeosock)

VII CORPS (LTG Franks)

1st Armored Division (MG Griffith)

3rd Brigade, 3rd Infantry Division

16th Engineer Battalion

54th Engineer Battalion (Corps)(Mechanized)

19th Engineer Battalion (Corps)(wheeled)

3rd Armored Division (MG Funk)

23rd Engineer Battalion

12th Engineer Battalion

1st Infantry Division (Mech) (MG Rhame)

2nd Armored Division Forward (1 Brigade)

1st Engineer Battalion

9th Engineer Battalion (Corps)(Mechanized)

176th Engineer Group (DS)

317th Engineer Battalion (Corps)(Mechanized)

588th Engineer Battalion (Corps)(wheeled)

249th Engineer Battalion (Combat Heavy)

1st Cavalry Division (BG Tilelli)

8th Engineer Battalion

1st (UK) Armored Division (MG Rupert Smith)

4th Armored Brigade

14th/20th King's Hussars (Challenger MBT)

1st Battalion, The Royal Scots (Mech)

3rd Battalion, The Royal Regiment of Fusiliers (Mech)

2nd Field (Artillery) Regiment

23 Engineer Regiment

7th Armored Brigade

The Royal Scots Dragoon Guards (Challenger MBT)

The Queen's Royal Irish Hussars (Challenger MBT)

1st Battalion, The Staffordshire Regiment (Mech)

40 Field (Artillery) Regiment

21 Engineer Regiment

Division Troops

16th/5th The Queen's Royal Lancers

26 Field (Artillery) Regiment

32 Heavy (Artillery) Regiment

39 Heavy (Artillery) Regiment

32 Armored Engineer Regiment

15 Field (Engineer) Support Squadron

37 Field (Engineer) Squadron

45 Field (Engineer) Support Squadron

2nd Armored Cavalry Regiment

84th Engineer Company

82nd Engineer Bn (OPCON)

11th Aviation Brigade

VII Corps Artillery (BG Creighton Abrams)

210th FA Brigade

42nd FA Brigade

75th FA Brigade

142nd FA Brigade

7th Engineer Brigade

109th Engineer Group

176th Engineer Group (DS to 1st Infantry Division)

249th Engineer Battalion (Combat Heavy)

317th Engineer Battalion

588th Engineer Battalion

926th Engineer Group

92nd Engineer Battalion (Combat Heavy)

9th Engineer Bn (DS OPCON 1st Infantry Division)

12th Engineer Bn (DS 3rd Armored Division)

19th Engineer Bn (DS 1st Armored Division)

54th Engineer Bn (DS 1st Armored Division)

82nd Engineer Bn (OPCON 2nd Armored Cavalry Regiment)

XVIII AIRBORNE CORPS (LTG Luck)

82nd Airborne Division (-) (MG Johnson)

307th Engineer Battalion (Airborne)

101st Airborne Division (Air Assault) (MG Peay)

326th Engineer Battalion

24th Infantry Division (Mech) (MG McCaffrey)

197th Infantry Brigade (M113A2s Mech)

36th Engineer Group (Attached)(Col. Ellis)

3rd Engineer Battalion

5th Engineer Battalion (Corps)(wheeled) (DS to 1st Brigade)

299th Engineer Bn (Corps)(wheeled)(DS to 197th Brigade)

MARINE FORCES CENTRAL COMMAND (MARCENT) (LTG Boomer)

1ST marine expeditionary force (MEF) (LTG Boomer)

1st marine division (MG Myatt)

1st marine (TF Papa Bear)

3rd marine (TF Taro)

4th marine (TF Grizzly)

7th marine (TF Ripper)

11th marine (TF King)

1st Light Armored Infantry Battalion (LAV armored cars TF Shepherd)

1st Battalion, 25th marine (TF Warden)

TF Troy (Deception)

1st Tank Battalion

3rd Tank Battalion

1st Reconnaissance Battalion

1st Combat Engineer Battalion

2nd marine division (MG Keys)

6th marine

8th marine

1st "Tiger" Brigade, 2nd Armored Division (U.S. Army)

10th marine

2nd Light Armored Infantry Battalion

2nd Tank Battalion (M1A1)

8th Tank Battalion (M60A1)

2nd Reconnaissance Battalion

2nd Combat Engineer Battalion

2nd marine aircraft wing

1st Force Service Support Group

5th marine expeditionary brigade

5th marine

marine aircraft Group 50

Brigade Service Support Group 5

1st MEF Troops

1st Surveillance, Reconnaissance, and Intelligence Group

24th marine (Rear Area Security)

3rd Naval Construction Regiment

6th (French) Light Armored Division (BG Janvier)

2nd Foreign Legion Infantry Regiment

3rd marine Infantry Regiment

2nd marine infantry regiment

1st Foreign Legion Cavalry Regiment (AMX-10 RC Armored cars)

1st Spahi Regiment (AMX 10 RC)

4th Regiment of Dragoons (AMX 30 B2)

11th Marine Artillery Regiment

1st Helicopter Combat Regiment

3rd Helicopter Combat Regiment

6th Foreign Legion Engineer Regiment

2nd Brigade, 82nd (U.S. Army) Airborne Division

27th (U.S. Army) Engineer Battalion (Airborne) (GS)

3rd Armored Cavalry Regiment

43rd Engineer Company

12th Aviation Brigade

18th Aviation Brigade

XVIII Corps Artillery (BG Halley)

18th FA Brigade

212th FA Brigade

196th FA Brigade

20th Engineer Brigade

36th Engineer Group

5th Engineer Bn (DS to 1st Brigade, 24th Infantry Division)

299th Engineer Bn (DS to 197th Brigade, 24th Infantry Div)

265th Engineer Group

46th Engineer Battalion (Combat Heavy)

52nd Engineer Battalion

62nd Engineer Battalion (Combat Heavy)

844th Engineer Battalion (Combat Heavy)

937th Engineer Group

20th Engineer Battalion

27th Engineer Battalion (Airborne) (GS 6th (FR) Light Armored Division)

37th Engineer Battalion (Airborne)

ARCENT Troops

416th Engineer Command

411th Engineer Brigade

43rd Engineer Battalion (Combat Heavy)

527th Engineer Battalion (Combat Heavy)

864th Engineer Battalion

30th Engineer Battalion (Topographic)

1030th Engineer Battalion

11th Air Defense Brigade

SPECIAL OPERATIONS COMMAND, CENTRAL COMMAND

5th Special Forces Group

3rd Special Forces Group

2. Iraqi Ground Order of Battle

As the Coalition built up its ground forces, Saddam Hussein also increased his forces in the Kuwaiti theater of operations. Section C.1 indicated that the Iraqis used four Republican Guard divisions to seize Kuwait. By early September these divisions had returned to their preinvasion locations in southeastern Iraq and less-capable Army divisions had been deployed to replace them. By late September Iraq had 22 divisions in the theater -- 13 light and 9 heavy. By 24 February 1991, 41-43 Iraqi divisions were in the theater, although not all were fully manned or effective. It should be noted that a number of the details of the Iraqi Order of Battle are still in dispute.

REPUBLICAN GUARD FORCES COMMAND

REPUBLICAN GUARDS CORPS (Southeastern Iraq along Northern Kuwait Border)

1st Armored Division Hammurabi

2nd Armored Division Medina

3rd Mechanized Division Tawakalna

4th Motorized Division Al Faw

5th Motorized Division Baghdad

6th Motorized Division Nebuchadnezzar

7th Motorized Division Adnan

Republican Guards Special Forces Division

ARMY COMMAND

II CORPS (Northeastern Kuwait and Kuwaiti Islands)

17th Armored Division (Some authorities indicate that the 17th Armored Division and the 51st Mechanized Division were subordinate to a II Armored Corps)

51st Mechanized Division

2nd Infantry Division

37th Infantry Division

Unk Infantry Division

51st Armored Brigade

III CORPS (Southeastern Kuwait)

3rd Armored Division

5th Mechanized Division

7th Infantry Division

8th Infantry Division

14th Infantry Division

29th Infantry Division

15th Infantry Division

18th Infantry Division

19th Infantry Division

42nd Infantry Division

11th Special Forces Infantry Division (Separate Command?)

54th Armored Brigade

IV CORPS (Southwestern Kuwait)

6th Armored Division

1st Mechanized Division

16th Infantry Division

20th Infantry Division

21st Infantry Division

30th Infantry Division

36th Infantry Division

JIHAD CORPS (Northwestern Kuwait)

10th Armored Division (Saladin) (or IV Corps?)

12th Armored Division (or VII Corps?)

VII CORPS (Southern Iraq just west of Kuwait)

52nd Armored Division

27th Infantry Division

28th Infantry Division

25th Infantry Division

31st Infantry Division

48th Infantry Division

26th Infantry Division

45th Infantry Division (As Salman)

47th Infantry Division

49th Infantry Division

I, V, AND VI CORPS

These Iraqi corps were "hollowed out" during the course of the buildup to provide troops for the Kuwaiti theater. I Corps commanded units roughly from south of Mosul to north of Baghdad. Units were shifted out of this corps both during the buildup and after the start of the air war. Similarly, the Baghdad area nominally fell under II Corps, but by 24 February most of its units were deployed to Kuwait and Basra as shown above. The Iraqi VI Corps covered Iraq from south of Baghdad to the northern boundary of the Kuwaiti Theater of Operations. It was responsible for the Majnoon Island area north of Basra and had a dedicated "Marsh Command" as part of the corps. The Iraqi V Corps covered the Turkish, Syrian, and western Iranian border areas. Evidence suggests that it deployed nine to ten infantry divisions. Thus the threat from Turkey, Syria, and Iran tied down between 100,000 and 120,000 troops throughout the crisis.

E. INITIAL DISPOSITIONS

Figures 3 and 4 show the approximate dispositions of Iraqi and Coalition forces just before the beginning of the ground war.

F. COALITION PLANS

The unified action both in the Arab League and in the United Nations and the rapid buildup of coalition forces apparently deterred Saddam Hussein from attacking Saudi Arabia. However, Iraqi forces remained in Kuwait, which was formally incorporated into Iraq. Repeated diplomatic efforts to persuade the Iraqis to withdraw came to naught. Clearly military force would be required to eject Iraqi forces from Kuwait.

During October 1990, CENTCOM planners developed a plan using the forces then available -- XVIII (U.S. Army) Airborne Corps, 1st marine division, the 3rd (Egyptian) Mechanized Division, 9th (Syrian) Armored Division, 7th (UK) Armored Brigade, and other Coalition forces. An air campaign was to be followed by a ground offensive directly north into Kuwait. Figure 5a shows this concept of operations. Such a ground offensive, with limited Coalition forces attacking directly against the strength of the Iraqi defense, was considered a high risk alternative. The concept was rejected, and, beginning in November, the strength of the

Figure 3. Iraqi Dispositions - Mid January 1991

Figure 4. Jump Off Locations of Coalition Forces - 23 February 1991

Coalition ground forces was virtually doubled. The increased ground forces gave the coalition planners much more flexibility.

CENTCOM stated the mission for the offensive as follows:

! Attack Iraqi political-military leadership and command and control

! Eject Iraqi Armed Forces from Kuwait

! Destroy the Republican Guard

! Destroy Iraq's ballistic missile and NBC capability

! Assist in the restoration of the legitimate government of Kuwait

To accomplish these missions, the planners developed a concept for a campaign in four separate but overlapping phases:

1. Waging a strategic air and missile war against the Iraqi heartland to neutralize the Iraqi leadership and the country's principal "centers of gravity."

2. Securing air supremacy over the Kuwait Theater of Operations by destroying Iraq's air defenses and command and control systems.

3. Reducing the combat effectiveness of Iraqi ground forces and their supporting rocket, missile, and artillery units by at least 50%, cutting their supply lines, and destroying their C3 systems by intense air and naval fire.

4. Liberating Kuwait by a ground offensive.

Figure 5a High Risk Concept of Operations - October 1990

The revised concept of operations for the ground operation was quite different from the earlier version. Although the U. S. marine and the coalition forces of Joint Forces Command East and Joint Forces Command North were still to attack north into Kuwait, these were to be only supporting attacks. The main effort was assigned to the U. S. Army VII Corps, which was to attack west of the wadi al-Batin, envelop the Iraqi forces in Kuwait, and then turn to the east to destroy the Republican Guard units north of Kuwait. Farther to the west the XVIII Airborne Corps would drive quickly to the north to seize the highway south of the Euphrates, block the main escape route of the Iraqi forces in Kuwait, and prevent the movement of reinforcements into the theater. Thus, in place of the ground attack by limited Coalition forces directly into the strength of the Iraqi defense, the revised plan called for a deep envelopment. The main attack would be conducted by much larger, tank-heavy forces and would avoid the heaviest fixed defenses, drive deep into Iraq, envelop Iraqi forces from the west, and destroy Saddam Hussein's strategic reserve -- the Republican Guard divisions together with several other Iraqi Army heavy divisions. Figure 5b shows the revised concept of operations for the ground campaign.

This was a simple concept -- a deep envelopment around the lightly defended west flank of the Iraqi forces. However, the detailed planning was quite complex. It had to consider not only the widely varying capabilities of the different coalition units but also political sensitivities as well. For example, the 6th (French) Light Armored Division which was selected to screen the far west flank of the coalition forces was well suited for such a mission. It had only one regiment (a battalion-sized unit) of AMX-30 B2 Main Battle Tanks but two regiments equipped with lightly armored wheeled AMX-10 RC vehicles and two helicopter combat regiments. Similarly, the 2nd marine division -- essentially a light infantry division one regiment short of its full strength, -- received the U.S. Army 1st "Tiger" Brigade of the 2nd Armored Division for its attack into the heart of the Iraqi position. The British 7th Armored Brigade had originally been assigned that mission, but with the arrival of the complete 1st (UK) Armored Division, the British pushed for a role in the main attack for both military and political reasons. Political considerations also were important in the assignment of missions to several of the Arab units. Most of them were reluctant to participate in an attack into Iraq, so they were assigned

sectors facing Kuwait. The Syrian forces at first did not want to participate in any offensive operations at all. Although they later agreed to participate, they were assigned a reserve mission under Joint Forces Command North. Such an assignment was also appropriate for purely military reasons, since the 9th (Syrian) Armored Division had Soviet equipment identical to that of the Iraqis. (Syrian engineers did, however, participate in the initial breaching of the Iraqi minefields.) However, the concept presented enormous logistical difficulties, since XVIII and VII Corps would be

Figure 5b. Revised Coalition Concept of Operations

maneuvering through areas where there were virtually no roads and a great deal of unfavorable terrain.

Clearly surprise was a key to the success of the Coalition plan. In order not to reveal the plan to the Iraqis, the Coalition ground units remained in place south of Kuwait until after the launching of the air campaign on January 17, 1991. Then VII Corps and XVIII Airborne Corps had to move from their assembly areas in the east to their attack positions in the west -- a distance of some 150 miles for VII Corps and 260 miles for XVIII Corps. This was an enormous task. It required the movement of 258,000 soldiers, 11,277 tracked vehicles, 487,449 wheeled vehicles, and 1,619 aircraft, together with 60 days of food, ammunition, and other supplies. The movement, which continued 24 hours a day for more than three weeks, was one of the largest and longest in the history of warfare.

G. IRAQI PLANS

The rapid buildup of coalition forces apparently deterred Saddam Hussein from any attack on Saudi Arabia. Thus the Iraqis adopted a defensive strategy for the remainder of the crisis. One could argue that the Iraqis had attained their strategic objectives in August 1990 -- the seizure and annexation of Kuwait. All they needed to accomplish was to retain Kuwait. This pointed toward a defensive strategy. In addition, the lesson the Iraqis drew from their war with Iran was that the defense is supreme. A defensive war would be a long war, like that with Iran. This would enable Iraq to exploit its advantage in numbers, its experience in combat, and its willingness to take losses. Moreover, a long, bloody war would take advantage of what the Iraqis considered the weak points of the coalition -- the American lack of combat experience in the area, its unwillingness to take losses, and the inherent fragility of a coalition containing both Moslem and western powers. As Tariq Aziz stated to Secretary Baker on Jan 9, 1991, "It will not be a short war. Americans do not know how to fight in the desert."

To implement this defensive strategy, the Iraqis built up their forces in the Kuwaiti theater of operations. From a strength of only 100,000 in Kuwait in August, Iraqi strength steadily increased to what U.S. and Coalition estimated at almost 550,000 in mid January, with 4,280 tanks, 2,880 armored personnel carriers, and 3,100 pieces of artillery. (Later estimates have revised these figures downward somewhat.) As Section D.2 indicates, some 41-43 Iraqi divisions were in the theater by 24 February 1991, although not all were fully manned.

The Iraqis estimated that a Coalition offensive would utilize three principal avenues of approach into Kuwait:

! A marine amphibious landing from the Gulf into Kuwait

! An attack from the south up the two existing highways

! An attack up the wadi al-Batin, which forms the western boundary of Kuwait

Figure 6 is a photograph of an elaborate sand table battle map, which the Iraqis constructed in the basement of a residence in Kuwait City showing the attacks they expected.

The Iraqi commanders estimated that there would be an amphibious landing from the Gulf. By a process of elimination, they concluded that the landing would probably be north of Kuwait City. From there it would be possible to cut the north-south highway to Basra and cut off the forces to the south. To guard this approach, two infantry divisions were dug-in and supported by anti-aircraft guns for use against the U.S. marine helicopters. Hundreds of anti-ship mines were

laid in the sea to prevent coalition ships and landing craft from approaching the coast. Behind these infantry divisions were Army mechanized and armored divisions. Even in Kuwait City the Iraqis estimated that the main attack would come from the sea, perhaps in a second landing in Kuwait harbor. Buildings facing the shore were evacuated and turned into fighting positions. Trenches were constructed along the beaches, and artillery positions were constructed. An armored division was located at the airport, ready to move rapidly to counterattack. A total of four heavy divisions and seven infantry divisions were placed to defend against the threat from the sea. (The Coalition did what it could to encourage this Iraqi thinking -- since America could ill afford heavy casualties attacking from the sea into such defenses so the 4th Marine Expeditionary Brigade remained impotently afloat, and the Marine staged a well publicized practice amphibious landing in November.)

Figure 6. Iraqi Sand Table Map Showing Expected Avenues of Attack

Although the Iraqis recognized that small units could attack anywhere across Kuwait's border with Saudi Arabia, they estimated that the major Coalition units would be unable to manage without roads or natural features to help them navigate. Therefore, they anticipated that major attacks would follow the two existing roads or the wadi al-Batin. They assigned sectors to infantry divisions all along the border but located their armored and mechanized forces near the roads. Approximately one heavy armored or mechanized division was available as a local counterattack force for every three forward infantry divisions. The role of the infantry divisions was to slow down and weaken any attacking force. Then the armored or mechanized brigades would mount a counterattack. Figure 7 is a captured map showing Iraqi positions in the 1st and 2nd Marine Division zones.

The wadi al-Batin presented a special problem. This is a wide valley, less than 100 feet deep which forms the border between Kuwait and Iraq. Since it is a clearly visible terrain feature with reasonable trafficability, it offered a good attack route both to the Iraqis and to the Coalition forces. The Iraqis not only located infantry units on the sides of the wadi as flanking forces but also placed two armored and one mechanized Republican Guard divisions and two armored Army divisions just north of the point where the wadi opened up into flat desert. They were expected to be able to stop any attack up the wadi al-Batin and would also serve as a theater reserve if the attack came elsewhere.

The Iraqi defensive organization continued for a short distance west of the wadi al-Batin. As Figure 3 shows, the Iraqi VII Corps placed five infantry divisions on line there, supported by an armored division. However, the Iraqis did not anticipate a major attack in this area or further west. The terrain just west of the wadi they considered unsuitable for tanks, since there were lots of boulders and sabkhas of quicksand. (Initial terrain analysis by the CIA came to the same conclusion.) Moreover, there were no roads in this area, and the Iraqis firmly believed that units trying to operate away from roads in the desert would simply get lost. This view ignored the profound change which the introduction of the Global Positioning System (GPS) had made in desert warfare. In addition, they anticipated that the Coalition would limit any offensive to Kuwait itself, because of Arab reluctance to attack other Arab states.

H. THE IRAQI DEFENSE SYSTEM AND MINEFIELDS

The Iraqis prepared for the expected Coalition assault into Kuwait in a manner that reflected the successes of their defensive strategy during their war against Iran. Iraqi doctrine for a positional defense called for a corps to defend an area 90 to 160 km wide and 50 to 80 km

Figure 7. Captured Map Showing Iraqi Army Positions in 1st and 2nd Marine Division zones

deep. The corps front was divided into divisional sectors 45 to 85 km wide and 20 km deep. Each divisional sector was divided into brigade zones 8 to 12 km wide and 7 to 5 km deep, which were in turn divided into battalion zones 3 to 4 km wide and 2 to 3 km deep. An Iraqi infantry division was expected to control a security zone along the front about 8 km deep. Most of the division's combat force was concentrated in an operational zone about 10 km deep. The divisional logistic and administrative area was concentrated in a more secure zone 2 km deep to the rear of the operational zone.

The defense was organized as a series of triangular strongpoints at platoon, company, battalion, and brigade level. Figure 8 shows a typical battalion strongpoint, with a company position at each apex of the triangle. Similarly, three of these battalion positions were

located at the apexes of a brigade triangular position. The Iraqis selected the triangles rather than the irregular "goose eggs" used by other armies primarily to facilitate the use of engineer equipment to push up the berms at the perimeter. Battalions and companies were expected to defend their front lines. The centers of the brigade and divisional triangles were to be kill sacks containing antitank and antipersonnel mines, trenches and wire, with triangular strongpoints spread along the front.

In addition to extensive fortifications and obstacles along the Kuwait coast, the Iraqis constructed two major inland defensive belts. The first belt paralleled the Saudi border roughly 5 to 15 km inside Kuwait. It was composed of virtually continuous minefields varying in depth from 100 to 200 meters, with barbed wire, antitank ditches, berms, and oil-filled fire trenches intended to cover key avenues of approach. The fire trenches were an unusual feature of the Iraqi defense belts. These were trenches which were to be filled with oil and ignited electrically at an appropriate time during an attack. Each fire trench was about 1000 meters long, composed of ten 100-meter sections. Figure 9 shows such a fire trench filled with oil. In many cases, underground pipes were laid to bring additional fuel to the trenches. These fire trenches would present a formidable, though temporary obstacle. Covering the minefields, fire trenches, and other obstacles of the first belt were Iraqi platoon and company-size strongpoints designed to provide early warning, call in artillery, and delay any attacker attempting to break through.

The second belt was up to 20 km behind the first and actually constituted the main Iraqi defense line in Kuwait. It began at the coast north of Al-Khafji and extended northwest of the Al-Wafrah oilfields until it joined the first belt near Al-Manaqish. West of this junction the belts were closer together, and the first belt was not entirely continuous. West of the wadi al-Batin there was only one belt, which extended only about 60 km along the Iraqi border with Saudi Arabia. Obstacles and minefields in the second belt were the same as in the first belt. The

Figure 8. Typical Iraqi Triangular Battalion Strongpoint

Figure 9. Iraqi Fire Trench Filled with Oil

second belt was covered by an almost unbroken line of mutually supporting brigade triangular positions composed of battalion and company trenches and strongpoints. The minefields in both defense belts contained both antitank and antipersonnel mines. Figure 10, based on a detailed postwar survey, shows the mined areas in Kuwait. The traces of the two defensive belts are clearly visible. It has been estimated that some 2.3 million mines were laid in these defensive belts.

The Iraqi tactical plan was to slow the attacking troops at the first belt, trap them in prearranged killing zones between the belts, and destroy them before they could break through the second belt. Any attacking forces able to breach the second belt would be counterattacked immediately behind the strongpoints by division and corps level armored reserves. Figure 11 is a schematic drawing of a section of the Iraqi defense in depth.

The construction of these defensive belts required an enormous engineering effort. In addition, Iraqi engineers constructed hundreds of miles of roads in Kuwait, dug in command posts, and buried telephone lines to support the defense. It is hardly surprising, therefore, that the actual minelaying was often assigned to non-engineer troops. As a result, the quality of the Iraqi minefields varied considerably from place to place, depending on the skill of the officers and the training of the troops. Some of the mines were carefully laid and followed Iraqi doctrine of 4 to 6 meters between adjacent mines in a row and at least 10 meters between rows. In other cases mines were laid so close together that sympathetic detonation would result. Some of the mines were buried, but most were laid on the surface. Some were originally buried, but the wind had blown off the covering soil before the Coalition offensive. In a few cases training was so poor that mines were laid unarmed or even without detonators.

In spite of these local variations, the Iraqi minefields followed a generally consistent pattern. Minefields of both defensive belts consisted of 6 to 8 rows of mines. The rows were roughly straight, and usually there was only one type of mine per row. On the enemy side of the minefield was a multistrand cattle fence or a roll of concertina wire. About 35 meters behind this fence was a single row of antipersonnel mines with trip wires. These were often buried. The first row of antitank mines was 10-20 meters behind the row of antipersonnel

Figure 10. Map of Mined Areas in Kuwait Showing Iraqi Defense Belts

Figure 11. Iraqi attempt at a Defense-in-Depth

mines, with another row of antitank mines 5-6 meters behind this. After a gap of 10-20 meters, there were another two rows of antitank mines. For an eight-row minefield this was followed by another two rows of antitank mines. In many cases individual antitank mines were protected by several antipersonnel mines laid in a semicircle on the enemy side -- the Iraqi version of the NATO cluster pattern. About 10-15 meters behind the last double row was a single row of antitank mines, with a cattle fence another 10-15 meters behind it. Most of these minefields were about 100 meters deep, but some were as deep as 500 meters. Minefield densities were extremely high. In the minefields along the Kuwait border with Saudi Arabia minefield densities of 4-6 antitank mines and 6-9 antipersonnel mines per meter of front were encountered. In a number of locations the Iraqis constructed fenced personnel lanes (4-6 feet wide) and vehicular lanes (12 to 70 feet wide) to make possible their passage through the mine fields.

The Iraqis used a wide variety of types and models of mines in these defense belts, as the table below indicates. Although most of the mines in their inventory were from the former Soviet bloc, the Iraqis also had French, British, and Italian mines -- many of them with some of the latest technology. The wide variety of mines had both advantages and disadvantages for the Iraqis. It certainly made more difficult the task of clearing the mines by hand -- the individuals who were doing the clearing had to be familiar with the technical characteristics of many different mines. But they also made things more difficult for the troops laying the mines, and, as indicated above, deficiency in technical competence and training was already a major problem in the Iraqi Army. As a result, for example, the British barmines were frequently laid too close together to take advantage of their ability to cover a wide area.

