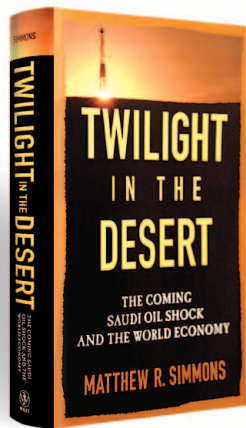




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By Matthew R. Simmons

## The Coming Saudi Oil Shock and the World Economy

# TWILIGHT IN THE DESERT

### THE SUMMARY IN BRIEF

*Saudi Arabia is the most important oil-producing nation in history. The secretive Saudi government repeatedly assures the world that its oilfields are healthy beyond reproach and that they can maintain and even increase output at will to meet skyrocketing global demand.*

*But what if they can't?*

*This summary looks behind the curtain to reveal a Saudi oil and production industry that could soon approach a serious, irreversible decline. Veteran oil industry analyst Matthew Simmons draws on his 30 years of insider experience and more than 200 independently produced reports about Saudi petroleum resources and production operations. What he uncovers is a story about Saudi Arabia's troubled oil industry, not to mention its political and societal instability, that differs sharply from the globally accepted Saudi version.*

*It's a story that is provocative and disturbing, based on undeniable facts, but until now never told in its entirety. This summary examines numerous aspects of Saudi Arabia and its looming oil crisis. It also reveals the history of other major oilfields to determine that Saudi Arabia is, in fact, overproducing its primary resources and couldn't possibly ramp up production for long.*

*How long can critical Saudi Arabian oil pipelines be kept open? This summary addresses the information needed to answer that question with keen examination into Saudi Arabia's plentiful, low-cost oil resource.*

*In addition, this summary will show you:*

- ✓ *The truth behind the 70-year history of modern Saudi Arabia.*
- ✓ *Why the geological phenomena that created Saudi oil invincibility now threaten to bring it to an end, far sooner than the world has been led to believe.*
- ✓ *A field-by-field assessment of 12 key Saudi oil fields, and how verified shortfalls in their production and potential stand sharply at odds with unverifiable Saudi rhetoric.*
- ✓ *How Saudi Arabia's Aramco invokes "fuzzy logic" to manage the future of Saudi oil.*

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# TWILIGHT IN THE DESERT

by Matthew R. Simmons

## — THE COMPLETE SUMMARY

### PART ONE: FROM BEDOUIN TO BOURGEOISIE

#### The Birth of a Nation

Of all the many nations that emerged during the 20th century, none moved so rapidly from obscurity to glaring prominence as Saudi Arabia. Dominated by the Ottoman Turks and warring tribal chiefs in the 1890s, the Arabian Peninsula was in political disarray, and the Saud family, traditional rulers of the area around Riyadh from the mid-1400s, was in exile in Kuwait.

The present nation came into being only in 1932, when Abdul Aziz ibn Saud proclaimed the kingdom of Saudi Arabia after reclaiming the traditional family homeland and battling rival tribes for 25 years to gain control of most of the peninsula. He ruled a largely rural people who followed centuries-old traditional ways as farmers and nomadic herders.

#### The Saudi Arabian Oil Industry

Saudi Arabia has always been an extremely reliable proprietor of the world's most critical oil supply. The kingdom has maintained a very close relationship with the United States, and, as the largest producer in the Organization of Petroleum Exporting Countries (OPEC), has worked to maintain fair oil prices and safe, reliable oil supplies.

What we know about the kingdom's oil is what Saudi Aramco (the kingdom's wholly owned integrated oil company), the Petroleum Ministry and the royal family want us to know. The "known facts" are few and simple. In late 2004, "proven oil reserves" totaled 259.4 billion barrels, plus another 2.5 billion barrels in the Saudi-Kuwait neutral zone. If these numbers are real, Saudi Arabia's oil will last another 90 years at the current production rates of 8 to 9 million barrels per day. ■

#### The History of Major Saudi Arabian Oil Discoveries

The first significant Middle East oil discovery was made in Iran in 1908, where small amounts of oil had been found in the 1880s. Fires fueled by oil seepages and gas bubbles at the surface in various parts of the Middle East

had been noted for several millennia. The Eternal Fires burning when Nebuchadnezzar was king, as described in the Bible, were no doubt fueled by petroleum.

