



Vijay Rupani
Chief Minister, Gujarat State

Dt. 06/02/2018

MESSAGE

It is really heartening to learn that **Gujarat Alkalies and Chemicals Ltd.**, one of our highly successful companies, is sharing its vast treasure of experiences in form of a book titled “**Salt of the Earth - The GACL Saga**”.

I am sure the book having rich contents and history of GACL is not only instructive but will also prove to be very interesting to all the readers, including the managers and for the staff of the state-run enterprises.

I extend my best wishes for the book and congratulate the **Team GACL** on the designation ceremony of the **COELHO** complex, in memory of **Late Shree S. J. Coelho**, the first Managing Director of GACL.


(Vijay Rupani)

To,
Shree Premkumar Gera, IAS,
Managing Director,
Gujarat Alkalies and Chemicals Limited,
P.O. Petrochemicals – 391346, Dist. Vadodara.

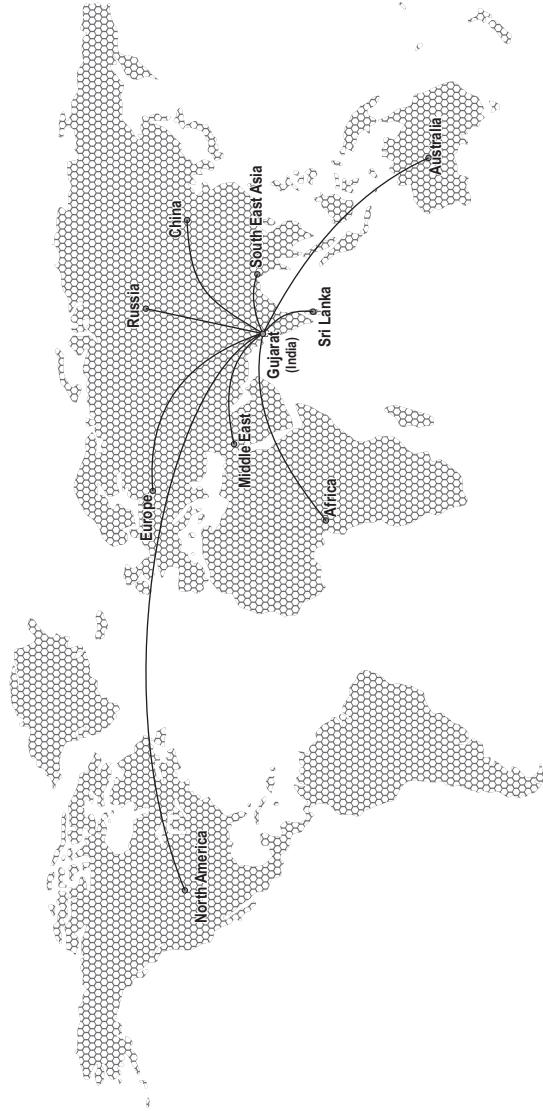


Salt of the Earth
THE GACL SAGA



This is the story of how a relatively modest organisation evolved over four decades. It made products that were hardly visible or of interest to the public, but the company was always under public gaze. It faced exhilarating growth as well as an existential crisis. Entirely on its own, it learnt to cope with them and evolve an exemplary culture in the process.

Enhancing capabilities, expanding horizons



Salt of the Earth

THE GACL SAGA

Gujarat Alkalies and Chemicals Ltd
Vadodara, India
2018

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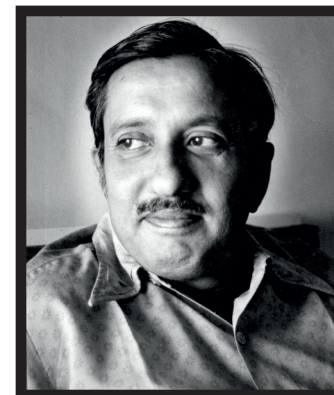
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Dedicated to the memory of



S J Coelho, IAS
(1933 – 2017)

First Managing Director
Gujarat Alkalies and Chemicals Ltd
1973-76

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Gujarat and Industrial Development

Gujarat today is among the most industrialised states of India. Its record on the volume of industrial production as well as the contribution that its industry makes to the state domestic product is one of the best among Indian states. It is a preferred destination for new investment. This happy state of affairs is due primarily to the spirit of entrepreneurship of the people of Gujarat and the decisions with great foresight its governments have taken all through the nearly six decades of its existence.

The government actively promoted industry from its inception. It followed an industry-friendly policy and created institutions that provided assistance and encouragement for the establishment of industry. Its corporations dealing with provision of land and infrastructure (Gujarat Industrial Development Corporation or GIDC), investment (Gujarat Industrial Investment Corporation or GIIC), finance (Gujarat State Finance Corporation or GSFC and electric power (Gujarat Urja Vikas Nigam Limited GUVNL formerly known as GEB) have set the template for other states to emulate.

Gujarat has been a pioneer in fostering public-private partnership. Companies promoted by the government or its agencies raised share capital from the investing public as far back as the early 1970s. Gujarat State Fertilizers and Chemicals, Gujarat Narmada Valley Fertilizers and Chemicals and Gujarat Alkalies and Chemicals all became companies listed on stock exchanges. Their overall performance has made them favourites of institutional and retail investors alike.

Their journey has not always been smooth. In fact, all three of these corporations faced severe problems at the turn of the century. Yet they came out of their respective crises without seeking bail-outs

from the government and resumed their onward march with renewed vigour.

It is quite natural for organisations to highlight their achievements and gloss over their difficulties. I am very pleased to note that Gujarat Alkalies and Chemicals has resisted that temptation and presented its saga with becoming candour. What emerges is a most absorbing case study of how an organisation discovered and internalised sound management practices on its own. This book tells in a highly engaging manner how this mid-sized company took its good fortune as well as the knocks it received in its stride and evolved a vibrant culture that would be the envy of a much larger, professionally managed company commanding resources, human as well as financial, of a far greater magnitude

I commend my colleagues in the company for sharing their experiences with others at large. There is much to learn here for all of us striving to put Indian development, especially its industry, in top gear.

Gandhinagar
January 2018

J N Singh, IAS
Chief Secretary to Government of Gujarat and
Chairman, Gujarat Alkalies and Chemicals Ltd

Why this Saga

I have had the privilege of managing Gujarat Alkalies and Chemicals Ltd (GACL) on behalf of its Board of Directors for very nearly two years now. It has been a period of very satisfactory performance for the company. It is today the leader of the chlor-alkali industry in India, with annual turnover of Rs 2,350 crore and profit after tax of over Rs 300 crore. It is a listed company, and its ordinary share of face value of Rs 10 is trading at over Rs 700.

But it was not always so rosy a position. At the end of the last century, the company plunged into an existential crisis and faced a hand-to-mouth situation, with today's expenses literally being met with yesterday's receipts.

We in the management thought, therefore, that it would be educative to review what caused the crisis and how the company came out of it. Indeed, we thought it would be well worth our while to record GACL experiences over its existence of nearly 45 years. The company records, such as its financial statements and minutes of Board meetings, provide a narration of events, but seldom touch upon numerous environmental and human factors lying behind them and influencing them. Besides, I can say without fear of contradiction, that these documents make dull reading, of interest only to the very limited circle of professionals in the corporate financial and company secretarial disciplines. We wanted a more comprehensive and inclusive account.

That meant we had to tap the memories of key decision-makers past and present to uncover some of the undocumented facts as well as the reasons underlying some decisions. Even though some of these people had either retired from active service or were no longer working with GACL, we could identify them and request them to share their memories and analyses with us. As a few of them were at an advanced age, it was imperative that we collect their most

valuable contributions at the earliest possible.

Another compelling reason for undertaking the documentation of GACL history is the fact that it is now functioning in an open market. It will face considerable competition in the near future from other players in the industry. Many of these are parts of large groups and have considerable in-house consumption of the products of the chlor-alkali group. In fact, GACL would be the only large stand-alone unit in the industry entirely dependent on the market for product off-take. It needs a sound road map to navigate its path in this highly competitive environment. While it cannot be guided solely by its history so far, it must nevertheless be fully informed of the strengths and weaknesses of the strategy it has followed up to now and draw appropriate lessons from such introspection.

Mr V K Gulati had served GACL in many capacities for over three decades retiring as Executive Director. He has had first-hand knowledge and experience of every aspect of GACL developments to date. He undertook an exercise to create a full narrative based on these.

GACL then sought the services of Dr Shreekant Sambrani, a renowned economist, management scholar and writer. He reviewed all the documentation already in place and company records including annual reports. He interviewed many former and present managers of GACL, including most of the past managing directors. He then applied his own personal knowledge to gain analytical insights into the GACL experience. This book is the end product of this exercise.

Most such commissioned works tend to be exercises in hagiography, highlighting only the positives and glossing over the negatives. GACL was acutely conscious of such limitations and gave a free hand to a reputed academic to come up with what has turned out to be a well-researched case study, covering the entire life of GACL and all aspects of its functioning.

But we make no claim for exhaustiveness. That would have made the task very unwieldy and the resulting document too long and bulky for almost anyone to read, thus diminishing its utility.

It is no one's case that the history of a technology-driven manufacturer of industrial intermediates would be of gripping interest to any but the concerned technocrats. We have therefore

tried to keep the focus firmly on the informed but lay reader and steered clear of voluminous technical and financial details, citing only those that advance the story. We have tried to engage the reader through instances of managerial innovations - and shortcomings as well - and their impact on the company.

This exercise has been most timely. We were able to engage Mr S J Coelho, the first Managing Director of GACL, tapping his exceptionally rich and detailed memory. This was the first time that he had expressed himself on the subject. Shortly thereafter, unfortunately, he passed away. We are saddened that he is not among us to see the result of the efforts to which he so richly contributed, but are grateful that we were able to record his experiences. We seek to honour his memory by dedicating this volume to him.

I would like to acknowledge on behalf of GACL, its Board and my own self a deep debt of gratitude to my colleagues past and present and all those others who were instrumental in producing this saga: persons far too many to name who shared their experiences and memories and generously gave their time for it, Mr Gulati for preparing exhaustive base material, Dr Sambrani for his skilful weaving together the various strands to create a most readable account, Ms Rita Bhandari Sambrani for meticulous copy editing and One Advertising and Communication Services for putting together a visually attractive volume that does justice to the material.

Vadodara
January 2018

Prem Kumar Gera, IAS
Managing Director
Gujarat Alkalies and Chemicals Ltd

In the Beginning..

The Fabled Land by the Sea

1

The Fabled Land by the Sea

Cradle of Maritime Civilisation

About 5,000 years ago, most mankind as it existed then was still learning to grow food, make rudimentary tools and build small settlements. But almost all of present-day Gujarat was well on the way to becoming a sophisticated trading civilisation, reaching out to other areas of the world. The Ghaggar may or may not have been the revered Saraswati, believed to be arising in the Himalayas along with the Ganga and the Yamuna but flowing south-west parallel to the Indus. But it was a perennial river emptying into the Rann of Kutch. That was the tail end of the Harappan or the Indus valley civilisation. Remains of what once were dry docks and warehouses excavated at Dholavira and Lothal suggest that they were river ports where ships could come in to dock with the full-moon new-moon high tides. They were thus the gateways for the Indus valley people to their contemporaries elsewhere, the Egyptians and the Mesopotamians. The three together are the earliest civilisations.

These ports must have been supported by settled communities in the interior, producing goods and commodities for trading. The available evidence from diggings elsewhere shows that these were much like modern cities, with well-laid out streets and dwelling areas, and provided with water supply and drainage systems.

Flourishing Gujarat and the Idea of Gujarat

Interpreting and reconstructing the Indus valley civilisation is fraught since the seals found have not yet been deciphered. But subsequent settlers in Gujarat - Gujjars or cowherds of northwest India, who gave the state its name – appeared to have followed the patterns left behind by the Harappans. Various dynasties and kingdoms ruled parts of what is now Gujarat well into the Middle Ages. The region was subject to major influences of Jain and Buddhist religious learning and practices.

Gujarat continued to benefit throughout its history from its strategic location on the Indian Ocean. With Greece, Rome, Egypt and West Asia on one side and Java, Sumatra Malacca and China on the other, it has had a central place in sea trade for centuries. Backed by a rich hinterland, industry and the entrepreneurial skill of its people and with organised governance for long periods, Gujarat's foreign trade flourished. Changes in geomorphology made the once important ports of Dholavira and Lothal non-functional. Fortunes of Bharuch, Khambhat and Ghogha fluctuated. At their peak, they aroused not just interest but envy as well of visiting Europeans. Surat was the leading metropolis of the world in the late eighteenth century with unmatched population and prosperity. These port cities and others saw organic growth and decline over long periods. Kandla and Mundra have experienced bursts of prosperity in recent times due to enlightened state policies and strong native enterprise.

Its interactions with numerous lands and people over millennia led to a society with a broad vision. Traders, travelers and ambassadors carried goods and influences back and forth between Gujarat and the world. It continued to attract foreign traders. They were dazzled by its wealth and industriousness. Some, like the Zoroastrians, became adopted children of the land and added

immensely to its variety and industry.

The fabled wealth of Gujarat also aroused interest of another kind, that of marauders. Five of the seven famed Somnath temples were destroyed by Muslim potentates, starting with Junayad, the Arab governor of Sind in 725 and ending with Aurangzeb in 1706. The worst sacrilege was committed by Mahmud Ghazani in 1024, which led not only to the loss of 50,000 lives, but also to the destruction of the lingam, pieces of which were used make steps of the Jamiah Masjid in Ghazani.

Jain temples and centres of learning, too, suffered similar fates at the hands of invaders. The fabulous temples of Sidhpur-Patan were sacked in the middle ages, compelling the local guilds to move their valued idols and illuminated texts to Jaisalmer for safe-keeping, where they remain to this day.

Yet on the whole, Gujarat successfully managed its affairs involving all communities. In the pre-colonial era, Muslim princes ruled, Hindu and Jain traders engaged in commerce, and Hindu and Muslim artisans produced goods for exchange. Prosperity was shared, though obviously not equally. The adventurous Gujaratis of all stripes travelled far and away in pursuit of fame and fortune, but mostly returned to their native land. This circulation (and not necessarily a Diasporic movement) meant that Gujarat was globalising long before the term gained currency. Geography, language and literature, poet-saints, economic interdependence between sub-regions, migration, religious sects, a long coastline and a Diaspora created and sustained the idea of Gujarat.

Gujarat up to 1960

The Dutch, the French, the English and the Portuguese all established bases along the coast of the region in the 1600s acquiring several enclaves along the Gujarat coast, including Daman and Diu as well as Dadra and Nagar Haveli.

The British East India Company set up a factory in Surat in 1614, which formed their first base in India, but it was eclipsed by Bombay after the British acquired it from Portugal in 1668. The Company wrested control of much of Gujarat from the Marathas during the Second Anglo-Maratha War.

Gujarat was placed under the political authority of the Bombay Presidency, with the exception of Baroda state, which had a direct relationship with the Governor-General of India. From 1818 to 1947, most of the present-day Gujarat, including Kathiawar, Kutch, and northern and eastern Gujarat were divided into dozens of princely states, but several districts in central and southern Gujarat, such as Ahmedabad, Broach (Bharuch), Kaira (Kheda) Panch Mahals, and Surat, were ruled directly by the British.



Sub-regions of Gujarat

All through this period, Gujarat followed a mercantilist culture, not dissimilar to the protestant ethic driving much of early European capitalism. Its principal export to the world was fine cottons from handlooms, then called Calico. The English passed strict laws to protect their infant textile industry against cheap Indian imports.

It was thus natural that with the invention of steam jennies, modern textile mills should attract the enterprising Gujaratis. The advent of Indian textile industry in Bombay, Nagpur and Ahmedabad, in the midst of cotton-growing areas was due to Parsi and Gujarati entrepreneurs.

The textile industry grew rapidly. It benefitted greatly from the Swadeshi call of Mahatma Gandhi in the 1920s, which urged Indians to shun imported textiles. The mills in Ahmedabad were mostly owned by former trading houses – the Sarabhais, the Lalbhais – which transformed themselves into modern industrial houses. Many of the enterprises became limited companies and a share market flourished in Ahmedabad. At its peak, Ahmedabad boasted of over 100 textile mills. It was called the Manchester of India. It attracted labour from mostly North India and professionals from all over India. The Gujaratis themselves were renowned for their legal and financial acumen.