Principal Mines Used in the Iraqi Defense

Designation	Type	Country of Origin
VS-1.6	Antitank	Italy
VS-2.2	Antitank	Italy
Barmine	Antitank	Great Britain
TM-46	Antitank	USSR/Russia
TM-57	Antitank	USSR/Russia
TM-62M	Antitank	USSR/Russia
Type 72	Antitank	China
PRB-M3	Antitank	Belgium
PT-MI-BA III	Antitank	Czechoslovakia
MAT 67	Antitank	Romania
SB-81*	Antitank	Italy
HPD-F1*	Antitank	France
ATM-6*	Antitank	Austria
VS-50	Antipersonnel	Italy
Valmara 59	Antipersonnel	Italy

Valmara 69	Antipersonnel	Italy
P-25	Antipersonnel	Italy
P-40	Antipersonnel	Italy
PMN	Antipersonnel	China
Type 72	Antipersonnel	China
PRB-M409	Antipersonnel	Belgium
SB-33*	Antipersonnel	Italy
VS-T	Illumination	Italy

* These mines were found stored in bunkers but were not identified among those emplaced.

In addition to the minefields in the two major defense belts, the Iraqis frequently laid small minefields for close-in protection of their defense positions. These minefields were laid by the unit occupying the position. The protective minefields were unmarked and usually contained only antipersonnel mines laid on the surface. They did not seem to follow a standard pattern.

The Iraqis made an effort to integrate their weapons systems and fortifications with the minefields. Tanks, personnel carriers, air defense artillery, and other direct fire weapons were located in the immediate vicinity of the minefields and emplaced in hull-down positions with supporting ammunition bunkers nearby. Infantry weapons (RPGs, AK-47s, machine guns, and grenades) were located along the entire length of both mine belts. Ammunition was readily available, and additional stocks were located in nearby supporting bunkers.

Field fortifications were integrated with the minefields into the defense belts. The quality of the fortifications, like that of the minefields, varied with the training and leadership of the occupying unit. Most field fortifications were waist-high trenches with two-man bunkers integrated every 8 to 12 meters. Bunker construction was crude and depended on the local material available. For example, the 842nd Brigade of the 45th Infantry Division was forced to use above ground stone field fortifications against the French, because of the shallowness of the bedrock in this area. Overhead protection usually consisted of corrugated metal or plywood, supported by timber or scrap metal stringers and covered with 4-6 inches of sand or other soil. In many cases there were no firing parapets for individual or crew-served weapons. Bunkers towards the rear were more elaborate and were often embellished with rugs and other items looted from Kuwait. Electricity for bunker lighting was provided by batteries, which were removed from combat vehicles for that purpose. Thus, although the Iraqi field fortifications were properly located and integrated with the minefields and appeared formidable from the air, their quality was actually not very high.

I. COALITION PREPARATION FOR BREACHING

1. General

The Iraqis began digging in and laying minefields in August. The Saudi forces and the first Coalition troops to arrive were not well equipped or trained to breach the hardening Iraqi defense lines. In fact, the first foreign troops to arrive were light forces -- not the best type of forces to breach dense minefields covered-by-fire. However, the Coalition ground offensive did not begin until February. By that time the Coalition forces were much better prepared to breach the minefields.

2. Equipment

In a few cases new equipment for breaching minefields was developed and fielded in time to be used in the Coalition offensive. The Mine Clearing Rake (Figure 12) was the most important piece of equipment in this category. This was a full-width blade designed to be attached to the M728 Combat Engineer vehicle or the M60 tank equipped with the M9 Dozer Kit. It sifted through sandy soil for buried and surface-laid antitank mines and pushed them aside. The cleared path

was 25% wider than an M1 tank. Development was begun in November 1990, and the first units were produced in December. A total of 43 Mine Clearing Rakes were delivered to U. S. Army forces and 16 to marine units in Saudi Arabia before the beginning of the ground offensive.

Similarly the French developed and fielded a remotely-controlled version of the AMX-30 tank with mine clearing rollers. The rollers were from the Soviet KMT-5 system, which the French obtained from the former East German Army. However, the plow portion of the system was not mounted. An ad hoc Demining Section with three of these tanks arrived in Saudi Arabia in early February and was attached to the 6th Foreign Legion Engineer Regiment with the Daguet Light Armored Division.

The marines developed the MK 154 (3-shot) Line Charge. This system consisted of three Mine Clearing Line Charges (MICLIC) mounted in an AAVP7A1 amphibious vehicle. The MK 154 was fielded to both marine divisions in Saudi Arabia in January 1991. It was considerably more mobile than the wheeled trailer-mounted MICLIC, and its three-shot capability enabled it to breach deeper minefields, though it meant the loss of an entire vehicle's personnel carrying capacity. Unlike the Mine Rake and the French AMX-30 with rollers, this was considered a standard marine system and was supported through the normal

Figure 12. Mine Rake Mounted on M728 Combat Engineer Vehicle (CEV)

marine supply and maintenance systems. A total of 55 MK 154s were fired during breaching operations.

U. S. Army units improvised a similar system. Engineers of the 1st Infantry Division mounted two MICLICs on the carrier of the Armored Vehicle Launched Bridge (AVLB). The resulting system was called the Armored Vehicle Launched MICLIC or AVLM. It not only had improved mobility over the wheeled trailer-mounted MICLIC but also provided improved armor protection for the crew. Although a Modification Work Order (MWO) was approved for the AVLM, the system has never become an approved Army-wide system.

Coalition forces developed several other improvised mine clearing systems before the beginning of the ground war. Naval Construction Battalions "SeaBees" supporting the marines, for example, designed and fabricated the "Roller Dude," a 12,000 pound, full width mine roller. The 1st marine division used this device to proof cleared lanes during briefing operations on February 24. The Army 27th Engineer Battalion (Airborne) also developed an improvised mine roller. This had a central axle supported at both ends by fixed rollers. Eight articulated rollers were attached to the central axle: four were pushed ahead of the axle, and four trailed behind it. The roller was attached to the towing shackles of a 5-ton dump truck and pushed ahead of the vehicle. This roller was designed to give light infantry the capability of proofing after a MICLIC. Since the 27th Engineers supported the 6th (French) Armored Division, which had the AMX-30 tank Mine Rollers, the expedient system was not employed in combat. Other expedient systems included an armor kit for the D-8 tracked dozer developed by the 46th Engineer Battalion (Combat) (Heavy) and a rifle-launched grapnel fabricated by the 27th Engineer Battalion (Airborne).

In addition to mine clearing equipment developed specifically for the Gulf war, Coalition forces brought several commercial systems not usually part of their inventory. For example, the British 32nd Armored Engineer Regiment, divisional troops of the 1st (British) Armored Division, brought four Aardvark Mine Flails. Similarly, both the U. S. Army 20th Engineer Brigade (Airborne) and the 1st Infantry Division brought backpack air blowers to clear sand from mines during clearing operations. USMC units took 25 Barrett .50 caliber Countermine Rifles to Southwest Asia, and U.S. Army units also acquired a few of them.

Although the new and additional mine clearing equipment was developed separately by the U. S., Great Britain, and France, there was considerable sharing of resources among the Coalition Allies. For example, the U. S. supplied eight of the new Mine Rakes to the two Egyptian Divisions. Similarly, some Track width Mine Plows were furnished to the Saudi forces to be used in lieu of the antiquated M157 "Diamond Lil" line charges. Although the four Aardvark Mine Flails were kept under British control, the 32nd Armored Engineer Regiment followed the U. S. 169th Engineer Battalion into the 1st Infantry Division breach and made it clear that the mine flails were available to assist in widening the breach if they were needed. The 27th Engineer Battalion (Airborne) attached four MICLICs, with crew, to the 6th Foreign Legion Engineer Regiment. The MICLIC trailers were towed by French Armored Personnel Carriers, as Figure 13

shows. The French planned to use the AMX-30 tank with Mine Rollers to proof the lanes cleared by the MICLICs.

3. Training

In peacetime most armies do a rather poor job of training for breaching operations. Moreover, as the discussion above indicates, much of the additional mine breaching and clearing equipment arrived in Saudi Arabia in December and January. Hence it was extremely important that the Coalition units be trained in breaching operations in general and the use of the new equipment in particular. In the United States the National Training Center (NTC) constructed a replica of the Iraqi minefields and other obstacles and prepared an excellent movie, *Breach and Assault*, which is still in use. The U.S. Army Engineer School distributed copies of the draft FM 90-13-1 Combined Arms Breaching Operations. Although it was not formally approved until February 1991, it provided the doctrine used for training. A USMC report stated, U.S. Army "FM 90-13-1 was our bible." In Saudi Arabia Coalition units began to train soon after they arrived. As the threat of an Iraqi attack lessened, the time devoted to training increased. Breaching operations came to dominate the training program as Coalition offensive plans developed. Each division set up training areas and constructed models and full-scale replicas of the Iraqi defense belts and minefields. For example, XVIII Airborne Corps constructed a complete triangular Iraqi battalion battle position

Figure 13. MICLIC Towed by French Armored Personnel Carrier

and used it to conduct a series of rehearsals and battle drills by all units expecting to participate in the breach or to assault prepared positions during the attack. The 82nd Airborne Division practiced breaching live minefields with armed M-15s and fuzed but unarmed M-16s. However, the troops were told that all mines were live. Using aerial photographs and templates as a guide, the 1st Infantry Division constructed a 5-kilometer wide replica of the forward Iraqi defense system, complete with minefields, fighting positions, bunkers, and mortar, tank, and artillery positions. Participants at several different levels commented that this training in Saudi Arabia was the most effective training they had experienced during their military service. U. S. training teams from 5th Special Forces Group assisted in training other Coalition units, especially the newly organized Kuwaiti brigades. Communications and close air support received special emphasis, but the teams also stressed basic small unit tactics, chemical countermeasures, and breaching operations. In addition, a partnership program paired XVIII Airborne Corps units with Saudi forces. The 3rd Armored Cavalry Regiment, for example, conducted live fire exercises with the Saudi 8th Brigade, and U. S. engineers taught their Saudi counterparts the techniques of breaching operations.

J. IMPACT OF THE AIR CAMPAIGN ON BREACHING OPERATIONS

The Air Campaign began on January 17, 1991, and the Ground Campaign did not begin until February 24. During this 39-day period Coalition aircraft waged a campaign of intensity not matched since World War II. Nearly 100,000 combat and support sorties were flown and 288 Tomahawk Land-Attack Missiles (TLAMs) and 35 Air-Launched Cruise Missiles (ALCMs) were launched before G-Day, February 24. Some 60% of all sorties flown were combat missions. Of course, not all these attacks were directed against the Iraqi ground forces and their lines of communication. At first, as Figure 14 shows, the bulk of the sorties were directed at Iraqi strategic targets and at gaining air supremacy. Later, however, sorties devoted to battlefield preparation dominated the campaign, as Iraqi aircraft disappeared from the skies, and available strategic targets became scarce. The goal of this battlefield preparation was to reduce the effectiveness of the Iraqi ground forces in Kuwait by about 50%. To this end, Coalition aircraft attacked Iraqi logistic installations, resupply routes and lines of communications, and, of course, the units themselves. U. S. forces discovered that even buried armored vehicles could

Figure 14. Air Campaign - Sorties by Phase

Figure 15. Iraqi Equipment Degradation in Kuwaiti Theater before G-Day, according to CENTCOM Intelligence Estimates at the Time

be located by their thermal imaging equipment, and "tank plinking" -- attacks on individual Iraqi armored vehicles using GBU-12 500-pound Laser Guided Bombs -- became a lucrative form of attack. Figure 15 shows CENTCOM estimates of the destruction of Iraqi military equipment in the

Kuwait Theater (KTO) before G-day. Thus, according to CENTCOM estimates, Coalition air attacks had damaged 39% of the Iraqi tanks, 32% of their armored personnel carriers, and 47% of their artillery in the theater before the ground campaign began. Postwar surveys indicated that CENTCOM's initial counts of equipment destroyed were too high -- for example, only about 10% of the Iraqi tanks captured had been destroyed by fixed-wing aircraft. However, estimates of the target base were also too high, and the errors offset one another. Thus CENTCOM's percentages of equipment destroyed by the beginning of the ground war were in line with later observations, although the numbers of pieces destroyed were too high. In addition, there were great variations in unit armor attrition during the air war -- from 10% for an armored division in the middle of the theater (12th Armored Division) to nearly 100% for divisions close to the front lines (52nd Armored, 25th, 30th, and 48th Infantry Divisions. The Republican Guard heavy divisions had suffered about a 24% armor attrition.

To directly assist in breaching the Iraqi defenses, B-52 bombers bombed the Iraqi minefields with 750-pound M-117 and 500-pound Mk-82 bombs, beginning on February 15. "Daisy Cutter" fuses were used to reduce cratering in the minefields. MC-130 Combat Talon I aircraft dropped 15,000-pound BLU-82 bombs to try to detonate the mines by overpressure. Fuel-air explosives were (FAE) also used. In the marine sector, AV-8Bs dropped napalm on the Iraqi fire trenches in an attempt to ignite the fuel and burn it off before the ground attack. These techniques did not meet with much success. In the sector of the 2nd marine division, for example, the Division Engineer reported, "The B-52 strike missed the minefields in the breach. All the obstacles, to include the wire, were intact when we started the breach."

Although the attempts to breach the minefields using air power were not very effective, the indirect effects of the Air Campaign on the breaching operations were significant. Minefields are much more effective obstacles when they are defended and covered by fire; and the Coalition Air Campaign severely reduced the equipment strength and, more importantly, the will to fight of the forces which were supposed to defend the minefields, place artillery fires on the Coalition breaching forces, and counterattack to eliminate any penetrations of the defense belts. CENTCOM estimated that the Air Campaign had reduced the combat effectiveness of front line Iraqi divisions by about 50%. (The combat effectiveness of units in the rear, including the Republican Guards, was however, reduced by only about 25%.) In addition to the damage to tanks, armored personnel carriers, and artillery described above, command and communications were disrupted -- in some cases corps, division, and brigade commanders lost touch with their units. Some of the equipment and supplies the Iraqis had stockpiled in Kuwait were destroyed, and the road nets for resupply were degraded. These interdiction operations also sapped the morale of Iraqi front line troops. Many prisoners of war reported that the air war seemed to go on forever, and food and water became scarce. Hence desertion rates increased. Thus the Coalition Air Campaign made the task of breaching the Iraqi defense belts considerably easier, even though the minefields and other obstacles remained in place.

K. THE BATTLE OF KHAFFJI

The first major ground action of the Gulf war was actually initiated by the Iraqis. On the night of January 29, 1991, they launched what was apparently a series of spoiling attacks or probes of the Coalition defenses with elements of the 5th Mechanized Division and the 3rd Armored Division. In spite of overhead photography, electronic intercept, and active patrolling, this attack came as a surprise to the Coalition. The first intimation of the attack came about dusk, when the Iraqis began jamming the communications of the marine units using antiquated AN/PRC-77 type non-frequency-hopping radios screening the border. Soon afterwards an Iraqi armored brigade crossed the border at the Saudi police post of al-Zabr, which the marines called OP-4. See Figure 16. This attack was repulsed by the USAF air strikes, AC-130 Spectre gunships and marine Task Force Shepherd (the 1st Light Armored Infantry Battalion-LAI), supported by coalition tactical air after a night of hard fighting. Although the wheeled Light Armored Vehicles (LAVs, essentially armored cars) with which the unit was equipped were considered too light to fight against tanks, the LAVs with TOW missiles proved effective by virtue of their stand-off range capability in the coverless desert. The Iraqis lost 10 tanks, and four of their soldiers were taken prisoner. The marine casualties were LAVs incinerated mostly from their own friendly fire. A little later the Iraqis also made crossings in battalion strength opposite marine screening positions at al-Wafra and between al-Raghwa and al-Rafi'iya. The marines engaged these attacks with artillery fire, anti-tank missiles, and air strikes. At al-wafra they destroyed some 24 Iraqi tanks and 13 other vehicles. The Iraqis quickly turned and withdrew back across the border.

while the attention of the Coalition headquarters was focused on the fighting at al-Zabr and al-Wafra, a tank battalion and a mechanized infantry battalion of the 15th Mechanized Brigade of the Iraqi 5th Mechanized Division crossed the frontier north of the town of al-Khafji. (This town had a prewar population of about 30,000, but it had been evacuated at the start of the Air Campaign, since it was within Iraqi artillery range.) The Iraqi attack was met by a screening force of the 2nd Saudi Arabian National Guard (SANG) Brigade, which was equipped with Cadillac-Gage V-150 armored cars. The Saudis, outnumbered and outgunned, withdrew south of the town, and the Iraqis occupied al-Khafji. Later that night, however, after the Saudis were reinforced with two tank companies (one Saudi and one Qatari), they attacked an Iraqi column moving south and captured 5 tanks and six armored personnel carriers.

Throughout January 30, Coalition air power was active around Khafji. North of the border Coalition aircraft dropped tons of bombs and GATOR mines to slow down Iraqi armor reinforcements. There were several B-52 strikes on suspected convoys. Carrier-based aircraft dropped cluster and guided bombs. Air Force jets followed with Maverick missiles and more

Figure 16. The Battle of Khafji

cluster bombs. When night fell three AC-130 Spectre gunships attacked the Iraqi forces. As a result of these air attacks, the Iraqis gave up attempts to reinforce their forces in Khafji.

The ground attack to recapture Khafji began about 0800 hours on January 31. It was a Saudi and Qatari operation, although the ground troops were supported by artillery and Coalition air power. A Saudi M60 tank battalion, reinforced with two TOW platoons blocked the road to the north. A Saudi Marine Battalion blocked the road to the south. Two battalions of the 2nd SANG Brigade, reinforced with a Qatari AMX-30 tank company and mechanized company attacked to clear the town. The fighting was brief but heavy. The Saudis advanced street by street and, in some cases, house by house. By about 1330 hours they had reached the north end of the town, although some pockets of Iraqi resistance remained. Those Iraqis who tried to escape up a rough coastal trail were harried by Coalition air attacks. A dozen tanks were destroyed and some vehicles were simply abandoned. Some Iraqis in the town, in fact, did not surrender until the next day. The Saudis reported that they had destroyed 11 tanks and 51 armored personnel carriers (APCs) in Khafji and captured another 19 APCs. A total of 463 Iraqis surrendered. The Saudis lost 18 dead and 32 wounded -- the Saudis killed in action were about half of those for the entire war.

Though not a major battle, the Battle of Khafji was important for several reasons. It exposed the limitations of the Iraqi ground forces and confirmed their vulnerability to Coalition tactics. It bolstered the morale and self-confidence of the Arab Coalition forces and removed any doubts of their combat capabilities. On a tactical level, the Iraqi 15th Mechanized Brigade was essentially destroyed at Khafji and the remainder of the 5th Mechanized Division heavily damaged by air attacks while it was moving toward the border. These were the forces intended to counterattack any Coalition attack up the coastal highway toward Kuwait City.

Minefields did not play a significant role in the Battle of Khafji. However, the fact that the Iraqis could move battalion-sized forces south through the minefields indicated that the Iraqis had probably left a number of cleared lanes for that purpose. The Marines were to devote considerable effort to locating such lanes. The minefields did have one indirect effect during the battle. One Iraqi battalion got lost and had difficulty finding its way back through the minefield. While searching for the passage it provided a lucrative target for Coalition air power and artillery.

L. BREACHING THE IRAQI DEFENSE LINES

1. Concept of Operations

As Section F indicated, the Coalition concept for the Ground Campaign involved a deep envelopment around the lightly defended west flank of the Iraqi forces. The main effort was assigned to the U. S. VII Corps, which was to attack west of the wadi al-Batin, envelop the Iraqi forces in Kuwait, and then turn to the east to destroy the Republican Guard units north of Kuwait. Farther to the west the XVIII Airborne Corps would drive quickly to the north to seize the highway south of the Euphrates, block the main escape route of the Iraqi forces in Kuwait, and prevent the movement of reinforcements into the theater. To the east, where the Iraqis were expecting the attack, marines and the coalition forces of Joint Forces Command East and Joint Forces Command North were to attack north into Kuwait. These were to be only

supporting attacks, intended to mislead the Iraqis as to the location of the main effort and fix their forces in place. To further these objectives, the timing of the attacks was different for the different corps -- the U. S. VII Corps and Joint Forces Command North (JFC-N) were not scheduled to attack until G+1, although their attack was moved forward when the plan was executed.

2. Joint Forces Command East (JFC-E)

Joint Forces Command East (JFC-E) was assigned a 20-km wide sector on the Coalition right flank along the Gulf Coast. The bulk of their forces were Saudi -- two mechanized brigades (8th and 10th) and the 2nd Saudi Arabian National Guard (SANG) brigade. However, the Command also included units from Kuwait, Oman, Bahrain, UAE, Senegal, Morocco, Qatar, and Bangladesh. For political as well as military reasons, the small units were grouped with the Saudi brigades into task forces with historic Arabic names -- it was politically much more acceptable for units from Kuwait, Oman, and Bahrain to be attached to Task Force Othman rather than to the 8th Saudi Mechanized Brigade, even though the Saudi brigade provided the command and staff for the task force. The task organization is shown in Section D.1.

The mission of JFC-E was to attack directly north to Kuwait City, beginning on G-Day. Gen. Sultan planned to attack with his two heavy task forces (Othman and Omar -- 8th and 10th Mechanized Brigades) side by side west of the coastal highway. Task Force Abu Bakr (2nd SANG Brigade) would conduct a reconnaissance in force up the coastal highway. Task Force Tariq (two Saudi Marine Battalions) would operate on the right flank, between the highway and the Gulf, clearing any enemy points of resistance. The Qatar Mechanized Infantry Battalion would screen the left flank and maintain contact with the marines. See Figure 17. In addition

Figure 17. Joint Forces Command East (JFC-E) Attack

to their own artillery, JFC-E received fire support from the guns of the USS Wisconsin and the USS Missouri, now longer available to U.S. forces though they could be if recommissioned

Although the Saudis had managed to purchase some countermine equipment from Turkey and Egypt, they planned to accomplish most of the breaching by hand. The Saudi engineers were well trained for this task. For weeks they had trained in the desert under realistic conditions, including the use of live mines and booby traps. Barriers were erected similar to the Iraqi ones, and each Saudi unit made two practice daytime crossings and one at night.

On February 20, four days before G-Day, the Saudis sent forward a strong combat patrol of tanks, artillery, special forces, and engineers. Eight miles inside Kuwait they encountered the First Defense Belt, with mines and tank ditches. The Iraqi units guarding the minefields had withdrawn, and the mines were all on the surface. It is not clear whether they had been laid on the surface or whether they had originally been buried and the wind had blown away the covering sand. Although there was some Iraqi artillery fire, it appeared to be unobserved. An engineer platoon began lifting mines by hand and cleared a 30-yard gap through the minefield, which was about 150 yards deep at that point. The Saudi engineers recorded the position on video and returned to their own lines with some 70 mines. The next day another patrol managed to open up three lanes and brought back 600 mines. The Saudis also captured the abandoned Kuwaiti border post of Nuwaisib and brought up Kuwaiti troops of the Al-Fatah Brigade and a band to raise the Kuwaiti flag. In addition to the psychological impact of liberating the first bit of Kuwaiti soil, this reconnaissance yielded two valuable bits of information: the Iraqi mines were on the surface in this area, and the minefields were no longer guarded.

Consequently, when JFC-E launched its attack at 0400 on G-Day, February 24, the troops made good progress. Engineers from the 2nd Saudi Arabian National Guard (SANG) Brigade breached the border berm, and the Coalition forces advanced into Kuwait without opposition. When they reached the First Defense Belt, the Saudi engineers began lifting mines by hand. By mid morning they had cleared a total of six lanes through the minefield. Since the mines were on the surface, clearing the lanes did not present a major problem. Except for a few artillery rounds, there was no serious opposition -- in fact the Saudis did not see an Iraqi soldier until they had advanced 13 miles into Kuwait. Likewise, the Iraqi tank ditches were also overcome without difficulty. The Saudis had brought up Armored Vehicle Launched Bridges (AVLB) to use in crossing the tank ditches. Since there was no fire on the breaching sites, however, the Saudis used unarmored dozers to fill in the ditches.

The SANG troops moving up the coastal highway encountered more serious delays. Although there were few mines, the Iraqis had done a thorough job of cutting the highway. The three northbound lanes were systematically destroyed. The three southbound lanes were cut by ditches at 100-meter intervals for the first three kilometers from the frontier. For the next three kilometers, cuts were made halfway across the three lanes every 100 meters. Further north the highway was blocked by wrecked vehicles and bomb and shell craters. In spite of these difficulties, Saudi engineers were able to open two lanes for traffic for about 25 kilometers into Kuwait by nightfall. This was quite important, since the Saudis planned to use the highway as their main supply route.

After breaching the First Defense Belt and securing the initial objectives, Gen. Sultan faced a difficult decision. Should he halt and prepare for the expected counterattack or continue and attack the Second Defense Belt? Since JFC-E had advanced more rapidly than the Marines on their left flank, an Iraqi counterattack could come from the west as well as the north and east. To make things more difficult, the day was overcast, and smoke from the burning oil wells limited visibility to about 100 meters. The prospect of making a blind attack against a numerically superior enemy was not attractive. Late in the morning, however, the wind shifted and started to blow from the southeast. Within a few minutes visibility improved dramatically. Coalition aircraft again had a clear field of vision and began attacking Iraqi positions. Task Forces Othman and Omar resumed their advance.

The anticipated Iraqi counterattack did not materialize. The Iraqi 18th Infantry Division was not able to organize a counterattack with its own resources. The designated counterattack force for this area, the 15th Mechanized Brigade, had essentially been destroyed at Khafji, and the rest of the 5th Mechanized Division had been heavily damaged. The virtually continuous Coalition air attacks had apparently prevented the Iraqis from rebuilding these counterattack forces. Moreover, the Iraqi III Corps apparently considered the marines attack more serious. Even when Task Forces Othman and Omar reached the Second Defense Belt, the defense was not nearly so strong as expected. The advancing forces faced artillery fire, but, with only a few exceptions, Iraqi infantry surrendered as the Saudi and other Coalition forces approached their positions. So many surrendered, in fact, that a battalion of the SANG was assigned the mission of escorting them to the rear. In this sector the minefields of the Second Defense Belt were also on the surface. Again Saudi engineers breached lanes by hand with no major difficulties. By nightfall the forces of JFC-E had advanced through the Second Defense Belt. Here they stopped for the night. Unlike the U. S. and British forces, the Arab contingents had limited night vision equipment and hence preferred not to fight at night.