The first oilfield of great size found on the Arabian Shield was Iraq's Kirkuk, discovered in 1927 near the Eternal Fires of King Nebuchadnezzar's time. The Kirkuk discovery kicked off an aggressive search for oil throughout the Middle East for almost five decades, accounting for 50 to 70 percent of Iraq's oil production for most of that time.

#### Prospecting for Oil

The first discussions about prospecting for oil in Saudi Arabia took place in 1923 when a New Zealander, Major Frank Holmes, visited King Abdul Aziz and insisted that there had to be oil on the Arabian Peninsula. He came to the Middle East as a quartermaster in the British army in World War I. He heard occasional rumors of oil seepages in the Persian Gulf, and after the war he established various syndicates to find oil in the region.

Holmes not only obtained the first oil concession in Saudi Arabia's Eastern Province, he also secured the concession in the area of Kuwait where the super-giant Burgan oilfield was ultimately found. Holmes continu-

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### The History of Major Saudi Arabian Oil Discoveries

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ously borrowed money from Abdul Aziz, whose coffers were meager at best.

On May 29, 1933, Standard Oil of California (SOCAL) and the Kingdom of Saudi Arabia signed a seemingly unremarkable oil concession. This 1933 concession gave SOCAL the exclusive rights to prospect for and produce oil in the entire Eastern Province. The 1933 decision of Saudi Arabia and SOCAL to sign the concession forever changed the nature of the kingdom that Abdul Aziz founded. This planted the seed that grew to create the most important oil producer on earth.

#### *Further Discoveries and Production Growth*

On March 3, 1938, after six wells were drilled with discouraging results, the seventh oil well drilled on the Damman Dome blew out and was producing almost 1,600 barrels per day. Within a few more days, the well was producing close to 4,000 barrels a day.

As SOCAL geared up its Saudi Arabian oil campaign, it soon brought in Texaco as a partner to help fund the expensive Damman drilling and also to gain Texaco's marketing facilities for the crude oil they hoped to discover. The name of the operating company was changed from California Arabian Standard Oil Co. (CASCO) to Arabian American Oil Company, or Aramco, in January 1944.

For almost 60 years, Saudi Arabia's "Big Seven" oilfields (Ghawar, Safaniya, Abqaiq, Berri, Marjan, Zuluf and Abu Sa'fah) produced almost all of the enormous volume of oil that made Saudi Arabia so important to global supply. And in reality, a high percentage of this oil production came from just the five largest, with the two largest, Ghawar and Safaniya, producing 75 percent of all Saudi Arabia's oil. These fields allowed the kingdom to become one of the three largest producers in the world by 1970, ranking just behind the USSR at its peak and the United States, which gleaned its oil production from some 500,000 individual oil wells. ■

### Saudi Arabia's Road to Oil Market Dominance

During the golden age of oil discovery in Saudi Arabia — 1941 through 1965 — the kingdom's oil production was still limited. Relative to the oil production of the United States, Saudi Arabian output was incidental. This situation was not destined to last, however.

Global oil demand was experiencing its greatest

growth ever seen as the 1970s began. In 1960, global oil demand was only 20 million barrels a day. Ten years later, global demand was approaching 50 million barrels a day.

#### *Saudi Arabia Replaces the United States as King of Oil*

In the 1970s, Saudi oil production soared as U.S. oil production dropped. The decline of U.S. oil production enabled Saudi Arabia to take advantage of its resource potential. With its oil output soaring and prices rising, Saudi Arabia enjoyed a revenue windfall.

The money that Saudi Arabia generated from this surging oil production was as astonishing as the rise in the volume of oil it produced, even though oil prices at the start of the 1970s were still only \$1 to \$2 a barrel. Since the population of Saudi Arabia was still small, the kingdom became a font of enormous wealth virtually overnight.

#### *Damaging Effects of Overproducing Oilfields*

The history of the petroleum industry is rife with examples of how easy it has been to accidentally overproduce an oilfield. Overproducing brings on rapid gas cap formation and premature water encroachment. Overproduction leaves far more oil in the ground upon depletion than steady production at lower rates. Experienced petroleum geologists and petroleum engineers will attest that overproducing is a real risk to any oilfield, regardless of its size.