Most of Gujarat continued to be part of the new Bombay province after 1947 in Independent India. Western Maharashtra and Northern Karnataka were also parts of the province. The princely states of Kathiawar were formed into a Class B state of Saurashtra. Kutch was a Class C state with much less autonomy.

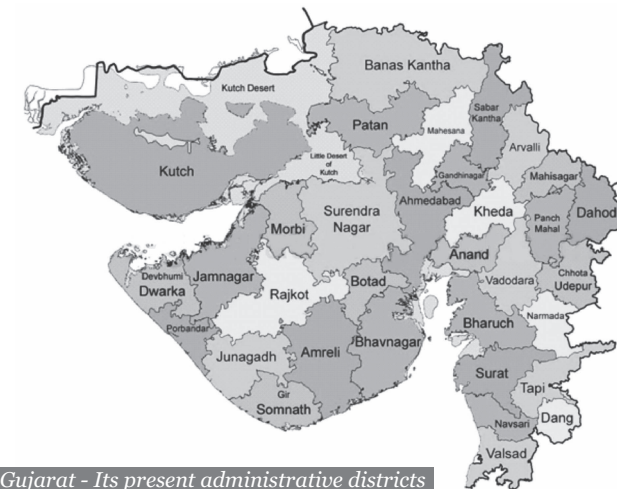
Immediately after Independence, the movement for linguistic states gained popular support and momentum. The States Reorganisation Committee recommended formation of states with a single language. Due to immense pressure from politicians and industrialists with substantial interest in Bombay, an exception

was made for Bombay. In 1956, it became a large bi-lingual state with all Marathi and Gujarati speaking areas included, which meant merging Vidarbha and Marathi-speaking areas of the old Hyderabad state as well as Saurashtra and Kutch into an unwieldy region.

Neither of the two linguistic groups much favoured the idea of the bi-lingual state. Protracted popular agitations followed in both Maharashtra and Gujarat. Several hundred people were killed in the ensuing police firing. Ultimately, two separate states of Maharashtra and Gujarat came into existence on 1 May 1960, much to the delight of the populations involved.

Problems of New State of Gujarat

The long business dominance of Bombay and to a lesser extent, Ahmedabad, left both the new states with many challenges. A number of Gujarati industrial houses had their investments and capital tied up in existing enterprises in Bombay and the Maharashtra region. There was not much by way of industry in most of Gujarat, except for textiles and ancillaries in Ahmedabad which had already started facing a decline. The state had no mineral wealth to speak of. It had no coal at all. All its electricity was generated in thermal power stations which depended on coal transported long distance by trains. On-shore oil deposits were yet to be discovered.



Gujarat - Its present administrative districts

Agriculture, too, was not very satisfactory. The central and southern parts were fertile and had river-based irrigation, but the rest of the state including all of North Gujarat and Saurashtra was virtually arid. Monsoons were always erratic and droughts a common occurrence. Cotton and groundnut were the main commercial crops then, as they still are. They fed processing units based in Ahmedabad and Saurashtra respectively. Tobacco, the

other commercial crop, was used by the bidi industry, mainly organised as cottage units.

Infrastructure was deficient and not conducive to growth. Roads were poor in most of the state. The shoreline of over 1,600 km (more than one-fifth of the country), for long the mainstay of Gujarat prosperity, had declined in importance. Older ports had long gone into decline. The state was entirely dependent on the port of Bombay (as was all of western India), which had reached saturation. The new port of Kandla in Kutch built as a replacement for Karachi was still in its development stage. It had extremely poor rail and road connectivity.

Although the Arabian Sea surrounding Saurashtra and Kutch offered abundant fish, absence of processing facilities and the limited local market in the largely vegetarian Gujarat meant that fishing was restricted in size to small country boats. Salt was extensively made from sea brine in Kutch as well as Surendranagar and Bharuch areas. Gujarat then was and still is the largest salt producing state in the country. Its industrial use was then limited to the Tata Chemicals plant in Mithapur near Okha and Dhrangadhra Chemicals in Dhrangadhra in Surendranagar district, both established in the 1930s.

What the state did not lack, however, was the spirit of enterprise and aspirations of its people and leaders. Most importantly, Gujaratis believed themselves to be destined for a bright future. In one sense, they were quite justified in this belief. Even though objectively conditions in Gujarat in 1960 could not be considered very bright, they were not much better elsewhere in India. Gujarat was seventh among 15 Indian states by area and tenth by population in 1960, but even then, its per capita income was among the top three. Therefore, then as now, Gujarat was a relatively advanced state.

Can-do Response of Government: Gujarat Marching on

Dr Jivraj Mehta became the first Chief Minister of Gujarat in 1960. He was a physician and the Finance Minister of the erstwhile Bombay state for long. His compact ministry comprised experienced politicians, most of whom had been ministers in earlier Bombay governments. The new state also received its share of administrators from the predecessor state, which had had a justified claim to be among the best-administered states.

The government was acutely aware of the problems the state faced right at its inception. It identified attracting industry as its highest priority. The unstated mission was “Make in Gujarat,” anticipating the Make in India campaign by more than half a century.

Political and administrative elite of Gujarat knew that they had a tough task on hand luring industry into Gujarat when the neighbouring Bombay-Poona-Nasik region offered an established industrial base and relatively advanced infrastructure. By contrast all that Gujarat could then offer was cheap, abundant and disciplined labour, which by itself was not sufficient.

New industrial units would need well-serviced and connected parcels of land and some assistance in raising capital, the government realised. They would also have to be facilitated to obtain the many support facilities, permissions and licences required to run manufacturing entities. The administrative framework was rather rigid in the 1960s and ease of doing business was becoming an increasingly important factor in the decision-making of entrepreneurs and established companies alike.

In a first-of-its-kind strategic move, Gujarat created three new institutions for this purpose. Gujarat Industrial Development Corporation (GIDC) was tasked with helping industries secure land. It also established several industrial estates where industries were offered plots. Units in these estates could benefit from common supplies of power and water on payment of user charges.

Gujarat Industrial Investment Corporation (GIIC) was meant to assist investors with ready and bankable project profiles and assistance in finding funds for investments. It would also channelise such incentives as the government was to offer. Finally, Gujarat Industrial Extension Bureau (INDEXTb) was to guide and assist intending investors with administrative and regulatory compliance. It was the first body anywhere in the country to offer one-window clearance of an industrial application.

Gujarat is now well-recognised as one of the premier industrial states in India. That is a testament to appropriateness of the strategy to establish these new institutions in the first place, as well how effectively they have performed their stipulated function.

All these institutions were headed by competent officers invariably belonging to the Indian Administrative Service (IAS). Their boards included government officials representing some concerned departments and well-known professional practitioners of disciplines such as engineering, law, accounting and management. They commanded public respect and soon gathered a reputation for efficiency. Gujarat thus established a reputation for industry-friendliness and relative non-interference from politicians as well administrators. These institutions became models for other states to emulate, including the neighbouring Maharashtra, but none of these matched the reputation of Gujarat.

Soon after the formation of Gujarat, sizeable on-shore oil deposits were discovered near the Gulf of Khambhat region (Kheda, Vadodara and Bharuch districts) and in Mahesana district. The Oil and Natural Gas Commission acted expeditiously to establish commercial production. The government-owned Indian Oil Corporation set up Gujarat Refinery in 1966 with a 2-million ton per annum capacity, then the largest in the country, on the outskirts of Vadodara.

This spurred great interest in downstream products and ancillaries.

Indian Petrochemicals Corporation (IPCL), another public sector entity (since privatised) came up in close vicinity of the refinery in 1969 with the objective of promoting greater use of plastics in India. The nearby Ranoli and Nandesari estates of GIDC housed many small and large downstream units. Old textile houses were quick to take note of these developments. The Sarabhais and the Lalbhais were among the earliest to invest in chemical businesses in the central Gujarat region with Vadodara acting as the hub. Engineering and pharmaceutical units also came up in the region.

Gujarat State Fertilizers Company (later Gujarat State Fertilizers and Chemicals, GSFC) was established in 1962 at Vadodara. After the refinery became functional, GSFC decided to set up a naphtha-based plant to manufacture the basic nitrogenous fertiliser, urea. This was a most-opportune decision, since demand for chemical fertilisers was to grow rapidly in the Green Revolution and supply of naphtha as the basic feedstock was assured by the new refinery. The project was quickly cleared and became operational in a short period of two years.

The GSFC ownership was a novelty in that period. The state government had only 49 per cent of the equity, with the rest being raised from the market. While the government did in fact control the company and had the power to nominate the managing director, it exercised great wisdom in nominating Jayakrishna Harivallabhdas, a reputed textile magnate from Ahmedabad, as the board chairman. That inspired great investor confidence. The GSFC shares remained investor favourites and enjoyed considerable premium for a very long time. This ownership pattern came to be known as joint sector. This was the first example of public private partnership (PPP) in India, some three decades before it came into vogue. Gujarat had thus played a pioneering and anticipatory role yet again.

Meanwhile, GIDC set up a very large industrial estate at Vapi, 40

km north of the Maharashtra border on the main Bombay-Ahmedabad highway and rail line. It was meant specially to invite small and medium investors who would otherwise have gone to Maharashtra. It attracted diverse units, from boiler-makers to dye-stuffs to pharmaceuticals. Its early success led to more such estates being established at Udhna, Ankleshwar and Makarpura further up the Bombay-Ahmedabad corridor.

At the end of its first decade as a separate Indian state, Gujarat appeared to be on track to reclaim the glory that it once enjoyed, that of being a fabled land. And the sea, as before, was to play a major role in Gujarat's aspirational journey in the modern era.

Gujarat Alkalies and Chemicals: Baptism by Fire

2

Gujarat Alkalies and Chemicals: Baptism by Fire

A Minister's Ire and the Birth of a Company

S J Coelho hailed from Mangalore. After a good academic career, he sat successfully for the IAS examination. He was assigned to the new state of Gujarat. He had his share of routine appointments of a young IAS officer. By 1964, he had become Director of Industries, which was an important posting because of the industrialisation drive of the state. He was transferred as Collector of Kutch in July that year. He was perplexed, because this was considered to be a punishment assignment given the size of the district, its remoteness, lack of development and infrastructure and desert-like environment, not to mention proximity to hostile Pakistan. Nevertheless, being a disciplined officer, he took it up as a challenge. Just how much of challenge it was, he was to find out next year.

In April 1965, the mounting tensions on the border led to open hostilities with Pakistan. That placed a great deal of added responsibilities on the civil administration and called for great resourcefulness. Coelho was the head of the district. His handling of the situation met with great approbation by not just the civil and military authorities but also the people of the district. But more was to follow soon.

The then Chief Minister Balwantrai Mehta took a small Beechcraft plane to go from Ahmedabad to Mithapur on 19 September 1965, when India was actively engaged in war with Pakistan in Kashmir and on the Punjab border. It appeared on the forward radar of Pakistan Air Force. It was shot down by a Pakistani jet on the suspicion that the Indian Army was using a small civilian aircraft to conduct reconnaissance of Pakistani forward positions. All those aboard the Beechcraft perished, which included the Chief Minister and his wife. It fell upon Coelho to handle the sensitive and tragic task of breaking the news and organise the transport of the mortal remains. This too was performed with efficiency and great delicacy.

Coelho remained in the district for two more months until November 1965 before being transferred to Vadodara as collector. His valiant efforts in Kutch earned him the award of Padmashri the next year. He was the youngest recipient of this national honour at that time.

He went on to hold several positions and ended up being the Managing Director of GIIC in 1972. GIIC had managed to create a substantial shelf of possible projects for the consideration of investors. One such was for the manufacture of caustic soda from electrolysis of salt. Lovraj Kumar, Advisor to the Ministry of Petroleum and Chemicals of Government of India, who was the main architect of IPCL had got the project prepared. Given abundant availability of salt in Gujarat and its own sizeable demand for caustic soda, Kumar believed that Gujarat would provide an excellent locational fit for the project. He therefore placed it at the disposal of GIIC.

But proposing a project was a mere first step in its life cycle. It could not proceed further without a Letter of Intent under the then prevailing industrial policy of the Government of India. Intending

investors considered such permissions absolutely critical and considered no effort spent on getting them as excessive. Kumar provided GIIC this all-important document as well. A preliminary market feasibility study was conducted by Indian Institute of Management, Ahmedabad. But GIIC had neither a possible investor nor funds of its own to carry the project through. So it remained on the GIIC shelf.

It would have remained there for some considerable time, but for the fact that Coelho had stepped on some toes in his career until then by his refusal to do favours for influential people or tolerate practices that were not entirely above board. One such person was a close associate of an important minister of the Government of Gujarat. The minister did not take kindly to Coelho's show of independence and was so annoyed as not to want Coelho to continue as the Managing Director of GIIC. He managed to remove him from that position through the ploy of offering him an appointment as the managing director of the caustic/chlorine project.

This was highly unusual, since projects yet to be finalised do not normally have managing directors or organisations. But political exigencies prevailed and Coelho was in no position to resist the minister's desire. Following the advice of the then Chief Secretary L R Dalal, he assumed this anomalous position in November 1972 with stoicism associated with the administrative service members. He continued to function within the overall administrative remit of GIIC, out of its Ahmedabad office.

Word was quietly passed around that Coelho should stay away from the minister, which he claimed was happy to follow to the letter.

Thus was born the entity we now know as Gujarat Alkalies and Chemicals Ltd (GACL).

Project in Search of Incorporation

Formation and incorporation of a new company are usually the last formal steps for a well-planned project just prior to its operationalisation. In case of GACL, the concerned minister's orders resulted in a managing director being in place before taking up the formalities. In effect, Coelho and the caustic-chlorine project embarked on all preliminaries including a detailed project feasibility report and a company to run it only after Coelho's new posting.

Some major decisions followed quickly. Since Vadodara had already emerged as the base of chemical industry in the state, it suggested itself as the project site. GIDC accommodated GIIC's request by offering a plot of land in Ranoli, close to IPCL and the refinery. Salt would come from the neighbouring Bharuch district. Electricity was the other main input, to be obtained from the Ranoli sub-station of the Gujarat Electricity Board, which was also based in Vadodara.

Framing the Memorandum of Association and Articles of Association was the next step. The company was formally incorporated on 29 March 1973 under the Companies Act (1956) as promoted by GIIC. The Registrar of Companies, Ahmedabad, issued the Certificate of Commencement of Business three months later, on 29 June 1973.

The incorporation documents mandate the listing of the main objectives of the proposed company. GACL stated that these were to pursue the manufacturing of chemicals and petrochemicals, and import and export of chemicals. As most companies routinely do, GACL also listed the pursuit of a range of activities as incidental and auxiliary to its main and allied business, as necessary to attain its main objective. It was to carry on such other business, which may seem to the company to be capable of being conveniently carried

out in connection with the main business of the company or calculated directly to enhance the value of or render profitable any of the company's property or rights.

The Articles of Association stated explicitly that as long as GIIC and its associates retained 26 per cent of the shareholding in GACL, the state government would have the right to nominate certain members of its Board, including the Chairman and the Managing Director. This position, which is what makes GACL to be considered almost a public sector organisation (although in terms of the Companies' Act it is not so) remains unchanged to date.

The Companies' Act also requires persons desirous of being formed into a company in pursuance of the Memorandum of Association to be named. GIIC proposed a slate of administrative officers as promoter shareholders:

L R Dalal
M D Rajpal
Hiranand Sadhwani
M Shivgnanam
H R Patankar
S J Coelho
A C Shah

The first Board of Directors of GACL again comprised serving officers of the state government:

B P Patel, Chairman
M D Rajpal
M Shivgnanam
S J Coelho, Managing Director

The Board met for the first time on 12 June 1973 in the Ahmedabad office of GIIC. The management and the managing director shifted

to Vadodara thereafter, along with the business office of the company (the registered office was formally changed to Vadodara on 8 September 1975). The shift also meant that the company and Coelho were at some distance from the state capital. That helped Coelho to remain relatively out of sight of the minister whose ire he had aroused.