3. 1st marine expeditionary force (MEF)

a. Sector, Mission, and Concept

As Figure 18 shows, the 1st marine expeditionary force (MEF) was assigned a sector from the left boundary of Joint Forces Command East to the point where the Kuwait border turns to the west. The mission of the 1st MEF was to breach the Iraqi defense lines and seize the al-Mutl'a Pass and the roads leading into Kuwait City, some 35 to 50 miles inside Kuwait. The 1st MEF faced the strongest concentration of enemy defenses in the theater.

Because of the shortage of breaching equipment, LTG Boomer's initial concept called for the 1st marine division to make the breach and the 2nd Division to follow through the same cleared lanes, execute a passage of lines, and become the point of the main effort. Neither division commander was happy with this concept. Additional breaching equipment arrived at the beginning of February, and LTG Boomer accepted MG Keys recommendation that the 2nd marine division have a separate breaching sector. Thus the final concept was for the two marine divisions to attack abreast with the 1st Division on the right.

b. 1st marine division

The 1st marine division developed a rather complex plan for the breaching operation. Two infantry forces, Task Forces Taro and Grizzly, would infiltrate through the First Mine Belt under cover of darkness. Then they would each turn 90E to provide security against counterattacks from the right (TF Taro) and left (TF Grizzly). The main attack would be a deliberate breach conducted by Task Forces Papa Bear and Ripper, each of which had a tank battalion, in addition to engineer reinforcements with minefield breaching equipment. After breaching the First Defense Belt, they would regroup and conduct a deliberate breach of the

Figure 18. 1st marine expeditionary force (MEF) Sector and Concept

Second Defense Belt. Depending on the difficulties encountered in the first belt, breaching the second belt might be delayed until the next day. Then they would continue the attack to seize the al-Jaber Airfield and Kuwait International Airport.

To carry out this plan, it was clearly vital to know the details of the Iraqi minefields. Consequently, the marines began conducting detailed reconnaissance on February 18, a week before G-Day. The reconnaissance teams discovered that the First Defense Belt was largely undefended and found a path through the minefields for TF Taro. Finding a path for TF Grizzly, however, proved to be much more difficult -- in fact, by the morning of G-1 one had still not been found. At 1500 hours that afternoon, while TF Grizzly was planning and preparing to conduct a hasty breach, a small group of Iraqis walked through the minefield to surrender. Their route was observed and carefully noted by a reconnaissance team, which retraced the Iraqis' steps through the minefield, captured three more prisoners, and seized a bunker overlooking the lane. At 1740 hours 22 Iraqi soldiers drove up to the minefield in three trucks, dismounted, and walked through the minefield to surrender. This revealed the location of another lane through the minefield. At 1800 hours marine combat engineers began checking these lanes by hand. A team of combat engineers led by SSG Charles Restifo crawled through the minefield probing for mines and marking the cleared lane with chemical lights. At 2300 hours TF Grizzly moved through the two lanes and set out for its blocking positions. TF Taro was similarly successful. At about 2000 hours the task force began infiltrating the First Obstacle Belt, using lanes located by the earlier reconnaissance and marked by the engineers. Thus by midnight on February 23, the 1st marine division had overcome the first major hurdle of the ground offensive. TF Grizzly and TF Taro were through the first minefields and on their way to their assigned blocking positions. They had encountered only light resistance and suffered few casualties.

Task Force Ripper began its breaching operation at 0618 hours on February 24. A tank with a Track Width Mine Plow towed a MICLIC trailer to the point chosen for Lane 1. The MICLIC was launched and detonated. Then the tank moved forward, lowered its mine plow and followed the mark left by the MICLIC through the lane. When it reached the end of the mark, the tank backed to the entrance of the lane. Then a MK-154 advanced to the far end of the cleared lane and fired a second MICLIC to extend the lane. The rocket fired, but this MICLIC failed to detonate. After an unsuccessful attempt to detonate it by hand, the MK-154 fired a second line charge directly on top of the first. The detonation of this line charge detonated the first. The process was then repeated, and the M-154 fired its third charge. This also worked perfectly, and the engineers reached the far side of the minefield. In spite of the difficulties with MICLIC, Lane 1 had taken less than 15 minutes to clear. After the plow tank cleared remaining mines, the marines used their locally fabricated roller system "Roller Dude" to proof the lane. The same technique was used for Lane 2. One MICLIC failed to detonate and had to be detonated by a hand-placed block of C-4. Nevertheless, the lane was cleared in 14 minutes. After the lanes had been proofed with the roller, the engineers marked the lanes. By 0700 hours the engineers were reloading their line charge launchers and waiting for the order to move to the Second Defense Belt.

At the breach location of the 1st battalion, 7th marines, the minefield was not so deep. At this point two successful line charges would be sufficient to breach the minefield. There were technical difficulties, however. In Lane 4 the trailer-launched MICLIC failed to detonate and could not be successfully primed by hand. A triple-shot MK-154 was brought forward. Two line charges from this system were enough to reach the other side of the minefield, although both had to be detonated manually. In Lane 3 the MICLIC launched and detonated properly. However, a mine remaining in the lane put out of action an M60 tank trying to proof the lane, and this blocked the lane. Since they had no equipment to extract the disabled tank, the marines moved 25 meters to the left and began again. After firing and detonating by hand two line charges from a MK-154, the engineers reached the far side of the minefield.

Task Force Papa Bear began its breach of the First Defense Belt at 0900 hours. They used the same methods as TF Ripper, with the 3rd battalion, 9th marines, in the lead. By 0930 they had established two lanes through the minefield and secured the other side. The engineer task force completed two additional lanes and moved to the northern side of the minefield, where it rearmed the MICLICs and MK-154s for breaching the second belt. The 1st Tank Battalion led the remainder of the Task Force through the minefield and prepared for the next breaching operation. The tankers attacked Iraqi positions defending the Second Obstacle Belt and directed

Cobra and Harrier attacks on enemy tanks and bunkers. These destroyed several tanks and observation posts and a number of enemy bunkers.

By midmorning it was clear that no Iraqi counterattack was coming from the east. In fact, the majority of the Iraqi troops between the two defense lines had either already withdrawn or were surrendering. Therefore, MG Myatt ordered TF Taro to clear two additional lanes in order to reduce traffic congestion at the breach site. With the assistance of two tanks with Track Width Mine Plows temporarily transferred from TF Papa Bear, TF Taro engineers cleared, proofed, and marked the two lanes and reported them open at 1300 hours.

The 1st marine division attack on the Second Defense Belt began at noon on February 24. The Iraqis defended this belt, and Task Force Ripper received artillery, mortar, and machine gun fire as it approached the minefield. Consequently, the assault was preceded by a 22-minute mixed artillery barrage. It included smoke rounds to hide the breaching operations, high explosive rounds to suppress enemy fire, and variable time fuse (VT) missions against enemy bunkers. TF Ripper also put heavy direct fire on the enemy positions. Under cover of this fire, the engineer obstacle clearing teams moved in and began work. They used the same procedures as in the First Defense Belt, except that in this case the breaching had to be done under fire. They also encountered some of the same difficulties. In Lane 1, when the tank tried to fire the MICLIC, nothing happened -- the firing cable had been broken when the turret rotated. A MK-154 drove up into position behind the tank and fired one of its line charges into the minefield. The charge failed to detonate and had to be manually primed. However, the remaining two charges worked perfectly, and the lane was cleared and proofed without difficulty. In Lane 2, everything worked like clockwork. The line charges all worked, the Track width Mine Plow cleared remaining mines, and the roller proofed the lane without encountering any mines. At 1208 hours the engineer officer in charge fired the green and white star cluster signifying that the first lane had been cleared. In Lane 3 the situation was quite different. Just as at the first belt, the MICLIC failed to launch. A MK-154 launched one of its three line charges, which had to be manually primed. Since the minefield was relatively thin at this point, this left only about 10 meters of minefield to clear, but both the remaining MK-154 line charges failed to launch. The company commander used the tank with the Track Width Mine Plows to clear it. No mines were set off in the process, and the lane was proofed and marked by 1225. Lane 4 was cleared by two line charges, although both had to be manually primed. By 1225 hours, therefore, TF Ripper had succeeded in opening four lanes in the Second Defense Belt.

As soon as the lanes were opened, the two infantry battalions and the 3rd Tank Battalion passed through and began their assault on the Iraqi positions. The three battalions pushed outward to expand the breachhead area. See Figure 19. The situation quickly became confused. Some Iraqis continued to fight with determination, and the Task Force had to fight bunker by bunker. The defense was strengthened by a number of tanks -- T-62s as well as T-55s. Many more Iraqis, however, decided to surrender. In one case, for example, several hundred Iraqis, with a colonel, surrendered to the 1st Battalion, 7th marines. The unexpectedly large number of Iraqi prisoners slowed the marine advance as much as the Iraqi resistance. In addition, the prisoners being evacuated helped to clog the already crowded lanes through the minefield. The division breach control party, which was supposed to control traffic, had not yet arrived at the Second Defense Belt.

After passing through the minefield, TF Ripper cleared the area known as "The Emir's Farm" on its right flank. This was a large tract of tamarind groves southwest of the burning al-Burqan oilfields. Some 56 towed 152mm guns had been located there, but they had been

Figure 19. Task Force Ripper's Breachhead

destroyed by air and artillery attack before and during the ground attack. A number of bunkers remained, and the 1st battalion, 7th marines rolled these up from the flank. In less than two hours Iraqi resistance in this area collapsed.

Then TF Ripper turned to the west and attacked al-Jaber airfield. TF Shepherd, which had followed TF Ripper through the breach, screened the north with its LAVs. The Iraqi 56th Armored Brigade had been stationed at the airfield, but it had moved west to stiffen the defenses in front of the 2nd marine division. Only an infantry brigade, reinforced by a company of old T-62 tanks, remained at the airfield. At 1600 hours TF Ripper attacked in a wedge formation, with the 3rd Tank Battalion at the point. Within two hours they had secured the objective. Then the

task force assumed defensive positions to await its relief by TF Grizzly. Once relieved, TF Ripper received orders to attack toward Kuwait International Airport, its final objective.

Task Force Papa Bear delayed the start of its deliberate breach of the Second Defense Belt until its direct support artillery battalion could displace north of the First Obstacle Belt to provide fire support. By 1500 hours on February 24, the artillery was in place and was shelling Iraqi positions. At 1520 the task force began breaching the Second Defense Belt, this portion of which was defended by the 22nd Brigade of the 5th Mechanized Division. TF Papa Bear encountered the same difficulties in the breaching as had TF Ripper. In Lane 1 a mine knocked out the M60 roller tank which was proofing the lane. Unable to extract the tank, the engineers moved to an alternate site and began clearing a new lane. The work on Lane 2, however, went well, and the lane was open by 1600 hours. Both assault companies of the 3rd battalion, 9th marines, passed through this lane, while the engineers continued work on the alternate Lane 1. As soon as the assault companies got through the minefield, they moved forward and began clearing Iraqi trenches. They caught five Iraqi tanks attempting to withdraw from their positions and destroyed them. After receiving mortar and small arms fire, the marines called in artillery and gunships. After a thorough pounding, the main Iraqi strongpoint fell. This caused the collapse of the rest of the position and the surrender of several hundred Iraqis. The 1st Tank Battalion followed the infantry through Lane 2. Then they wheeled east and smashed through a line of dug in tanks and infantry, destroying some 14 tanks. At this point the reserve units from the 22nd and 501st Iraqi Brigades began withdrawing to the northeast. At 1700 hours the 1st battalion, 1st marines followed the tank battalion through Lane 2 and began enlarging the breachhead to the north. By 1800 hours Iraqi resistance to the north had largely ceased. The engineers had completed the alternate Lane 1. Work on a third lane, however, was stopped when a tank equipped with a mine rake was disabled while proofing the lane. As darkness fell, the task force halted and consolidated its positions.

Figure 20. Situation within Kuwait 1800 Hours February 24, 1991

In spite of technical difficulties with the MICLIC and MK-154 line charge and Iraqi opposition, the 1st marine division conducted very successful breaching operations on February 24. They succeeded in breaching two well prepared defense belts, the second of which was quite well defended and seized their objectives ahead of schedule and with relatively light losses. Figure 20 shows their advance in the context of the entire country of Kuwait. The expected Iraqi counterattacks had not materialized, although intelligence reports indicated movements of Iraqi armor north and east of the breach sites.

c. 2nd marine division

As Figure 20 shows, the 2nd marine division was assigned a sector to the west of the 1st marine division. The mission assigned to the division was to break through the Iraqi defense belts and attack to the north to destroy enemy forces in the sector, seize al-Jahra and the al-Mutl'a Pass, and thus cut off Iraqi forces in Kuwait City and southern Kuwait. To accomplish this mission, MG Keys and his staff developed an elegantly simple breaching plan. Since the division had no experience in breaching, they used an amphibious assault as a model -- an area in which the entire division had a great deal of experience. A breach approach sequence table was developed and a breach control group activated to ensure orderly and timely traffic flow through the breaches. Combat engineers would lay out six lanes from six departure points along a 12-kilometer front at the Berm. These were named like beaches: from left to right Red 1, Red 2, Blue 1, Blue 2, Green 1, and Green 2. Each lane would be marked about every 250 meters by appropriately colored plastic garbage cans, filled with sand and spray-painted with lane numbers and phase lines. The lanes would converge down to a four-kilometer front at the First Obstacle Belt and then continue in parallel until past the second belt. Figure 21 shows the entrance to one breach in the First Defense Belt. The blue banner with the numeral 3 indicates that it is lane Blue 3. The route up to it was marked with blue garbage cans spray-painted with 3. The garbage can just below the left banner is marked "PL" for phase line.

Like the 1st marine division, the 2nd marine division conducted detailed reconnaissance to determine the details of the First Defense Belt. Based on the information obtained, together with that available from overhead photography and other sources, the division commander selected a breach site between gathering centers 17 and 18 of the Umm Gudair Oil Field. This site supported the division's scheme of maneuver and avoided all Iraqi fire trenches in the area. To conceal the location of the actual breaching site, the division cut eighteen gaps in the border berm all across the division sector instead of the six required at the breaching

site. In addition, the 2nd Light Armored Infantry (LAI) LAV armored car battalion was ordered to conduct an active screening operation, beginning on G-3, February 21, in the northwest corner of the division sector. The battalion conducted this operation so vigorously that the Iraqis reported that the ground offensive had begun and that they had repelled an assault by a full marine division. Figure 21. Entrance to Lane Blue 3 at First Defense Belt

Again for simplicity, responsibility for the actual breaching operation through both defense belts was assigned to one unit, the 6th marine regiment, which was reinforced with the 8th Tank Battalion (a Marine Corps Reserve unit), Task Force Breach of the 2nd Combat Engineer Battalion (CEB), and the 1st battalion, 8th marines. The commander of the 6th marines, in turn, assigned each of his mechanized battalions responsibility for two lanes as follows:

! Lanes Red 1 and 2: 1st battalion, 6th marines with Company B, 2nd CEB

! Lanes Blue 3 and 4: 2nd battalion, 2nd marines, with Company D, 4th CEB

! Lanes Green 5 and 6: 1st battalion, 8th marines, with Company C, 2nd CEB

Each infantry battalion had one tank company in direct support. Early in February, the 6th marines were released from their defensive mission, and the breaching task organization shown above was activated. The regimental task force conducted training and rehearsals on a breach training area which mirrored the actual breach site. Thus each combat engineer company conducted several rehearsals with the infantry battalion it supported.

The following equipment was available to the task force to support the breaching operation:

! 18 AAVs with MK-154 three-shot mine clearing line charges,

! 2 M60A1 dozer tanks,

! 16 M60A1 tanks with track-width mine plows,

! 4 M60A1 tanks with mine rakes,

! 22 AAVs for the engineer squads,

! 15 M9 Armored Combat Earthmovers (ACE),

! 39 M58 MICLIC trailers,

! 6 M1A1 tanks with mine plows, and

! 4 Armored Vehicle Launched Bridges (AVLB).

At 0530 hours on February 24, the lead elements of the 2nd marine Division crossed the border berm and began their offensive -- an hour and 30 minutes after the attack of the 1st marine Division. The attack was preceded by a brief but intense artillery preparation. Some 1,430 rounds, most carrying bomblets, were fired in only 11 minutes. None of the planned smoke rounds were needed. There was light rain, and this, together with the smoke from the burning Umm Gudair Oilfields, provided sufficient concealment. Shortly after 0600 the 6th marine Task Force closed on the First Obstacle Belt and began the breaching operation.

As the list of equipment indicates, the 2nd marine division did not have any of the locally manufactured "Roller Dude" mine rollers only available since coalition forces had months of time to "get their act together". which the 1st marine division used for proofing the breached lanes. Consequently, the 2nd Division adopted a slightly different breaching procedure. Both divisions began by launching one to three line charges to make the initial breach. Since the 2nd Division had no rollers, however, they used a single pass of a tank with either a mine rake or track width mine plow both to clear any remaining mines and to proof the lane.

In Lanes Red 1 and 2 and Blue 3 and 4, the breaching operation went well. Although about half the line charges failed initially to detonate in the minefield, demolition men dismounted and, working under indirect fire, set them off by hand. The tanks with mine plows or rakes pushed aside any remaining mines without problems, and by about 0730 four lanes had been opened through the First Defense Belt, and the 1st Battalion, 6th marines and the 2nd battalion, 2nd marines had passed through the breach. The distance between the two Iraqi defense belts was only about 5 kilometers at this point. Without pausing, the marines continued the advance. Lanes Red 1 and 2 were completed through the Second Defense Belt by 0900, and Blue 3 and 4 by 1030. Resistance stiffened as the marines moved north. However, the regiment had the support of the division's artillery and of Cobra gunships.

In Green Lanes 5 and 6, on the other hand, the breaching team encountered considerable difficulties. At this point the minefields had greater depth and a larger number of mines. In addition, they included British Bar Mines, which the Iraqis had captured in Kuwait. These were resistant to the overpressure produced by the MICLICs, and many of them had been fitted with anti-disturbance devices so that they detonated on contact with mine plows. There were also power lines running across the minefield. In Lane Green 5 the breaching team began its task shortly after 0600 by launching a line charge from an AAV. After the charge had been detonated, an M60 with a track width mine plow proofed the lane. The AAV then followed the tank and launched another line charge. This line charge went over a series of high tension power lines. When it detonated, it brought down some of the lines but did nothing to clear the lanes. The tank with the mine plow moved forward to clear enough space to give the AAV a clear shot. It hit a mine, probably a bar mine, which disabled the tank but did not injure the crew. The AAV cautiously backed out of the minefield, and a second M60 plow tank was sent in. It followed the same route as far as the disabled tank and then made a detour to the left. The AAV followed and detonated a second line charge to extend the lane. The second tank began plowing and was about 20 meters in front of the disabled tank when another mine exploded, ripping off its track. The AAV had used all three of its charges and withdrew. A third M60 plow tank, this one towing a MICLIC entered the minefield. It launched the MICLIC and then began plowing to proof the lane. It was within about 20 meters of the far side of the minefield when it also hit a mine. With three M60 tanks disabled in the minefield, work on Green 5 came to a halt while more engineer equipment was brought forward. Lane Green 5 through the First Mine Belt was not clear until about 0930.

In Lane Green 6 things did not go much better. Approaching the First Mine Belt, the crews of both the plow tank and the AAV missed the stake which the Iraqis had left to mark the forward edge of the minefield, and the AAV hit a mine. Fortunately the 6,000 pounds of line charges inside the vehicle did not explode, but the vehicle lost three road wheels, and a crewman broke a leg. The lead tank was thus blocked in the minefield with mines on three sides and the disabled AAV to the rear. A second AAV was brought forward, took up a position about 70 meters to the left of the original lane, and fired a line charge. It failed to detonate and had to be detonated by hand. A second M60 plow tank then proofed the lane, and the AAV pulled forward and launched a second line charge to extend the lane. After the M60 plow tank had proofed the lane, Green 6 was declared open for tanks at 0736. The commander of the first unit to move through, B Company, 4th Tank Battalion, ordered the lead M1 tank (loaner from the U.S. Army) to plow the lane as an additional precaution. About two-thirds of the way through the minefield, the tank hit a mine. Although there were no injuries, the tank was disabled and the lane blocked. At this point the commander of the M60 plow tank blocked in the minefield decided that his best choice was to go forward. He reached the far edge of the first minefield without incident, executed a 180E turn and came back through the minefield to ensure that it had been adequately cleared, making a detour around the disabled AAV. The lane was declared open for tracked vehicles at 0830, and the 1st Battalion, 8th marines began moving through the First Mine Belt.

The breaching operation on the Green Lanes in the Second Mine Belt began about 1100. Again there were difficulties. In Green Lane 5 a plow tank detonated another mine and was disabled. Because of the shortage of engineer equipment, work on Green Lane 5 was abandoned and all efforts concentrated on the remaining lane, Green 6. Two line charges broke their arrestor cables and flew free into the minefield where they could not be detonated. Two others had to be detonated by hand. In spite of these problems, the lane was finally opened shortly after noon. This lane was renamed Green 5 -- the original Green 5 was never cleared. A lane to the southeast, originally intended to carry return traffic, was designated Green 6. This sixth lane was finally declared cleared and safe about 1345.

Once through the Second Mine Belt, the three lead battalions of the 6th marine regiment pushed out to enlarge the breachhead. The 1st battalion, 6th marines, turned to the left and rolled up

much of the 14th Brigade of the 14th Iraqi Infantry Division. the battalion then pushed into the 7th Infantry Division Sector, destroying part of the 19th Infantry Brigade and pushing the rest of it away from the breaching sector. In the center the 2nd battalion, 2nd marines and its supporting tank company overran the rest of the 14th Brigade. On the right the 1st battalion, 8th marines, with its tank company seized an area of trenches and destroyed some 15 tanks and 22 other vehicles. They established contact with the 1st marine division near al-Jaber Airfield. The 2nd LAI Battalion passed through the Blue Lanes and began screening to the northeast of the division sector. By sunset the division had closed on Phase Line Red, as Figure 22 shows.

At 1500 the Tiger Brigade (U.S. Army 1st Brigade, 2nd Armored Division) began moving through the Red and Blue Breach Lanes. In Red Lane 2, however, one of the M1A1 tanks of the 3rd Battalion, 67th Armor, hit a mine in the berm left by the mine plows. The tank was disabled with a broken track and the lane blocked. The damage was minor, however, and there were no injuries. The lane was reopened within a few minutes, and the tank was repaired and returned to action by the next day. After passing through the minefield, the brigade then moved west and took up a position on the left flank of the division sector. This flank was open and an Iraqi counterattack from that direction was considered a major threat, since Joint Forces Command North (JFC-N) was to attack later and planned to operate primarily in the western part of its sector. While moving into its positions, the Tiger Brigade suffered its first fatality. A HMMWV of the 502nd Military Police Company detonated an antitank mine; one Soldier was killed and another wounded.

The 2nd marine division's breaching operation had been quite expensive in terms of equipment, though not in casualties. The division's losses in breaching equipment included seven M60 tanks equipped with mine plows, two AAVs, and one M1A1 tank with track width mine plow. In addition, a Direct Support Command armored D7 tractor was disabled by a mine while attempting to widen Lane Blue 3. During the breaching operation the division fired 34 MK-154 line charges. Eight of these deployed but had to be detonated by hand. Eleven M58 MICLIC line charges were fired, of which five did not function properly. The malfunctions included one air burst and two broken arresting cables, in addition to two MICLICs which had to be detonated manually.

Figure 22. 2nd marine division Attack on February 24, 1991

In spite of these difficulties, the 2nd marine division's operations on G-Day, February 24, were successful. The division had opened six breach lanes through the two Iraqi defense belts against considerable opposition. Then the bulk of the division had moved through the minefields and seized its initial objectives. By the end of the day, it had overrun the Iraqi defense positions and eliminated the better part of two Iraqi divisions, the 7th and 14th Infantry Divisions. Iraqi troops had initially displayed dogged fighting qualities when attacked frontally but surrendered quickly when flanked or attacked from the rear. By nightfall large numbers of Iraqis were surrendering. The 6th marine regiment reported more than 4,000 enemy prisoners of war, and the 2nd LAI Battalion reported 3,000. Moreover, the division had accomplished these successes with remarkably light casualties: two killed in action (one marine and one Soldier) and twelve wounded in action.

4. Joint Forces Command North (JFC-N)

a. Sector, Mission, and Plan of Attack

As Figure 23 indicates, Joint Forces Command North (JFC-N) was assigned a sector from the west flank of the 1st marine expeditionary force (MEF) to the wadi al-Batin, which formed the western boundary of Kuwait with Iraq. The mission assigned to JFC-N was:

- ! Attack on G+1 and penetrate the Iraqi 1st and 2nd tactical echelon forces

- ! Seize the Headquarters of 1st Iraqi Corps at Al Abraq

- ! Protect the right flank of VII (U.S. Army) Corps

- ! Seize Ali Al Salem Air Base and link up with the 1st MEF

! Establish blocking positions outside Kuwait City

! Be prepared to continue the attack to the north or to participate in the liberation of Kuwait City.

To accomplish this mission, MG Sulaiman planned a two-pronged attack. The Saudi and Kuwaiti forces, organized into Task Force Muthannah and Task Force Saad, would attack on the right. The main attack would be conducted on the left by the II (Egyptian) Corps, which included an Armored Division, a Mechanized Division, and the 1st Ranger Regiment. The

Figure 23. Joint Forces Command North (JFC-N) Sector and Plan

Syrian 9th Division would follow the Egyptians as the JFC-N reserve. The coalition was reluctant to put the Syrian forces in the lead, because they had essentially the same Russian equipment as the Iraqis -- which presented obvious dangers of confusion and friendly fire.

The attack of JFC-N was planned for G+1, February 25, just as was the attack of VII (U.S. Army) Corps to the west. By midmorning on February 24, however, the advance of the marines and JFC-E that had less distance to go was proceeding so rapidly that Gen. Schwarzkopf and Gen. Khalid decided to advance the time of the attack. Consequently, JFC-N launched their attack at 1600 hours on February 24, twelve hours earlier than planned.

b. Saudi and Kuwaiti Forces

The Saudi and Kuwaiti forces were grouped into two task forces. Task Force Muthannah consisted of the 20th Saudi Mechanized Brigade and the 35th Kuwaiti Mechanized Brigade. Task Force Saad comprised the 4th Saudi Armored Brigade and the 15th Kuwaiti Infantry Brigade. Most of the Kuwaiti brigades had been formed in Saudi Arabia from refugees. Although eager to fight, they were short on training. However, the 35th Mechanized Brigade was an exception to this generalization. The brigade had fought well against the Iraqi invasion and had withdrawn to Saudi Arabia only after running low on ammunition. See Section C.1. The tanks which the brigade had lost in these initial battles had been replaced by M-84s, Yugoslav versions of T-72s upgraded with laser rangefinders and ballistic computers. The mission of the Saudi and Kuwaiti forces was to attack, seize 35th Brigade's former base and Ali Al Salem Air Base, link up with 1st MEF, and be prepared to participate in the liberation of Kuwait City.