Saudi Arabia, through its long-standing desire to be a responsible and reliable provider of oil, probably inadvertently caused long-term, if not irreparable, damage to its great reservoirs by trying to keep pace with soaring global demand. It was a noble undertaking to become the world's swing oil producer; but this title role, despite its prestige, was achieved only at a steep, long-term cost to the sustainability of its Big Five fields.

By the late 1990s, almost all OPEC producers, other than Saudi Arabia, were starting to bump against their peak sustainable production rates. Oil production in every Middle East OPEC country was still coming from only a handful of giant oilfields. Few fields of any significant size had been discovered in the entire Middle East in the preceding three decades.

As the 21st century began, the bulk of OPEC's oil production still came from a small number of slowly aging mature fields. But these great fields had produced so much oil for so long that even the current Aramco managers began to assume their prolific output might be immune to the normal aging problems affecting all other oilfields. ■

## The Veil of Secrecy Over Saudi Reserves and Production

By the mid-1970s, Saudi Arabia's giant and super-giant oilfields were already showing the first signs of normal aging and, perhaps, of damage caused by raising production so rapidly in response to soaring world demand. But Saudi Aramco continued to increase its oil output as needed in response to either increasing demand or shortages caused by one crisis or another. Ironically, in trying to meet its responsibilities as a swing producer, Saudi Arabia probably violated the principles of good stewardship of its great oilfields.

In other respects, it is clear that Saudi Arabia abrogated certain responsibilities, although it was by no means the only important oil producer to do so. By veiling its oil operations in secrecy and refusing to provide credi-

ble data to support its claims about reserves, production rates and costs, Saudi Arabia served its customers, the consuming nations, poorly. Energy planners the world over were forced to base their calculations on assumptions rather than verifiable information, a circumstance that has undoubtedly had harmful consequences for all energy stakeholders, producers and consumers alike. This secrecy concealed the true condition and extent of aging of Saudi Arabia's principal fields.

As Saudi Arabia's oilfields aged, the multitude of problems grew. Saudi oil operations in 2005 are far more complex, sophisticated and costly than they were prior to the mid-1970s. Thus, the kingdom entered the 21st century and the 72nd year of its national history with issues of several sorts — technical, economic and political — that may interrupt or reduce its oil exports. These issues have no obvious positive resolutions. ■

### PART TWO: THE EBBING OF THE SAUDI OIL BOUNTY

## Saudi Aramco

Virtually all of Saudi Arabia's oil and gas is under the control of the kingdom's wholly owned integrated oil company, Saudi Aramco, one of the world's most sophisticated petroleum organizations. Aramco produces more oil each day than any oil-producing country, and twice as much oil as the next largest individual oil corporation in the world. Aramco is now one of the most active and adept users of state-of-the-art oilfield technology.

The history of oil exploration in Saudi Arabia has followed a pattern seen in many other key oil basins of the world. This pattern was described by old-timers at the French Petroleum Institute (IFP) as "The King, Queen, and Lords of an oil basin." Based on a lengthy review of all known oilfields, the IFP study revealed that any petroleum basin, regardless of its extent, contains oilfields of various sizes that can be ranked in a predictable hierarchy:

- A King — a field larger than any other in the basin.
- A Queen — one to three fields that range from one-half to one-fifth the size of the King.
- A handful of Earls or Lords — five to 10 fields, all significantly smaller than the Queens.
- A large number of commoners or peasants — small oil and gas fields and reservoirs above and below the royalty formations.

As a general rule, the largest fields in a basin have been discovered and developed first, with the smaller ones coming along later as exploration and production (E&P) work across the entire basin matures. The IFP study concluded that it takes between three and eight years to find a Queen in a previously unexplored hydro-

carbon basin. Only rarely is the King found first. After a handful of years, the King shows up, and it then takes a decade or two to round up all the remaining royalty. ■

## Oil Is Not Just Another Commodity

As is evidenced by the data disclosed by the GAO Report in 1978 and the more detailed April 1979 Senate Staff Report, Aramco experts believed that a realistic, albeit possibly conservative, estimate of its total proven oil reserves was 110 billion barrels.