The Board was expanded later with the addition of bankers, financiers and industry professionals. GIIC was the promoter organisation and the principal shareholder in GACL at this time. As such, GACL was a subsidiary of the parent GIIC until its shareholding was diluted through a public issue in 1975. The GACL Board took note of the pre-project activities of GIIC and recognised them as parts of the project under implementation.

Starting up in Earnest

The incorporation formalities having been over, Coelho began the project start-up in right earnest after moving to Vadodara. The first task was to get the Letter of Intent converted into an Industrial Licence and then have it transferred from the holder GIIC to the executor of the project, GACL. This was accomplished by July 1974. The licence was for a capacity of 100 tons per day of caustic soda (sodium hydroxide) translating to 37,425 tons per year. The process involved was electrolysis of brine (common sea salt) solution. Salt is chemically sodium chloride. Its electrolysis causes the two ions, sodium (positive, or cation) and chlorine (negative, or anion) to separate. Hence chlorine is an essential product resulting from the process as well. The licence stipulated the chlorine at 33,000 tons a year as liquid chlorine and 15,000 tons as pure (100 per cent) hydrochloric acid (hydrogen chloride).

The GACL project was not the first one in Gujarat for manufacturing sodium compounds from salt. Gujarat was home to other, older plants using this abundant natural resource as raw material, notably Dhrangadhra Chemicals at Dhrangadhra, then a princely state in Surendranagar district and Tata Chemicals as Mithapur near Okha in the former Baroda State. Both these plants dating back to 1939 and 1944 respectively, however, produced soda ash (sodium carbonate) and not caustic soda. They used salt from the Rann of Kutch. GACL in comparison was a pioneering venture in Gujarat in that it was to engage in the production what could only be termed as hazardous chemicals – caustic soda is corrosive and chlorine either as liquid or as hydrochloric acid even more so. It was also to use salt from the Arabian Sea coastal areas of central Gujarat.

GIIC had got a study of the market potential for caustic soda done by the Indian Institute of Management even before GACL came into existence. That, however, was not sufficient basis to plan a full-fledged industrial project. Quite early in its corporate existence, GACL decided to commission a detailed feasibility and bankability study, covering all aspects of the project, including technology and manufacturing, markets, economics and finances, and operational planning. The Board asked a leading project consulting firm, Tata Consulting Engineers, to take up this assignment in November 1973.

While Coelho had rich policy and administrative experience, he had no technical background nor did the Government of Gujarat or GIIC. He decided to seek expertise elsewhere. He reached out to his old friend R L Ramani of Mettur Chemicals (now part of the Chemplast Sanmar Group), located near the Mettur Dam in Tamil Nadu and among the earliest producers of caustic soda in India, dating back to 1936. Ramani recommended that Coelho talk to one of his top technocrats, L R Krishnamurthy. Coelho was able to persuade Ramani to lend Krishnamurthy's services to GACL for a period of two years.

Box 1: Caustic-chlorine Industry in India

The term caustic chlorine or chlor-alkali industry refers to processing of common salt, sodium chloride, to yield either caustic soda, sodium hydroxide or sodium carbonate (soda ash) and chlorine or its products, chiefly hydrochloric acid. It involves electrolysis of the salt to separate it into its component ions of sodium and chlorine.

Caustic industrial production started globally in 1897. It began in India more than four decades later, in 1941. Two units were

established that year, with what would now appear to be utterly minuscule capacity of processing 5 tons a day of salt in each plant.

The caustic-chlorine industry has grown substantially since then. It is now considered a well-established, mature industry with a capacity of 34 lakh tons a year of caustic soda. Its annual turnover is about Rs 7,000 crore. It comprises 34 manufacturing units and provides employment to about 1.5 lakh.

The Indian soda ash industry comprises five producers with a combined annual turnover of about Rs 5,000 crore. Nearly 95 per cent of the soda ash capacity is concentrated in Gujarat. The first soda ash factory in India was started by the erstwhile Dhrangadhra Chemical Works in 1925 in Gujarat. The industry has now grown to be able to meet over 90 per cent of the country's requirements.

The Indian alkali industry is regarded by its global peers as being among a most efficient and eco-friendly one. It has phased out mercury cells and has instead adopted the energy-efficient and eco-friendly membrane cell technology. The Environment Ministry now classifies the sludge from caustic soda plants as non-hazardous. This is well ahead of the 2025 deadline set by the Minamata Convention on mercury. India is the second country in the world to do so, after Japan.

Caustic soda is a bleaching agent widely used in textile and paper, soap and detergent industries. It also finds use in metallurgical processing, chiefly of aluminium ores such as bauxite. It is sold either in liquid form as lye or as solid flakes or prills.

Chlorine is a very versatile but hazardous chemical. Its main use is in chlorine derivatives such as chloromethanes and

increasingly, poly-vinyl chloride. It requires adequate safety measures in all manufacturing units as well as during transportation and use at the consumers' end. Therefore, the industry launched in 2013 a dedicated helpline to attend to emergencies that arise during transportation and use.

Presently, the industry is considering massive expansion, with large groups such as Reliance and Aditya Birla investing in added primarily for captive use. Even the newly established units are planning major capacity increases.

Identifying the right technology and its supplier was next on the agenda. Armed with Krishnamurthy's expertise and a review of experiences of existing Indian plants, although few in number, GACL short-listed several international firms as likely suppliers of know-how, equipment and basic engineering services. These included Friedrich Uhde of West Germany (as it was then), Asahi and Shin Etsu of Japan, ICI of the United Kingdom and de Nora of Italy. The last two were ruled out due to their high costs (and in case of ICI, a possible conflict of interest due to its own operations in India). The initial Japanese quotations were quite attractive, but their scrutiny revealed that they did not include comprehensive back-stopping support as did Uhde. This would have added to the effective cost.

Protracted and hard negotiations with Uhde's Indian agents followed. At one time, GACL even threatened to withdraw and have Uhde blacklisted in India. The end result was a final figure that was some 40 per cent lower than the initial quotation and lower than what GACL had gathered as the prevailing costs world-wide. The fact that Uhde was considered a global leader in the then accepted mercury cell technology with over 75 plants operating in many

countries substantially strengthened the credentials of the German company.

By February 1974, GACL had made contractual commitments with Uhde for basic and detailed engineering, purchase and erection of critical imported equipment, detailed engineering, supervision of erection, commissioning and inspection and training of key GACL personnel.

With land in Nandesari in its possession, arrangements in place for water from the French well IPCL had dug in the river Mahi nearby and power supply from GEB, identification of technology supplier leading to contracts and core technical staff in position, the stage was set for laying the foundation stone of the plant. This ceremony was performed in June 1974 by K D Malviya, then the Minister for Petroleum and Chemicals in Government of India.

Major Hurdle: Raising Finance

Even as GACL was making steady progress in giving concrete shape to the project, the major worry was finding funds for investment. The overall cost of the project was estimated to be Rs 11.4 crore. That may appear a very manageable sum in today's terms, but back in 1974, it was quite sizeable. For comparison, petrol prices had just crossed Re 0.75 a litre then as against Rs 70-plus now, and IAS officers after their promotion to what was called the senior scale drew a basic salary of Rs 900 a month as recommended by the Third Pay Commission in 1973.

The project cost was proposed to be funded through a prudent debt:equity ratio of 1.5. A consortium of term-lending institutions led by the Industrial Development Bank of India and including the Unit Trust of India, Life Insurance Corporation, Industrial Credit and Investment Corporation of India among others came on board to provide the proposed debt part of the funding amounting to Rs 7.15 crore. Foreign currency needed for the import of equipment and payment to foreign suppliers was scarce in those days. Fortunately, given the German sourcing of technology and equipment, the German government development bank Kreditanstalt für Wiederaufbau (KfW) offered a foreign currency loan on attractive terms.

But the main problem was the equity component of Rs 4.25 crore. GACL tried to tap official sources of funds early on, even prior to tying up loan funds. Its promoter, GIIC, had no funds of its own for this purpose. During this crucial period, the Government of Gujarat was not inclined to consider investing its own funds in GACL.

Funding from private business houses was then explored but rather tentatively. The JK Group of industries had shown some interest to begin with. But since it was then concentrating on its own plant

coming up at Kota in Rajasthan, the matter did not proceed much further.

The state had no popular government at this time and was under President's Rule with an advisor in the person of a retired civil servant H C Sarin who was quite supportive of Coelho and encouraged him in his efforts to raise funds. Coelho recalled the earlier, very successful experience of GSFC raising equity through a public issue. He approached Pradip Hurkissondas, a leading broker of the Bombay Stock Exchange, who was instrumental in getting the positive response to the GSFC issue.

Hurkissondas suggested that GACL follow the GSFC route of raising equity through a public issue, albeit of a much smaller size. He agreed to play the lead role yet again. The authorised share capital of GACL was raised to Rs 7 crore from the original Rs 5 crore, of which GIIC held Rs 1.7 crore. A public issue was floated on 19 June 1975. It was fully underwritten by financial institutions, banks, insurance companies and brokerages. This was a grand success and was oversubscribed twice over in just five days.

But that was not to be undiluted pleasure. The GACL shares not only sold faster than those of GSFC during the initial offering but also appreciated faster, undoubtedly because of the investors' happy experience of the GSFC issue. But that did not stop the GSFC top echelons feeling that their company had been upstaged by this new entrant.

GACL had to go yet again to the share market after reckoning the overall costs of the project. The all-in cost of the project came to Rs 16.6 crore as against the original Rs 11.4 crore. The cost overrun of Rs 5.2 crore was financed by additional loans of Rs 3.5 crore and a further equity infusion of Rs 1.7 crore. Existing shareholders were offered a rights issue in the ratio of 2:5 in 1977. This went through without a hitch as well.

Steady March to Commissioning and Start-up

Even at this early stage, GACL decided to augment its technical manpower to meet all likely challenges. Before the end of Krishnamurthy's term with GACL, a capable successor was needed. Coelho interviewed a well-known industry professional S P Srivastava on the sidelines of an industry meeting in Mumbai. Srivastava's plan of running the plant with the least number of people impressed Coelho and led to his recruitment as General Manager (Works). He was to remain with GACL until his superannuation and played a crucial role in all technical developments, including the eventual switch-over to membrane cells. Eventually, though, Krishnamurthy continued to remain with GACL until 1982, becoming its Technical Director.

Srivastava was instrumental in attracting experienced personnel from existing plants all over India. Many of these early recruits also remained with GACL till their retirement. This experienced talent pool was augmented by local hiring of freshly qualified engineers and technicians.

Construction and erection activities proceeded apace, with the guidance and supervision of German technicians from Uhde. Numerous contractors and sub-contractors were engaged for specific activities. Co-ordination was never a problem in the prevailing atmosphere of cordiality and camaraderie despite the long hours and harsh outdoor weather conditions.

Pre-commissioning trials began in August 1976. After their successful conclusion, the plant was finally commissioned on 19 October 1976. But in the early days, hazards such as leakage of chlorine gas which causes extreme irritation in the throat and eyes if inhaled, remained. They were gradually overcome without any major accident.

Given the concentration of chemical units in the Nandesari – Ranoli area, the state government decided to build an effluent disposal system and channel all the way to the Gulf of Khambhat according to the design of the Central Public Health Engineering Research Institute (now the National Environment Engineering and Research Institute) at Nagpur. GACL joined this effluent disposal project (now called Vadodara Enviro Channel Ltd) along with the refinery, GSFC and IPCL.

Shifting Gears to Steady Operations

3

Shifting Gears to Steady Operations

Turnover at the Top

While GACL was on its way to completing plant erection, Gujarat had again a popular government. Madhavsingh Solanki was the Chief Minister in 1976. A senior civil servant, H K L Capoor had been appointed the Chief Secretary. The new dispensation decided that it needed Coelho to come back to the state administration as Secretary of the Industries Department. He was recalled from his holiday in June 1976 and told about the impending transfer. As the erection work was nearing completion, he requested an extension of three months to see it through. This became four months. Ten days after the commissioning, Coelho left his post. It seems as if Coelho was destined only to start GACL and get it going.

Coelho had recommended another civil servant, Y V Pai, as his successor. But Pai had an extremely short tenure of three-and-a-half months. Moosa Raza, the Principal Secretary to the Chief Minister wanted an able and efficient officer to be the first Resident Commissioner of Gujarat in Delhi to lobby effectively for the state government. He considered Pai very well suited for this assignment.

H R Patankar became the next Managing Director of GACL in

February 1977. He was related to the erstwhile ruling family of Baroda State. He had entered the IAS in 1956, the same year as Coelho. Having recently settled in Ahmedabad and with family commitments there, he was initially reluctant to shift to Vadodara. He eventually served four years as the Managing Director. Immediately thereafter, he became its Chairman for the next nine years, making his association with the company the longest of any of its chief executives/chairmen.

Search for Markets and Value-added Products

Patankar came to GACL four months after its plant was commissioned. Plant stabilisation, product quality, their storage and marketing were now the main concerns of the management. A major problem at that time (and at times even now) was the storage and disposal of chlorine. This product of electrolysis can neither be exhausted as a gas nor flushed through effluents because of the corrosion and explosion hazards. Chlorine gas and hydrochloric acid possess industrial markets but that requires their storage and transport. On-site storage capacity must be within permissible limits approved by the Chief Controller of Explosives. That would at most be a few days' worth of production. This becomes a limiting factor for the overall operation of the plant. If the demand or despatch of chlorine falls, there would be an automatic brake on production.

The basic determinant of the success of a chlor-alkali plant is an assured off-take of the resulting co-products such as hydrogen and chlorine. Patankar thus realised that if GACL were to cater to the growing market of caustic soda, it must simultaneously find ways of disposing off the chlorine as well. That required not just a concerted effort between marketing and technical departments but some innovations as well.

The GACL strategy was to encourage the establishment of small units in its vicinity which would be engaged in the manufacture of products using chlorine or hydrochloric acid and hydrogen as starting materials. Eventually, it had to resort to producing chloromethanes, hydrogen peroxide and other downstream products on its own or as toll products.

Since chlorine is commonly used as a water purifying agent, Patankar sought the interest of civic bodies in Gujarat and the neighbouring areas of Maharashtra to use GACL's chlorine. That

met with some initial success but the capacity of these clients was limited, as was their ability to pay. At times, the revenues from such sales would not cover even the cost of transport.

The solution lay in seeking productive uses of chlorine elsewhere. The original plan was that IPCL would be a major customer of GACL chlorine for its continuing and expanding production of the leading plastic material poly-vinyl chloride (PVC). Given the proximity of the plants, a pipeline between the two would have been the ideal means of conveyance.

IPCL's own plans were, however, slow to materialise and the negotiations were long drawn out. GACL therefore sought other products such as chloromethane to use its chlorine and began investigating the feasibility of such products. Hydrogen peroxide and sodium cyanide were also on the list of value-adding possibilities for caustic soda.

The nearby GSFC plant had a gas stream rich in methane as a waste product, which was used as a fuel. GACL successfully worked out a barter deal for this methane against the hydrogen which it then vented. Methane became the feedstock for chloromethanes. This was a win-win situation for both the companies.

In the meanwhile, the demand for caustic soda was steadily building up. Even before commissioning its original plant, GACL had sought and obtained a Letter of Intent to double its capacity (this expansion is called the mirror image, not just because of the doubling but also because of the close proximity of the two cell blocks in the GACL premises at Vadodara). This step in advance was followed as a necessity by most companies since the absence of such permissions would have meant foregoing good market opportunities. Organisations sitting on unutilised licences or letters of intent was a routine occurrence in those times of rigid controls. They were considered good investments.

The GACL Board asked Patankar to visit possible technology and equipment suppliers and come up with appropriate plans. He travelled to Europe and met with Uhde. He learnt that Uhde had a surplus saved up from the execution of the first GACL plant. Patankar managed to get Uhde to agree to set this off against the cost of the expansion.

The leading technology supplier for sodium cyanide was a French firm, with whom Uhde had arranged an appointment for Patankar. He found a great deal of reluctance on part of the company to enter into any discussion on the proposed activity, possibly arising from their complete lack of familiarity with the Indian economic scene.