The Saudi forces in JFC-N used the same techniques to breach the Iraqi minefields as the forces in JFC-E. In both cases they accomplished the breach by hand, and their success was based on thorough training under realistic conditions and detailed reconnaissance. Four days before G-Day, the Saudis began conducting strong combat patrols into Kuwait. In this zone the Iraqi outposts protecting the First Defense Belt had been abandoned and there was only desultory, unobserved artillery fire. Hence, just as in the JFC-E area, the Saudis began lifting mines by hand in order to clear lanes through the minefields. Although in this area the mines were buried, they were easy to detect, because the soil on top of mines was a different color from undisturbed soil. When the two task forces launched their attack on the afternoon of February 24, they encountered no real difficulty in passing through the First Defense Belt. The Iraqi defense appears to have been relatively weak in this area, and the primary concern of the JFC-N commander was that the Saudi and Kuwaiti forces not advance so rapidly that their flanks would be exposed. After an hour's advance, therefore, the Saudi and Kuwaiti advance was halted to wait for the Egyptians.

c. II (Egyptian) Corps

In the Egyptian sector the II (Egyptian) Corps faced a formidable series of obstacles and an enemy who anticipated a major attack. The 20th and 30th Iraqi Infantry Divisions had been especially assiduous in laying minefields and setting up other obstacles. Not only was the series of outposts protecting the First Defense Belt fully manned, but additional mines had been laid between the outposts -- in effect creating a third belt of minefields. Between this outpost line and the First Defense Belt a series of fire trenches had been constructed all across the front in the sector. MG Salah Halabi, the Corps Commander, planned to use his Ranger Regiment to sabotage the fire trenches in the zone of attack. Then the 3rd (Egyptian) Mechanized Division would attack, conduct a deliberate breach of the minefields, and continue

to the north to seize Al Abraq and the headquarters of 1st Iraqi corps. The 4th Armored Division would pass through the breach and continue the attack to the northeast.

To carry out the deliberate breach, the Corps had the following countermine equipment:

- ! 8 full-width mine rakes, mounted on M-60 tanks with blades

- ! 18 MICLIC trailers

- ! 64 MICLIC charges (6 of these were of Egyptian manufacture and designed to detonate automatically immediately after deployment)

This countermine equipment was all placed in support of the 3rd Mechanized Division, which divided it equally between the two assault brigades, the 10th and 222nd Mechanized Brigades. Each brigade planned to clear four lanes, which were named Red 1, 2, 3, and 4 and Green 1, 2, 3, and 4.

The Egyptian Army had encountered fire trenches during their wars against Israel. In, fact, MG Salah had commanded the first assault company across the Suez Canal in 1973, when Egyptian commandos had sabotaged the Israeli system. On the night of G-1, February 23, teams of Egyptian rangers used similar techniques to sabotage the ignition systems of the Iraqi fire trenches on a four-mile front in the planned attack sector.

At about 1300 on February 24, after Gen. Schwarzkopf and Gen. Khalid decided to advance the time of the attack, MG Sulaiman met with MG Sallah at the Egyptian Corps Headquarters. At this meeting the two generals decided that, rather than disrupt the carefully prepared plans for the assault by trying to change all the times on such short notice, the Egyptians would make a two-battalion "raid" on the Iraqi outpost line and its minefields. MG Sallah decided to use two tank battalions from the 99th Armored Brigade of the 3rd Mechanized Division to conduct this raid and shifted countermine equipment to them for this operation.

Two hours later, at 1500 hours, the Egyptian artillery began a 20-minute preparation, which included fire from BM-21 multiple rocket launchers as well as fire from 122mm and 155mm guns. As soon as the preparation ended, two battalions of the 99th Armored Brigade attacked through gaps in the berm which engineers had cut the day before. The four lead tanks in each battalion were equipped with mine rakes and towed MICLICs. The attack was made slightly to the left of the sector where the rangers had sabotaged the fire trenches. Hence, when the Iraqis ignited the remaining fire trenches, the flames concealed the advancing troops. The breaches of the outpost line minefields were made between Iraqi strongpoints, far enough from each so that they could not bring effective fire on the attacking force. The raid was quite successful. By sunset on February 24 the 99th Armored Brigade had opened four lanes and was through this minefield. The plan called for the tanks to drop the rakes after passing through the minefield. They were to be picked up by the following mechanized brigades, which were to conduct the breach of the two principal mine belts. This plan proved too complicated, and the complete tank-rake systems were actually transferred to the following mechanized brigades.

The two mechanized brigades of the 3rd Mechanized Division followed the two tank battalions through the outpost minefield. In order to be in position to assault the First Defense Belt at the planned point, they needed to move slightly to the right, to the location where the Egyptian Rangers had sabotaged the fire trenches. By this time, however, darkness had fallen, and the two-kilometer space between the outpost line and the first fire trenches was extremely congested. The two brigades became intermingled, and the confusion required some time to sort out. Fortunately, the fire trenches had mostly burned out by this time, and Iraqi artillery fire was unobserved, sporadic, and ineffective. By dawn on February 25, the brigades were in position to launch the assault on the First Defense Belt.

The assault was conducted by the 10th Mechanized Brigade on the left and the 222nd on the right. Both brigades had recovered the mine rakes from the 99th Armored Brigade; thus each brigade had four tanks with mine rakes. Each of these tanks also towed a MICLIC trailer and each was followed by an engineer M113A1 towing another MICLIC. Each of these breaching teams was assigned to one of the eight planned breach lanes. In addition, each of the breaching brigades had two additional engineer platoons attached for the breach. The minefields in this area were only 70 meters deep, so one MICLIC was sufficient to make the breach in most cases.

Even though the fire trenches in the breach sector had been sabotaged, they remained obstacles, since they were six to eight feet deep. Some of the trenches were bypassed, but Armored Vehicle Launched Bridges (AVLB) were used to cross most of them. The two minefield belts were 100 to 150 meters apart in this area. Hence, the Egyptians continued the breaching operation through both minefields without a significant pause. During the breaching operation two platoons of tanks in each brigade provided suppressive fire. Nevertheless, the breaching forces and the accompanying infantry received indirect artillery fire for about 45 minutes before counterbattery fire could suppress the Iraqi artillery.

The breaching forces encountered some problems, especially in the leftmost lane, Red 1. The breaching tank assigned to this lane backed up and tipped the MICLIC trailer on its side. Then the tank continued forward without the crew realizing that the trailer was being dragged in its side. When the tank attempted to fire this MICLIC, the explosion caused extensive damage to the tank, although no soldiers were killed. In addition, a MICLIC charge on a trailer behind an M113A1 blew up, killing two soldiers and injuring several others. As a result of these difficulties, Lane Red 2 was opened much more quickly than Red 1. The breaching tank from Red 2 moved to Lane Red 1 and successfully breached the minefield from the enemy side. Its rake hit seven mines (some AT and some AP) without missing any, but its effectiveness after seven hits was questionable. In spite of these difficulties and the continuing Iraqi artillery fire, the Egyptians completed eight lanes soon after noon.

As soon as the lanes had been cleared through the minefields, the two mechanized brigades passed through and prepared to attack the Iraqi trench lines, which were located about 500 meters behind the Second Minefield Belt. The 10th Mechanized Brigade attacked to the left and the 222nd to the right to roll up the Iraqi defenses. The Iraqis appeared ready to mount a defense, but as soon as the Egyptians came within small arms range white flags appeared. Soon more than 1,500 Iraqis had surrendered, and the Egyptians spent most of the afternoon of February 25 collecting the remnants of the 20th Infantry Division.

Although some Iraqi small units in the outpost line fought well, most of the Iraqi units facing JFC-N were fighting without leadership. Most field grade officers and Ba'ath party members had left their units to attend mysterious "important meetings" elsewhere. Others simply left. They either left orders for the next few days or telephoned their orders to the units -- in many cases from Baghdad. For the Iraqi units they left, this made resistance much more difficult and surrender much easier.

To protect the breach site, the 10th Brigade set up blocking positions to the left and the 222nd Brigade to the right. The 99th Armored Brigade followed the two mechanized brigades through the minefields and set up blocking positions against any counterattack from the north. Preparing to continue the attack, the engineers of the 3rd Division widened the lanes to expedite the passage of the 4th Armored Division. By the end of the day on February 25, the Egyptians had successfully breached the Iraqi obstacle system and were preparing to continue the attack. Their casualties had been quite light: some 11 killed and 84 wounded, mostly from artillery fire during the breaching operation.

5. VII (U.S. Army) Corps

a. Sector, Mission, and Plan of Attack

The VII (U.S. Army) Corps, with one mechanized and three armored divisions and heavy artillery and engineer support, made the main effort. It was assigned a 115 km sector just west of the Wadi al-Batin, which formed the boundary between Kuwait and Iraq. See Figure 24. The mission of the corps was to break through the Iraqi defenses and attack to the north. After outflanking the Iraqi units defending in Kuwait, the Corps would pivot and attack to the east to destroy the Iraqi Republican Guard Divisions located in northern Kuwait and across the border in Iraq. The VII Corps attack was originally scheduled for G+1, February 25, just as was that of JFC-N. By midmorning on February 24, however, the marines and JFC-E were advancing so rapidly that Gen. Schwarzkopf advanced the time of the attack. Consequently, VII (U.S. Army) Corps actually attacked at 1500 hours on February 24.

LTG Franks' plan included a feint and an envelopment, much like the overall theater ground plan. On the east flank of the corps, the 1st Cavalry Division, still the theater reserve at this time, would conduct a series of feints and limited attacks at the Wadi al-Batin to convince the Iraqis that the main corps attack would come at this point. While Iraqi units

reinforced against these attacks, the 1st Infantry Division would conduct a deliberate breach of the Iraqi Defense Belt farther to the west, along the division boundary between the Iraqi 48th and 26th Infantry Divisions. The 1st (UK) Armored Division would follow the 1st Infantry Division through the breach and then turn to the east to destroy the Iraqi armored reserves threatening

Figure 24. VII (US) Corps Sector and Operations on February 24, 1991

the right flank of the corps. The 2nd Armored Cavalry Regiment would lead the 1st (US) Armored and the 3rd (U.S. Army) Armored Divisions around the lightly defended Iraqi west flank.

b. 1st (U.S. Army) Infantry Division

The 1st Infantry Division's deliberate breach of the Iraqi Defense Belt was obviously a key to the success of the VII Corps attack. Consequently, it was planned very carefully and rehearsed several times. MG Rhame, the division commander, planned to concentrate his forces on a very narrow front and support the attack with massed artillery fires. The two lead brigades would mass their forces on a narrow front, penetrate the defenses, and then roll up the flanks to enlarge the breach. The division massed 241 tanks and more than 100 M2 Bradleys on a frontage of 6 kilometers -- a density recalling those of world war II battles. At the points of penetration, U. S. mechanized battalions were attacking Iraqi platoon positions. Moreover, the Americans knew precisely where the Iraqi positions were located. The Air Force had produced extremely detailed aerial photographs of this area, and these had been supplemented by photographs from satellites and from low level drones. Figure 25 compares the U. S. Intelligence information on some of these positions with captured Iraqi diagrams of the same positions. The captured Iraqi commander of the 110th Infantry Brigade of the 26th Infantry Division ruefully commented that the Americans had more accurate information on the location of his troops than was available to him.

This detailed information on Iraqi positions made the planned artillery fires very effective. To support the attack, a tremendous amount of artillery was available. In addition to the division artillery of the 1st Infantry Division and that of the 1st (UK) Armored Division, three entire artillery brigades and 10 Multiple Launched Rocket System (MLRS) batteries were allocated to support the attack. This amounted to more than 350 howitzers or 22 guns for each kilometer of the attack zone. This density also approached that of world war II battles -- at Kursk, for example, the Russian 6th Guards Army had 26.3 guns and mortars per kilometer of front. Originally, the U. S. fire plan called for a three-hour fire support program before the attack, but this was shortened to an intense 30-minute barrage when the time of the attack was advanced.

The division also did a great deal of planning and rehearsal for the actual breaching operation. To be sure, the Iraqi Defense Belt at this point was not nearly so formidable as in the marine or Egyptian Corps sectors. There was only one belt of minefields, and

Figure 25. Iraqi Positions Facing 1st Infantry Division: U. S. Intelligence Template and Iraqi Diagram

each of the minefields was reported to be less than 100 meters deep. Nevertheless, the 1st Division planners treated the breaching problem with great seriousness. At first, they planned to breach lanes in the minefields by using three tanks with Track Width Mine Plows in echelon. Each of the following two tanks would slightly overlap the path of the lead tank to create a cleared lane at least two tank widths wide. Although this approach was in accordance with doctrine, it did not work well in tests in the desert. The outside edge of the plows of the following tanks dug into the piles of spoil left by the lead tank, lifting the inside edges a few inches and causing the blades to pass over test mines. The first demonstrations of the MICLIC were also not very promising. One company commander noted that by January 26, he had witnessed seven MICLIC firings, only two of which worked properly. Consequently, the commanders decided to use a tank with a track width mine plow to clear each lane, with a mine roller or mine rake to proof the lane. Thus each breach team would lead with a track width mine plow, followed by a roller or a mine rake, followed by an Armored Vehicle Launched Bridge with two MICLICs, followed by an engineer squad in an M113A2. Each of the four leading battalion task forces, supported by a company of engineers, would open four one-way lanes initially, plus an additional return lane for each task force.

At 0530 hours on February 24, the 1st and 2nd Brigades moved through gaps the engineers had cut in the border berm and attacked the Iraqi security zone, a 10 kilometer deep area south of the main enemy fortifications. Their mission was to eliminate the enemy observation posts and local security patrols in preparation for the deliberate breach scheduled for the next day. Each brigade advanced with two battalion task forces leading. Each task force was spread across a 6 km front. By 0915 the operation had been completed. Opposition was light -- many of the Iraqis surrendered. Although this preliminary attack alerted the Iraqis, it blinded them as to precisely where it would come and eliminated their ability to put observed artillery fire on the advancing U. S. units. The 1st Infantry Division units regrouped and prepared for the deliberate breach the next day.

Thus when the time of the attack was advanced, the lead brigades were ready to move out, although the change produced major difficulties for artillery and logistical units. At 1400 hours a concentrated, 30 minute fire support program began. In this brief period of time some 11,000 rounds of artillery and 414 MLRS rockets, dispersing more than 600,000 explosive bomblets (Dual Purpose Improved Conventional Munitions -- DPICM), were fired into the sector. Even though the Iraqi units were dug in, the psychological impact of the artillery preparation was enormous. As the commander of the 48th Infantry Division later described it, "The earth shook!" The targeting was also quite good. For example, artillery positions were prime targets in an effort to reduce fire on the units conducting the breach. The Iraqi 48th Infantry Division Artillery Group had had 100 guns on January 17. During the air campaign, it lost 17 guns. During the artillery preparation, every one of the remaining 83 guns was destroyed.

At 1500 hours the 1st Infantry Division began the attack, with the 1st Brigade on the left and the 2nd Brigade on the right. Each brigade attacked with two mechanized infantry heavy battalion task forces forward and a tank heavy task force in reserve. Each of the two lead companies in the leading task forces had two breaching teams. The remaining tanks and all the M2 Bradleys put suppressive fire on the Iraqi positions. The breaching followed the drills which had been rehearsed many times. A tank with its Track Width Mine Plows lowered led each team through the minefield. In the 2nd Brigade these were followed by tanks with rollers to proof the lanes. In the 1st Brigade, however, Combat Engineer Vehicles with mine rakes were used. Engineers dismounted from their M113A2s to mark the lanes. The AVLB mounted MICLICs stood by, ready for use in case of problems, but none were fired during the breach. (However, one MICLIC was later fired on a protective minefield located 3 kilometers northwest of the breach zone.) The remainder of the task force's tanks and Bradleys followed through the sixteen cleared lanes. As soon as each of the tanks with blades reached the trench lines, each turned 90 degrees and drove down the trench, filling it in. The other tanks and the Bradleys provided covering fire. No infantry dismounted to clear the trenches. Figure 26 shows detailed sketches of the breaching operation conducted by Company D, 3rd Battalion, 37th Armor as part of the 2nd Brigade. The same drill was used by the other breaching companies, except that the units of the 1st Brigade used mine rakes instead of mine rollers. While the two breaching task forces in each brigade enlarged the breach, the tank heavy task force in reserve, the 4th Battalion, 17th Armor and the 1st Battalion, 34th Armor, passed through the breached lanes and fanned out to deepen the bridgehead. They destroyed scattered artillery positions, several trucks, and a number of bunkers and machine gun positions. By the end of the day the 1st and 2nd Brigades had reached Phase Line Colorado, about 20 kilometers beyond the Iraqi front line of defense. During the night, the 1st Infantry Division took up defensive positions and prepared to continue the attack the next morning.

Figure 26. Breaching Operation Conducted by Company D, 3rd Battalion, 37th Armor

As soon as the combat forces of the two lead brigades had passed through the minefields, corps engineers of the 588th and the 317th engineer battalions began widening the cleared lanes to facilitate the passage of the 3rd Brigade and the 1st (UK) Armored Division. Each lane was widened to about 100 meters and marked with painted 4 by 8 foot signs, arrows, and funnel markings leading into and out of the minefield. The lanes were labeled alphabetically from left to right. Figure 27 shows how these markings appeared to a British unit making the passage on February 25. Since these corps battalions had no mine clearing equipment except hand-held mine detectors, it was fortunate that there were not many mines. (However, the British 32nd Armoured Engineer Regiment, which led one of the British columns to the breaching site, had Aardvark mine flails, but they were not needed.) In widening the 8 lanes in the 1st Brigade Sector, for example, the 317th Engineers found only about 6 mines. There were, however, large numbers of unexploded Coalition bomblets. Although these presented no danger to armored vehicles, they could disable wheeled vehicles and could be fatal to anyone on foot. During the widening

operation, the engineers interrupted traffic about every 45 minutes to destroy mines and bomblots.

The 1st Infantry Division's breaching operation was very successful. Before the attack, U. S. planners had estimated that breaking through the Iraqi Defense Belt might require 18 hours and that casualties in the engineer and breaching units would be heavy -- up to 80% in some estimates. In fact, the breach was accomplished in less than two hours, and casualties were very light. (In the 1st Brigade one soldier was killed by a bomblot and there were a few wounded. There were no casualties at all in the 2nd Brigade sector.) During the day the 1st Infantry Division had breached the Iraqi Defense Belt, destroyed two brigades of the 26th Infantry Division (434th and 110th Brigades) and captured 2,500 prisoners. The 3d Brigade was scheduled to pass through the breach at first light on February 25, followed by the 1st (UK) Armored Division.

c. 1st (U.S. Army) and 3rd (U.S. Army) Armored Divisions and 2nd Armored Cavalry Regiment

As Figure 24 indicates, the 1st (U.S. Army) and 3rd (U.S. Army) Armored Divisions were assigned attack sectors to the west of the 1st Infantry Division. Their mission was to attack to the north and, moving quickly, outflank the Iraqi units in Kuwait. Then they would turn and attack to the

Figure 27. Signs for Cleared Lane November

east to destroy the Iraqi Republican Guard Divisions. Their initial objective was the Iraqi logistical base of al-Busayyah, some 120 km north of the border.

The Saddam Line, the Iraqi Defense Belts and minefields which began on the beaches of the Gulf and extended westward all along Kuwait's southern boundary, ended in the sector of the 1st Infantry Division. Hence the 1st (U.S. Army) and 3rd (U.S. Army) Armored Divisions did not face the problem of making a deliberate breach in minefields covered by fire. They did expect, however, to encounter protective and defensive minefields during the advance, and were prepared to breach them. What they were less well prepared for was the large numbers of unexploded bomblots they encountered. The first encounter with one of these bomblots occurred near the border berm, when an NBC team dismounted from their Fuchs NBC reconnaissance vehicle. One of the soldiers threw a rock at a bomblot and detonated it, injuring all three soldiers. Such bomblots remained a serious problem for the remainder of the war, and a considerable engineer effort was devoted to clearing them.

Since there were no extensive minefields or defensive positions in their sectors, the 1st (U.S. Army) and 3rd (U.S. Army) Armored Divisions conducted an advance to contact. The 1st Armored Division was assigned a 25-km sector, while the 3rd Armored Division had only a 15-km front. Hence the 1st Armored Division advanced in a wedge formation, with the 1st Brigade in the lead followed by the 2nd and 3rd Brigades abreast. Because of its narrow sector, the 3rd Armored Division advanced in a column of brigades, with each brigade in a wedge formation. In both divisions each brigade had an engineer battalion in support, and the engineers were positioned well forward to provide in-stride breaching, breach marking, and other mobility support. The 2nd Armored Cavalry Regiment advanced about 30 minutes ahead of the two armored divisions to clear minor enemy forces and locate any major ones. The regiment had been reinforced with the 82nd Engineer Battalion and three artillery battalions, in addition to its organic engineers (the 84th Engineer Company) and artillery.

The Line of Departure for the two armored divisions was the berm which marked the boundary between Saudi Arabia and Iraq. At 0530 on February 24, 16 dozers of the 19th Engineer Battalion, a Corps battalion, began cutting breaches in the berm. By noon they had cut 45 lanes, each 8 meters wide, through the berm and by mid afternoon more than 250 lanes. At 1430 lead elements of the two armored divisions began crossing the berm. The 2nd Armored Cavalry Regiment had moved through the berm the day before and was already some 20 kilometers inside Iraq. On February 24, the regiment began its advance at 1430 hours. An aerial screen from the 4th Squadron and a thin line of Bradleys led the way. The 1st and 3rd Squadrons followed on line 10 kilometers behind, with a denser formation of M2 Bradleys and M1 Abrams tanks. They advanced rapidly -- more than 40 kilometers in two hours. They encountered no minefields and only light opposition, although some of the lead elements fought fleeting engagements with small Iraqi units during the afternoon. For example, Troop L on the regiment's eastern flank reported nine engagements over a space of twenty kilometers against T-55 tanks, BMPs, infantry,

and bunkers. They destroyed one T-55, a PT-76 light tank, and a BMP and took 300 prisoners. Behind the cavalry screen the leading brigades of the armored divisions began moving through the berms. By 1800 hours the lead elements had advanced some 15-20 km into Iraq. However, the berms continued to act like filter and slow down the divisions, in spite of the large number of passages cut. A U. S. armored division is a large organization, with more than 8,000 vehicles. The 1st Armored Division in wedge formation stretched about 80 kilometers from front to rear, and the 3rd Armored Division, in a column of brigades, over 100. Thus much of the divisions' combat power was still in Saudi Arabia at the end of the day. After discussions with his division commanders, LTG Franks decided to halt the advance of the 2nd Armored Cavalry Regiment to allow time for the armored divisions to close up. The attack would continue at dawn the next day.

6. XVIII (U.S. Army) Airborne Corps

a. Sector, Mission, and Plan of Attack

The XVIII (U.S. Army) Airborne Corps was the westernmost corps of the Coalition Forces. Its mission was to defend the western flank, to attack to the Euphrates River to cut Highway 8, the principal line of supply and withdrawal of the Iraqi forces in Kuwait, and then to attack to the east to assist VII (U.S. Army) Corps in the destruction of the Iraqi Republican Guard armored and mechanized divisions. To accomplish this mission, the corps was assigned an unusually disparate collection of forces: a French light armored division, an American Airborne division, an American Air Assault division, an American mechanized infantry division, two American aviation brigades, and an American armored cavalry regiment.

LTG Luck and his staff developed a plan which took maximum advantage of the strong points of each of his subordinate units. The mission of protecting the Corps (and Army) western flank he assigned to the French 6th Armored Division, which had two regiments (battalion-sized formations) of heavy armored cars mounting 105mm guns, one regiment of AMX-30 tanks, and infantry and engineers mounted in VAB wheeled armored personnel carriers. The division was given operational control of the 2nd Brigade of the 82nd Airborne Division, transported by wheeled trucks, to provide additional infantry. The French division was also supported by the U. S. 27th Engineer Battalion and 18th Artillery Brigade. The mission of attacking quickly to the Euphrates to cut Highway 8 was assigned to the 101st Air Assault Division, with its hundreds of helicopters. The 24th Mechanized Infantry Division was to attack through Iraqi forces in its sector to the Euphrates and then turn east to attack the Republican Guard Forces. The 3rd Armored Cavalry Regiment would protect the right flank of the corps and maintain contact with the forces of VII Corps. The remainder of the 82nd Airborne Division, mounted in trucks, would follow the French 6th Armored Division. The attack was scheduled for G-Day, February 24. Figure 28 shows the plan for the initial attacks.

b. 6th (FR) Armored Division (Daguet)

There were very few roads or trails in the entire XVIII Corps area. In the 6th (FR) Armored Division sector, however, the Iraqis had constructed a paved, two-lane road from Samawah on the Euphrates River south to the Saudi Arabian border near Rafha. At the small town of As Salman this road connected with another highway parallel to the Euphrates and to the border. In an area without other roads, these were naturally a focus for XVIII Corps logistical planners, who needed high speed routes for their many wheeled vehicles. The north-south route was called Main Supply Route (MSR) Texas, and the east-west route MSR Virginia. The roads also attracted the concern of Iraqi planners. Although they did not anticipate major operations west of the wadi al-Batin, they recognized that the north-south road through As Salman would provide a possible route of approach into the heart of Iraq. Hence the Iraqi 45th Infantry Division, a veteran of the Iran/Iraq War, was assigned responsibility for its defense. The division headquarters was at As Salman, and two of its brigades were located on the north-south route. (The third brigade was located in the 101st Airmobile Division sector.)

The 6th (FR) Armored Division was assigned the mission of attacking the Iraqi forces in its sector, seizing the airfield and road junction at As Salman, and defending the west flank of the XVIII Airborne Corps. To accomplish this objective, BG Janvier, the division commander, and his staff developed a rather complex plan, which is shown in Figure 29. The French planned to attack along two parallel axes. The main effort, with the tank regiment, a mechanized infantry regiment, and the 2nd Brigade of the 82nd Airborne Division, would be

Figure 28. XVIII Airborne Corps Plan of Attack

Figure 29. Overall Scheme of Maneuver for the 6th (FR) Armored Division

in the east, where the road and the bulk of the Iraqi forces were located. As Salman, with its airfield and the headquarters of the Iraqi 45th Infantry Division was Objective White. The location of the forward elements of two Iraqi brigades was Objective Rochambeau. On the west axis the principal forces were two armored cavalry regiments equipped with the AMX-10RC, a six-wheeled heavy armored car with a 105mm gun. This force would screen against any attack from the west and would be in a position to assist the main effort by attacks from the flank should this be necessary. The objectives shown on this axis were possible locations of Iraqi company positions. Both forces would have massive artillery support. In addition to the French artillery regiment assigned to the division and the division artillery of the 82nd Airborne Division (with 105mm howitzers), the American 18th Artillery Brigade (with 155mm howitzers and MLRS) provided direct support. Thus the division had about 100 guns and rocket launchers to support its attack. The French artillery commander commented that no French division in history had ever had so much artillery support. Additional fire support was provided by the two French combat helicopter regiments and the U. S. Air Force.