Saudi Arabia raised its proven reserves estimates from the 100-billion-barrel level to more than 150 billion barrels at the end of 1979. The proven reserves then jumped to more than 250 billion barrels in 1988 — in the absence of any large new discoveries. The 250-billion figure then crept steadily upward, despite the fact that Saudi Arabia produced almost 3 billion barrels of oil each year. These reported reserves numbers raise legitimate questions:

- What criteria did Saudi Aramco use to increase the estimate of proven reserves by a factor of 2.5 times in less than a decade?
- What is the source of the estimates' validity?
- How is it possible that proven reserves effectively remained constant for the last 17 years, while Saudi Arabia produced another 46.5 billion barrels of oil?

Despite decades of technical advances, the process of estimating proven reserves still lacks precise accuracy and is subject to errors and significant revisions. The reserves estimation process may also be biased by

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### Oil Is Not Just Another Commodity

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financial and career interests or by political concerns. When such imperatives bias the estimation process, the numbers are even less likely to reflect reality.

#### Keeping Up the Pressure

Saudi Aramco operates one of the world's most complex and extensive water injection systems. This system has one overarching objective — to maintain adequate pressure in the producing reservoirs. Injected water maintains high reservoir pressure by replacing fluids extracted from the reservoir as oil is produced.

The most common water/oil problems happen when the “perforation” — the point where oil actually enters a

producing wellbore — gets too close to the oil/water contact. As an oilfield is produced, the oil/water contact steadily rises as the oil column shrinks. This also leads to wellbores getting too close to the water. Since water generally flows more readily than oil toward the wellbore, it tends to displace oil production.

Corrosion is a further issue that is both a result of the presence of water and a cause for additional water intrusion. In almost all Middle Eastern oilfields that have water drive, corrosion in the water injection systems has become a constant problem. Leaks accidentally release hydrocarbon fluids into zones where they cannot be retrieved. The difficulty of managing these water problems has risen exponentially as the giant Middle Eastern oilfields age. ■

## PART THREE: GIANTS AT THE TIPPING POINT

### Ghawar, the King of Oilfields

Ghawar is the greatest oil-bearing structure the world has ever known. Its superlative qualities cannot be overstated. It is unlikely that any new oilfield will ever rival its bounteous production.

Technical work launched in the early 1990s — computer modeling, new seismic data gathering and analysis and re-examination of well cores and well logs going back 40 years — revealed a picture of Ghawar that was not pretty.

In a paper delivered at the 2001 Annual Technical Conference in New Orleans, four senior Aramco experts admitted the technical difficulty of properly managing Ghawar's oil drainage and depletion. According to these authors, the best way to manage Ghawar's endgame was still an open question, even though the field had been in

production for 50 years. The paper candidly described how the great field's most productive areas were now extremely mature and showing the common symptoms of their age — declining pressure, increased water production and higher gas fractions, which all play a significant role in the recovery of oil. ■

### The Second-Tier Oilfields

When the current production phase ends at Ghawar, it will be virtually impossible to replace its declining output even by aggressively developing a series of much smaller fields already in the kingdom's inventory. Ghawar is the king of Saudi oilfields. There is no “crown prince” waiting to assume the throne. It is the same in an oil basin as it is in chess: Once the king has fallen, the game is over.

If all the lesser giant oilfields were still enjoying prime reservoir conditions, a jolt from Ghawar would not be such a serious event. Unfortunately, the Saudi Aramco teams responsible for maintaining a steady flow of oil from the other great Saudi oilfields (i.e., the “queens” and the “lords”) face the same technical challenges encountered at Ghawar. These problems are typical of the difficulties that affect all mature oilfields. They vary, but the overall list of issues is the same:

- **Falling reservoir pressure**
- **The emergence of a secondary gas gap**
- **Rampant corrosion**
- **Erratic water behavior**
- **Growing water cuts**
- **Lower productivity in the parts of each field remaining to be drilled.** ■

### Coming Up Empty in New Exploration

Saudi Arabia achieved a remarkable string of exploration successes from 1940 through 1968. Then the successes dried up. For the next three decades, Saudi Aramco employed the best exploration technologies available anywhere to bulk up its portfolio of world-class oilfields. Unlike exploration in many other regions, however, Saudi Arabia's efforts produced only very meager payoffs.