He came to know that a relatively small and rather obscure Romanian firm also possessed the technology and would be willing to transfer it. But that did not quite materialise, since the host firm was under pressure from its American sponsors not to part with the technology.

PCK, an East German company, which was a supplier to the Nazi regime during World War II, was in a position to supply the sodium cyanide technology. Persuading it to do so was not easy, but Patankar managed to do it using considerable dexterity. This was one of the happier outcomes of the visit.

The Mirror Image

The original plant had earmarked adequate space for additional balancing equipment for eventual expansion. The cell house building had provision for 26 mercury cells to begin with and a subsequent addition of 12 more as expansion. The silicon rectifier system was consistent with expanded capacity requirements.

The expansion involved adding 12 cells along with modifications to auxiliary/supporting facilities for handling, storage, bottling, disposal of sludge and effluents and the needed utilities. GACL also added a waste water demercurisation unit to ensure that the effluent was within permissible limits of mercury contamination. The power allocation was also suitably increased to 44 MVA.

This was followed by a second expansion with 30 additional cells in a new cell house, which came to be called the mirror image. The original layout of the plant had provided adequate space for the new cell block.

Given GACL's satisfactory experience of the Uhde Group's execution of the original plant and the surplus lying with the supplier, it was the chosen contractor for the expansion as well. The overall cost was Rs 6.5 crore, which was met by additional borrowings of Rs 4.5 crore and internal accruals of Rs 2 crore.

The expanded plant had one additional hydrochloric acid unit, thus making a total of four units to burn 100 tons a day of chlorine to produce 300 tons of commercial acid. This afforded GACL the flexibility to switch sales from chlorine to hydrochloric acid and vice versa.

The expanded plant with the capacity of 70,425 tons of caustic soda a year was successfully commissioned in November 1981 on schedule at a slightly higher total cost of Rs 6.7 crore.

Commercial Progress

The market for caustic soda continued to grow steadily. Marketing took by far the greatest share of Patankar's attention and consideration. Since not all buyers were known to GACL or were always credit-worthy, a recourse to selling agents rather than direct selling appeared more convenient and manageable. The agents not only booked orders and passed them on to GACL, but also acted as collection agents. As far as GACL was concerned, its immediate buyers were the agents. That system, begun in Patankar's tenure is still functioning with minor variations. Over time, as GACL reputation and volume of business grew, GACL dealerships were much sought after. They also became focal points of commercial influence and power. That situation continues to date.

This also attracted considerable investor interest, individual as well as corporate bodies. GACL scrip continues to be actively traded. The annual general meetings are well-attended affairs.

The surging fortunes of GACL revived the interest of the JK Group as well. They approached Gujarat Government to convert GACL into a joint venture in the late 1970s. When Patankar learnt that there was some interest within the government in this proposal, he marshaled the forces at his disposal including strong protests from individual Board members to fight it. The Group eventually abandoned its foray, which was half-hearted to begin with.

GACL registered its first commercial turnover in 1976-77, amounting to Rs 1.5 crore. It incurred losses in excess of Rs 2 crore on this, as was to be expected. Two years later in 1978-79, GACL earned its first profit of Rs 1 crore on sales of Rs 9.5 crore. Patankar relinquished his charge in May 1981. In the year just concluded, the GACL sales were Rs 17.6 crore with a profit before tax of Rs 6.25 crore. That profitability of over 36 per cent in the fifth year of operation would be the envy of any chief executive anywhere in the world.

Consolidation...and crisis!

Pursuing Growth and Technology by All Possible Means

4

Pursuing Growth and Technology by All Possible Means

GACL: Outlier among 1980s PSUs

After beginning its operations in 1976, GACL had quickly stabilised its production and marketing activities and started earning profits in 1979-80, effectively, its third year of commercial existence. That would have to be considered quite an achievement at that time.

Not many industrial enterprises had so short a gestation period, thanks to the many known and unforeseen bottlenecks Indian industry then faced. These included shortages of raw materials, power cuts of extended durations, strict regulations limiting degrees of freedom available to managements (and changing for the worse), foreign exchange shortages, troublesome labour relations causing periodic stoppages and strikes, among others. These would impact production and marketing, often adversely.

The profitability of enterprises was affected in turn first by the prevailing high interest rates. Double digit interest rates prevailed, both for term and working capital loans. Established blue-chip companies could be charged around 12 per cent a year for their term loans and 15 to 18 per cent for working capital. Newer companies would of course end up paying higher rates. Even though wage rates were relatively low, so was the productivity which frequently meant that the labour component of the cost of production was of a

higher proportion in India as compared to other countries. The burden of local and central direct and indirect taxes also affected profitability. All manufacturing companies, including established and long-profitable ones, faced these problems to varying extents. Managements spent disproportionate amounts of time anticipating disruptions and devising coping strategies.

The situation was worse in public sector undertakings due to their poor accountability and control. The overall image of the public sector was that of inefficient enterprises not particularly worried about their operating parameters. Many in fact incurred losses on an on-going basis. Governments, either the central or that of the concerned state, ended up providing direct or indirect support in the form of bearing the losses or offering various concessions. A profitable public sector company was an exception in those times. A start-up took rather long to show surpluses, leave alone profits. Even when it did, there was no assurance that it would continue to do so for a sustained period.

The GACL performance for its first 10 years shines in contrast to this general trend:

Rs crore

Year	Sales (Exclusive excise duty)	Profits	
		before tax	after tax
1976-77	1.5	(2.1)	(2.1)
1977-78	5.4	(1.1)	(1.1)
1978-79	9.6	1.0	1.0
1979-80	14.7	4.6	4.6
1980-81	17.6	6.3	6.3
1981-82	23.4	5.0	3.4
1982-83	26.6	4.7	3.6

While the heady high profitability ratio of 1981-82 was never again achieved, profitability before tax in the remaining two years of GACL's first decade remained above a very respectable 15 per cent.

GACL's growth was not a flash in the pan either. Its sales have shown increases every year except two years (1997-98 and 2001-02) and it has been profitable in all but four years (1998-2002) throughout its entire existence. The loss-making years were exceptional and are discussed a little later on.

Such performance would be deemed excellent in any organisation. In a public sector undertaking, it was truly an outlier.

Compulsions of Product Mix, Rising Energy Costs

Given GACL's generally more than satisfactory level of performance and not much pressure from its stake-holders for improvement, it would be quite natural to assume that it would slip into a steady but unexciting existence, its management content with maintaining the early trends. But that was not the case. GACL pursued growth systematically from its early phase, just as it sought to double its capacity even before it had begun operations.

Two factors motivated this pursuit. The first is the very nature of the production process. It leads to a simultaneous and proportionate availability of caustic soda and chlorine, with the added complication of having to dispose of chlorine with minimum time lag in view of inability to store it on site for any but the shortest period.

Managing a balance between the two outputs is a physical necessity, but not necessarily supported by market forces. Fluctuations or shortfalls of demand in one of the two affect the supply of the other. This is the existential characteristic of the chlor-alkali industry. The GACL management faced it from day one. Seeking balanced commitments for both the products would be well-nigh impossible. The strategy then would be to diversify the product mix to ease first the constraint of storage and then generate an alternative base of buyers. This was especially relevant for chlorine.

The second and even more pressing factor was a steady rise in energy costs. Electricity is the major and critical input to the production process. The GACL project was conceived before the oil crisis of 1973, which resulted in petroleum crude prices rising 400 per cent almost overnight. That game-changer affected all economic activity all over the world. Its impact on energy-intensive processes was virtually cataclysmic, forcing users to find all

possible ways of conserving and reducing energy requirements.

Although many Indian states suffered from electricity shortages throughout the post-independence period, most of them followed incentive pricing for power, especially for continuous process industries as a means of attracting investment. Power supply and its cost often became matters of negotiations and bargaining between the intending investor and the concerned state, as they still are (albeit to a far lower extent).

Gujarat was no exception and GACL did get a very favourable deal at the start, with a dedicated supply of 28 MVA at a cost of just Rs 0.17/kWh. That was well below not just what commercial users paid for electricity then but also the cost generation. Unfortunately, as power supply did not keep pace with the demand, GEB continued to raise its charges. By 1982, GACL faced the prospect of paying close to Rs 1.40 per unit, or more than eight times the original price.

Yet another reason made GACL look continuously for better technology. The electrolysis cells it had used mercury as the cathode. One product of electrolysis was an amalgam of sodium and mercury. After being treated with water, it separates into sodium hydroxide (caustic soda) solution and mercury. The solution is concentrated and the mercury is recycled. This technology dating back to the 1890s was the world standard at that time.

Mercury being highly toxic to human beings always posed problems of handling. Even though the bulk of mercury is recovered, a small part is inevitably lost in the effluent, which could cause major health hazard. Between 1930 and 1960, several tons of mercury waste was dumped in Minamata Bay in Japan. Thousands of people living around the bay developed methylmercury poisoning through the consumption of contaminated fish. The

victims suffered from severe neurological damage, which later became known as Minamata Disease. All told, thousands were afflicted and more than 900 died. Since then, there has been a significant move away from mercury-cell technology. Existing plants now focus on operating their plants at lower than the maximum mercury loss requirements of 1.9 gram/year/ton of chlorine as set by the Eurochlor- Best Available Technology.

GACL had been aware of this limitation and hazard of the mercury cell technology and kept looking for alternatives to it. But the Indian chlor-alkali industry as a whole chose to adhere to mercury cells in the 1970s and the 1980s as the preferred technology. The industry body, the Alkali Manufacturers Association (AMA), routinely justified this choice by claiming that the mercury emissions/losses of its members were well within the prescribed safe limits and posed no health hazard. That made GACL an even more of an exceptional member of this otherwise conservative industry.

Further Expansion and Product Variations

GACL had already doubled its original annual production capacity to 70,000 tons of caustic soda and matching amounts of chlorine in the ninth year of its formal existence, 1981-82. But it contemplated adding more capacity even before the expansion was completed. By 1980, IPCL had indicated, after much back-and-forth discussions, that it would be taking 125 tons a day of chlorine for its PVC plant by 1983. That implied that GACL would have to forego several other opportunities of selling chlorine to other customers it was working on if it did not increase its capacity. Caustic soda enjoyed good demand and GACL was on the way of being treated as a reliable, good quality supplier by its customers and dealers. Therefore, as early as July 1980, GACL sought and obtained a letter of intent to raise the capacity by adding another cell block which would produce 33,000 tons a year.

Krishnamurthy and his technical team including Srivastava did all the further planning starting 1981. Their thinking at that stage was to consider the new membrane cell technology that was becoming increasingly common in Europe and even more so in Japan. The Board authorised an extensive study of existing units of various technologies before taking a final decision.

In view of the many restrictions then prevailing on imports of equipment and technology, the study concluded that there was not enough evidence about the emerging membrane cell technology at that time to satisfy all the regulatory requirements. The Board concurred with this view and decided in favour of mercury cells with the possibility of replacing the conventional graphite anodes with metal – primarily coated titanium – anodes.

The choice of supplier boiled down to Uhde and de Nora of Italy. By this time, power costs had risen exponentially and power consumption was the key determinant of the final choice. On that

criterion, Uhde outscored de Nora, allowing GACL to continue its association with the German company. Since metal anodes were not yet available in the country, GACL went ahead with graphite anodes as before.

GACL was also concerned that the caustic soda it sold was in the form of a 50 per cent slurry. That required special tankers for delivery to the buyers. But they had to almost always return empty to GACL, as they could find no load for that leg. Effectively, the transport cost was doubled and that too for conveying water! The company therefore decided to invest in a fusion/flaker unit to produce anhydrous caustic to save on the cost and convenience of transport.

The IDBI-led consortium approved the investment of Rs 23 crore in the expansion, but not in the fusion/flaker unit. GACL was required to raise Rs 8 crore of this through debentures which cost it 17 per cent a year as against 14 per cent for the term loan. The expansion was completed in March 1984, to coincide with IPCL's plans for the committed offtake of chlorine.

Herculean Struggle for Technology Started – Metal Anodes and Flakes

GACL progressed one step at a time. Its expansion plant became stabilised in October 1984 after rectifying some teething troubles it had suffered. But its quest for superior technology did not allow it to rest on this achievement.

We now expect that the choice of and investment in technology would be matters to be decided on the basis of concrete evidence and economic feasibility to be assessed by the intending investor and approved by the financiers. But GACL was working on these decisions in the mid-1980s, arguably at the height of what is now called the licence-permit Raj period. Many approvals from various bodies and commitments of a nature now unimaginable were required. In the absence of competition, many Indian and some international organisations had come to enjoy monopolistic positions and looked askance at any new developments that appeared to go counter to their entrenched interests. Lobbying, often intense, became inevitable. Strategies bordering on skulduggery were not uncommon. Enterprises also faced the very real possibility of last-minute reversals rendering all the effort and investment until then ineffective.

The GACL experience in this phase of its development is quite typical of the situations then prevailing. It bears recounting to place enormity of the struggle involved in perspective.

The new cells were all along planned with metal anodes in place of the earlier graphite ones. This would result in lower power consumption per unit of output. Permalec, a Spanish company, was the leading global supplier of such electrodes. The company guaranteed a per unit power consumption that was 150 kWh lower than that of the competitors'. The GACL technical team had studied these installations and came back impressed.

But importing these electrodes was not a straight-forward matter. The prevailing policy required that there must be a clear-cut case that no India-made substitute with comparable performance was available. It was also the government policy that India should make even the most sophisticated pieces of equipment at home. Whenever permission was sought for importing technology or equipment, the foreign supplier had to agree to a phased manufacturing programme in India, regardless of the size of Indian market.

The policy may have been dictated by considerations of conserving scarce foreign currency resources and promoting technological development in India, but in effect, it often meant reinventing the wheel. It also afforded unwarranted protection to domestic manufacturers even if they produced distinctly inferior substitutes. In case of metal anodes, two Indian firms claimed that they were making them in India according to international specifications.

Box 2: Caustic-chlorine Electrolysis Technologies

The chlor-alkali industry is one of the largest electrochemical technologies in the world. It is an energy intensive process and is the second largest consumer of electricity (nearly 3 trillion kWh) among electrolytic industries.

Chlorine is produced by the electrolysis of sodium chloride solution, called "brine." When sodium chloride is dissolved in water, it dissociates into sodium cations and chloride anions. The chloride ions are oxidised at the anode to form chlorine gas and water molecules are reduced at the cathode to form hydroxyl anions and hydrogen gas. The sodium ions in the solution and the hydroxyl ions produced at the cathode constitute the components of sodium hydroxide formed during the electrolysis

of sodium chloride.

Chlorine is produced electrolytically using three types of electrolytic cells. The main difference in these technologies lies in the manner by which the chlorine gas and the sodium hydroxide are prevented from mixing with each other to ensure generation of pure products. Thus, in diaphragm cells, brine from the anode compartment flows through the separator to the cathode compartment, the separator material being either asbestos or polymer-modified asbestos composite deposited on a ferruginous cathode. In membrane cells, an ion-exchange membrane is used as a separator. Mercury cells contain no diaphragm or membrane and the mercury itself acts as a separator. The anode in all technologies is titanium metal coated with an electrocatalytic layer of mixed oxides. All modern cells use these dimensionally stable anodes, while earlier cells used carbon-based anodes. The cathode is typically steel in diaphragm cells, nickel in membrane cells, and mercury in mercury cells.

Mercury cells

The mercury cell has steel bottoms with rubber-coated steel sides, as well as end boxes for brine and mercury feed and exit streams with a flexible rubber or rubber-coated steel cover. Adjustable metal anodes hang from the top, and mercury (which forms the cathode of the cell) flows on the inclined bottom. The current flows from the steel bottom to the flowing mercury.

Saturated brine fed from the end box is electrolyzed at the anode to produce the chlorine gas, which flows from the top portion of the trough and then exits. The sodium amalgam reacts with water in the decomposer, packed with graphite particles and produces caustic soda and hydrogen. Hydrogen, saturated with

water vapour, exits from the top along with the mercury vapours. Caustic soda then flows out of the decomposer. The unreacted brine flows out of the exit end box. The mercury from the decomposer is pumped back to the cell.