The terrain did not favor the attack. Just north of the frontier was a steep natural escarpment that stretched all across the division sector. This escarpment was accessible to vehicles only at a few passes without considerable engineer effort. The southern objectives shown on Figure 29, Nachez, Falcon, and Montcalm, represented seizing the passes and controlling the escarpment in order to launch the attack. A relatively few troops on the escarpment, with the passes mined, could easily conduct an effective defense and inflict significant losses on the attacker. BG Janvier, the division commander, was quite concerned about the danger of mines. He wrote, "Mines and chemical weapons are my principal worries. Undoubtedly mines will be located in the passes that I must seize in order to launch the attack. There will probably also be mines in front of the defense positions, where the Iraqis are thoroughly dug in. There will probably also be mines around the airfield at Al Salman."

To defeat the mine threat, the French had three remote-controlled AMX-30 tanks equipped with KMT-5 mine rollers, in addition to hand-held mine detectors and probes. In addition, six U. S. MICLICs from the 27th Engineer battalion were attached. These were towed by French VAB wheeled armored personnel carriers of the 6th Foreign Legion Engineer Regiment. Two U. S. engineers rode inside the armored personnel carriers to launch the MICLICs. The mine rollers and the MICLICs were expected to be very useful in case extensive minefields were found in the flat terrain to the north, but neither would be very effective in clearing mines from the passes in the escarpment.

Fortunately, the Iraqis decided not to mount a serious defense of the escarpment. The commander of the Iraqi 45th Division decided instead to position his major forces astride the highway, with the 841st Brigade east of the highway and the 842nd Brigade on the west. The escarpment was occupied only by the light forces of the 17th Border Guard Brigade, who had neither the forces nor the will to mount a sustained defense. On the night of 23/24 February the 6th Division seized the critical passes in a series of infantry small unit engagements. The 2nd Foreign Legion Infantry Regiment took Objective Nachez, the 2nd Brigade of the 82nd Airborne captured Objective Falcon, and the 3rd French Marine Infantry Regiment occupied Objective Montcalm. There was very little opposition, and no significant mining. However, MSR Texas was cratered at the top of the escarpment. The Border Guard withdrew very quickly and played no further part in the campaign.

The main offensive began at first light on February 24, after an artillery and air bombardment. By 1130 hours the French had reached the Iraqi position at Objective Rochambeau. The Iraqis were dug in on both sides of the highway. Instead of attacking straight up the highway, the 4th Dragoon (Tank) Regiment swung to the east and attacked from the flank. The Iraqis were unprepared to face an attack from this direction and, after a brief firefight, began surrendering in large numbers. Although the French identified what appeared to be protective minefields, these proved to be either dummy minefields or dud bomblets. One member of the 6th Foreign Legion Engineer Regiment, however, was wounded by a bomblet while checking one of these minefields -- the first French casualty of the operation. By the end of the day, the French were in possession of Objective Rochambeau, except for its northern tip, which was called Objective Chambord. Their advance toward Objective White and As Salman was delayed more by the

large numbers of surrendering Iraqis than by Iraqi opposition or minefields -- by 1700 hours they had captured more than 2,000 prisoners of war.

On the west axis the French encountered a number of company and platoon positions but no minefields and no significant opposition. In the Iraqi positions they found abandoned food, water, ammunition, and even weapons. Hence the French forces advanced rapidly during the February 24 through Objectives Pollux, Nimes, and Valence. By the end of the day they had reached Objective Castor and were prepared to assist in the attack on Objective White the next day.

Thus on the first day of the ground war the French had been very successful. They had seized their planned objectives and destroyed about half the combat power of two brigades of the 45th Division. They were poised for an assault on As Salman and its airfield and road junction on the following day. Although the French had been quite concerned about possible Iraqi minefields and were prepared to breach them, they actually encountered only some small protective minefields.

c. 101st Airborne Division (Air Assault)

The objective of the 101st Airborne Division, Highway 8 just south of the Euphrates River, was too far north to be supported from the division's base in Saudi Arabia. Consequently, the division planners decided to establish an intermediate base, Forward Operating Base (FOB) Cobra about 90 miles north of the border. The location they selected was just south of the east-west road which began at As Salman (MSR Virginia) and was only about 35 kilometers from that town. MG Peay planned to seize the area with his 1st Brigade, bring in supplies both by land and by helicopter, and use the base to cut Highway 8.

The helicopters for the initial assault were scheduled to take off at 0530 hours on G-Day, February 24, but they were delayed for two hours because of dense fog. At 0727 hours the 66 UH-60L Blackhawk and 30 CH-47D Chinook helicopters carrying the first 500 soldiers took off. Forty minutes later they began to touch down in the landing areas. After touchdown the infantry fanned out to secure the landing areas and the artillerymen prepared their 105mm howitzers to fire. The landing was unopposed. Only two minutes after the infantry had landed, support troops began arriving to set up refuel points. At about 1000 hours, however, AH-1S Cobra attack helicopters reported Iraqi troops dug in along the east-west road. This was the 1st Battalion, 82nd Brigade of the 45th Iraqi Infantry Division. After an intense bombardment by Air Force A-10s, Cobra and Apache helicopters, and 105mm artillery, the Iraqi battalion commander and his 340 men surrendered. The afternoon was devoted to bringing in more troops and supplies. Eventually more than 300 helicopter sorties were used to ferry troops and equipment into FOB Cobra in one of the largest Air Assault operations in military history. In addition, a convoy of some 700 vehicles arrived soon after dark. Their arrival marked the opening of a land supply route, MSR New Market, cut through the desert by the division's 326th Engineer Battalion. They had encountered no mines and relatively few bomblets. By the end of the day, FOB Cobra was secure and helicopters operating from FOB Cobra had begun to attack traffic on Highway 8.

d. 24th Infantry Division (Mechanized) and 3rd Armored Cavalry Regiment

In the XVIII Corps plan the 24th Infantry Division (Mechanized) had the central role of blocking the route south of the Euphrates River with heavy forces to prevent the escape of Iraqi forces in Kuwait and then attacking to the east in coordination with VII Corps to destroy the Republican Guard armored and mechanized divisions. This mission would require the division to move farther and faster than the other mechanized and armored divisions in the theater. However, the division sector contained no fortified Iraqi Defense Belt, no extensive minefields, and, in the portion of the sector close to the Saudi border at least, virtually no Iraqi forces. The division's west flank would be protected by the 101st Airborne Division, which was scheduled to advance even more quickly. The division and Corps east flank would be covered by the 3rd Armored Cavalry Regiment, which would maintain contact with VII Corps.

Like the VII Corps and JFC-N, the 24th Division was originally scheduled to attack on G+1, February 25. Because of early coalition success, however, the time of the attack was advanced to 1500 hours, February 24. General McCaffrey began the division attack with three brigades on line: the 197th Infantry Brigade on the left, the 1st Brigade in the Center, and the 2nd Brigade on the right. Each brigade had an entire combat engineer battalion attached. Six hours before the main attack the division's reconnaissance unit, the 2nd Squadron, 4th Cavalry, had

moved across the border and begun scouting to the north along the two axes of advance, X-ray on the left and Yankee on the right. The reconnaissance produced little evidence of the enemy, and the rapid advance of the brigades confirmed the scouts' reports. About 45 km. into Iraq the division transitioned into a formation with two brigades abreast and the 1st Brigade following the 2nd Brigade on the right.

During this advance, battalions of the 24th Division generally moved in "battle box" formation, with a cavalry troop screening 5 to 10 miles to the front and four companies in the corner positions. Heavier units of the battalion -- tanks or Bradleys -- occupied the front corners. One company often advanced outside the formation to provide flank security. Inside the box were the logistical vehicles carrying the ammunition, food, water, and fuel needed to continue the advance in jumps of about 40 miles. The box covered a front of about 4 to 5 miles and extended about 15 to 20 miles front to rear.

Following the armored cavalry screen, the division advanced rapidly to the north, maintaining a speed of 25 to 30 miles per hour. In the flat, virtually featureless terrain, the brigades and battalions kept on course with the aid of long-range electronic navigation, a satellite based triangulation system in use for years before Desert Storm. Some small units also had commercial Global Positioning Systems (GPS). Of course, many follow-on and logistical units did not have this equipment. To prevent their getting lost, engineers from the 36th Engineer Group marked the routes with blinking, light-sensitive yellow construction lights mounted on engineer stakes. Combat Heavy Battalions of the 265th Engineer Group assumed the mission of improving these routes for wheeled traffic.

About midnight MG McCaffrey halted his lead brigades about 75 miles inside Iraq, on a line roughly as far north as Objective White (As Salman) in the French 6th Division Sector and just south of Forward Operating Base Cobra in the 101st Airborne Division Sector. Thus on February 24, all three divisions of XVIII Airborne Corps had established positions deep inside Iraq and were poised to continue the attack on the following day. Only the 6th Armored Division had encountered any serious opposition, and even this was much lighter than had been anticipated. Unlike the situation farther to the east, there were few Iraqi minefields in the XVIII Airborne Corps sector and they had little effect on the operations on February 24.

7. Summary of Operations on G-Day, February 24

As they prepared to launch the ground offensive on G-Day, February 24, the Coalition Forces faced a formidable task. From the beaches of the Persian Gulf to a point west of the wadi al-Batin the Iraqis had constructed two formidable Defense Belts with deep minefields and prepared entrenchments. Although the Coalition Forces had procured additional countermine equipment and trained intensively to breach these defense belts, they expected to have difficulties and feared that casualties might be heavy. At the end of the day, however, the Saudi Arabian forces, the two marine divisions, the Egyptian 3rd Mechanized Division, and the U. S. 1st Infantry Division had all succeeded in breaching the Iraqi defense belts and were poised to continue the attack. Casualties had been remarkably light. Farther to the west, where there were no extensive fortifications and minefields, the French 6th Armored Division, and the U. S. 101st Airborne and 24th Mechanized Infantry Divisions were moving quickly around the flank of the Iraqi defense and were already threatening the Euphrates River valley and the Iraqi lines of communication with their forces in Kuwait.

Figure 30. 24th Mechanized Division Attack on February 24, 1991

To be sure, even after the Coalition Forces had breached the main Iraqi Defense Belts, many other Iraqi minefields remained. But their tactical importance was much less. Instead of two dense belts of minefields, covered by artillery and small arms fire and stretching across the entire southern border of Kuwait, what remained was only a number of relatively small protective and nuisance minefields. Many of these could be bypassed relatively easily as the Coalition Forces continued their advance. By the end of the day on February 24, the Coalition Forces had essentially resolved the bulk of their problems with the Iraqi minefields.

M. FEBRUARY 25, 1991 (G+1)

1. Joint Forces Command East (JFC-E)

At dawn on February 25, Joint Forces Command East (JFC-E) resumed their advance. Task Forces Othman and Omar continued their advance north against the light resistance of the Iraqi 18th Infantry Division and with very few casualties. Their advance was slowed more by the large number of Iraqis who surrendered than by organized Iraqi resistance. By evening they had reached Schuaiba and Ahmadi, about 10 km. south of Kuwait International Airport. Task Force Abu Bakr, the 2nd Saudi Arabian National Guard Brigade, continued to advance up the coastal highway. The number of roadblocks and barriers diminished as they moved north. The Saudi Arabian Marine Battalion of Task Force Tariq liberated the Kuwait Naval Base of Ras Al-Jalayh. Late in the evening the Kuwaiti Resistance reported that the Iraqis were withdrawing from Kuwait City, and the Kuwaitis began organizing a reconnaissance force to verify these reports.

2. 1st marine expeditionary force (MEF)

a. 1st marine division

In the 1st marine expeditionary force sector, however, the Iraqis were still ready to fight on February 25. During the night both marine divisions had halted and assumed defensive postures. Intelligence reports indicated that the Iraqis were planning to mount counterattacks against both divisions, but it was not clear where and when the attacks would come.

The 1st marine division spent most of the morning of February 25 fighting off a series of Iraqi counterattacks in what the division history called "The most important engagement fought by 1st marine division during the war." The counterattacks were conducted by three Iraqi brigades: the 501st Brigade of the 8th Infantry Division, the 22nd Brigade of the 5th Mechanized Division, and the 15th Mechanized Brigade of the 3rd Armored Division. The counterattacks were probably planned as a coordinated series of operations, but because of poor execution and the limited visibility due to the oil field fires and a dense morning fog, they turned into a series of individual battalion task force attacks. In spite of intelligence warnings, the Iraqis obtained tactical surprise by attacking from the burning Burqan Oilfield. At about 0730 hours a battalion of the 22nd Brigade moved toward the command post of Task Force Papa Bear through the smoke and fog. The first thing the commander and his staff knew of the attack was when an Iraqi tank appeared only 50 meters away. Fortunately these Iraqis, a major and some 20 men, wanted to surrender. Thus the marines were ready when the rest of the Iraqis with 50 vehicles arrived a few minutes later looking for a fight. The marines beat off the attack and alerted other forces. A few minutes later the 501st Iraqi Brigade attacked the 1st Tank Battalion. The marine tank battalion first halted the Iraqis and then attacked, advancing some 2000 meters through the Iraqi brigade. Although these marine tankers were equipped with the M60A1 rather than the newer M1s, they achieved high rates of success with armor-piercing discarding sabot depleted uranium rounds.

However, the counterattacks were not over. At 0930 hours the Iraqi 15th Mechanized Brigade, attacking to the south, ran into the 1st marine Division command post. Fortunately, B Company of the 1st LAI battalion had been assigned to provide security and it was able to beat off the initial attack. The Iraqis regrouped and attacked again, but by this time the fog had cleared and the marines had called in Cobra gunships. The arrival of the helicopters marked the end of the Iraqi initiative in their attack on the division command post. A few hours later an aerial count indicated that more than 60 Iraqi vehicles had been destroyed in this engagement.

After spending most of the morning beating off Iraqi counterattacks, the 1st marine division resumed their advance in the afternoon. By 1600 Task Force Papa Bear had reached the limit of their advance, roughly half way through the Burqan Oilfields. Task Force Grizzly had relieved a battalion of Task Force Ripper at the Al-Jaber Air Base. Although the air base was not defended, it was littered with unexploded munitions. The marines stopped for the night and deferred seizing the main buildings until the next day. Thus during the fighting on February 25, the 1st marine division successfully defeated a series of Iraqi counterattacks and was prepared to continue their advance to the north toward their objective, the Kuwait International Airport, now less than ten miles away. In sharp contrast to the breaching operations on the day before, countermine operations played little part in the combat on February 25.

b. 2nd marine division

In the 2nd marine division sector the first Iraqi counterattack hit the 8th marines at about 0600 hours in what has been called the "Reveille Counterattack." A battalion task force of the

Iraqi 8th Mechanized Brigade of the 3rd Armored Division with T-72 tanks conducted the attack. The reserve marine tank company attached to the 8th marines, Company B, 4th Tank battalion, was equipped with M1A1 tanks loaned to them from the U.S. Army, and their thermal sights detected the Iraqis through the morning fog and the smoke from the burning oil wells. Captain Parkinson, the marine tank company commander ordered his tanks to engage, and they were soon joined by the other weapons of the marine task force, including a number of TOWs. The battle was decided in the first two minutes. The Iraqis first became aware that they were under attack when their tanks began exploding. They attempted to withdraw but could not see the marines and did not know where the TOWs and tank guns were located. After the brief but intense firefight, 34 out of 35 Iraqi tanks were out of action (30 T-72s and 4 T-55s), in addition to 9 BMPs. There were no marine losses thanks to the technical supremacy of the U.S. Army tanks being borrowed.

This counterattack was apparently part of a planned brigade operation, but with its failure the Iraqis facing the 2nd marine division fought from prepared positions during the remainder of the day. The 2nd marine division advanced steadily toward its objective, the road intersection near Al Jahra, about 33 km. west of Kuwait City. On the left flank the 1st Brigade, 2nd Armored Division (U.S. Army "Tiger" Brigade) cleared two large bunker complexes and captured several hundred prisoners, including the acting commander of the 39th Infantry Brigade of the 7th Infantry Division. Later in the day they also captured the commander of the 116th Brigade of that division. In the center the 6th Marines cleared the buildings and bunkers of the area known as the "ice tray," and on the right the 8th marines cleared a similar but smaller area called the "ice cube." At the end of the day the division was well in advance of the forces in its left and right. Therefore, the division halted at Phase Line Horse (See Figure 31) and consolidated their positions for the night.

3. Joint Forces Command North (JFC-N)

On February 25 Joint Forces Command North (JFC-N) continued their steady advance against the IV Iraqi Corps. On the eastern axis the Saudi and Kuwaiti forces turned to the right and attacked to the east against minimal opposition. By 1700 hours the 35th Kuwait Brigade had reoccupied its own base south of the Salmi Road.

On the western axis, the Egyptian 3rd Mechanized Division pushed north to enlarge the breachhead. The division objective was the village of al-Abraq, where the Headquarters of the Iraqi IV Corps was located. The Egyptian attack was conducted in a deliberate, step-by-step style. The 222nd and 10th Mechanized Brigades established blocking positions north and west of the village and the 99th Armored Brigade attacked from the south. The twenty brick and cinderblock buildings which constituted the village had been destroyed by air and artillery

Figure 31. Situation of 2nd marine division on G+1, February 25, 1991

bombardment, but many of the Iraqis had survived in well-designed bunkers. At about 1000 hours the remaining defenders, about 1000 men, surrendered.

After following the 3rd Mechanized Division through the breaches in the minefields, the 4th Armored Division wheeled to the right and attacked to the east. Its objective was Ali al-Salem Airfield, about 40 miles from the breach site. The Egyptians encountered no minefields and no combat on the way. However, they moved relatively slowly to avoid leaving their artillery and support units behind. Most of their artillery was towed and had difficulty keeping up with the tanks and armored personnel carriers over the rough terrain. Just after dark the Egyptians arrived in the vicinity of the airfield and began coordinating with the marines and the U.S. Army Tiger Brigade to begin occupying the airfield. Ali al-Salem Airfield was a picture of destruction. The hardened aircraft shelters had been destroyed with Iraqi aircraft inside, the runways had been cut by British JP 233 munitions, and there were unexploded munitions throughout the air base. Consequently the Egyptians decided to delay occupying the airfield until first light the next day.

4. VII (U.S. Army) Corps

a. General

On February 25 VII (U.S. Army) Corps advanced against light to moderate opposition, preparing for an attack on the Revolutionary Guards units on the following day. The British 1st Armored Division passed through the lanes breached by the 1st (U.S. Army) Infantry Division, wheeled to

the right and attacked to the east. The U. S. 1st and 3rd Armored Divisions advanced, seized their objectives, and began their turn to the right which would take them against the Revolutionary Guards. See Figure 32. Although Iraqi opposition on February 25 was not heavy, a major concern of LTG Franks was to keep the heavy forces of the corps together so that he could strike the Revolutionary Guard divisions with a coordinated attack and not a series of small-scale attacks. He was also concerned about the possibility of a major Iraqi counterattack from the east. Consequently, he assigned the 1st British Armored Division the mission of destroying the forces which could carry out such an attack.

b. 1st (U.S. Army) Infantry Division "Big Red One"

At first light on February 25, the 3rd Brigade of the 1st Infantry Division passed through the breach lanes and attacked to the north to enlarge the breachhead. They found no additional

Figure 31. VII Corps Operations on February 25 (G+1)

minefields, and quickly destroyed the few Iraqi tanks and armored personnel carriers they encountered. Meanwhile the 1st Brigade attacked to the west and the 2nd Brigade to the east, both hitting the Iraqi positions from the flank. By 1100 hours all three brigades had reached Phase Line New Jersey, the planned limit of advance, and were ready to support the passage of the 1st British Armored Division. They had captured about 1,500 Iraqis and suffered only light casualties. One Soldier from the 2nd Brigade had been wounded by an antipersonnel mine, and two Soldiers killed and two wounded by bomblets.

c. 1st (UK) Armored Division

At about 1100 hours the British 1st Armored Division began passing through the cleared lanes in the Iraqi minefields. Although they were equipped and trained to make their own breaches -- the leading British engineer unit even had Aardvark Mine Flails -- this was not necessary. Several British officers commented on how effectively the lanes had been widened and how clearly they had been marked with large 4 by 8 foot plywood signs. Nevertheless, moving the division through the lanes was a relatively slow process. The armor-heavy 7th Brigade led through the breach, and it did not cross Phase Line New Jersey until about 1500 hours. The 4th Brigade was about four hours behind. Once the passage of lines was completed, both brigades turned and attacked to the east, with the 7th Brigade on the north. Their objectives, named for metals, are shown on Figure 32. These objectives represented positions occupied by Iraqi armored and mechanized units, particularly those of the Iraqi 52nd Armored Division. Although the British got a late start on February 25, their night vision devices and their training in night operations enabled them to continue the attack all night. The Iraqis were quite unprepared for a night attack by the British. The commander of the Iraqi 52nd Armored Brigade of the 52nd Division remarked after his surrender that he did not know what a British Challenger Tank looked like until a number of them appeared outside his bunker. By 0800 hours on February 26 the British had taken Objectives Bronze, Copper, and Zinc, destroyed much of the 52nd Armored Division, and virtually eliminated the threat of an attack from the east against the east flank of VII Corps.

Figure 32. 1st British Armored Division Operations

d. 1st and 3rd (U.S. Army) Armored Divisions

On the west flank of VII Corps, the U.S. Army 1st Armored Division resumed its advance at first light. At about noon they encountered their first resistance: an infantry position about 50 km south of al-Busayyah manned by troops from the 806th Brigade of the 26th Infantry Division. To maintain the momentum of the advance, MG Griffith directed the 1st and 2nd Brigades to bypass the position and leave it for the 3rd Brigade. The Iraqi position had no minefields and no supporting tanks or artillery. After firing a few rounds the Iraqis surrendered to the 3rd Brigade. About 1400 the 1st Squadron, 1st Cavalry and the 1st Brigade encountered a second Iraqi position manned by a mechanized infantry battalion supported by a few tanks. Again the Iraqis surrendered after a brief fire fight. Meanwhile, MG Griffith attacked the town of al-Busayyah, the next division objective, with the 4th Brigade's helicopters and later with artillery. By nightfall the 1st and 2nd Brigades had closed on the town. To avoid house-to-house fighting at night, MG Griffith decided to continue hitting the town with artillery fire during the night and mop up any remaining resistance the next morning.

Between the U.S. Army 1st Armored Division and the 1st Infantry Division, the 3rd Armored Division advanced all day on February 25 against minimal opposition. By the end of the day the division was in position to wheel to the east and attack the Revolutionary Guards.

e. 2nd Armored Cavalry Regiment

On February 24 the 2nd Armored Cavalry Regiment had acted as a corps screening force in front of both the 1st and 3rd U.S. Army Armored Divisions. During the advance on February 25, the regiment gradually shifted to the right, uncovering first the 1st Armored Division and then the 3rd Armored Division, and then advanced to the northeast. At about 1430 hours the regiment encountered a major Iraqi force, the 50th Armored Brigade of the 12th Armored Division, which was acting as a covering force for the Tawakalna Revolutionary Guard Division's defensive positions. The Iraqis were not aware that there were any coalition forces in the vicinity. Many of their vehicles were not manned, and the crews were still digging in. No protective minefields had been laid. After some 30 armored personnel carriers and tanks had been destroyed, Iraqi resistance stopped. The Armored Cavalry Regiment captured several hundred prisoners, including the Iraqi brigade commander and his second in command. At about 1600 hours the regiment reorganized into a horseshoe-shaped defensive perimeter for the night. The halt would give the heavy divisions of the corps time to close up and prepare for the planned attack on the Revolutionary Guards on February 26.

5. XVIII Airborne Corps (U.S. Army)

a. General

On February 25 XVIII Airborne Corps continued to drive into Iraq. The 6th (French) Armored Division seized the corps' objectives in the west, the 101st Airborne Division placed a brigade-sized blocking position astride the Iraqi lines of communication, and the 24th Infantry Division was poised to strike into the Euphrates River Valley . See Figure 33.

b. 6th (FR) Armored Division

At first light on February 25, the French 6th Armored Division resumed its attack on both axes. In the west there was a blinding storm but no opposition. The 1st Regiment of Spahis, the Foreign Legion Cavalry Regiment, and the 2nd Foreign Legion Infantry Regiment seized Objectives Cajun and Spire and then turned west to Objective Paris, which they captured about 1100 hours. See Figure 29 (page 89.) From Paris they were poised to attack Objective White from the west.

On the eastern axis the day began with an attack on Objective Chambord by the 3rd French Marine Infantry Regiment and the 4th Dragoon Tank Regiment. Here the Iraqis put up a vigorous resistance for a time. In less than an hour the Dragoons destroyed eight T-55 tanks as well as an American manufactured M-48A5, which the Iraqis had probably captured from Iran. The attack was delayed by a protective minefield, which the Foreign Legion engineers breached by hand. By mid afternoon Chambord was clear, and the French closed on Objective White.