Unless some great series of exploration miracles occurs soon, the only certainty about Saudi Arabia's oil future is that once its five or six great oilfields go into steep decline, there is nothing remotely resembling them to take their place.

### The Best of the Rest

The half-century of miraculous oil production in Saudi Arabia has been anchored by the largest oilfield the world has ever known, Ghawar. This field is supported strongly by three other super-giant fields: Safaniya, Abqaiq and Berri. In 1979, when Saudi Arabia's oil output was nearing its all-time peak, these four fields accounted for 8.5 million barrels a day of a 9.8-million-barrel sustainable peak output. All three of these sustaining oilfields are well past their production peaks and possibly nearing steep production declines. They might be reinvigorated for some period of time through aggressive drilling and stimulation strategies, but this would be the equivalent of performing a tune-up on a 30-year-old Buick: It will make the car run better for a short while, but top speed will be 60 miles per hour instead of 95, and every hard acceleration will take a toll.

What about the other fields that have supplemented production from the super-giants over the years? Can they make up for declining production from Saudi Arabia's Big Four oilfields? The answer would seem to be "no," but with a minor qualification. The more recently developed Shaybah field may have further upside potential, but it has already shown that it will not replicate Abqaiq or Berri. No other new discoveries are queued up for development.

#### *The Lesser Offshore Fields*

Saudi Arabia has a total of 13 offshore oilfields in the Persian Gulf. They all lie in shallow water off the northern coast of the Eastern Province, between the western shore of the Gulf and the boundary dividing Kuwait, Saudi Arabia and Iran. The Safaniya field is the largest. Two others have achieved giant status — Zuluf and

Marjan. The smaller fields, such as Manifa, Ribyan, Hamur, Maharah and so forth, have either never been produced or only produced sporadically.

A recent Society of Petroleum Engineers (SPE) paper reported that this entire northern offshore area contains a total of 1,045 producing oil wells. If the report is accurate, 52 percent of these wells are now experiencing water cut problems. As the number of wet wells grows, the complexity of downhole water management practices will rise. ■

### Turning to Natural Gas

From the time Saudi Arabia began producing oil in 1938 through the 1960s, the kingdom saw little value in its natural gas. Saudi Arabia's internal domestic energy needs were still small, and the cost to export gas was prohibitive. Only a fraction of the associated gas was used for domestic purposes. All that has changed: Over the last 40 years, gas has become the critical feedstock and fuel for Saudi industry and domestic utilities.

While the oil challenge is mostly a *monetary* threat for the kingdom, Saudi Arabia's need for a substantial increase in natural gas supply is fundamental, a more compelling concern for the kingdom than flattening or even declining oil production. The kingdom's natural gas needs are all about creating more kilowatts and more potable water. Without abundant additions to natural gas supplies, it will be extraordinarily difficult, and perhaps impossible, for Saudi Arabia to fill these urgent *social* needs.

For Saudi Arabia to function securely and comfortably in 2010 and beyond, it must find and develop *massive* amounts of natural gas. ■

## PART FOUR: TWILIGHT IN THE DESERT

### Saudi Oil Reserves Claims in Doubt

The SPE technical papers dealing with Saudi Arabia's giant oilfields make it clear that each of these rapidly maturing fields poses serious challenges for Aramco. None seems immune to pending production declines, including even the Shaybah oilfield, though it has been in production for only five years. These production challenges would seem to bear directly on the most fundamental elements of Saudi Arabia's petroleum supremacy — its vast oil reserves — inviting these questions:

- Are there *sufficient reasons* to believe that Saudi Arabia really has the 260-plus billion barrels of proven oil reserves that it claims?
- Could this claim merely reflect the *competitive need*

of an otherwise minor nation to remain at the top of the OPEC reserves pecking order?

- Or does it represent an *optimistic best guess* at how many barrels might ultimately be produced?
- Even granting the sincerity of Saudi Arabia's reserves claims, do the difficulties in the mainstay fields imply that some (or much) of this oil *may not be recoverable*?