Diaphragm cells

The diaphragm cell is a rectangular box which has metal anodes supported from the bottom with copper-base plates, carrying a positive current. The cathodes are metal screens or punch plates connected from end to end of the rectangular tank. Asbestos, dispersed as slurry in a bath, is vacuum deposited onto the cathodes, forming a diaphragm. Saturated brine enters the anode compartment and the chlorine gas liberated at the anode during electrolysis, exits from the anode compartment. Sodium ions are transported from the anode compartment to the cathode compartment by the flow of the solution and by electromigration, where they combine with the hydroxyl ions generated at the cathode during the formation of the hydrogen from the water molecules. The diaphragm resists the back migration of the hydroxyl ions, which would otherwise react with the chlorine in the anode compartment.

Membrane cells

An ion-exchange membrane separates the anode and cathode compartments. The separator is generally a bi-layer membrane made of perfluorocarboxylic and perfluorosulfonic acid-based films, sandwiched between the anode and the cathode. The saturated brine is fed to the anode compartment where chlorine is liberated at the anode, and the sodium ion migrates to the cathode compartment. Unlike in the diaphragm cells, only the sodium ions and some water migrate through the membrane. The unreacted sodium chloride and other inert ions remain in

the anolyte. Hydrogen gas, saturated with water, exits from the catholyte compartment. Only part of the caustic soda product is withdrawn from the cathode compartment. The remaining caustic is diluted and returned to the cathode compartment.

Comparison of cell technologies

Parameter	Value in cell type		
	Mercury	Diaphragm	Membrane
Operating current density, kA/m ²	8.0 – 13.0	0.9 – 2.6	3.0 – 5.0
Cell voltage, V	3.9 – 4.2	2.9 – 3.5	3.0 – 3.6
Caustic strength, %	50	12	33 – 35
Energy consumption, kWh/t @ (current density, kA/ m ²)	3,360 (10)	2,720 (1.7)	2,605 (5)

The GACL team was only too well aware of these realities. Srivastava, who had become Technical Director by then, mounted the effort needed to surmount these formidable hurdles. He had a very able project manager in the person of V K Gulati. The team functioned under the overall guidance of P V Swaminathan, IAS, who was the Managing Director from 1983 to 1985 and his successor P K Das, also from the IAS, who served until 1990. The Board backed these efforts wholeheartedly.

GACL lobbied hard with its parent Ministry of Petroleum and Chemicals in the Government of India as well as the government's main technical body, the Directorate General of Technical Development (DGTD). After much effort, it achieved a minor victory. It was allowed to import three sets of Permalec metal anodes, provided it also installed equal number of anodes from each Indian manufacturer. Performance comparison was the obvious reason for this provision. But it also saddled the intending

user with possibly inferior equipment which was not found acceptable from the very start.

GACL had no choice but to order nine sets of metal anodes, three each from Permolec and the two Indian companies. The terms and performance guarantees of one of the Indian firms, Bharat Heavy Plate and Vessels, a public sector company now merged with Bharat Heavy Electricals, were not satisfactory and the idea of starting the new expansion with metal anode cells had to be given up.

But not for long. Wimco Ltd, the Indian subsidiary of Swedish Match AB, had formed a unit in collaboration with de Nora to make in India metal anodes of Permolec design. Setting it up required enormous effort and lobbying by Wimco, but by the time GACL was ready to go ahead with metal anodes, Wimco had emerged as an Indian supplier. It convinced Srivastava that it could meet GACL's desired purpose of using Permolec-designed metal anodes.

GACL's inquiry resulted in Wimco's quotation being higher than that of the remaining Indian supplier, but the saving in the power cost of just one year in case of Wimco anodes was more than the initial price difference. Even so, to safeguard against any later representation by the competitor against GACL or Wimco, the Board commissioned its old consultants TCE to prepare a thorough feasibility study of the metal anode changeover project. A comparison of the two offers was an integral part of the assignment. TCE recommended using Wimco anodes. Government permission and lender approvals followed on the basis of this report. GACL also received price concessions from Wimco because of its being their first customer. The task of replacing graphite anodes by metal anodes in all 30 cells of the expansion project was completed in August 1984.

GACL was quite satisfied by the performance of the new anodes in its cell house 2. The 38 cells in the old cell house still used graphite

anodes. Eighteen of these were under study for possible switchover to membrane cells. GACL decided to convert the remaining 20 cells to metal anodes as well. This step was accomplished by December 1986. GACL could then claim that it successfully met all the stipulations of the letter of intent in letter as well as spirit.

But that was only one part of the comprehensive technology upgrade agenda GACL had set for itself. The next item on its to-do list was the flaker-concentrator deferred at the behest of the financiers. After going through the by-now routine search for technology suppliers and permissions, GACL placed an order on a US-based firm (a first for it). A caustic soda concentration unit of a capacity of 80 tons per day (comprising two phases of 50 and 30 tons per day), became fully operational by the end of 1987. It cost Rs 3.6 crore, with a 2:1 split between borrowings and own funds. The new plant faced the usual snags and teething troubles of stabilisation such as initial breakdowns and equipment malfunctioning, but the GACL technical team was now thoroughly adept at working together with the suppliers to deal with them successfully. This was no mean achievement.

One blot on the GACL copybook in this phase needs mention. Attracted by the premium of about \$ 35 per ton for caustic in prill form, GACL not just investigated the possibilities, but actually invested in a plant for prilling the product. This was integrated with the flaking unit. The plant was commissioned at the end of 1995. Unfortunately, it never worked smoothly, frequent choking of the unit being the main problem. As always, GACL made sustained efforts off and on for about two years to rectify the problem with full support from the suppliers. In the meanwhile, the premium on prills reduced substantially. Ultimately, GACL chose to concentrate on flakes and removed the additions meant for prilling to provide more space for flaking.

Herculean Struggle for Technology Continued – Membrane Cells in Cell House 1

GACL was fully convinced of the need to switch to membrane cells in view of the environmental hazard mercury cells posed and their substantially higher power consumptions. But it had deferred the decision to do so in 1982 anticipating difficulties in getting approvals from the government as the prevailing opinion held that the technology was as yet unproven and in need of improvement. Even as GACL diligently went ahead with the installation of mercury cells in cell house 2, the pursuit of membrane technology remained its holy grail. This took the form of continued study of existing plants and new developments elsewhere in the world and collection of relevant information.

By the middle of 1985, the company management led by its Managing Director P V Swaminathan decided that 18 or nearly half of the 38 cells in cell house 1 should be converted to membrane cells, based on internal working of the feasibility of such a changeover. This was a very conservative approach, aimed at minimising the risk in trying out new technology and at the same time, holding down the investment required. Swaminathan joined the technical team to apprise and convince IDBI, the leader of the lenders' consortium. That was only the first step of a rather long and convoluted process of getting the project off the ground.

GACL soon floated inquiries among suppliers for this conversion. P K Das, who had succeeded Swaminathan as the Managing Director and Srivastava visited possible technology suppliers to acquaint themselves of the details. This visit led to the realisation that the approach of converting only half of cell house 1 to membrane cells would pose very substantial operational problems of managing two dissimilar processes within a compact space. There was also the added risk of leakages and accidents. Das then

took a calculated risk and decided to convert all the 38 cells to membrane technology in one go.

That would have been a bold decision in any circumstances. Given the straightjacket that the industrial policy then imposed on enterprises, the prevalence of great suspicion about foreign technology, and the nature of ownership of GACL, the decision could be termed as radical and the most important one in the 13-year existence of GACL until then.

GACL's feasibility analysis required that the additional revenue from increased production and savings in the operational costs (mostly due to reduced power consumption) should be adequate to cover not just the investment in the new cells and accessories, but also the cost of recoating and/or replacing membranes and anodes and any other critical component within the stipulated payback period. This was based on certain conservative assumptions about power tariffs and consumption, changes in them over the period of analysis, and guarantees on membrane performance and life from membrane and cell suppliers.

GACL found that the two membrane suppliers, DuPont of the US and Asahi Glass of Japan, normally offered two-year guarantees. Its technical team convinced these companies that this would not work in India by sharing its calculations with them. If these suppliers wanted to develop business in India, they had to offer three year back-to-back guarantees along with cell suppliers. This was the first such change accepted by these companies.

Uhde, Asahi Glass and ICI were the three suppliers short-listed. Uhde had supplied only one membrane cell plant of a capacity of 30 tons a day, almost small enough to be considered a pilot plant, to a Norwegian firm at that time. But it had innovated and developed a bi-polar, three compartment, cell design as opposed to the monopolar, two compartment, cells then prevalent and offered by

the other two suppliers. The GACL technical team studied this plant thoroughly. It observed that the larger cell size offered quite substantial advantages. They included lower chances of leakages and consequent losses, operating under positive pressure resulting in power savings, lower possibilities of explosions, and ease of operation. It concluded that these advantages outweighed the much longer experience of the other suppliers and their bigger list of clients. Uhde had emerged yet again the preferred supplier for GACL.

The prevalent policy required those intending to import capital equipment to publish their requirements so as to allow possible Indian suppliers to make an offer. GACL duly published its intention. The same company that had tried and failed to supply metal anodes now had an experimental membrane cell plant of a 30-ton per day capacity based on Japanese technology in operation in the South. It claimed that it could meet GACL's needs. Based on its earlier experience, GACL was wary of this bid. It lobbied hard and long with the controller of capital goods imports to thwart this attempt. Such was the intensity of lobbying that GACL had to even assert that it would rather drop the project entirely in the event of being compelled to use this source. This threat and the overall merit of GACL's case proved effective and it was allowed to select Uhde as its source.

GACL was in an enviable position of negotiating with Uhde holding an upper hand. This order was prestigious for Uhde which could place it as a leading supplier among its competitors. GACL used this knowledge to obtain what it considered was a very favourable deal for itself in September 1987 including a commission on next big orders in India. The contract also stipulated that the rated capacity of 200 tons per day could become 240 tons per day by adjusting the current density. This was to be very useful to GACL

soon after the completion of the project.

The proposed import of technology and equipment was deemed to be a foreign collaboration in the existing regulatory framework and needed a separate approval. This ran into unexpected resistance in the form of doubts about the GACL selection process raised by none other than the secretary of its parent Ministry of Chemicals. Senior officials of the ministry demanded access to every manner of information.

GACL had to manage the tightrope exercise of complying with this demand and adhering to the confidentiality agreement it had with the technology suppliers. Its experience in the recent past came in handy and GACL could get the required permission. The chairman of the company at that time, H R Patankar, was also the Chief Secretary of the state. He had to use his considerable expertise, seniority and persuasive power to achieve this happy result. AMA wrote to DGTD stating that the technology was as yet not fully developed and therefore not suited for India. GACL could, however, effectively counter this objection as well.

The process of obtaining the multitude of permissions required for even the most justifiable and legitimate business activities in the 1980s resembled nothing so much as an obstacle race. The seeker of permissions had to vault past one hurdle after another to reach the destination of all clearances. The GACL membrane cell project had now to negotiate the next set of permissions from lending agencies.

Given its spotless record of meeting all stipulations and timely payments of interests and principal, GACL would have been expected to receive excellent credit rating. It should have sailed through this last leg as more of a formality than anything else. That was not to be. At this stage, GACL had to gather all its resources to bear upon the situation. Its project manager Gulati had to display

extreme persuasiveness based on facts and analysis as well as an ability to think on his feet.

Although IDBI was the leader of the consortium of financiers, it was necessary to convince the other major lender, ICICI, as well, given the size and nature of funding involved, the first of its kind and relatively unfamiliar to bankers. International Finance Corporation, an arm of the World Bank, was also involved since it financed the foreign currency component. That is where the first problem arose. IFC had spent time with GACL and studied the proposal thoroughly. It had no issues with the technology or selection of the vendors, but its chief representative conveyed his reservations about the proposed capacity to IDBI in confidence. IDBI was caught in a dilemma. On the one hand, given its good relations with GACL, further cemented by the attention devoted to the project by the senior management of GACL, it wanted to clear the project quickly, preferably in March 1988 itself, before the end of the financial year. On the other hand, it could not very well brush aside IFC's reservations, dependent as it was on IFC for the needed foreign exchange.

IFC knew that GACL was then selling chlorine at a low price in order to ensure adequate caustic volumes for the market. IFC felt that a cut in production to realise better prices would be a preferable option. It came to the conclusion that the optimal caustic daily capacity would be around 200 – 220 tons from both cell houses. Hence the proposed expansion to 315 tons was thought to be unwarranted. IDBI followed this advice and shared it with GACL along with its own recommendation to reduce the extent of conversion to half the proposed level and bring down the capacity to 200 tons, in line with the IFC recommendation. It also suggested that GACL should meet with the representative of IFC.

This was a most cordial and open meeting. The representative

shared all his working with Gulati, who had gone well prepared for the discussion. Gulati could point out certain omissions in the IFC analysis of the chlorine market such as the dynamic element of chlorine supply to IPCL. The outcome was that IFC accepted the GACL version and its plans, but protected itself by restricting its role to provision of foreign exchange to IDBI and not a direct financier of the project. That meant IDBI and the consortium were to bear the entire risk involved.

IDBI then proposed that GACL should restrict the capacity of the membrane cells to 125 tons per day as against the 200 tons it had proposed. GACL pointed out that accepting this suggestion would mean starting the entire exercise from seeking permissions to floating inquiries all over again, since GACL was bound as a public sector organisation to do so in case of major changes in project parameters. That would affect not just investment but also other project performance indicators such as cash flows and the payback period. This would ill serve the interests of all concerned.

GACL conducted simulations of the project parameters at various capacities between 100 and 200 tons, at intervals of 25 tons. It was able to demonstrate that the optimal capacity would be 200 tons indeed. In case of slower than expected development of markets, it proposed that the utilisation of the capacity of cell house with mercury cells could be made flexible. This had the added advantage of lower cost of production since GACL would be restricting the use of its more expensive facility. IDBI was so impressed by this logic that its Executive Director got his office opened on a Sunday to record its approval.

In the meanwhile, vested interests from the existing set of players in the caustic industry had fed ICICI some misinformation that on analysis showed the payback period for membrane cells to be in excess of 20 years. ICICI prepared a note incorporating these

findings for internal circulation. It also shared the note on a confidential basis with IDBI. In turn, IDBI showed it to Gulati on conditions of utmost secrecy. The problem then became of reworking the whole project exercise giving due weight to the opinion of a leading member of the consortium, ICICI, whose approval and participation was essential for further progress.

Gulati knew well the ICICI manager handling the case. He decided to risk the personal relationship and called on the manager the day before the consortium was to meet. He had gone well-armed to this meeting to refute the misinformation and provide correct data in its place. The ICICI manager was kind enough to run through the analysis himself. This convinced him of the validity of the GACL case. But the note in circulation could not be withdrawn at this short notice. Instead, he agreed not to attend the meeting the next day and also not inform ICICI about this, lest it send someone else in his place.

When the IDBI Executive Director was told of this development, he had his doubts as to whether this would really come to pass. He directed Gulati to post himself at the door of the meeting room to ensure that any representative ICICI does not come into the meeting. Gulati cheerfully obliged and the meeting duly approved the project.

This whole exercise had given moments of extreme anxiety to the entire senior management of GACL, including the chairman and the managing director. Gulati was always at the beck and call of all the leading members of the consortium, away from the GACL headquarters. He was in daily contact with the home team. That was no mean feat at a time when an uninterrupted long distance call in India was a luxury and faxes were just making their presence felt. The effort undertaken then is hard to imagine in this age of instant and uninterrupted connectivity being within everyone's reach.

Thus it came to pass that this visionary project without parallel in the annals of smaller public sector companies in India received all the required approvals. The management was keen to complete it speedily, with March 1989 being the target date for commissioning as per the original schedule despite the delays in obtaining approvals. The new crash schedule was facilitated by Uhde agreeing to set up an office in Bombay for conducting the detailed engineering.

Its execution required another unprecedented step. The GACL Board was quite anxious to adhere to the accelerated implementation schedule. To cut short the time required for shipping components from Europe by surface routes, it decided to bring the critical ones by air. Some 46 air consignments reached the then Bombay airport through various airlines in just six days. The Managing Director used his persuasive influence with the Bombay customs to get them cleared quickly. The project was thus completed on schedule by March 1989. The usual bottlenecks and snags were rectified by Uhde performing the required re-engineering at its own initiative.