For control purposes the French had divided Objective White into three parts. The northern portion, Objective Nemours, contained the As Salman airfield. The central portion, Objective Bordeaux, included the road junction between MSRs Texas (north-south) and Virginia (east-west). The southern portion, Objective Cleves, was just west of the small town of As Salman. The French attacked the two northern objectives from the western flank. The Foreign Legion Cavalry Regiment and the 2nd Foreign Legion Infantry Regiment attacked Nemours, and the Spahi Regiment Bordeaux. The Spahis took Bordeaux by about 1400 hours. The 11th

Figure 33. U.S. Army XVIII Airborne Corps Advances on February 25 and 26

French Marine Artillery Regiment provided very effective support and managed to destroy the Iraqi bunkers without damaging the critical road intersection. Before the Foreign Legion attacked the airport, the 3rd Helicopter Regiment made an intensive attack, which destroyed a tank and set fire to the fuel dump. A heavy artillery bombardment followed, which set off explosions in the ammunition dump. The airfield was surrounded by barbed wire, and there were some minefields, as well as large numbers of unexploded bomblets. To clear a lane into the airfield, the French decided to use a MICLIC. It was towed into position by a French engineer armored personnel carrier and launched by an American team from the 27th Airborne Engineer

Battalion transported in the carrier. The MICLIC functioned, and the Legion assault forces moved through the gap. By nightfall the Legion had secured Nemours, although the airfield was still littered with unexploded bomblets. The 3rd Marine Infantry Regiment took Objective Cleves without significant opposition. At 1700 hours the 6th Armored Division informed XVIII Corps that Objective White had been taken and that MSR Texas was open to US units. The tasks of clearing the airfield and the town of As Salman, however, were deferred until the next day.

c. 101st Airborne Division (Air Assault)

On February 25 the 101st Airborne Division launched its 3rd Brigade into the Euphrates Valley to occupy blocking positions on the south bank of the river. As Figure 34 shows, the area selected was just west of the town of An-Nasiriyah and a few miles north of the Iraqi Tallil Air Base. It was about 175 miles north of the Saudi border and 85 miles north of FOB Cobra. The first units, which landed just after noon, consisted of the heavy units of the brigade: 12 105mm artillery pieces, 4 engineer vehicles, and 48 HMMWVs with TOW missiles. Because of the limited range of the Chinook helicopters transporting this force, it landed at LZ Sand. This was only about 25 miles south of the Highway 8, but the terrain was so bad that it took more than six hours for the force to move that distance. The infantry units of the brigade were landed adjacent to the highway at about 1500 hours and quickly established blocking positions to the east and the west. Accompanying engineers from the 326th Engineer Battalion destroyed an overpass where Highway 8 crossed the railroad. Thus both rail and highway links between Baghdad and eastern Iraq and Kuwait were cut. Although the brigade was quite concerned about the danger of an Iraqi attack -- particularly before the artillery and antitank weapons arrived from LZ Sand -- there was no Iraqi attack. There were no American casualties, and the few Iraqi troops in the area were not interested in combat.

Figure 34. 101st Airborne Division Attack into the Euphrates Valley on February 25

d. 24th (U.S. Army) Infantry Division

After advancing unopposed on February 24, the 24th Infantry Division encountered its first Iraqi opposition early on February 25. At about 0300 hours the M113A2-equipped 197th Brigade attacked Objective Brown, an Iraqi logistics and electronic early warning installation located on the east-west road designated MSR Virginia. See Figure 35. There were no minefields and little resistance. The brigade captured 49 prisoners and a number of maintenance and electronics vans. After securing the objective, they linked up with the 3rd Battalion, 187th Infantry Regiment, the adjacent unit of the 101st Airborne Division.

On the right flank of the division, the 2nd Brigade attacked Objective Gray at about 1300 hours. This was also located on MSR Virginia and proved to be an Iraqi electronic intelligence station. Although there were no minefields, the installation was located on a difficult escarpment. After an intense artillery bombardment, about 300 Iraqis came out with their hands up. Many of them were soldiers fleeing northward from units which had disintegrated.

The 1st Brigade attacked to the north and occupied Objective Red, a piece of high ground to the north which commanded the approaches to the Euphrates River Valley. There were no Iraqis on the position, only a camp of surprised Bedouin. North of this point the terrain changed dramatically. The 24th Division had been advancing along the eastern portion of the Sahra al-Hajarah (Desert of Stone), a high rocky desert 300 to 400 meters above sea level that is covered with sharp stones and boulders. About 60 kilometers from the Euphrates, however, the terrain begins a 290-meter drop to the river. Steep cliffs, many as high as 50 meters, flank the wadis that are the natural routes down from the high desert. Where the ground levels out sabkhas mark the areas flooded during the infrequent rains. When the 24th Division reached the area, it had been raining for nearly 24 hours. The sabkhas had become impassable quagmires. An Air Force pilot's survival map called the area "the great dismal bog," and the name stuck within the division. Faced with this obstacle all across its front, the division slowed its progress to a crawl. The 2nd Battalion, 4th Cavalry Regiment, the divisional reconnaissance squadron spent most of the night searching for passable routes through the great dismal bog, and the engineers worked to improve the routes they found. Nevertheless, the division was well located to attack into the Euphrates Valley the next day.

Figure 35. 24th Infantry Division Advance on February 25

6. Summary of Operations on February 25

On February 25 the marine expeditionary force beat off a series of weak Iraqi armored and mechanized counterattacks. Elsewhere the Coalition forces advanced rapidly against Iraqi opposition that was surprisingly weak. Thousands of Iraqis surrendered, but Coalition casualties were very light. XVIII Airborne Corps, for example, had only 2 KIA and 2 missing during the day's operations. In sharp contrast to the situation on February 24, mines and mine breaching played a very small role in operations on February 25. The Iraqis made little effective use of protective mine fields. Only in the sector of the French 6th Armored Division did the Coalition forces have to pause and conduct a formal breaching operation. Figure 36 shows the situation at the close of the day on February 25.

N. FEBRUARY 26, 1991 (G+2)

1. Joint Forces Command East (JFC-E)

At about 2000 hours on the evening of February 25, the Iraqis began withdrawing from Kuwait City. The Kuwaiti Resistance reported this withdrawal almost immediately. Col. Mohammed Al-Harmi, the commander of JFC-E's Kuwaiti troops, received orders to send a force to Kuwait City as soon as possible. Of course, the entire Kuwaiti Al-Fatah Brigade could not move without authorization from the Saudi JFC-E commander. However, the Kuwaitis decided to send a strong reconnaissance element. A 60-man patrol was organized under the command of Kuwaiti Lt. Col. Al-Faraj. The patrol was based on a reinforced infantry platoon from the Al-Fatah Brigade, and included ten U. S. Air-Naval Gunfire Liaison Company (ANGLICO) and Special Forces men. They set off in the early hours of February 26 in a motley convoy of Fatah armored personnel carriers and jeeps, heading north up the empty Maghreb-Assafar motorway into Kuwait City. Fortunately they encountered no mines or Iraqi troops. At 0400 hours, when they had reached the intersection with the Fourth Ring Road, they came under small arms fire. A Kuwaiti Resistance Unit thought that they were Iraqis. The fire stopped when the Resistance troops noticed the American flag flying from one of the vehicles. Not knowing how to link up with the Resistance, the patrol continued to the Sheraton Hotel, near the center of the city. There they met MG Mohammed Al-Bader, one of the leaders of the Resistance, at about 0500 hours. Central Kuwait City was liberated barely 48 hours after the ground war began. February 26 is celebrated as Liberation Day in Kuwait.

At dawn the remaining forces of JFC-E resumed their advance against opposition that was generally light. Task Force Omar continued its attack in the western part of the sector. The UAE motorized infantry battalion screened the left flank. Task Forces Othman and Omar advanced to positions just south of Kuwait City. During the afternoon JFC-E prepared for an

Figure 36. Situation on February 25

all Islamic force to enter Kuwait City on February 27. Gen. Khalid directed that JFC-E form a Task Force made up of contingents from all six Gulf Cooperation Council (GCC) members. This Task Force would enter Kuwait City from the south and meet a similar Task Force from JFC-N near the center of town. Thus contingents from all the Arab forces would participate in the formal Coalition entry into the city.

2. 1st marine expeditionary force (MEF)

a. General

Although the Iraqis were withdrawing from Kuwait City on February 26, many of those facing the 1st marine expeditionary force were still fighting vigorously. Moreover, the two marine divisions had to make several hasty breaches of Iraqi minefields during the course of the day. The objectives of the MEF were the Kuwait International Airport and the Al-Mutla'a Pass. The 2nd marine division attacked to the northwest toward Al Jahra. The Tiger Brigade headed toward Al-Mutla'a Ridge, a terrain feature that dominated the roads from Kuwait City to Iraq and key to cutting off the Iraqi retreat. The 1st marine division attacked toward the north to seize the Kuwait International Airport.

b. 1st marine division

In the 1st marine division sector, Task Force Grizzly spent the day clearing Al-Jabar Airfield. The day's experience confirmed the wisdom of not trying to accomplish the task during the

night. Most of the Iraqi defenders had withdrawn, but they had left tremendous numbers of booby traps. In addition, there were large numbers of unexploded munitions. The clearing process was slow and deliberate. The marines treated each bunker and room as if it were occupied by Iraqis until it was proved otherwise, and they carefully investigated every possible booby trap. By about 1500 hours there were no more bunkers and rooms to clear. The marines had captured several hundred Iraqis and had suffered no casualties. The air base was available for Coalition use, and combat service support units quickly installed a forward air refueling point.

The remainder of the 1st marine division attacked to the north at 0700 hours through dense smoke from the burning oil wells. Task Force Papa Bear was in the center leading the

Figure 37. 1st marine division Attacks on February 26.

attack, TF Ripper on the left and TF Shepherd on the right. MG Myatt planned a two phase operation. First the division would advance to the 30 east-west grid line (designated Phase Line Margaret), which was distinguishable on the ground by a high-tension power line. Then the division would isolate the airport and seize it. See Figure 37. The battleground TF Ripper and Papa Bear crossed was littered with enemy tanks and armored personnel carriers. Some had clearly been destroyed from the air, and some were intact but abandoned. However, some Iraqi crews remained with their vehicles and waited in ambush. The marines developed different tactics for dealing with this threat. In TF Papa Bear the 1st Tank Battalion shot at everything. In TF Ripper, on the other hand, the 3rd Tank Battalion tested the Iraqi vehicles with long-range machine gun fire. Those that responded were destroyed by a tank round or a TOW missile. The infantry battalions led with their scout detachments, which used the TOW thermal sights. If the Iraqi vehicle had its systems turned on and gave a "hot" signature, the marines attacked it with a TOW missile. The frequent fire fights interrupted the advance with numerous stops and starts. Nevertheless, TF Ripper reached the designated limit of advance at 1130 hours and TF Shepherd and TF Papa Bear at about 1300.

The attack jumped off from Phase Line Margaret at 1500 hours. The division plan called for TF Ripper to seize the highway northwest of the airport and establish blocking positions. TF Papa Bear would isolate the airport from the south. TF Shepherd would skirt the east side of the airport and cut it off from Kuwait City. Then the infantry of TF Taro would move north by truck and secure the airport complex.

At 1545 hours the 1st Battalion, 7th marines of Task Force Ripper encountered an obstacle belt. Three bands of double-strand concertina wire were in a line running east to west, and behind the wire was a minefield. Behind the obstacle belt were Iraqi mechanized forces of the 3rd Armored Division. Unable to find a way around the obstacle belt, the marines decided to conduct a hasty breaching operation. The battalion conducted the same battle drill that they had rehearsed many times in preparation for breaching the Iraqi main defense belts. Team Tank took up overwatch positions to provide covering and suppressive fire. By 1600 hours the battalion gunners had destroyed eight BTRs. The combat engineers of Team Mech moved their M60A1 tanks and AAVs in position to launch MICLICs to open three lanes. Suddenly two Iraqi tanks emerged from the smoke 200 yards away and attempted to beat back the combat engineers. However, Team Tank's gunners spotted the attack and destroyed the two tanks before they could do any damage. Covered by fire from the tanks and AAVs, the engineers successfully fired the line charges across the obstacle belt, but all three charges failed to detonate. In all three cases an engineer had to leave his armored vehicle and prime the charges by hand. As soon as the lanes were opened, the battalion attacked through the minefield. When the marines came through the minefield, the Iraqi defense collapsed, and Task Force Ripper advanced to the north on the west side of the airport.

Task Force Papa Bear attacked from a position directly south of the Airport. At about 1745 hours, the 3rd Battalion, 9th marines encountered a double Iraqi obstacle belt. Each belt consisted of a row of concertina barbed wire in front of a minefield. This time, however, there were no Iraqi defenders, and the combat engineers quickly used MICLICs to clear lanes through the two belts. By 1800 hours the battalion was through the minefield and attacking an Iraqi defensive position just south of the Airport. This was a strong position with bunkers and fighting positions supported by tanks and armored personnel carriers. It was occupied by elements of the 20th Infantry Regiment of the 3rd Armored Division. However, most of the defenders decided not to fight. The marine advance was slowed less by Iraqi opposition than by the near-zero visibility from the smoke from the burning oil wells and a sandstorm, together with the difficulties of movement around the wells, pipe lines, and occasional oil lakes. It

took the battalion until 2300 hours to locate and cut through the perimeter fence of the Airport and establish a small beachhead.

On the division east flank, the LAV armored cars of Task Force Shepherd encountered less opposition. At 1830 hours the Task Force had established its position near the racetrack to the east of Kuwait International Airport. Task Force Taro, however, was delayed by the difficulties of movement over a battlefield crisscrossed with abandoned enemy defensive positions and littered with abandoned and destroyed enemy vehicles. At 2200 the Division directed Task Force Taro to stop for the night and continue at first light. The Division gave Task Force Shepherd the mission of occupying the airport, but they were not able to accomplish this until after midnight.

Nevertheless, by midnight on February 26, the 1st marine division had achieved its primary objective. The Kuwait International Airport was cut off on three sides, and the Division was preparing to occupy and clear it. Fighting had been continuous during the day, and elements of the division had conducted two hasty minefield breaches, one of them against somewhat significant Iraqi opposition.

c. 2nd marine division

For the 2nd marine division February 26 began, as had the day before, with an early morning counterattack by the Iraqis. About 0230 the positions of the 8th marine regiment, which was on the right flank of the division, were hit by a sudden artillery barrage. This was followed by an attack by dismounted infantry, supported by tanks and armored personnel carriers. The Iraqis were from the 5th Armored and 3rd Mechanized Divisions. The artillery of the 10th marines located the Iraqi artillery and destroyed it with counterbattery fire. The marine tanks and TOW gunners attacked the Iraqi armored vehicles and infantry. The marines required almost ninety minutes to repulse the counterattack. Some Iraqi armored vehicles got within 75 meters of their objectives before being destroyed. However, the marines claimed destroying 9 T-55 tanks and 18 other armored vehicles. The marines had only five casualties, all during the artillery bombardment.

The 2nd marine division's primary objectives for the day were the road junctions at Al-Jahra and the Al-Mutla'a Pass -- the bottleneck for Iraqi forces withdrawing from Kuwait. MG Keys anticipated that Iraqi opposition would be relatively light. Hence he decided to attack with all three of his regiments/brigades abreast, as Figure 38 shows. The U.S. Army Tiger Brigade (1st Brigade of the 2nd Armored Division) would make the main effort, attacking on the west flank to seize the Mutla'a ridge and prevent the escape of the Iraqis to the north. The 6th marine regiment would seize the key highway intersection just west of Al-Jahra and destroy enemy columns attempting to escape. The 8th marine regiment would attack on the right to seize a wooded area at As Sulaybiya and protect the division's right flank against a possible Iraqi counterattack from Kuwait City.

The U.S. Army Tiger Brigade attacked to the north at noon with two tank-heavy battalion task forces in the lead. (Each tank battalion had given one tank company to the infantry battalion and received an infantry company in return.) The 3rd Battalion 67th Armor Task Force on the left was the first to make contact. Soon after crossing the line of departure, it encountered a battalion-sized Iraqi position. As the Americans were preparing to assault this position, the Iraqis on the left decided to surrender. Taking advantage of this opportunity, the Task Force moved into this gap and then rolled up the position from the west. On the right the 1st Battalion 67th Armor Task Force found a complex of Iraqi bunkers and dug-in tanks. Using their TOWs and the main guns of their tanks, the Task Force destroyed 20 Iraqi tanks and armored personnel carriers. As the two leading Task Forces pushed on to the north, they continued to overrun small, scattered groups of Iraqi armor. Most of these vehicles were engaged from the rear as they tried to escape toward Al-Jahra.

As the 3rd Battalion 67th Armor Task Force approached the southern slope of the Al-Mutla'a Ridge, they encountered a minefield protecting an Iraqi strongpoint. The minefield was clearly marked with concertina wire, and the mines were on the surface. The battalion commander decided to conduct an in-stride breach. The unit employed the battle drill rehearsed in preparation for breaching the main defense belts. B Company used mine plows to clear two lanes in the minefield, while the remainder of the Task Force provided covering and suppressive fire. Once the lanes were opened, the Task Force assaulted through the minefield and quickly destroyed the

enemy position. Then the Task Force continued toward Al-Jahra, moving along the hard-surfaced road which ran along the ridge line. Their objective was the Al-Mutla'a Pass,

Figure 38. 2nd marine division Attack on February 26

where the highway from Kuwait City crossed the ridge. This natural choke point had been strengthened by the minefields the Iraqis had laid all along the ridge -- there was no other way for traffic to pass. When the Task Force reached the pass, Company B attacked north across the highway and blocked the Iraqi retreat. Company C crossed the highway and its attached infantry platoon cleared the police station complex, room by room. Company D attacked southeast along the highway to secure a major cloverleaf intersection. On the way it had to conduct an in stride breach of another minefield and encountered and destroyed several more tanks and armored personnel carriers.

With the U.S. Army Tiger Brigade on the Mutla'a Ridge, in possession of the pass, and blocking the highway from Kuwait City to Iraq, a principal objective of the 2nd marine division and of the MEF had been achieved. In fact, the Brigade had completed a task begun by air power the night before. The area the Brigade now controlled was a scene of death and destruction. A tightly-packed column of thousands of destroyed, damaged and abandoned vehicles stretched down the highway for two miles filling all six lanes and overflowing over to the sides of the road. Iraqi military vehicles were mixed in with civilian vehicles stolen from the citizens of Kuwait and packed with loot taken from Kuwaiti homes and businesses. All who saw the scene were impressed by what reporters quickly christened the "Highway of Death."

On the right of the U.S. Army Tiger Brigade, the 6th marines had also crossed the line of departure at noon. They attacked with two battalions forward, the 1st Battalion, 6th marines, and the 2nd battalion, 2nd marines. In order to move quickly, the two lead battalions bypassed small groups of enemy forces, leaving them to be taken care of by the reserve battalion, the 3rd battalion, 6th marines. They encountered no minefields, but the regiment's advance took it into a quarry area where there were a number of dug-in tanks. A section of Cobra gunships was assigned to support each battalion, and engaged these targets. As the regiment approached the cloverleaf intersection which was its objective, it destroyed several Iraqi tanks, self-propelled artillery pieces, and armored personnel carriers trying to escape. By evening the regiment had secured the intersection and closed that section of the road as an escape route.

On the right flank of the 2nd marine division, the 8th marines had the shortest distance to cover, but its zone was more heavily fortified. Early in its advance the 2nd Battalion, 4th marines, encountered an Iraqi minefield. However, it was able to bypass the minefield and continue the advance. Its attack brought it into a large agricultural area which had been occupied by one brigade of the Iraqi 3rd Armored Division and also contained a major logistic site. It was surrounded by a high cinderblock wall and was filled with bunkers and fighting positions. After air and artillery strikes the battalion conducted an assault into the area, with infantry dismounting to clear the bunkers and buildings. About a dozen armored vehicles in the position were destroyed or captured fairly quickly, but the bunkers were not all cleared for two days. On the right the 1st Battalion, 8th marines, encountered a similar Iraqi stronghold in an area known as "The Dairy Farm." After a thorough artillery pounding, the battalion overran the position. In spite of the Iraqi opposition, the regiment had secured its section of the highway by 1800 hours and established anti-tank ambushes along it.

Through their Kuwaiti liaison officers, the 2nd marine division contacted the Kuwaiti Resistance to make arrangements for the final capture of the built up area of al-Jahra. Since the Resistance forces clearly knew the town better than the marines, it was decided that they should clear the remaining pockets of Iraqis and secure the town. Thus the Kuwaiti Resistance actually cleared and secured al-Jahra.

3. Joint Forces Command North (JFC-N)

At first light on February the Egyptian 4th Armored Division began occupying Ali al-Salem Airfield. The air base was in shambles. The hardened aircraft shelters had been destroyed with Iraqi aircraft inside, the runways had been cut by British JP 233 munitions, and there were unexploded munitions throughout the air base. The division spent most of the day carefully and methodically clearing the base.

After completing its capture of the village of al-Abraq, the 3rd Egyptian Mechanized Division also turned to the east. It encountered no minefields and only light opposition. By 2000 hours it was only 4 kilometers northwest of the Ali al-Salem Airfield. Task Force Muthannah (the 20th Saudi and the 35th Kuwaiti Mechanized Brigades) also moved east. The Saudi 9th Armored Division, the JFC-N reserve, crossed the border and moved into Kuwait. Its 3rd Brigade followed Task Force Muthannah toward Kuwait City. At nightfall the JFC-N forces halted and began an intensive period of coordination with the 2nd marine Division. Additional liaison officers were exchanged, and preparations were completed for a combined force, with contingents from Kuwait, Saudi Arabia, Egypt, and Syria, to pass across the division's front lines early the following day on their way to their formal entry into Kuwait City.

4. VII (U.S. Army) Corps

a. Situation and Plans

In the east on February 26 the Iraqis were abandoning Kuwait City and trying to escape with their loot back to Iraq, but the situation was quite different in the VII Corps sector. On February 26, G+2, VII Corps had its heaviest combat of the war. Four Coalition armored and mechanized divisions struck an Iraqi force of six divisions in what one historian has called "the largest armored battle since the Second World War."

Moreover, these Iraqis were not disorganized and demoralized units trying to escape, nor second-rate units without food or water and ready to surrender at the first opportunity, but well trained, well fed, and well equipped units ready to fight. They had much better equipment than the units the corps had faced earlier, including T-72 tanks, and their officers were reasonably competent and did not abandon their troops in combat. By this time, the Iraqis were aware that there was a significant Coalition force in the west moving toward Kuwait. General Ayad Futayih al-Rawi, commander of the Republican Guard, was ordered to dig in and stop the Coalition force. He immediately took control of the Jihad Army Corps (10th and 12th Armored Divisions) in addition to the four Republican Guard Divisions in the area and began forming a series of defensive lines running from north to south. The first line was manned by the Tawakalna and 12th Armored Divisions, as Figure 39 shows. Behind them were the Medina and 10th Armored Divisions and the Adnan Motorized Division. The Hammurabi Armored Division was in reserve. It was the 50th Brigade of the 12th Armored Division, acting as a covering force, which the 2nd Armored Cavalry Regiment encountered and largely destroyed on the afternoon of February, as Section M.4 described.

From the reports of the 2nd Armored Cavalry Regiment, from aerial and overhead photography, and from intelligence reports, LTG Franks knew roughly where the Iraqis were located. As Figure 39 indicates, he planned to attack with three heavy divisions abreast across the 80-kilometer front: the 1st Armored Division in the north, the 3rd Armored Division in the center and the 1st (Mechanized) Infantry Division in the south. The ground attack would be supported by air and helicopter attacks, as well as by artillery. Although Central Command had

Figure 39. VII Corps Attack on the Republican Guard

released the U.S. Army 1st Cavalry Division to VII Corps, and the division was moving north as quickly as possible, it appeared unlikely that it could arrive in time for the battle.

b. 1st (U.S. Army) Armored Division

The U. S. 1st Armored Division had reached the town of al-Busayyah late on February 25. To avoid house-to-house fighting at night, MG Griffith had decided to delay a ground attack on the town until the next day. Artillery continued to hit the Iraqi positions all night. By 0615 hours on February 26, a total of 346 MLRS rockets and 1,441 artillery shells had hit the town. Nevertheless, the Iraqi defenders, the Commando Battalion of the 26th Division reinforced by a company of tanks, were determined to resist. At 0630 hours the 1st and 2nd Brigades attacked, surrounding the town and destroying several Iraqi T-55 tanks. The mission of clearing the 35 small stone buildings of al-Busayyah was assigned to a reinforced Task Force based on the 6th Battalion, 6th Infantry. After a ten-minute artillery barrage, the assault team entered the town. The Iraqis continued to resist from fortified buildings, and the assault team used a Combat Engineer Vehicle (CEV) as well as 25mm fire from M2 Bradleys against their positions. The 165mm demolition gun of the CEV was very effective in this role -- it fired 20 rounds and destroyed 19 fighting positions. (This was the last combat action for this highly useful

vehicle.) Then the Task Force used two Armored Combat Earthmovers (ACEs) to level the ruins of the buildings. There were no U. S. casualties. Just north of the town the Task Force captured an enormous Iraqi corps logistics base.

While the 6th Battalion 6th Infantry Task Force was completing the clearance of al-Busayyah, the remainder of the 1st Armored Division wheeled to the right and advanced to the east to attack the Republican Guards. As Figure 39 indicates, the division advanced with three brigades abreast: the 2nd Brigade in the north, the 1st Brigade in the center, and the 3rd Brigade in the south. In spite of blowing sand and rain, by 1300 hours the division had reached Phase Line Tangerine, a few kilometers west of the Iraqi first defensive line. The 2nd and 1st Brigades passed around the northern end of the Iraqi line, but the 3rd Brigade in the south hit the position of the 29th Brigade of the Tawakalna Republican Guard Division. The 29th Brigade, with two tank battalions and two mechanized battalions, had prepared a rear slope defense behind a stretch of particularly rugged terrain, on which they had placed a number of Italian antitank mines. In addition, they had more tanks than the Americans. The 3rd Brigade attacked at 1900 hours when it was pitch dark. The superior American thermal sights gave them an advantage, but this was lessened by the rear slope defensive position. The Americans were far superior in training and particularly in tank gunnery. D Company of the 1st Battalion, 37th Armor, had been training to represent the U. S. Army in the Canadian Army Trophy Competition. The 3rd Brigade lost four tanks, one to a mine, but destroyed some 76 T-72 tanks, 84 BMPs, and a number of other vehicles. The protective mines the Iraqis had laid were not dense enough to be effective -- the 1st Battalion 37th Armor simply bulled through, losing only one tank to a mine in the process. By 2300 hours the 3rd brigade had consolidated on the far side of the Iraqi first defense line. The brigade halted only long enough to refuel and rearm before continuing the attack to the east. To the north the 1st and 2nd Brigades had turned the flank of the Republican Guard's first defense line and the 4th Aviation brigade was attacking the positions of the Adnan and Medina Divisions in the second defense line.

c. 3rd (U.S. Army) Armored Division

As Figure 39 indicates, the U. S. 3rd Armored Division was assigned a sector in the center of the VII Corps. Since the sector was only 27 km. wide, the division attacked with two brigades forward and one in reserve. The 2nd Brigade attacked in the north, along what proved to be the boundary between the 29th and 9th Brigades of the Tawakalna Republican Guard Division, and the 1st Brigade attacked in the south against the Iraqi 9th Brigade. Once the 2nd Brigade had penetrated the Iraqi position, MG Funk planned to use the 3rd Brigade to exploit the success. The 4th Battalion 7th Cavalry screened the division's southern flank and maintained contact with the 2nd Armored Cavalry Regiment.