#### *Future Oil Production Estimates Are Unreliable*

The task of assessing proven reserves in any oil reservoir is elaborate, difficult and problematic, relying as it must on data gathered by remote sensing and many assumptions. The fluid volumes being estimated are never visible or physically present, and the whole process is plagued by numerous variables that cannot be controlled.

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## Saudi Oil Reserves Claims in Doubt

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The bottom line on Saudi Arabia's proven oil reserves is that the real number is hidden in obscurity. Like all proven reserve estimates, the final number will only be known with certainty when the last producing oil well has been capped. Until detailed production data is disclosed and proven reserves are identified for each key field, no estimate has any substantive reliability. ■

## Facing the Inevitable

The most striking aspect of the technical challenges now facing all the important Saudi Arabian oilfields is the difficulty Saudi Aramco is having merely to keep each field's oil output flat. Unless the kingdom soon discovers a new generation of giant oil and gas fields, it now seems almost impossible that Saudi Arabia could grow its production by any significant amount.

If it is unrealistic for Saudi Arabia to substantially grow its daily oil output on a long-term sustained basis, a more urgent question arises: How easy would it be for Saudi Arabia simply to maintain flat production of 7 to 8 million barrels a day? And when Saudi Arabian production finally begins to decline, how rapidly could output actually drop? These are now the most important energy questions in the world. Unfortunately, they cannot be answered easily. ■

## Reading Between the Lines of the Latest News From Aramco

The 2003 and 2004 SPE papers continue to provide detailed information about the condition and status of Saudi Arabian oilfields. These most recent technical reports both add to the volume of evidence and provide more specific detail about the severity of the problems now affecting the once trouble-free giant oilfields. *Without question these challenges are mounting, not receding.*

Saudi Aramco authors presented 12 papers at the SPE Annual Technical Conference and Exhibition held in October 2003 in Denver, Colo. Several of these papers deal with various aspects of the overriding issue — how to sustain production from Saudi Arabia's giant oilfields for the long term. As with prior Saudi-authored reports, no single paper addresses the overriding issue directly. But taken together, they continue to highlight the intense technical struggle that Saudi Aramco is now engaged in to keep the Oil Miracle alive.

## Aramco Invokes 'Fuzzy Logic' to Manage Saudi Oil

At some point, the steady, high reservoir pressures that keep typical Saudi Arabian oil wells flowing at such prodigious rates will fade. A growing number of the most productive sections of Saudi Arabia's greatest fields have now been depleted. The massive water injection programs that began decades ago will finally sweep all the easily mobilized oil into producing wellbores. This endgame will play out in all the mainstay giant and super-giant oilfields.

Once these events arrive, all of the reservoirs that made Saudi Arabia the world's "Oil Superpower" will still have a great deal of oil left. What will have disappeared is their driving energy, the "fizz" in the soda bottle's water. When the reservoir pressure drops below "bubble point" in each key field, the gas dissolved in the oil will immediately begin to emerge from the oil solution and create a gas cap at the top of the reservoir. As this gas separates from the oil and reservoir pressure continues to fall, the flow of oil and water into the wellbores decreases progressively.

Regardless of an oilfield's size, when its reservoir pressures breach bubble point, they tend to quickly head to their dew point. Once dew point pressure is reached, oil ceases to freely flow out of the wellbore. At dew point, there is no reservoir pressure left to keep oil, water and natural gas separated, and the enormous volumes of oil left behind in the reservoir start to commingle with the underlying water at the bottom. At this point, it is no longer easy to create high oil flows in Saudi Arabia. It is a scenario that will soon become reality as Aramco invokes "fuzzy logic" in an attempt to ward off the inevitable decline. In some respects, it has already begun.

### 'Fuzzy Logic' Versus Crisp Logic

Crisp logic deals with statements that are clearly true or false. Crisp logic answers questions within the black-and-white range of an issue or problem. There is no ambiguity. But in the middle area, the picture blurs and crispness gives way to fuzziness.

It is the maturity facing each of Saudi Arabia's oilfields that requires the use of fuzzy logic to determine how these resources can best be managed over their remaining lives. As these fields grow steadily more mature, predicting their future performance becomes increasingly more difficult. It is no longer clear to the production managers and reservoir engineers just what should be done to achieve a certain objective. Perhaps it is not even clear what the objectives should be. They are forced to deal with complex probabilities and seek

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### Aramco Invokes ‘Fuzzy Logic’

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assistance from experts who have dealt with similar situations elsewhere.