Although rated at 200 tons per day, the new plant could be operated at 240 tons by increasing the current density. This was the GACL intention all along. Partly due to this higher production and partly because of the steady rise in power costs, GACL achieved payback of the additional investment in this project in just three years, as against the five-year target of the appraised and approved project.

Herculean Struggle for Technology Concluded – Membrane Cells in Cell House 2

The GACL management could not have been faulted if it had chosen to rest on its laurels after the successful completion of the conversion of cell house 1 and increasing capacity of the mercury cells in cell house 2 from 100 tons to 175 tons a day by resorting to an increase in current density in these cells as well. It could continue to meet the ever increasing caustic demand thus. It was, however, far too committed to its twin objectives of environmental safety and cost reduction to engage in such vain indulgence.

After both technical and commercial operations of this expansion had stabilised, the Board tasked the technical team with preparing a project for conversion of all mercury cells of cell house 2 to membrane cells. It was also exploring the possibility of converting six of the caustic soda cells to caustic potash cells, in the process foregoing 35 tons of caustic soda to produce 50 tons of caustic potash.

After much deliberation and detailed analysis of all operational data, a composite project for conversion, production of caustic potash from new cells and additional flaking of caustic soda emerged. It was more expensive than the original conversion project because the scope of the new project was larger and required more facilities to handle and purify caustic potash etc, even after taking into account the commission from Uhde for the second order in India assuming Uhde were to be chosen. The Board needed some convincing, but eventually approved the project.

GACL did not expect any major problems in seeking either the administrative or financial approvals in view of the experience it had gained and the record it had established. This expectation came true.

But there was a completely unexpected complication. Uhde was

now an established player in the Indian chemical project market because of its continuing association with GACL. It had also supplied a well- running caprolactam plant to GSFC. Some ill-wishers of Uhde, whose vested interests it had threatened, complained to the Government of Gujarat claiming that Uhde's record on parameters such as timely execution of projects and performance guarantees was truly abysmal. The state government took cognisance of it by appointing a committee to look into these charges under the chairmanship of the Additional Chief Secretary of the Energy and Petroleum Department, P V Swaminathan, formerly the GACL Managing Director. The committee followed the universally prevailing practice and ordered that no further orders be placed on Uhde until the final disposal of the recommendations of the inquiry panel.

The committee asked Gulati to assist it in its task. GACL shared with the committee all post-implementation data to refute the charges against Uhde. After deliberations spread over several sittings, the committee absolved Uhde of all charges and revoked the ban it had earlier imposed. This lifting of the cloud on Uhde brought much well-deserved cheer and jubilation to it as well as GACL.

GACL had floated the inquiry to the usual gang of three: Uhde, Asahi Glass and ICI. The last mentioned showed no interest and Asahi responded only partially, for the caustic soda plant and not caustic potash. The Board took a decision in principle to go with the single bidder, Uhde, recently cleared of all allegations.

Due to the much larger scope of the project, the cost was nearly thrice that of the original membrane cell conversion. Although the project was viable even at this cost, the Board asked three of its senior members to thoroughly scrutinise the project before placing the final order. After the clearance of the senior directors, the

Board approved the project in its next meeting and tasked the project team with speedy implementation.

The usual procedure of obtaining approvals and sanctions, gradually relaxed after 1991, was followed. The project was commissioned in 1994.

In the 21 years since its inception, GACL had emerged as the leading caustic soda producer in India which had completely eliminated mercury from its operations and achieved power conservation as well. This achievement placed it among world-class organisations.

The story of membrane cell conversion would be incomplete without the narration of a crucial aspect of human behaviour. The Technical Director S P Srivastava was given to claim the conversion as his own personal achievement even in the presence of the Managing Director P K Das. Das took Srivastava aside and gently reminded him that while Srivastava was no doubt the technical leader, the project succeeded due to the efforts of the entire team. The Managing Director himself had shown a great deal of initiative by providing approvals even for decisions considered risky. He had put his personal and professional reputation on line for this and also used his considerable influence judiciously to push the project and help remove bureaucratic hurdles in its path.

Srivastava's behaviour thereafter turned considerably more modest. That too was not an insignificant development.

1980s: GACL's Defining Decade

By the end of 1990-91, GACL, not yet 20 years in legal existence, had emerged as the leader of the Indian caustic-chlorine industry. It had achieved a record output of over 1,27,000 tons of caustic soda, thanks to the full year of functioning of membrane cells in cell house 1. Its secondary products, chloromethane and sodium cyanide had also reached record levels of production. It had a full plate of new projects. Besides the conversion of cell house 2, it was planning to produce super-fine soda ash, sodium ferrocyanide, hydrogen peroxide, phosphoric acid as well. This blend of products would allow its transition from essentially a one-product company to a diversified chemical manufacturer. That could in turn provide stability in the face of market fluctuations in case of any products.

Its progress over the decade was worthy of note:

Sales, Rs crore		Increase, %	PBT, Rs crore		Increase, %	Assets, Rs crore		Increase, %
1979-80	1989-90		1979-80	1989-90		1979-80	1989-90	
15	99	560	5	9	80	13	134	930

Impressive as the over six-fold growth of sales over the decade was, the growth of assets was even more so, ten-fold. GACL had managed to grow in size in both current volumes and potential for the future. It posted a healthy profitability of about 10 per cent in what was essentially a commodity market. That this profit was achieved in a competitive market with others eyeing GACL with considerable hostility and GACL often having to dispose of the chlorine at throw-away prices makes it even more creditable. It achieved this enviable result primarily by being diligent about costs of production, seeking efficiency through technology even at this early phase of its existence.

It also held down its fixed and administrative costs. Das pointed

out its conscious decision not to create a township for its employees, unlike the practice then followed by almost all public sector enterprises as an instance of this wisdom. The facts that GACL had followed a lean-staffing policy from its inception and Vadodara did not then have problems of affordable housing also helped.

We have seen how meticulously planned and executed its expansion programmes were. They were equally prudent in financial terms. It had all along followed a very conservative debt:equity ratio of 1.5. Its loans outstanding at the end of 1990-91 were Rs 92 crore, while shareholders' funds amounted to Rs 62 crore. Consequently, the interest paid was never an onerous burden. It was Rs 11 crore in 1990-91, or just 8 per cent of the sales revenues of Rs. 133 crore.

These trends would bring unqualified credit to any organisation in any country or industry under all market and economic systems. GACL achieved them without ever being under any stakeholder pressure to do so. That indicates the complete internalised motivation and commitment of GACL for meaningful and significant growth, quite the opposite of the desultory manner of functioning associated with public sector companies then and now.

Four factors account for this strong internal commitment and motivation of GACL: innovation and risk-taking, technology, firmness of resolve and team spirit.

Innovative ability and risk-taking: This was in evidence right from the start. Coelho started from scratch, but never allowed the lack of funds or relevant experience and domain knowledge to hinder his execution of the project. He resorted to a public issue, a practice followed only once before by an organisation promoted by government, GSFC. But the GSFC public issue had the backing of a leading private industrialist, Jayakrishna Harivallabhdas. GACL

had no such Godfather. On the contrary, it did not even have the whole-hearted support of the government and encountered some hostility from within.

GACL displayed similar innovation in its struggle to get the many permissions and licences during its drive for expansion and modernisation. It overcame each obstacle in its way by resorting to some novel way or the other. Its decision to convert the entire cell house 1 to membrane cells at one go may sound audacious, as would its decision to stick with Uhde as its technology supplier even when the latter was the least qualified among the suppliers. These were not foolhardy adventures, but calculated risks wisely taken as we have seen earlier.

The GACL history abounds many another decision of this nature, too numerous to mention.

Unflinching belief in technology: Even though it was part of an industry that was quite traditional and set in its ways, GACL had been acutely aware of the need to deploy the most efficient and modern technology available. This was an existential need as GACL discovered very early in its existence. It was born in the period of the original oil crisis and thus fully aware of the criticality of energy costs. It was never content to pass the added costs to its customers, which was the response of most Indian manufacturers and not just the chemical industry then. GACL's response was similar to that of organisations in developed world: seek higher efficiencies through advanced technologies. The initial costs may be high, but the resulting economies would be well worth the while.

GACL had to occasionally hide its light under the bushel when many Cassandras, within the industry and even more importantly, the government and finance regulators, voiced their scepticism. But it never allowed such doubts to affect its own judgment about the positive role of technology.

Steadfast commitment to its pursuits: GACL had to cross hurdle after hurdle in its pursuit of expansion and use of latest technology. Some of these were so formidable as to deter the faint-hearted. GACL displayed a “never-say-die” spirit and never gave up on its chase of relevant permissions and approvals. It lay low when it knew the odds against it were too high and bided its time. It armed itself with the most potent weapon: truth and data to back it up. Its persuasiveness was effective because it had always done its homework thoroughly and spoke from a position of conviction.

At the same time, it was not above the use of unorthodox methods such as privately meeting the doubting Thomases to allay their apprehensions and engineering situations so as to make possible outcomes favouring its position.

Team spirit: Most organisations suffer from internecine rivalries among its departments. Turfs are defined in exclusive fashions and guarded zealously. Unlike these, GACL had to marshal all its resources, from commercial intelligence to technical expertise to financial manoeuvrability to effectively counter all the objections and doubts raised. Its timely and cost-effective project implementation also required a similar recourse to all its organisational resources. Everyone had to be a mover and shaker. Its ability to speak with conviction arose partly from its team work which allowed it to anticipate queries from diverse quarters.

Das admonishing Srivastava in his gentle fashion is the clinching piece of evidence of GACL's belief in team work. Leaders it wanted but not stars and prima donnas with an exaggerated sense of self-importance.

These factors defined not just GACL's character as a corporate entity, but were also the building blocks of GACL culture along with its prudent management of finances. They were subjected to severe stress caused by the enterprise killing environment of distrust and

suspicion created by the licence-permit raj. GACL was able to carve out an autonomous space for itself even within the otherwise constricting atmosphere of public sector organisations because it had a self-sustaining culture.

Yet another aspect of the GACL concerns needs mention. On the night of 2 December 1984, the Union Carbide plant at Bhopal suffered the worst-ever gas leak tragedy in Indian history, killing or incapacitating thousands, whose after-effects continue to haunt India even today. Swaminathan, who was the Managing Director of GACL at that time, immediately ordered night patrolling of the plant and daily checking of all gas pipelines. Concern for safety and precaution against accidents then adapted have continued to be essential constituents of the GACL manual of good governance

Thus the 1980s was the period that defined GACL.

Spreading Wings to Dahej

5

Spreading Wings to Dahej

Dahej Now and Then

There is a gleaming new four-star hotel situated near the entrance to GACL's Dahej facility. It is 45 km directly west of Bharuch, on the estuary of the Narmada. A smooth six-lane State Highway 6 connects it to National Highway 48 from Mumbai to Delhi via Vadodara. The 105-km distance from Vadodara could be easily covered in about an hour and three-quarters, despite the heavy traffic, largely comprising oversize container trucks and tankers servicing the many manufacturing units (mostly chemicals and pharmaceuticals) located in the Dahej Special Economic Zone. State transport buses ferrying local population and private buses carrying staff of the plants are also regular sights on the highway.

Dahej lies about 20 km south-south west of Gandhar. This was the second location after Ankleshwar where oil and natural gas were found onshore in the 1960s. The field now produces more gas than oil. National Thermal Power Corporation operates a 630-MW combined cycle power plant based on natural gas situated in the vicinity.

Dahej also has a chemical port, the first of its kind, owned and operated by Adani Ports. Further down the coast, past the

Narmada estuary, is Hazira, home to one of the largest Reliance Industries' petrochemicals production facilities.

But 25 years ago, it was quite a different story. The road from Bharuch was a narrow one lane strip for the most part. For long stretches, it was just a dirt track. One or two buses made a single desultory trip everyday – if the conditions were good. The journey from Vadodara took four to five hours each way and at times, even eight or nine hours.

A few isolated hamlets were dotted along the road. Lakhigram was a rather large settlement, an enclave of some cultivated lands in the midst of mostly mud swamps. The low-lying area was regularly flooded every monsoon when the Narmada was in spate, submerging the few small fishing jetties completely. The area was among the most backward ones in the state.

GACL took possession of the present plot in 1994. It was nothing but marshland then. Old time establishment staff narrate riveting stories about having to always wear gumboots lest they suffer deadly snake bites, carefully placing the incoming containers lest they get stuck in the mud, responding to SOS calls from nearby settlements and generally making do with barest minimum creature comforts. The GACL Managing Director from 1995 to 1997, Sudhir Mankad, IAS, (later Chief Secretary of the state from 2005 to 2007) talks of how he would schedule the round trip from Vadodara for two days, carrying with him even drinking water and spending nights in the make-shift shelter of containers (later camp cabins).

But this chapter of the GACL saga is really not about such human interest stories, however interesting they may be. It is about ambitious expansion and diversification plans, halting progress, back-and-forth negotiations between unequal players, well-thought out and executed plans going wrong because of unforeseen

changes in external conditions and reneged commitments, trying out different strategies and ultimately emerging as the mainstay of GACL activities.

Prior to Dahej: Abandoned Foray into Odisha

Dahej was not quite the first attempt of GACL venturing afield from its Vadodara base. K C Mahapatra was appointed the Managing Director after the Swaminathan-Das duo who had mentored GACL's successful drive to modernisation facing formidable obstacles. Mahapatra belonged to the Gujarat cadre of the IAS but had served a stint in his native state of Odisha. While there, he spent time as general manager on deputation to the recently-formed National Aluminium Corporation (NALCO) now Asia's largest aluminium producer. He became very well acquainted with the plans and needs of NALCO in this period. He also established excellent relations with the Odisha Chief Minister Biju Patnaik and his Principal Secretary, another IAS officer Pyarimohan Mohapatra (no relation).

Aluminium is produced from the ore bauxite which occurs naturally. Bauxite is hydrolysed with caustic soda to produce aluminium hydroxide which then is calcinated to yield aluminium oxide or alumina. This is smelted to produce aluminium metal. Thus the aluminium industry is a major user of caustic soda.

GACL was one of the suppliers of caustic soda to NALCO. But this involved expensive road transport, mostly of 50 per cent caustic lye, clear across the country, a distance of over 2,000 km. Barge transport was as yet not quite feasible; it also involved road shipment to a west coast port and transfer to a barge, which was cumbersome and added to the cost.

Mahapatra thought of establishing a base in Odisha, which, being a coastal state, could supply salt locally. He sought permission from Chimanbhai Patel, who had become Chief Minister of Gujarat in 1990. Patel agreed readily. Mahapatra thereupon worked out a plan to set up a caustic soda plant adjacent to the NALCO plant in Odisha to process local salt. He believed this was a win-win

situation. NALCO readily agreed and Patnaik approved the decision in principle. He instructed Mohapatra to get the Odisha Electricity Board to allocate 50 MVA for the proposed plant. That was quite an achievement in view of the severe shortages of electricity the state then faced.

Mahapatra met Patel in Delhi on his way back to Gujarat and briefed him thoroughly. Patel agreed and approved the idea. Getting two states to agree to work together in this fashion along with a Government of India owned company was not exactly a common occurrence in those days, perhaps not even now.

The project, however, could not proceed further. Doubts arose about the quality of salt, availability of labour and reliability of promised power supply. Amarsinh Chaudhari, a former Chief Minister of Gujarat and now the leader of the opposition objected strenuously to the idea. He said he did not want the wealth of Gujarat to go out of the state, which is what he believed the new plant would do. Patel pleaded helplessness when Chaudhari threatened to go on an indefinite fast in protest. That put a full stop this attempted expansion of GACL.

Adding Dahej to Accommodate Ambitious Growth Plans

At the beginning of the 1990s, the mood in GACL was buoyant. The management planned to aim even higher after its successes of the previous decade. A rather formidable portfolio of new products to be taken up existed along with a continuing interest in adding capacities to existing lines.

But the Vadodara facility was already somewhat overcrowded with existing lines. Addition of anything other than balancing equipment without causing bottlenecks and incurring significantly higher risk of accidents was not possible.