Advancing to the east in the blowing sand and wind with all three battalion task forces forward, the 1st Brigade was the first to make contact. At about 1630 hours it hit the enemy security forces, surprising the Iraqi division commander, who had not expected their arrival for at least five hours. After pushing back the security forces, the brigade found a well developed Iraqi bunker complex supported by dug-in T-72 tanks and armored personnel carriers. The positions were extensive, including battalion positions almost 3 km. in depth behind the main Iraqi defensive line. However, there were no significant minefields. Although the brigade quickly destroyed several T-72s and other armored vehicles, the Iraqis continued to resist and sent forward a number of tank hunting infantry teams. During the fighting in the southern portion of the brigade sector, brigade units became entangled with portions of the 4th Battalion 7th Cavalry and the 2nd Armored Cavalry Regiment in the darkness and foul weather. Caught in the middle, the 4th Battalion 7th Cavalry took friendly fire from its right and left rear, resulting in the death of two Soldiers and the loss of three M2 Bradleys. With the confusion developing on the southern flank, MG Funk decided to halt until daybreak. Until then close air support, artillery, and attack helicopters would repeatedly strike the Tawakalna positions. The two artillery battalions supporting the 1st Brigade, for example, fired over 1,400 rounds.

The experience of the 2nd Brigade in the north was quite similar -- it encountered the northern portion of the same bunker complex. Here too the Iraqis fought vigorously. After pushing back the security forces and destroying several Iraqi armored vehicles, the 2nd Brigade launched an organized attack at 2200 hours. Intense fighting continued for the next four hours, until Iraqi resistance was largely broken and the fighting tapered off. The brigade's tanks used heavy machine gun and shaped charge (HEAT) rounds to clear bunkers.

At the same time as the 2nd Brigade attack was launched, 2200 hours, Corps Headquarters informed the division that the Joint Surveillance Target Attack Radar System (JSTARS) had discovered a column of Iraqi armor moving northwest across the division front. Captured documents later confirmed that a Tawakalna armored force had been directed to conduct a counterattack into the area between the 3rd and 1st Armored Divisions. The column was too far away for tank fire and the location was not precise enough for artillery. Consequently, the divisional aviation brigade was directed to attack the column, and they launched 24 AH-64A Apaches. The weather was so bad that the helicopter pilots had to steer using night goggles and Forward-Looking Infra Red (FLIR). At 2300 hours the lead Apache spotted the distinctive heat signature of a battalion of Iraqi armored vehicles lined up in column and closing on an open area between the two divisions. The Apaches caught the column from the flank and required only two minutes to destroy 8 T-72 tanks and 19 armored personnel carriers. Thus the principal Iraqi counterattack was defeated almost before it could be launched. The 1st Brigade was scheduled to resume its advance at first light, and the 3rd Brigade was ordered to pass through the 2nd Brigade to maintain the tempo of the advance.

d. 1st (U.S. Army) Infantry Division

VII Corps planners had anticipated that the 1st Infantry Division might suffer heavy casualties in breaching the Iraqi Main Defense Belt on G Day. Hence they planned to use the division as corps reserve during the attack on the Republican Guard. The 1st Cavalry Division would provide the third division for the main attack. However, as Section L.5. indicates, the 1st Infantry Division had very few losses in the breach. At the same time, Gen. Schwarzkopf delayed releasing the 1st Cavalry Division to VII Corps. Therefore, LTG Franks decided to use the 1st Infantry Division in the attack. The division was alerted during the evening of February 25 and began moving north early on February 26. After a ten-hour movement through rain and blowing sand, the division arrived at the rear of the 2nd Armored Cavalry Regiment. The division was ordered to execute a passage of lines with the Armored Cavalry Regiment and attack the southern sector of the Republican Guard position. As Figure 39 indicates, this portion of the first Iraqi defense line was held by the 18th Brigade of the Tawakalna Republican Guard Division and the 37th Brigade of the 12th Armored Division. This portion of the Iraqi position had been designated as Objective Norfolk. Hence the fighting in this sector is often called the Battle of Norfolk. Behind this position, east of the wadi al-Batin, the second defense line in this sector was held by elements of the 10th and 17th Armored Divisions.

A passage of lines is always a difficult military operation. It was especially difficult in this case, since it was conducted at night, and the 2nd Armored Cavalry Regiment was in contact with the enemy. Nevertheless, the operation was carefully planned and was completed without incidents. The cavalrymen put chemlights on the rear of their vehicles, where they could be seen by the advancing 1st Division and were ordered to stay in their vehicles during the passage of lines. By about 2300 hours the passage was complete, and the division was attacking the Republican Guard positions.

MG Rhame attacked with two brigades forward: the 1st Brigade in the north and the 3rd Brigade (actually the 2nd Armored Division Forward) in the south. In reserve was the 2nd Brigade, the only U. S. Army unit in the theater still equipped with the older M1 tanks. In the north the 1st Brigade attacked the lead Iraqi positions with two armor-heavy task forces forward, the 1st and 2nd Battalions, 34th Armor. An infantry-heavy task force, the 5th Battalion 16th Infantry, followed, clearing the positions the tanks had bypassed. The night was filled with a seemingly endless succession of short fights against tank or infantry positions, but there were no reports of significant minefields. By first light the 1st Brigade had swept through Objective Norfolk, the first Republican Guard defense line and was preparing to rearm, refuel, and continue the attack.

In the south the 3rd Brigade attacked with all three battalion task forces forward. Almost immediately they encountered well-prepared defenses behind an antitank ditch running the width of the brigade sector. The accompanying engineers used their M9 Armored Combat Earthmovers (ACE) to cut entrances and exits, but the obstacle still slowed the advance. As the tanks crawled across the obstacle, Iraqi antitank teams hidden in nearby trenches engaged the tanks from all sides with rocket-propelled grenades. These blew off external gear but did not seriously damage the tanks. Nevertheless, the Iraqis continued the tactic all night -- antitank teams repeatedly emerged from previously bypassed positions to stalk the tanks and M2 Bradleys. With their thermal sights, the American tankers had little trouble detecting their approach and then cutting them down with bursts of machine gun fire. By remaining still and cold, a few Iraqi tanks managed to escape detection long enough to open fire at close range. Red and green

tracers crisscrossed and careened into the night as gunners on both sides opened fire on virtually any likely target. The superior American thermal sights gave their tanks a tremendous advantage, but the sights were not foolproof. On several occasions during the night American gunners fired on friendly vehicles. These incidents cost the lives of six soldiers and destroyed five M1 Abrams tanks and five M2 Bradleys. In the 3rd Brigade sector fighting continued for most of the night. At first light, however, the brigade began rounding up prisoners, regrouping units, resupplying tanks, and preparing to continue the attack.

Thus in less than 24 hours the 1st Infantry Division had moved the entire division north, executed a night passage of lines, and assaulted the first Republican Guard' defense line. In hard fighting at night, the division had seized and cleared the Iraqi defense line and destroyed some 126 Iraqi tanks and 76 armored personnel carriers.

e. 1st (UK) Armored Division

Although the sector assigned to the 1st (UK) Armored Division was just to the south of that of the 1st (U.S. Army) Infantry Division, the British had a mission quite different from that of the remainder of VII Corps. The rest of the corps was attacking the Republican Guard and the Jihad Corps, which were occupying a series of defense positions running from north to south. The British were attacking Iraqi armored and mechanized units, such as the brigades of the 52nd Armored Division, which had originally been given the mission of counterattacking any major coalition penetrations in the Iraqi Main Defense Belt. Because of their location, however, these units presented a threat to the flank of VII Corps. Essentially the task of the 1st (UK) Armored Division was to eliminate that threat.

Like the U. S. Army forces, the British were equipped with night vision devices which enabled them to fight effectively in the dark. Hence, after passing through the breach on February 25, they continued the attack all night. By 0800 hours on February 26, they had taken the first three of their objectives, Bronze, Copper, and Zinc. (The British objectives, named for metals, were locations where they anticipated finding Iraqi units.) The British attacked with both brigades abreast. MG Smith alternated attacks by the two brigades in order to shift his artillery fires back and forth between them.

On the morning of February 26, 4th Brigade in the south attacked Objective Brass. See Figure 40. They encountered no significant minefields. In spite of the blowing sand and rain, the Challenger tanks of the 14th/20th Hussars and Warrior infantry fighting vehicles of the Royal Scots and the Royal Fusiliers quickly destroyed most of two armored and mechanized infantry battalions. The Iraqi tank and mechanized units were from two different brigades of the 52nd Armored Division. By 1330 hours 4th Brigade had occupied the position in strength. As soon as Brass had been secured, the 3rd Battalion Royal Fusiliers, with an attached company of Challengers from 14th/20th Hussars attacked Objective Steel. Iraqi resistance on this objective was relatively light, but two warriors were destroyed by friendly fire from an A-10. Nine

Figure 40. 1st (UK) Armored Division Advance on February 26

Soldiers were killed and eleven were wounded in this air strike. In spite of this friendly fire incident, Steel was in British hands by 1600 hours and the 4th Brigade was headed for Objective Tungsten. This was a major Iraqi artillery fire base located to stop a Coalition attack up the wadi al-Batin. The most difficult part of this attack was crossing the terrain between objectives Steel and Tungsten -- the terrain became increasingly difficult as the brigade approached its objective. In addition, the tanks had to maneuver around a pipeline to the west of Tungsten. The Iraqis considered this terrain impassible and therefore did not bother to lay mines. In spite of the difficult terrain, the brigade was in place by 2330 hours. The attack was preceded by a massive artillery barrage in which the British were joined by the fire of the entire U. S. 142nd Field Artillery Brigade. The barrage was extremely effective -- 59 of the 76 Iraqi guns on Tungsten were destroyed, including several South African G-5 155mm guns. When the 3rd Fusiliers and the 1st Royal Scots attacked, they encountered many surrendering Iraqis and only sporadic gunfire. Tungsten was reported cleared at 0430 hours on February 27 and proved to be 4th Brigade's last battle of the war.

Shortly after noon on February 26, the 7th Brigade launched an attack against Objective Platinum in the north. This objective contained almost a thousand troops, with about 40 tanks and 20 armored personnel carriers. Platinum was divided into two parts. The Queen's Royal Irish Hussars took the western half, while the 1st Battalion Staffordshire Regiment seized the

eastern portion, after circling the Iraqi positions on the north and attacking from the rear. The fighting lasted about two hours, under conditions of blowing sand and very poor visibility. The British captured some 800 prisoners, including a brigadier general who was commanding the 52nd Armored Division. As soon as Platinum had been secured, about 1430 hours, the 7th Brigade continued its attack to seize Objective Lead. Although Lead was occupied by an entire Iraqi Brigade with a company of dug-in tanks, most Iraqis were ready to surrender. By nightfall the Scots Dragoon Guards and the Staffordshire Regiment had succeeded in mopping up the few pockets of Iraqi resistance and had taken another 800 prisoners. The 7th Brigade then halted and regrouped, preparing to attack across the wadi al-Batin at dawn on February 27 to seize Objective Varsity.

f. 11th Aviation Brigade

LTG Franks had always intended to attack the Iraqis not only in their front line positions but also in depth at the same time. While the 1st (U.S. Army) Armored Division was attacking the Tawakalna Division on the ground, for example, the division's 4th Aviation Brigade was striking the Adnan Division in the second defense line. On the night of February 26, the Corps 11th Aviation Brigade attacked the 10th Armored Division east of the wadi al-Batin. This division, minus a brigade supporting the Tawakalna Division, was located in an assembly area directly north of the British Objective Varsity. See Figure 40. The attack was carried out by the Apaches of the 4th Attack Helicopter Battalion, 229th Aviation Regiment. In two separate 30-minute attacks, the Apaches destroyed some 33 tanks, 22 armored personnel carriers, and 37 other vehicles -- substantially weakening the division for the next day's fighting.

5. U.S. Army XVIII Airborne Corps

a. General

On February 26 the XVIII Airborne Corps accomplished its primary objectives. The 101st Airborne Division had placed one brigade in the Euphrates Valley the day before but was concerned about the possibility of an armored attack from the east. See Section M.5. On February 26, the 24th Infantry Division eliminated this threat by attacking into the Valley and cutting Highway 8, the principal line of communication between Baghdad and Kuwait. Then the corps prepared to wheel and attack to the east to support the attack of VII Corps on the Republican Guard. To the west the 6th (French) Armored Division, having seized all its objectives, screened the west flank against the possibility of an attack from that direction.

b. 101st Airborne Division (Air Assault)

Early on February 26, the artillery and the anti-tank weapons of the 3rd Brigade, 101st Airborne Division, arrived in AO Eagle, the division's lodgement in the Euphrates Valley. In the evening the weather improved and a second lift of Blackhawks brought the rest of the 3rd Brigade's men and equipment. Their position, astride the railroad and Highway 8, essentially closed one of the Republican Guard's possible escape routes from Kuwait. Moreover, the force in Eagle had enough men and weapons to hold the position against an Iraqi armored attack from the east. Such an attack was increasingly unlikely, however, since the 24th Infantry Division was already on its way to cut Highway 8 farther to the east.

c. 24th Infantry Division

By noon on February 26, the three brigades of the 24th Infantry Division were emerging from "The Great Dismal Bog," a massive collection of wadis and swamps which stretched across most of the division's line of attack. The Iraqis evidently considered that this terrain would block any attack from the south and did not bother to lay minefields. As Figure 41 indicates, the plan for the attack into the Euphrates Valley called for the M113A2-equipped 197th Brigade to seize Battle Position 101, on the southeastern edge of Tallil Airfield. The 2nd Brigade would seize Battle

Figure 41. 24th Infantry Division Secures Highway 8 on February 26

Position 103 and then turn east to attack toward Jalibah Airfield. The 1st Brigade, the division's main effort, would seize Battle Position 102 astride Highway 8. The three brigades launched their attack at 1400 hours amid the rain and blowing sand of a shamal.

The 1st Brigade was the northernmost brigade of the division and hence the first to hit its objective, BP 102 astride Highway 8. Before the attack, the 1st Battalion, 41st Artillery, and the 212st Field Artillery Brigade hit the objective with a 30-minute preparation. But the Iraqis struck back. For the first time the 24th Division met spirited resistance. Although surprised, the soldiers from the Iraqi 47th and 49th Infantry Divisions and commandos from the Republican Guard engaged the attackers with small arms, towed anti-tank guns, and artillery. Soon hundreds of rounds of Iraqi artillery began to land in the midst of the attacking forces. Fortunately, however, the Iraqi gunners fired only at preselected targets, in many cases 55-gallon drums which they had emplaced as reference points. American drivers soon learned to stay away from such drums. After a delay, American target acquisition radar located the Iraqi guns, and counterbattery fire put the Iraqi guns out of action. One company of the 4th Battalion, 64th Armor, blocked Highway 8, while the two other companies continued north to a canal paralleling the river. There they overran a huge ammunition storage area. Soon after they had blocked the highway, the American tankers stopped a large Iraqi convoy with trucks, tankers, and heavy equipment transporters carrying tanks. A brigade from the Hammurabi Armored Division was attempting to escape to Baghdad. The trucks and tanks were quickly destroyed, and BP 102 was secured soon after midnight.

To the west the 197th Brigade had as much difficulty with terrain and weather as with the Iraqis. As the brigade emerged from the "Great Dismal Bog," sandstorms and high winds slowed the march and obscured visibility. At 2200 hours elements of the 3rd Republican Guard Commando Regiment attempted to ambush the lead elements of the 1st Battalion, 18th Infantry. However, the scout platoon in the lead saw the Iraqi anti-tank teams and overran them. When they approached Battle Position 101, the brigade conducted a coordinated, three-battalion attack on the right flank of the enemy position and rolled up another 300 Republican Guard commandos. They encountered no mines. The 4th Battalion, 41st Artillery, fired improved conventional munitions ahead of the advancing infantry. By 0430 hours on February 27 Battle Position 101 was secure. While the 1st Brigade encountered a vigorous defense and the 197th Brigade struggled with mud (fortunately they had light M113A2s that were able to lead the way for the heavier M1s/M2s) and Iraqi commandos, the 2nd Brigade encountered only light resistance. By early evening it had raced forward to seize Battle Position 103 and immediately began to prepare for the attack on Jalibah Airfield. Thus by the evening of February 26, the lead elements of the 24th Infantry Division stood on Highway 8. Not until the Hammurabi's tanks on transporters ran into the American roadblock did the Iraqis discover that the XVIII Airborne Corps had closed their most direct route to Baghdad.

6. Summary of Operations on February 26

In the east fighting was light on February 26. The Iraqis withdrew from Kuwait City and the Kuwaiti Resistance took over the city. The Arab Coalition forces pushed ahead towards the city against light resistance. Elsewhere, the situation was quite different. Both marine divisions faced some fighting all day and made several hasty breaches of Iraqi minefields. The VII Corps struck the Republican Guard in the heaviest fighting of the war. In the west the XVIII Airborne Corps attacked into the Euphrates Valley, cut the principal Iraqi Line of Communications, and prepared to attack to the east to assist VII Corps. Figure 42 shows the situation at midnight on February 26.

0. FEBRUARY 27, 1991 (G+3) TO CEASE-FIRE (0800 HOURS FEBRUARY 28)

1. Joint Forces Command East (JFC-E)

At about 0900 hours on February 27, a task force of Joint Forces Command East (JFC-E) began entering Kuwait City from the south. As LTG Khalid bin Sultan had directed, the task force included elements from all the Arab contingents: Saudis, Bahrainis, Omanis, Qataris, Kuwaitis, and troops from the United Arab Emirates. The last Iraqi unit to occupy the city, the 11th Infantry Division, had surrendered to the Kuwaiti Resistance the day before, so there was no resistance. The sky was dark with oil smoke and clouds, but nothing could suppress the joy of the occasion. Crowds were in the streets cheering, clapping, waving flags, sounding car horns, and carrying posters of the Emir and the Crown Prince which they had hidden during the occupation. Although there were still thousands of mines in the city -- mostly along the beaches -- they did not hinder movement of the task force. At about noon the task force met a similar task force from Joint Forces Command North (JFC-N) in the center of the city, near the landmark water towers.

2. Joint Forces Command North (JFC-N)

The multinational task force from Joint Forces Command North (JFC-N), like the corresponding one from JFC-E, included contingents from every Arab Coalition force in the command -- Saudis, Kuwaitis, Egyptians, and Syrians in this case. The task force from JFC-E had a simple route of approach. It merely continued up the expressway and needed to coordinate only with the Kuwaiti Resistance. The JFC-N task force, on the other hand, had to cross the sector assigned to the 1st marine expeditionary force. There were Iraqi units and remnants of units in the area -- some trying to surrender, some trying to escape, but some

Figure 42. Situation at Midnight on February 26

continuing to fight. Hence there was a real danger of confusion and casualties from friendly fire. As Section N.3 indicated, marine and JFC-N staffs went to great lengths to prevent any incidents of this type. Additional liaison officers were exchanged, recognition signals and radio frequencies were arranged, and the passage was planned for daylight hours. The JFC-N passage began about 0720 hours, and all movements were slow and deliberate. There were no incidents. The JFC-N task force encountered no mines -- the Iraqis had not anticipated an attack down the highway from Basra -- but there were large numbers of unexploded bomblets in some areas. The JFC-N task force met the JFC-E task force in the center of Kuwait City at about noon amid an intense popular celebration. "Conservative Kuwaiti women in abayas and veils danced in the streets like teenagers, ululating. Kuwaiti men and even some of the Coalition Arab troops fired off abandoned Iraqi Kalashnikovs in celebration." For the Arab contingents of the Coalition, the war was over and the victory won.

3. 1st marine expeditionary force (MEF)

a. 1st marine division

In the marine sector, however, the enemy was not subdued yet and there was still fighting on the morning of February 27. As Section N.2 describes, the 1st Marine Division had established positions on three sides of the Kuwait International Airport by the evening of February 26. The division plan called for the infantry of Task Force (TF) Taro to move north by truck and seize the airport. Since TF Taro was delayed in its movement, MG Myatt decided to assign the mission of seizing the airport to the two light armored vehicle (LAV wheeled armored cars) companies of TF Shepherd, which was located east of the airport. It took TF Shepherd three hours to move through the darkness and reach the assigned point on the airport's south perimeter. At this location the 3rd battalion, 9th marines, of TF Papa Bear had cut through the perimeter fence and established a small beachhead. Although observation of the airport with thermal sights indicated enemy activity, it was not until 0330 hours that the Iraqis reacted and opened fire with rocket-projected grenades (RPGs) and machine gun fire. The Iraqi fire caused little damage, and the marine attack began at 0430 hours with the two companies on line: Company A on the left and Company C on the right. Company A immediately engaged and destroyed an Iraqi armored personnel carrier. But it also encountered antipersonnel mines and stopped. The marines could see the mines all around the company but little else as a shift in the wind brought clouds of smoke from the burning oil wells. Two of the LAVs even had a minor collision in the darkness. Hence the battalion commander decided to halt the assault until dawn. At about 0615 he resumed the attack. In daylight the marines had no difficulty avoiding the mines. When the marines reached the main terminal building, they received orders to dismount the scouts and clear it. The Iraqis had abandoned the building, and at 0647 hours the marines took down the Iraqi flag and raised the American, Kuwaiti, and -- naturally --as their egos dictated marine flags to boast of their empty triumph. At about 0800 hours Task Force Taro arrived, and the 3rd battalion, 3rd marines joined the clearing and security operations. They captured more than 89 additional Iraqis. At 0900 the division command post arrived. Since the division had captured all its objectives and fighting had ceased across the division front, MG Myatt and his staff took action to minimize any further casualties. He ordered units not to advance any farther but to conduct a thorough reconnaissance of their zones for stragglers, mines and items of intelligence value. That afternoon the marines were authorized for the first time to remove their protective chemical clothing. The division order to cease all offensive operations was not issued until 0647 hours on February 28. Figure 43 shows the location of 1st marine expeditionary force (MEF) units at the end of hostilities.

b. 2nd marine division

Division orders for February 27 called for 2nd marine division units to clear their zones up to the coast during the day. Essentially the division remained in its positions along Phase Line Bear and cleared the pockets of resistance remaining within its sectors. See Figure 43. Because of the passage of JFC-N units on their way to Kuwait City, however, the clearing operations were not begun until later in the day. The clearing operation turned out to be a fairly large one, since the marines and the U.S. Army Tiger Brigade had bypassed major Iraqi positions in their zones. The logistics area that the 2nd battalion, 4th marines, had entered contained a large number of well-constructed bunkers and large supplies of ordnance. Similarly, when the sun rose the men of the 3rd Battalion, 23rd marine reserves, could see that they were in the center of a much larger complex than they had realized. The agricultural area called the Dairy Farm contained a vast complex of bunkers that might still contain Iraqi soldiers and a large number of tanks and other armored vehicles. The battalion swept the area with two infantry companies and a tank platoon, using a psychological operations tape in Arabic to persuade the remaining Iraqis to surrender. Once the area had been swept, combat engineers destroyed the Iraqi armored vehicles. In the late afternoon the 3rd Battalion, 23rd marines received sniper and rocket fire at the northern end of the farm complex. Reacting quickly, the marines destroyed an Iraqi ammunition truck and killed some Iraqi soldiers. This was the 2nd marine division's last action during the war.

Figure 43. Situation within Kuwait at the End of Hostilities

c. Summary of 1st marine expeditionary force (MEF) Operations

Although the 1st marine expeditionary force (MEF) units, with the exception of the U.S. Army Tiger Armored Brigade, were essentially infantry units, they performed well enough well against the hollow Iraqi units who did not have the will to fight. They made the major penetrations of the Iraqi Defense Belts and defeated minor Iraqi units they encountered. They encountered six collapsing Iraqi divisions and three armored brigades, killed over 1,500 Iraqi soldiers, captured over 22,000 abandoned and destroyed or captured about 610 tanks and 485 other armored vehicles. Clearly, it was not much of a fight. Still the MEF lost 26 killed in action (24 marines and 2 Soldiers) and 92 wounded.

4. VII (U.S. Army) Corps

a. Situation and Plans

For Joint Forces Command East (JFC-E) and Joint Forces Command North (JFC-N) fighting had essentially ended by February 27, and for the marines the fighting was winding down. For VII (U.S. Army) Corps, however, the day was one of very heavy combat, as the corps continued its attacks on the enemy's most capable Republican Guard units which had begun the day before.

As Section N.4 and Figure 39 indicated, the Iraqis had organized their defense in two main lines running north-south. On February 26 the VII Corps had broken through the first line all across the front, destroying a large part of the Tawakalna Republican Guard Mechanized Division, the 12th Armored Division, and the 52nd Armored Division. On February 27 the Corps attacked the second line, which was held by the Medina Republican Guard Armored Division, the 10th Armored Division, and the 17th Armored Division, together with elements of the Tawakalna and 12th Armored Divisions which had managed to remain intact.

By the morning of February 27 the 1st Cavalry Division had completed its move to the north and taken up a position to the rear of the 1st (U.S. Army) Armored Division in the north of the Corps sector. LTG Franks wanted to use this division to envelop the north flank of the Iraqi position while either the 1st Infantry Division or the British 1st Armored Division enveloped the south flank in a classic double envelopment. However, this maneuver required either that the Corps boundary be moved north or the 1st Armored Division shift to the south to make room for the 1st Cavalry Division. Army Component Central Command would not agree to the boundary change, and the 1st Armored Division could not shift to the right while it was heavily engaged. Therefore, on the morning of February 27 VII Corps continued its attack with the same formation as on the previous day: four divisions attacking on the 80-kilometer front, as Figure 39 shows.

b. 1st (U.S. Army) Armored Division

Just before midnight on February 26, as Section N.4.b. described, the 1st (U.S. Army) Armored Division broke through the Tawakalna Division, which constituted the first Iraqi defense line.

After refueling and rearming, the division continued its attack to the east, with all three brigades on line. The advance continued all night, with halts only to refuel. By dawn on February 27 the division was about 15 km. ahead of the 3rd Armored Division on its right and about 60 km. ahead of the 24th Infantry Division of XVIII Airborne Corps on its left. The division's helicopters ranged ahead, attacking Iraqi units and trying to determine precisely where the Medina Republican Guard Division had established its defense line. About midmorning, division intelligence alerted the division commander that the Medina Division was dug in and was waiting for them somewhere in the next few kilometers. At this point MG Griffith pulled back his scouts, who were mounted in lightly armored M2 Bradleys. Thereafter the division 25-km. wide front was made up of 350 Abrams M1A1 tanks.