The question of when and how rapidly Saudi production will decline sits at the top of the list of issues to be turned from fuzzy to crisp. With that issue and others brought into sharper focus, we can then begin to map an energy future on a more realistic basis than we are able to do now, a future that will almost certainly involve decreasing oil supplies. ■

### In Search of Crisper Truths Among Saudi Claims

The first 2005 edition of *The Economist* carried a story about how the world’s largest and most powerful oil firm has finally revealed some of its secrets. The story reports that Aramco’s technical experts “now openly discuss field data previously held secret.”

The story quotes Dr. Nansen Saleri, Aramco’s head of reservoir management, as stating, “We’ve released more data in 2004 than we did in the previous 50 years. On a field-by-field basis, we now release more than investor-owned companies.” The story gives credit for this new openness to Abdullah Jumah, Aramco’s CEO. But it noted also that when Jumah was asked about the need to bring in outside auditors to verify their comforting claims, “A glint of steel appears in his eyes: ‘Why should we? We have never failed to deliver a single barrel of oil promised to anyone, anywhere!’” Unfortunately, the story did not report, even by way of example, any of the new data that it claimed Aramco had released.

As Saudi Arabian oilfields age and the world’s need

for oil steadily rises, the probability increases month by month, year by year, that we are approaching an oil-curtailing twilight in the desert kingdom that has provided the greatest single contribution to the world’s oil supply at the least expensive cost.

When this desert twilight arrives, the world faces an energy future, and in turn an economic future, far different from the one that all current forecasts and human expectations assume. The need to begin creating an energy blueprint for a world that has passed peak oil output is so urgent that the citizens of all nations, in unison, need to demand energy data reform. The time to trust but verify is now, before twilight arrives and darkness begins to set in. ■

### Aftermath

History has shown that out of great crises comes man’s greatest ingenuity. We will soon witness twilight in the desert for Saudi Arabia’s oil production.

But it need not create twilight for the global economy. If the problem is diagnosed in time and if we begin to take the proper steps to transcend into a new age beyond dependence on oil, this single event could begin a journey into a world that becomes even more prosperous for an even greater part of the global population than the affluent enclaves that a minority of us living in North America, Europe and Japan have enjoyed in the Great Age of Cheap Oil.

The twilight of Saudi Arabia’s oil miracle, if properly understood and managed, could become the dawn of a more enlightened and sustainable global society. It could lead to the dawn of prosperous and democratic new societies throughout the entire Middle East, Nigeria, Libya, Algeria and Venezuela. It could be the triggering event to change the energy habits of the United States and other oil-dependent Western nations. And finally, it could unleash the dawning of a scientific revolution as the world’s brightest minds work to invent new energy forms that create even greater security and prosperity than we enjoyed through the bounty of affordable and dependable oil. ■



If you liked *Twilight In the Desert*, you’ll also like:

1. ***A Thousand Barrels a Second* by Peter Tertzakian.** According to Tertzakian, the future of energy is a mix of increasing dependence on alternative fuels and conservation.
2. ***Black Gold* by George Orwell.** Investment suggestions that will allow you to profit from current and future conditions in the oil industry.
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4. ***The Coming Economic Collapse* by Stephen Leeb, Ph.D.** Leeb shows how hard times in the energy sector can be a boon for smart investors.
5. ***Black Gold Stranglehold* by Jerome R. Corsi, Ph.D. and Craig R. Smith.** Analysis of the belief that oil is not a fossil fuel, but a bio-product continuously produced below Earth’s surface.

### The Post-Peak Era

Once Saudi Arabian oil production peaks, we will face a number of issues, many of which are interdependent. These include:

- ✓ The long-term price and affordability of oil.
- ✓ Extending conventional oil supplies.
- ✓ Allocation of available supplies.
- ✓ Modification of consumption patterns.
- ✓ Sources of investment in conventional oil production and alternative energy forms.
- ✓ The need for accurate oil resource data.
- ✓ The environment and emissions controls.
- ✓ Development of alternative forms of energy.