When it started looking for more space, GACL discovered that the Ranoli Industrial Estate of GIDC was full. Perforce it had to seek a more distant second location. The possibilities included several other GIDC estates in Vadodara and Bharuch districts, as well as a purchase of the neighbouring land of Ambalal Sarabhai Enterprises. Given its proximity, GACL pursued this last option quite seriously, and agreed on a price. But it gave it up as the seller wanted to fast-track the decision, while GACL wanted more time to make it a part of its comprehensive land purchase plan. There was also the safety issue of chlorine pipelines having to pass under railway lines.

J J Mehta, the pioneer chemical engineer, conceptualised and oversaw the formation of IPCL. He chaired the GACL board almost from its inception until 1980. He was greatly concerned that both IPCL and GACL would be running out of space at their respective premises in Vadodara. After scouting several possible locations, he zeroed in on Dahej in the Gandhar complex by 1990. He was very excited by the possibilities and insisted that K C Mahapatra, who was then the GACL Managing Director examine the possibility of acquiring land at Dahej. Mahapatra visited Dahej with his

colleagues. They were rather deterred by the desolate location, then more or less a swamp.

IPCL had proposed a joint venture with GE to make polymers and plastics required 1,600 acres of land. Its chairman Hasmukh Shah took a keen personal interest in this exercise. Possibilities of acquiring relatively cheaply a large tract of land, albeit undeveloped, at Dahej, which was within reasonable distance of Vadodara and the plans of basing future chemical plants in the vicinity, although still quite unformed, motivated Shah's choice.

GIDC had already been seeking land from local owners but had encountered a fair amount of resistance. Shah studied IPCL's previous acquisitions to understand sellers' concerns and their consequences. That led to a realisation that money alone did not compensate the farmers' losses. He decided to adopt a humane and imaginative approach, which would provide gainful employment to all able bodied women and men of the area affording them a life of dignity without resorting to migration. He believed the cost involved would be modest in the context of overall investment. Such an approach would succeed, he felt, because it would help transform the local skill set to make it relevant and enable each member of the society to earn a livelihood without getting uprooted.

Shah held a meeting with a large number of villagers from Lakhigram with the district collector and the GIDC officer in charge in attendance. He encouraged the villagers to articulate their expectations and demands. The land involved was salinity-affected and distress sales for as little as Rs 6,000 an acre were not unknown. GIDC estimated the price to be Rs 15,000 an acre. Farmers expected Rs 20,000 and their brokers demanded Rs 30,000 in the expectation of settling around Rs 20,000.

Farmers were annoyed with GIDC. Shah asked a young man to

state his expectation. He said Rs 35,000, perhaps with the future in mind. Shah encouraged him to ask for more, but he could no higher than Rs 55,000. He finalised the deal at Rs 56,000. At that price, land was a mere 2 per cent of the total project cost. IPCL acquired 2,000 acres and created great goodwill among the sellers.

That also set precedent for other companies including GACL intending to buy land there. The GACL committee of Board members recommended in 1992 that it buy 200 acres (later increased to 320 acres, and actual purchase of 248 acres) of land adjacent to the IPCL site. Subsequently, it added another plot of 72 acres next to the original one and two more of 186 acres and 129 acres at some distance. These last two have not been developed yet.

The original plan was to acquire another plot 14 km away for making a housing colony for the staff, since that would be a major problem at this new location unlike in Vadodara. The staff colony with 92 residences eventually came up not at this location but just on the outskirts of Bharuch near the IPCL colony.

The Board displayed great enlightenment by accepting the IPCL template of active engagement with the sellers. Even today, it maintains a roster of candidates from families which sold land to it for possible employment despite the fact that vacancies do not always match demand for employment. This has ensured harmonious relations with the local community for the most part. The importance of this policy cannot be gainsaid when availability and acquisition of land have been major roadblocks to India's industrial development.

Caustic-Chlorine at Dahej: Shadow of Big Brother Reliance

The first facility to come up at Dahej was for the manufacture of phosphoric acid. It generates substantial effluent. Dahej location and the dedicated effluent pipeline to the sea made it a very good site for the plant. This plant was to be supported by Israeli technology suppliers, but that arrangement ran into trouble. Effectively, GACL had to learn on the job and develop its own expertise.

GACL had six other major product groups under consideration for this latest phase of its expansion. Caustic-chlorine headed that list, not just because it was historically the original product of the company, but also because of its impact on GACL's relationship with IPCL. The latter had polyvinyl chloride (PVC) as the major focus of its production activities at Dahej. It had obtained a letter of intent for setting up a new caustic soda – chlorine facility at Dahej to meet the raw material needs for PVC or the intermediate ethylene dichloride (EDC).

The GACL Board considered a joint venture with IPCL for caustic-chlorine to be a better strategy for both the companies to follow for mutual benefit rather than each of them setting up parallel facilities. This idea was mooted in 1990. They were pursued further after both IPCL and GACL acquired land in Dahej. IPCL was not very keen on the joint venture as it felt that the advantage of a captive unit far outweighed the conceptual neatness of joint venture. GACL offered various alternatives including taking over the IPCL caustic-chlorine project in its entirety and reimbursing IPCL the costs it had incurred.

There was no agreement in the end and both the companies set up their own units in close proximity with each other. Their mutual relations, however, did not suffer on this account.

The original GACL plan was to set up yet another 100 ton per day caustic soda plant at Dahej. Independent studies indicated that taking into account all the planned additional capacity, caustic soda supply would fall short of the demand by about 2,00,000 tons a year by 1999. GACL decided to embark on a more ambitious project to make the capacity of the proposed plant to 300 tons per day. It was confident that it would find markets for the added output.

The GACL management thought it prudent to invest in a captive cogeneration power plant as well, based on naphtha as also the then ample availability of natural gas from the neighbouring Gandhar fields. Positive responses from the Oil and Natural Gas Corporation (ONGC) which operated the field and the Ministry of Petroleum which set the policy further encouraged it to plan the power capacity with an eye to the future. This was fixed at 90 MW based on combined cycle systems, sufficient to meet power requirements for capacities up to 800 tons per day.

Tata Economic Consultancy Services estimated the investment to be Rs 570 crore which fetched a healthy internal rate of return of 20 per cent a year. The Board approved the project subject to an analysis of sensitivity of the results to changes in the internal transfer pricing of hydrochloric acid and change of feedstock of the power plant from naphtha to natural gas and lignite.

Even though the trade circles had widely assumed that Uhde will yet again be chosen as the technology provider, GACL made very thorough and elaborate efforts to widen its net of suppliers. Nevertheless, an exhaustive analysis of all options and bids showed that Uhde was still GACL's best choice.

The power plant needed considerably longer lead time for implementation as compared to that for the caustic plant. The company did not wish to delay the commissioning of the caustic

plant on this account. It decided to go ahead with it and requested 40 MVA supply from GEB. It shared the cost of additional transmission lines with the nearby Indo-Gulf Fertilisers factory which also received its power supply from it.

The caustic plant of the 300 ton capacity was commissioned in 1998 and stabilised to operate at 240 tons per day. The rest of the project was, however, delayed enormously due to various factors. The company faced fluctuating markets, which affected its cash flows and profitability, in turn impacting its own contribution to the project cost. GEB delayed power supply. Above all, GACL's vastly ambitious plan of raising capital through a Euro issue in 1996-97 had to be abandoned. The company plunged into a first-rate financial crisis which took about four years to resolve (this is discussed in the next chapter). The net result was that the total project could be completed only by 2007. It now has a capacity of producing 765 tons a day of caustic soda at Dahej.

Meanwhile, the Reliance Industries plant at Hazira continued to increase its production of PVC, using chlorine from the IPCL Dahej facility. India, it seemed, had an insatiable demand growing at a double digit rate annually for this versatile plastic material. Reliance decided in 1999 to set up a new ethylene di-chloride (EDC) plant with an annual capacity of 2,50,000 which would have needed 1,80,000 tons of chlorine annually. GACL was to supply this quantity. The original idea of locating this new facility within the GACL campus to avoid the necessity to transport chlorine did not quite work out as it was not found to be commercially feasible.

Reliance chose to set up the EDC plant at Hazira itself and purchase from the market 240 tons of chlorine per day. Such was the market power of Reliance even at the turn of the century that GACL had to organise a consortium of suppliers under the aegis of AMA in order to avoid a price war among them. Reliance was now using both

imported EDC and produced EDC with imported ethylene. The price of chlorine was to be adjusted to maintain for Reliance the cost parity between its two sources of EDC. In this period international prices of ethylene rose rapidly while those of chlorine remained somewhat stable. This could at times lead to a negative price for chlorine used for domestic production of EDC.

GACL managed to steer the situation competently and ensured steady supply, safe transport and positive price for chlorine even when parity considerations would have ruled them out, as was the case in 2008-09 following the economic downturn. This contribution was much appreciated by Reliance as well as GACL's fellow members of AMA.

The Government of India sold its entire holding of promoters' equity of 26 per cent to Reliance in 2002 as part of its disinvestment programme. Reliance made the mandatory offer to purchase 20 per cent of the IPCL equity from the market and became the controlling shareholder in IPCL. This was followed by a formal merger of IPCL into Reliance five years later in 2007.

Reliance thus further consolidated its already formidable position in the chemical industry. That was of even greater consequence to GACL because of Reliance's hold over the chlorine market, the effective determinant of the caustic soda production.

This was also the time of gradual economic liberalisation in India. Imports were now easier, even of capital and intermediate goods. Some countries, notably China and South Korea, took great advantage of this opportunity to unload their surplus production. South Korea was particularly aggressive in what amounted to dumping chemicals in India. PVC was among the main commodities it exported to India.

This affected Reliance directly. It could retaliate chiefly by

aggressive pricing to compete with the imports. That meant that even as Reliance sought larger supplies of chlorine for its own production, its ability to pay what Indian suppliers thought to be remunerative prices was severely limited.

GACL faced a double bind: it had to cope with the dumped caustic products and at the same time, be content with the price Reliance could pay for chlorine. Despite this, it managed the situation and obtained prices that could keep its operations going. Its dependence on the substantially larger and much diversified Reliance increased considerably in the post-liberalisation phase. The shadow of the big brother looms large over GACL even today, 25 years after liberalisation.

Captive Power Plant: From Boon to Burden?

Most major Indian companies routinely invested in their own power generation, often to the full extent of their requirements. Even though this resulted in redundant additional capacity from the point of view of the national economy, it made sound economic sense to individual organisations to do so. Power from state electricity grids was unreliable in terms of quantum and hours of availability as well as quality in terms of voltage and cycles. Sole dependence on this source of power meant risks of interrupted and reduced production. Continuous process industries were more vulnerable, because interruptions often meant complete loss of whatever was in the pipeline and added start-up time after cleaning the system. Steadily increasing power tariffs made own generation an attractive proposition even when power supply was assured.

The Gujarat situation was somewhat better than the rest of the country, because GEB somehow managed to walk the tight rope condition caused by limited capacity (financial constraints meant slow expansion) and uncertain supplies of coal from long distance (most of the Gujarat capacity was based on thermal power stations using coal from central and eastern India). GEB often deferred scheduled maintenance shut-downs of its ageing power stations to stretch the availability of power. But even so, power cuts, voltage regulation and forced holidays, not to mention random unplanned and unannounced outages could not be avoided. This continued well into the 1990s.

Controlling costs of production was always relevant and of great concern to GACL. The principal component of it is the cost of power. That is reflected in its lead investment in and continued patronage of Gujarat Industrial Power Corporation Ltd (GIPCL) at Vadodara. This company was formed while H R Patankar was simultaneously the Chairman of GACL and Gujarat Electricity

Board in the 1980s. Its purpose was to provide captive power to neighbouring IPCL, GACL, GSFC and Petrofils plants in Ranoli. GIPCL was allotted 750,000 SCM of natural gas as its fuel. GIPCL proved to be a very big support to GACL later, when GEB increased its tariff for industrial users rather steeply in the 1990s and thereafter, to keep its own balance sheets clean. The concern with power cost had driven GACL to successfully switch to the power-saving membrane cell technology in the previous decade incurring great cost and even greater effort. Since it had now reached much lower power consumption, the logical extension of this concern would have been to reduce the unit cost of power.

It was therefore entirely logical that GACL should consider investing in a captive power plant when it was planning a very substantial expansion at a new location. The Petroleum Ministry had committed naphtha supplies to run the power plant. GACL was to pay the unsubsidised price, which was still affordable. The plant was designed to run on both naphtha and natural gas, as GACL correctly assumed that in the foreseeable future, gas would be the more convenient and economically attractive fuel.

The design, bidding and evaluation of offers for the power plant proceeded smoothly enough, along with the work on the new caustic plant. The Board observed that the final offers were for amounts higher than those assumed by its consultants in their feasibility analysis. It asked the two bidders, Bharat Heavy Electricals (BHEL) and L&T to reduce their costs. The order went to L&T with a completion deadline of December 1996, subject to GACL completing the civil works in time.

The black cotton soil and the marsh at the site proved to be formidable obstructions, causing substantial delays in execution. The gas turbines could be commissioned only by January 1998.

The entire plant was commissioned by the end of March 1998, but the first gas turbine had started providing power to the caustic soda cells a month earlier. The grid synchronisation was achieved by August 1998. GACL had to negotiate a reduction in the connected load to GEB, wheeling of surplus power to GEB and a purchase agreement.

This slippage in the schedule turned out to be a relatively minor problem. Much worse was in store for GACL on account of fuel for the captive power plant. The original plan to use naphtha ran into trouble soon after the commissioning of the plant. International prices of naphtha started rising steadily. They jumped three-fold in just one year, from January to December 1999. The upward trend has continued in the present century with considerable swings. Current prices are about 20 times what they were in 1998.

Obviously, GACL could continue using naphtha only at unacceptably high costs to itself even in the interim until it could switch to natural gas. Gujarat State Petroleum Corporation (GSPC) had offered GACL more than adequate quantities of natural gas for both Vadodara and Dahej facilities in 1997. GACL accepted the contract at a firm price for five years from the start of supply. The Japanese partners of GSPC wanted the rupee equivalent of US dollars at the well head and the period to be reckoned from the date of agreement. This delayed the contract, which was ultimately signed in February 2000 for supply at a price that was linked to the dollar exchange rate and was higher than the original offer by about 20 per cent, delivered at GACL premises. Even at this revised price, GACL estimated it saved about Rs 35 crore annually by switching from naphtha to natural gas.

The supply actually started from November 2001, at the rate of 500,000 cubic metres a day, with the possibility of additional 10 per cent, which would have improved the plant load factor of the

plant, much to GACL's delight. That turned out to be short-lived, as GSPC could not deliver the agreed quantity due to short supply to itself. Within two years, by October 2003, the supply had fallen by 20 per cent to 400,000 cubic metres a day. The plant load factor also came down, and GACL was no longer able to feed surplus power into the GEB grid.

GACL thereafter tried to meet the gas shortfall through the use of low-pressure natural gas from the regassified liquid natural gas offered by the Gas Authority of India from its Dahej Plant. It had to install a compressor for this purpose. It proposed to meet its gas requirements by using equal quantities from both GSPC and GAIL.

Soon, international gas prices also started climbing. They had quadrupled by 2005. They have since come down from that high level, with wide fluctuations being the rule. The Government policy changed as a result, with priority accorded to the use of natural gas as feed stock rather than as fuel.

GACL had now completely switched over to natural gas as its fuel. The naphtha tanks and handling equipment were dismantled. But the continued use of natural gas increased its cost of production in comparison to that of the competitors, most of whom used the cheaper coal-based power. This also happened to be the period of high dumping of chemicals of foreign origin in the Indian market. Consequently, GACL's top line (more than 50 per cent of which comprised caustic soda) as well as its bottom line suffered.

The GACL response to this situation was of a "if you can't beat them, join them" nature. It thought of investing in a coal-based captive power plant, which would have meant abandoning all that it had done so far in this regard. In 2011, GEB agreed to purchase power from the Adani power plant at a relatively cheap price. It offered GACL an attractive proposition, whereby GACL could get 40 MW of power from GEB at reasonable cost if it invested in wind mills

elsewhere and fed the power they generated into the grid. GACL management agreed to this after exhaustive study.