As Figure 44 indicates, the 2nd Brigade was advancing on the division's left flank. Three tank-heavy task forces led the advance, while the infantry-heavy Task Force 6-6 (6th Battalion, 6th Infantry) screened the northern flank, where there was a threat from the Adnan Motorized Division across the corps boundary. Progress during the morning was slow, as the brigade worked its way through an Iraqi training and logistics area, destroying tanks, armored personnel carriers, artillery pieces, and other vehicles. However, they encountered no mines. The sky was dark, and a wet wind was blowing across the sand. The tanks had been running all night and had stopped to refuel at first light. Fuel was short, but each of the three tank battalions had enough fuel for about four more hours of running time. At about 1130 hours the brigade entered a wadi filled with grass-covered, sandy hillocks. As the tanks emerged onto the sandy ridge to the east of the wadi, the tank crews of the 2nd Battalion, 70th Armor, began to pick up targets on their thermal sights. Though barely distinguishable at 3000 meters, they appeared to be tanks and other armored vehicles buried deeply in the sand. As Figure 44 shows, these were forces of the 2nd Tank Brigade of the Medina Republican Guard Division, which had been reinforced with soldiers and tanks from a number of other units. The Iraqi force was arrayed in two parallel lines of tanks and infantry fighting vehicles. The vehicles were some hundred meters apart, well camouflaged and dug in, and covered by armored antiaircraft vehicles, one of which managed to shoot down an American A-10 aircraft. However, there were no minefields. The Iraqi commander had set up a reverse slope defense, digging in his tanks and other armored vehicles to protect them. He hoped to catch the American tanks in a vulnerable position as they emerged from the wadi and came over the crest of the low ridge. However, the Iraqis made a major tactical error: they were located too far from the wadi. The

Figure 44. 1st (U.S. Army) Armored Division Attack on Medina Armored Division

thermal sights of the M1A1 tanks enabled them to fire effectively at ranges up to 3,000 meters, but the range of the T-72 tanks was only about 1,800 meters. This difference, together with the American Army's superior training and gunnery, determined what came to be called the Battle of Medina Ridge. The tanks from the three leading tank battalions moved into position and opened fire. For the first ten minutes the main guns on the M1A1s fired almost as fast as they could be loaded. Even at extreme range, the fire was very accurate. In some places Bradleys also pulled up on line, using their TOW missiles against T-72 tanks and their 25mm guns against armored personnel carriers and softer vehicles. A little later AH-64A Apache helicopters from the 3rd Battalion, 1st Aviation Regiment, joined the battle, hovering 30 meters above the American battle line while launching Hellfire missiles. In less than an hour the 2nd Brigade destroyed some 55 T-72 tanks, 6 T-55 tanks, 35 armored personnel carriers, and 5 SA-13 antiaircraft systems, with no US losses. Essentially the 2nd Brigade of the Medina Republican Guard Division was destroyed in what was the largest -- and the shortest -- tank battle of the war.

As Figure 44 indicates, the 1st Brigade of the 1st Armored Division attacked to the south of the 2nd Brigade. Its northernmost task force, the 4th Battalion, 66th Armor, was also involved in the attack on the 2nd Brigade of the Medina Division. During the day's fighting they destroyed some 66 T-55 tanks and 23 armored personnel carriers. The remainder of the brigade attacked the portion of the Iraqi defense line held by the 14th Brigade of the Medina Division and the remnants of the 46th Brigade of the 12th Armored Division. The 14th Brigade had sent over half its tanks to support the Tawakalna Division. Not one of these tanks had survived the battle, but the brigade had been reinforced with four tank battalions of the 17th Armored Division. This mixed group of units presented more widely spread concentrations than the 2nd Medina Brigade to the north. During the day the two southern task forces of the 1st Brigade of the 1st Armored Division destroyed 8 T-72 tanks, 24 T-55, and 3 T-62 tanks, as well as 57 armored personnel carriers.

To the south, the 3rd Brigade of the 1st Armored Division attacked the southern end of the line. Although this portion of the line was extensively dug in -- it had been previously occupied by the 10th Armored Division -- the positions were defended by only two battalions of the 17th Armored Division. The 3rd Brigade advanced at a steady 6-8 mph, destroying Iraqi armored vehicles as they appeared. During the day they destroyed 41 T-55 tanks and 35 armored personnel carriers, with no losses.

The Iraqis had planned to support their defense with a large mass of artillery. However, the American counterbattery fire was extremely effective. As each Iraqi battery opened fire, counterbattery radars located their positions, and the Americans responded -- usually in less than two minutes -- with a minimum of 12 MLRS rockets and a battalion of 8-inch artillery. By 1400 hours they had destroyed four battalions of artillery, and the Iraqi artillery was silent. During a 24-hour period on February 27-28, this counterbattery fire destroyed some 72 Iraqi guns.

By about 1500 hours the Battle of Medina Ridge had ended, and the 1st Armored Division resumed its advance to the east. Instead of continuing directly east, however, the division turned to the southeast. This would allow space for the 1st Cavalry Division to come up on line between the 1st Armored Division and the boundary with XVIII Airborne Corps. By the time they reached the north-south road behind the Iraqi defense line, however, the units were becoming intermingled in the darkness, and there had been a serious friendly fire incident. Facing the threat of further such incidents, MG Griffith halted the division for the night. The division spent the night refueling and consolidating its position. There were hundreds of bunkers to clear and a large number of abandoned vehicles to destroy.

After a 45-minute artillery bombardment, the 1st Armored Division resumed the attack at about 0600 hours on February 28. Before the cease-fire at 0800 hours, the division had advanced about 20 km. through the Medina Division's reserve positions and supply trains and destroyed some 41 additional tanks and 60 armored personnel carriers. At the time of the cease-fire the 1st Armored Division was just short of the Kuwaiti border.

c. 3rd (U.S. Army) Armored Division

On February 26 the 3rd Armored Division had broken through the Tawakalna Republican Guard Division in the first Iraqi defense line. On February 27 the division continued the attack. Because of the narrow sector, only two brigades were forward. Early on the morning of February 27 the 3rd Brigade passed through the 2nd Brigade, which became the division reserve. Behind the Tawakalna Division, in the Iraqi second defense line, was the 10th Armored Division, once considered the finest unit in Iraq's regular armored force and the equal of any republican Guard unit. On the night of February 26, however, the division had been the primary target of the 11th Aviation Brigade, as Section N.4.f described. These helicopter attacks not only destroyed a large number of tanks, other armored vehicles, and artillery, but also seriously affected the morale of the division. In addition, six battalions of the 17th Armored Division, which had occupied positions adjacent to those of the 10th Armored Division, were pulled out and sent north to join the Medina Division. With heavy losses during the night, a massive armored force rolling toward them, and adjacent units pulling out, there appeared to be little reason for the 10th Armored Division to stand and fight.

As the 3rd Armored Division advanced, MG Funk used his artillery and helicopters to attack Iraqi positions far ahead. Then the tanks would advance to within 2,500 meters of Iraqi vehicles and positions. From this distance, out of range of the Iraqi tanks, the Americans used concentrated tank fire to destroy all live vehicles. Then the M1A1 tanks and Bradleys would sweep through the position. In more than one case a single volley from the lead tank company was enough to convince an entire Iraqi company to stand up and surrender. As the division advanced during the day, more prisoners began to appear -- a sure sign that Iraqi morale was beginning to collapse. The division began to find entire battalion sets of equipment abandoned, some with vehicles still running, shells loaded in gun breeches, and radios switched on. By 2030 hours lead elements of the 3rd Armored Division had reached Phase Line Kiwi, their limit of advance for the night. The division remained along this line until the cease-fire.

d. 1st Infantry Division

On February 26 the 1st Infantry Division had broken through the first Iraqi defense line in the "Battle of Norfolk." By first light on February 27 the division had finished clearing Objective

Norfolk and was ready to resume the advance. About 0700 hours the 2nd Brigade replaced the 1st Brigade on the left. MG Rhame's plan was for the 2nd and 3rd Brigades to advance for another 20 km. Then the 1st Brigade would pass between the two other brigades and lead the division wedge to Objective Denver, on the highway from Kuwait City to Basra.

Iraqi opposition was scattered. In the 2nd Brigade sector, for example, the major fighting of the morning was against an Iraqi tank battalion of the 30th Infantry Division. This tank battalion, dislodged by the Egyptian 3rd Mechanized Division from its location at al-Abraq, was moving to the north. When it crossed the path of the 3rd Battalion, 37th Armor, the Americans destroyed some 26 tanks in 17 minutes. After the division crossed the wadi al-Batin, the terrain became much more difficult: a vast mining area with pits as deep as 30 feet and high piles of spoil. On the other hand, the second Iraqi defense line in this area proved to be occupied primarily by infantry units. The tank units had mostly been shifted north to assist the Medina Republican Guard Armored Division. The advance was slowed more by the terrain than by Iraqi opposition.

The division reconnaissance unit, the 1st Squadron, 4th Cavalry, was assigned the mission of screening the division's north flank. At about 0930 hours the squadron overran the last remaining unit of the 46th Mechanized Brigade of the 12th Armored Division, a force of 15 tanks and 17 armored personnel carriers. At about noon the squadron crossed into Kuwait and encountered the positions which had been held by the 17th Tank Brigade of the 10th Armored Division. There were large numbers of vehicles which had been destroyed by the helicopter attacks and a significant number of abandoned vehicles. The Iraqis offered little resistance. The cavalry squadron spent the afternoon bypassing abandoned positions and disarming surrendering Iraqis on its way to the Basra Highway. The squadron's route took it to the north of the bad terrain in the rest of the division sector and hence it made much better progress. It reached the highway about 1700 hours, surprising some 2,000 Iraqi infantrymen with a few T-55 tanks. Without contact with the remainder of the division, the squadron set up a defensive perimeter astride the highway and passed an anxious night. The 2nd Brigade reached the highway about 0730 hours on February 28, just before the cease-fire.

e. 1st (UK) Armored Division

With the capture of Objectives Tungsten, Platinum, and Lead on February, the British 1st Armored Division had accomplished all the its missions originally assigned. Late that night, however, VII Corps ordered the division to continue the attack towards the Basra Highway. The 7th Armored Brigade moved out at about 0730 hours and by 0930 had crossed the border into Kuwait. During the morning they encountered little Iraqi opposition, but there were many abandoned vehicles and artillery pieces which had to be destroyed. However, there was another friendly fire incident. Some American 1st Infantry Division tanks fired across the division boundary and hit a reconnaissance vehicle of the Queen's Royal Irish Hussars. Fortunately, the crew had dismounted at the time and were not hurt. By 1400 hours the British had arrived at Objective Varsity, about 60 km west of Kuwait City. See Figure 40.

During the night the British received orders to continue the attack and cut the Basra Highway. At 0730 hours elements of the Queen's Dragoon Guards and the Queen's Royal Irish Hussars reached the highway and set up a defensive position before the 0800 cease-fire.

f. Summary of VII Corps Operations

By the time of the cease-fire on February 28, the VII Corps had made an opposed breach in the Iraqi Defense Belt, advanced rapidly more than 160 miles through difficult desert terrain, and crushed five Iraqi heavy divisions. The Tawakalna, Medina, 10th Armored, 12th Armored, and 52nd Armored Divisions were all destroyed as fighting units. Of the Republican Guard heavy divisions, only the Hammurabi Armored Division remained reasonably intact. In addition the five Iraqi infantry divisions along the Saudi border had disintegrated. Their soldiers were among the thousands in VII Corps prisoner of war camps. The VII Corps had destroyed or captured 1,749 tanks, 1,672 other armored vehicles, and 285 artillery pieces. This was accomplished in only four days of combat and with very light losses in men and equipment -- only 47 killed and 192 wounded. Figure 45 shows unit locations on February 28.

5. U.S. Army XVIII Airborne Corps

a. Situation and Plans On February 26 the XVIII Airborne Corps had achieved its primary objective: it had cut Highway 8 and the parallel railroad, the principal line of communication between Baghdad and Kuwait. The light, airmobile brigade which the 101st Airborne Division had placed in the Euphrates Valley the day before was strengthened by the mechanized forces of the 24th Infantry Division. The threat of an Iraqi armored attack from the east reopening the highway was effectively eliminated. On February 27, having accomplished its first mission, the corps wheeled and attacked to the east to support the attack of VII Corps on the Republican Guard divisions.

To change the direction of an entire corps -- even one as mobile as XVIII Airborne Corps -- is not an easy task. Before the corps could join the VII Corps in attacking to the east, several preliminary tasks needed to be accomplished. In the first place, the 101st Airborne Division needed a new Forward Operating Base (FOB). FOB Cobra was well located to support the 3rd Brigade in the Euphrates Valley, but it could not be used to effectively support operations near Basra. In addition, before moving east the 24th Infantry Division needed to take the two major airfields in its zone which were still in Iraqi hands. The corps' turn to the east increased the importance of the screening operations that the 6th French Armored Division was conducting to the west. An Iraqi attack from this direction would be directly into the corps rear areas.

b. 3rd Armored Cavalry Regiment

One corps unit, however, could move east very quickly. Just after midnight the 3rd Armored Cavalry Regiment started its movement to the east. Its primary mission was to reestablish contact with the VII Corps, whose turn to the east had opened up a 50-km. gap. In addition, the regiment was ordered to seize the small airfield at Umm Hajul, 30 km. southwest of Jalibah airfield, for use as a Forward Operating Base for the 101st Airborne Division.

On the early morning of February 27, the southernmost squadron of the regiment attacked the airfield. Although there was no Iraqi opposition and no mines, the southernmost troop commander observed what appeared to be Iraqi vehicles on the southwest tip of the airfield. After firing warning shots and getting no response, the troop opened fire.

Figure 45. Unit Locations at 2000 Hours on February 28, 1991

Unfortunately, the vehicles were from the 54th Engineer Battalion of the 1st Armored Division. The engineers were awaiting recovery of a disabled vehicle. They were actually located across the corps boundary within the 1st Armored Division sector. The friendly fire killed one engineer and wounded another. As a result of this incident the two corps commanders established a 5-km. "sanitary zone" along the corps boundary and agreed that no target in the zone, even if positively identified as Iraqi, would be engaged.

c. 101st Airborne Division (Air Assault)

Soon after the 3rd Armored Cavalry Regiment seized the airfield, the 2nd Brigade of the 101st Airborne Division occupied it. The first serial of helicopters arrived just after 0900 hours with an infantry battalion, an artillery battalion, and engineers. More than 500 infantrymen and 60 HMMWVs established security around the airfield, while the artillerymen set up their guns. Within four hours the Iraqi airfield had been converted into FOB Viper, with enough fuel and ammunition on the ground to provide temporary support for four attack helicopter squadrons.

At 1430 hours the 64 Apache helicopters began launching attacks into Engagement Area (EA) Thomas, about 145 km. farther east and just north of Basra, as Figure 46 shows. Two battalions of the 12th Aviation Brigade attacked the northern half of EA Thomas, while two battalions from the 101st Aviation Brigade attacked the southern half. The two-lane causeway across the Hawr al-Hammar lake north of Basra provided especially lucrative targets. On their way to and from the engagement area, the Apaches screened the north flank of the corps and shot up any Iraqi vehicles they encountered. During four hours of continuous attacks and in spite of low visibility, the Apaches destroyed 14 armored personnel carriers, 8 multiple rocket launchers, 4 grounded helicopters, and 56 trucks. However, they did not encounter any tanks. Either the tanks had already passed through EA Thomas to the north or they were still in the city of Basra or to the south.

To follow up the helicopter attacks, the 101st Airborne Division planned to air assault the 1st Brigade into EA Thomas. This would block the principal escape route of the Iraqi forces after the closure of Route 8. However, the ceasefire precluded this operation.

Figure 46. 101st Airborne Division Operations on February 27, 1991

d. 24th Infantry Division

Before moving east the 24th Infantry Division needed to capture the Iraqi Air Bases of Jalibah and Tallil. The attack on Jalibah was conducted by the 2nd Brigade, with the 1st Brigade making a supporting attack down Highway 8. The attack began at 0500 hours, as five battalions of artillery poured massed fire into the objective for an hour. During this preparation, two armor-heavy task forces, TF 1-64th Armor and TF 3-39th Armor took up firing positions to the south of the airfield and began systematically to destroy the T-55 tanks on the base, firing from positions well outside the range of the Iraqi tanks. While the attention of the defenders was focused to the south, TF 3-15th Infantry swept through the airfield from the west, firing 120mm and 25mm rounds at anything that moved. By 1000 hours the field was secure. In addition to destroying 24 T-55 tanks and 13 other armored vehicles, the brigade also destroyed 10 MIG jet fighters and 6 helicopters -- unusual for an infantry unit. By noon the 2nd Brigade had completed the operation at Jalibah Air Base and was regrouping to move east.

Tallil Air Base was some 70 km northwest of Jalibah. The M113A2-equipped 197th Infantry Brigade assigned the mission of taking it to TF 2-69th Armor, a balanced force of two tank and two mechanized infantry companies. When scouts from the task force approached the air base on the morning of February 27, they discovered that the Iraqis had built a 20-foot berm all around the base, except for the entrance gates. Instead of waiting for engineer equipment, the task force decided on the risky maneuver of attacking through the main gates. This proved to be a good decision, since the defenders had not anticipated an attack from this direction. The attack began at 1330 hours with 28 close air support sorties and a short but intense artillery preparation. Then TF 2-69th Armor burst through the front gates and charged down the runway, firing at all likely targets. By 1730 hours the air base was secure. The task force destroyed two T-55 tanks, 6 MIGs, 3 helicopters, and a cargo plane without any losses. Tallil proved to be a major weapons storage site. However, the task force turned over the job of destroying the weapons and supplies to the 3rd Brigade of the 82nd Airborne Division, which was brought in by truck for this task.

At 1300 hours the 24th Division launched its attack to the east. For control purposes the division defined the series of phase lines shown in Figure 47. The division attacked with the 1st Brigade on the north and the 2nd Brigade in the south. The 197th Infantry Brigade was to follow the 2nd Brigade as soon as it had secured Tallil Air Base. Operational control of the 3rd Armored Cavalry Regiment was assigned to the division for the attack, and the regiment functioned as a fourth brigade. The division advanced on a 50-km. front with more than 800 combat vehicles. The 212th Field Artillery Brigade and the 24th Division Artillery preceded the movement with a series of planned fire strikes, and an Apache battalion covered the advance.

The Iraqis clearly had not anticipated a major attack down Highway 8 from the direction of Baghdad. They had not constructed any defense lines or laid any significant minefields. They were not able to conduct a coordinated defense. Instead, elements of the al-Faw, Nebuchadnezzar, Adnan, and Hammurabi Republican Guard Divisions continued to appear in scattered enclaves on both sides of the highway. Iraqi artillery fire was heavy at times but not effective.

The 24th Division attack zone ran through an enormous military storage facility. Constructed during the war with Iran, the site measured about 50 miles from north to south and over 60 miles from east to west. There were more than a thousand underground bunkers in the complex with ammunition supplies for several divisions. The facility was well dug in and concealed and had escaped the air war without major damage.

During the afternoon the division advanced rapidly. Helicopter gunships ranged ahead of the division locating or destroying Iraqi units which appeared to be setting up a defense. The division artillery traveled behind the lead units and provided immediate artillery support and the ability to reach ahead of the tanks. Whenever an Iraqi force tried to set up a defense in front of one of the lead brigades, it was usually destroyed by the helicopter gunships or by artillery. By 1700 hours the division had reached Phase Line AXE. During the night massive

preparation fires were fired in anticipation of continuing the attack east at 0500 hours on February 28. Because of the ceasefire, the ground attack was canceled, although artillery fires continued until 0800 hours. After the ceasefire, however, the division was ordered to move forward to Phase Line Victory, with its reconnaissance elements out as far as Phase Line Crush.

P. CONCLUSIONS

Countermine operations were essential to the success of ground operations during the Gulf War. To be sure, U.S. Army XVIII Airborne Corps and all of VII Corps except the 1st Infantry Division outflanked or flew over the Iraqi minefields -- almost always the best way to get past minefields. But the remainder of the Coalition forces -- Joint Forces Command East (JFC-E), the 1st marine expeditionary force, and Joint Forces Command North (JFC-N) -- all conducted successful breaching operations and attacked through the minefields, fortunately aided by 5 months of preparation time to get their houses in order..

The Iraqis began digging in and laying minefields in August, 1990. The Saudi forces and the first Coalition troops to arrive were not well equipped or trained to breach the hardening Iraqi defense lines. In fact, the first foreign troops to arrive were light forces -- not the best type of forces to breach dense minefields covered by fire. However, the Coalition ground offensive did not begin until February 24, 1991. By that time the Coalition forces were much better prepared to breach the minefields. Not only were the units equipped with existing countermine equipment but also some new equipment was developed specifically for the operation; for example, the U. S. Army Mine Rake, the Armored Vehicle Launched MICLIC (AVM), the usmc MK 154 (3-shot) Line Charge, and the French remotely controlled AMX-30 tank with mine clearing rollers.

At least as important as the countermine equipment was training in breaching operations. In peacetime most armies do a rather poor job of training in this area. Faced with the task of breaching the Iraqi minefields, the Coalition forces took advantage of the time available and did an outstanding job of training in breaching operations in general and the use of the new equipment in particular. In the United States the National Training Center constructed a replica of the Iraqi minefields and other obstacles and prepared an excellent movie, Breach and Assault, which is still in use. The Engineer School distributed copies of the draft FM 90-13-1 Combined Arms Breaching Operations, which became the bible for breaching operations. In Saudi Arabia each division set up training areas and constructed models and full-scale replicas of the Iraqi defense belts and minefields. For example, XVIII Airborne Corps constructed a complete triangular Iraqi battalion battle position and used it to conduct a series of rehearsals and battle drills by all units expecting to participate in the attack. The 1st Infantry Division constructed a 5-kilometer wide replica of the forward Iraqi defense system, complete with minefields, fighting positions, bunkers, and mortar, tank, and artillery positions. Participants at several different levels commented that this training in Saudi Arabia was the most effective training they had experienced during their military service. U. S. training teams from 5th Special Forces Group assisted in training other Coalition units, especially the newly organized Kuwaiti brigades.

The massive 39-day Coalition Air Campaign made the task of breaching the Iraqi defense belts considerably easier. Although the attempts to breach the minefields using air power were not very effective, the indirect effects of the Air Campaign on the breaching operations were significant. Minefields are much more effective obstacles when they are defended and covered by fire; and the Coalition Air Campaign severely weakened the strength and especially the will to fight of the forces which were supposed to defend the minefields, place artillery fires on the Coalition breaching forces, and counterattack to eliminate any penetrations of the defense belts. In fact, CENTCOM estimated that the Air Campaign had reduced the combat effectiveness of front line Iraqi divisions by about 50% before the beginning of the ground campaign.

The Coalition forces used a wide variety of techniques to breach the Iraqi Defense Belts. The Saudi forces of JFC-E and JFC-N used handheld mine detectors and probes to clear passages in the hostile minefields. Task Forces Grizzly and Taro of the 1st Marine Division accomplished a covert breach, infiltrating infantry forces through the First Mine Belt under cover of darkness. Then Task Forces Ripper and Papa Bear conducted deliberate breaches, using standard MICLICs, MK-154s, and tanks equipped with track width mine plows. The marines used a locally fabricated roller system, called "Roller Dude", to proof the lanes but its questionable if there will be TIME in future conflicts to do this. They used the same equipment for a deliberate breach of the Second Defense Belt. The 2nd marine division also used line charges to

make the initial breach. Since they had no rollers, they used a single pass of a tank with either a mine rake or a track width mine plow both to clear any remaining mines and to proof the lane. In JFC-N the 3rd Egyptian Mechanized Division first sabotaged the Iraqi fire trenches. Then they used MICLICs to make the initial breach and tanks with mine rakes to clear any remaining mines. The two belts of minefields were so close together in this area (100 to 150 meters) that the Egyptians simply continued the breaching operation through both minefields without a significant pause. West of the Wadi al-Batin the U. S. Army 1st Infantry Division faced only one Defense Belt and fewer mines. Although they had MICLICs and AVLMS, they fired only one of them. Instead, they used tanks with track width mine plows to make the initial breach. Then the 1st Brigade used tanks with mine rakes and the 2nd Brigade used tanks with mine rollers to proof the lanes.

All of these techniques were successful against a mediocre enemy. At the end of the day on February 24, the Saudi Arabian forces, the two marine divisions, the Egyptian 3rd Mechanized Division, and the U. S. 1st Infantry Division had all succeeded in breaching the Iraqi defense belts and were poised to continue the attack. To be sure, there had been difficulties. In particular, about half of the MICLICs had failed to detonate and had to be detonated by hand. In addition, many pieces of countermine equipment had been damaged during the breach. For example, the 2nd marine division's losses in breaching equipment included seven M60 tanks equipped with mine plows, two AAVs, and one M1A1 tank with track width mine plow. In addition, a Direct Support Command armored D7 tractor was disabled by a mine while attempting to widen Lane Blue 3. But casualties in all the breaching units had been remarkably light.

After breaching the minefields of the Iraqi Defense Belts on the first day of the ground war, the Coalition Forces had resolved the bulk of their problems with the Iraqi minefields. To be sure, other Iraqi minefields remained. But their tactical importance was much less. Instead of two dense belts of minefields, covered by artillery and small arms fire and stretching across the entire southern border of Kuwait, what remained was only a number of relatively small protective and nuisance minefields. Many of these could be bypassed relatively easily as the Coalition forces continued their advance. For those that needed to be breached, the training of the Coalition forces again came into play. On February 26, for example, Task Force Ripper and Task Force Papa Bear of the 1st marine division each conducted a hasty breaching operation south of the Kuwait International Airport. Both units employed the breaching battle drill they had rehearsed many times in preparation for breaching the Iraqi main defense belts. Team Tank took up overwatch positions to provide covering and suppressive fire. Covered by this fire, the engineers moved into position and launched MICLICs to open three lanes. All three line charges failed to detonate and had to be primed by hand. As soon as the MICLICs detonated, tanks with track width mine plows proofed the lanes, and a marine battalion attacked through the minefield. Later that same day, the 3-67th Armor task Force of the U.S. Army Tiger Brigade attached to the 2nd marine division conducted an in-stride breach just south of the Al-Mutla'a Ridge. They used their breaching battle drill developed and rehearsed for breaching the main defense belts: one company used mine plows to clear two passages in the minefield while the remainder of the task force provided covering and suppressive fire. Once the lanes were opened, the task force assaulted through the minefield and quickly destroyed the enemy position.

Surprisingly, the Iraqis did not make much use of mines in the Republican Guard Divisions' defense against VII Corps. The U. S. Army 1st Armored Division encountered only a few mines in its attack on the Tawakalna defensive position -- so few, in fact, that the 1st Battalion, 37th Armor, simply bulldozed through and lost only one tank to a mine in the process.

Thanks in part to the long delay before the beginning of the ground campaign, the Coalition forces were able to field the countermine equipment and conduct the training necessary to conduct successful breaches through the formidable Iraqi defense belts with only light casualties. This equipment and training also enabled them later to breach smaller Iraqi defensive minefields without difficulty.