GACL began to invest in wind mills in the preferred Kutch area. It wheels the power so generated into the GEB grid, against which it is able to draw power at its plant locations. By 2017, it had invested in wind power generation capacity of over 158 MW.

The situation today is that GACL balances its power requirements between GEB and Adani supplies and that generated by one turbine running on natural gas, with its share of the wheeled power from the wind mills. It has thus managed to meet the needs of its 785 ton per day caustic soda plant at Dahej. At Vadodara, power from GIPCL supplements that from the GEB grid and the wheeled power.

Dahej Today: From Chequered History to Stable Flagship “Kloribird”

Operations at Dahej stabilised after 2007 and have since progressed well. Apart from the basic caustic-chlorine combination along with facilities for flaking the caustic and caustic potash, the Dahej facility today produces a variety of related and unrelated downstream products:

- o Phosphoric acid based on imported rock phosphate from Jordan using Israeli technology. This was the first activity to be started at Dahej.
- o Polyaluminium chloride (similar facility at Vadodara as well).
- o Hydrogen peroxide (similar to that at Vadodara).
- o Anhydrous aluminium chloride.
- o Sodium chlorate.

Dahej has now become by far the larger of the two campuses in terms of both physical volume and value of output. Nearly three-quarters of the current GACL top line is on account of Dahej. The gradual addition of various plants and facilities has used up the vacant spaces in the 300-plus acres of the complex. In fact, some of the earlier gardens (and the ducks it contained, called “kloribirds”) have had to be shifted to Vadodara. Future expansion will have to be located in the other two plots GACL has in Dahej.

Dahej remains a technical and production centre. All commercial and administrative functions – save those related solely to the Dahej centre – are controlled by the Vadodara head office. The experiment of creating a position of Executive Director, Dahej did not quite work out. Successive managing directors have followed a practice of a weekly visit to Dahej. All said and done, Dahej still retains a sense of being a frontier outpost.

Dahej was the focal point of GACL strategic thinking and management actions in the 1990s, just as the conversion to membrane cells at Vadodara was in the previous decade. The management faced tough challenges in both these periods. But there was a qualitative difference. In the 1980s, GACL functioned in a protected environment which also severely inhibited enterprise. The difficulties it faced were mainly procedural and administrative, formidable though they were. The leadership of GACL had to supplement its combined expertise in administration with the technical competence of its senior managers and come up with innovative, workable solutions to the problems it faced serially.

In the 1990s, GACL and the rest of the industry in India were getting used to the country's opening up to the world, initially halting, but gaining momentum as it progressed. This was uncharted territory for most organisations. They had to learn through the knocks they received, at times quite hard.

GACL was no exception to this general observation. In fact, its main difficulties arose in the context of globalisation, be it the issue of fuel pricing or its availability. In all fairness, it needs to be mentioned that there were no prior indicators of most fluctuations in these parameters. The energy market was a virtual gambler's den. The government no longer protected Indian industry against serial oil shocks as it did earlier. It passed on the added burden to the actual users, especially the industrial users.

The depreciation of the Indian currency was another shock to many organisations. It had fallen nearly four-fold from about Rs 12 to the US dollar at the start of the decade to about Rs 45 by the end of it. Suppliers of foreign technology and goods would insist on contracts based on international currencies. There was no guarantee that any conclusions arrived on the basis of prevailing rates of exchange

would remain valid up to the end of even relatively short term decision horizons of say, three to five years. This added another element of risk to all decision-making.

Dumping in the Indian markets was widely practised by foreign suppliers in this early phase of India's globalisation. The government had not yet developed adequate competence to build firewalls against this. The sufferers were the domestic manufacturers. The fact that their earlier experience was all from protective markets did not exactly help them.

The stop-and-go progress of GACL in this period was mainly caused by such factors. It had to develop its sea legs to manoeuvre in this changed environment. But even before it could do so, it embarked on what could only be called a misadventure in retrospect. The collapse of the Euro issue of 1996-97 very nearly threatened its existence. It certainly affected its balance sheets of the period adversely and delayed the completion of projects on hand by quite some period. It not just managed to survive this crisis but also stabilised its progression and went on to a perfectly respectable position.

All this speaks of the trials and tribulations of the organisation its management and its survival strategies. That narrative follows.

Euro Issue Adventure and... Crisis!

6

Euro Issue Adventure and... Crisis!

“Spending Yesterday's Collection to Pay Today's Expenses”

At about 7:30 in the evening of 19 October 1998, it was already quite dark. A K Luke, the GACL Managing Director, decided to ignore the advice of his security officers and walked to the gate where agitated workers were waiting anxiously. It was kali chaudas (the fourteenth day of the dark fortnight), the day before all of Gujarat including GACL observed four days of Diwali holidays. The workers were upset because they feared that their leader and Luke could not reach an agreement on the bonus for the year in their long meeting earlier in the afternoon. The security sensed the mood of the crowd to be quite sombre.

In Luke's own words, the company was using yesterday's collections to pay today's expenses. He explained to the workers that there simply was no money to pay them any bonus, leave alone the Rs 16,000 they had received the previous year and were prepared to accept this year as well. The workers knew that the company was facing a dire financial situation for some time now. Their leader had confirmed this as well. But the workers needed money, some money, to meet their families' expectations for the festive season. One of them suggested that they go to Luke's office for further discussion.

About 50 workers, a few officers and a couple of policemen squeezed somehow into the cabin. Still others waited just outside. Luke said that while he understood the workers' plight, they should show their own understanding of the company situation by accepting Rs 2,500 as the bonus for the year. The workers took barely 10 minutes to think. They accepted the offer and departed.

Luke quietly instructed the finance department to raise the amount to Rs 3,500 with another Rs 1,500 as interest-free loan against future salaries and distribute the money the next day. He left his office around 9:00 PM. To his surprise, he found workers still milling about at the gate. They wanted to shake his hand and wish him and his family a happy Diwali. On that hugely satisfactory note ended what could have been a very ugly situation.

This instance highlights not just the grave financial condition of GACL in the late 1990s. It speaks volumes for the forbearance and understanding on part of the staff, which is a valuable element of the GACL culture. It also illustrates the can-do spirit of the management even in the face of major difficulties the like of which it had never before confronted.

GACL had come to this pass from a very buoyant position in a relatively short span of a few years. A combination of factors – its own ambitious plans, unexpected changes in the external environment and forays into uncharted territory – led to it. How this happened is discussed in the pages to follow.

Star Performer of Dalal Street, Investors' Favourite

GACL was in the pink of health at the start of the 1990s. Its profitability was enviable in an industry that produced not branded goods but commodities. Its debt:equity ratio and interest payments met the norms of financial prudence. This was a major factor fuelling its ambitious plans of expansion. It continued to enjoy this good fortune in the early years of the decade.

Parameter	Rs crore for year ending 31 March				
	1992	1993	1994	1995	1996
Gross income	193	236	219	289	417
Earnings before interest, depreciation and tax as % of income	48 24.9	68 28.8	50 22.8	74 25.6	135 32.4
Interest as % of income	12 6.3	15 6.4	12 5.5	19 6.6	24 5.8
Profit before tax	18	30	24	34	85
Profit after tax	16	26	24	31	81
Shareholders' funds	73	94	219	243	391
Loans	97	127	176	242	359
Debt: Equity	1.3	1.4	0.8	1.0	0.9

The company paid its maiden dividend of 15 per cent within three years of its start of operations. It maintained an attractive dividend rate all through this period. It rewarded its shareholders with bonus issues in 1983 and again in 1987 by capitalising a part of its reserves and share premium funds. It had also made a rights issue in 1988 at a premium of Rs 10 per share of the face value of Rs 10, shortly after the bonus shares of the previous years.

It made another rights issue in 1993, this time at a premium of Rs 90 per share of the face value of Rs 10, which is reflected in the steep rise in shareholders' funds in the table above. It continued to raise funds through secured debentures (convertible as well as non-

convertible) from time to time.

All these met with very good response from the market. GACL was considered a star performer among mid-size companies. That gave the company ample confidence of being able to raise funds sufficient to meet the promoters' share of the proposed ambitious plan of expansion. Subsequent events show that this was not quite justified. But that is in hindsight, which is always perfect. At that time there appeared to be no cloud of any kind looming over the GACL horizon.

Tapping Foreign Funds through Euro Issue - and its Collapse

GACL started discussions with its lead financier, IDBI, concerning the expansion project. It included the new green-field Dahej facility with a caustic-chlorine plant which would more than double the installed capacity and a captive power plant. Some additional products were also proposed aiming to add value to the basic product mix and guard the company against excessive dependence on its main products alone.

The entire basket was estimated to cost Rs 628 crore. Keeping the by-then standard 60:40 split between borrowed and own funds, GACL was advised that it needed to raise about Rs 265 crore as its share of the investment.

Sudhir Mankad was appointed the Managing Director of GACL in May 1995. The Chief Minister sent him a message asking him whether he would move to Vadodara. Mankad, who was then in the Sachivalaya at Gandhinagar, assumed that he would be the municipal commissioner, a prospect that did not particularly please him. He was informed that it was the GACL position that awaited him. The Chief Minister gave him a cryptic brief of cleaning up the mess.

Mankad found himself in the thick of Dahej acquisition and the expansion project. While the physical work was making steady progress, raising the required funds became his main concern. He contemplated several options available in the prevailing environment, including foreign funding.

By the mid-1990s, Indian reforms had begun to attract the attention of investors abroad. Foreign institutional investment flowed into Indian share markets. Two leading Indian companies, Southern Petrochemicals and J K Lakshmi Cements, raised equity

abroad by getting their shares listed on the New York Stock Exchange in 1993 and 1994 respectively. Others, including Aditya Birla, sought listing in European bourses, mainly London, Luxembourg and Frankfurt. These listings are known as American or Global Depository Receipts (ADR/GDR).

GNFC was the first government-controlled company to contemplate a GDR issue. The Controller of Capital Issues in the union Ministry of Finance was not quite convinced of the need and the benefits of such a move. K C Mahapatra, Managing Director, GNFC, had to use his considerable powers of persuasion to get a brother officer from the administrative service, N K Singh, then an additional secretary in the Ministry to grant approval. The GNFC team held road shows in all major financial centres of Europe, North America and East Asia, raising \$ 100 million.

These early forays were considered success stories, inspiring many other companies to consider this option. The irresistible appeal of this avenue of raising capital lay in being relatively low cost and requiring no obligation to repay the money so raised, unlike foreign currency commercial borrowings. There was no foreign currency obligation as well.

Box 3: Equity Depository Receipts

A **depository receipt** (DR) is a negotiable financial instrument issued by a bank to represent a foreign company's publicly traded securities. DR trades on a local stock exchange. It facilitates buying shares in foreign companies, because the shares do not have to leave the home country.

DRs listed and traded in the United States are American depository receipts (ADRs). European banks issue European depository receipts (EDRs), and other banks issue global

depository receipts (GDRs).

DR typically requires a company to meet a stock exchange's specific rules before listing its stock for sale. For example, a company must transfer shares to a brokerage house in its home country. Upon receipt, the brokerage uses a custodian connected to the international stock exchange for selling DRs. This connection ensures that the shares of stock actually exist and no manipulation occurs between the foreign company and the international brokerage house.

A typical ADR goes through the following steps before it is issued:

- The issuing bank in the US studies the financials of the foreign company in detail to assess the strength of its stock;
- The bank buys shares of the foreign company;
- The shares are grouped into packets;
- Each packet is issued as an ADR through an American stock exchange;
- The ADR is priced in dollars, and the dividends are paid out in dollars as well, making it as simple for an American investor to buy as the stock of a US-based company.

A **global depository receipt** (GDR) is a certificate issued by a depository bank, which purchases shares of foreign companies and deposits it on the account. They are the global equivalent of ADR. GDRs represent ownership of an underlying number of shares of a foreign company and are commonly used to invest in companies from developing or emerging markets by investors in developed markets.

Prices of global depository receipt are based on the values of related shares, but they are traded and settled independently of

the underlying share. Typically, 1 GDR is equal to 10 underlying shares, but any ratio can be used. It is a negotiable instrument which is denominated in some freely convertible currency. GDRs enable a company, the issuer, to access investors in capital markets outside of its home country.

Several international banks issue GDRs, such as JPMorgan Chase, Citigroup, Deutsche Bank, The Bank of New York Mellon. GDRs are often listed in the Frankfurt Stock Exchange, Luxembourg Stock Exchange, and the London Stock Exchange, where they are traded on the International Order Book (IOB). They have common features such as:

1. They are unsecured securities;
2. They may be converted into number of shares;
3. Interest and redemption price is public in foreign agency
4. They are listed and traded in the stock exchange

International fund raising used to be the domain of multinational companies. With globalisation and increased cross-border capital flows, smaller companies also enjoy the benefits of raising capital abroad. Cross-listing of shares through issuance of depository receipts is a common occurrence.

The prime objective for a company to cross list its shares is the reduction of cost of funds. Unless there is significant financial benefit from cross-listing, companies may not tap the foreign capital market as it involves certain other explicit costs in terms of annual listing fees, costs associated with recasting the annual report as per the foreign country GAAP requirement, costs associated with abiding by the listings requirement foreign country stock exchanges and so on. Irrespective of the reasons for cross-listing, more and more companies are issuing DRs thus broadening the international equity market.

The ADR listing required conforming to the strict American guidelines for financial practices and reporting. GDR listing, meant for European exchanges, required adherence to the relatively stringent European guidelines, and was therefore, preferred by Indian companies. Over the years, India has emerged as the country with most ADR/GDR listing; there are only 20-odd ADR listings, while those on GDR exceed 300.

The Board duly considered all available information and IDBI's advice on project funding. After contemplating a Euro issue of \$ 50 – 100 million, it finally settled on a \$ 50 million issue. This would bring in Rs 175 crore, leaving a balance of Rs 90 crore to be raised from domestic sources. The Board was assured that this was a sound, workable plan.

The Hongkong and Shanghai Investment Banking Corporation (HSBC) were appointed lead managers to the issue. Crosby Securities and Citibank were to be co-lead managers. The issue comprised \$ 50 million worth of GDRs, with each depository receipt representing two fully-paid GACL ordinary share of face value of Rs 10 each. It was to be listed on London or Luxembourg exchange.

As per HSBC advice, the process of launching the issue was begun in June 1996. A GACL management team headed by Mankad and assisted by the lead managers held road shows for intending investors in Hong Kong, Singapore, Dubai, Abu Dhabi, Frankfurt, Paris, London, Edinburgh, New York, Boston and San Francisco from late June to early July 1996. The initial response to these presentations was very positive and an atmosphere of guarded optimism prevailed.

That, however, was not to last even a few days. Major global security markets started convulsing on 8 July 1996. The United States and United Kingdom markets suffered a crash one week

later, beginning 15 July.

It was clear that the GACL issue could not be launched under such adverse conditions. HSBC advised GACL to postpone the issue until such time as the situation improved and markets stabilised. It further advised that the requirements could be met by foreign currency commercial borrowings as well. GACL obtained government permission to do so and armed itself with flexibility to follow either option or their combination and waited for the turmoil to ease. When that did not happen quickly enough, GACL decided to abandon the Euro issue altogether. This decision was taken after due consideration of the rather pessimistic accounts of the global situation given by the managers to the issue.

An analysis of global share market movements and trends 20 years later shows that the whirling movements of July-August 1996 did not signal a major downswing; indeed, in comparison to later cataclysmic events such as the collapse of Asian Tiger economies starting with the Thai crisis of 1997, the dot.com bubble burst of 2000 and certainly the sub-prime crisis and the recession of 2008, the 1996 happenings could be considered mere blips.

But that realisation is again a product of hindsight. The fact remains that neither the GACL management nor its advisors starting with IDBI had enough first-hand experience of global financial markets in mid-1996. They were not very well served by the lead managers or co-lead managers. Under the circumstances, a decision of waiting a few weeks and riding out the rough weather could have been considered too adventurous, especially under deadline pressure of a major project already under execution.

Ironically, GACL's rather ambiguous situation of having to adhere to some of the practices of public sector companies without strictly being one was both a handicap and an advantage. The accountability concerns emanating from the public sector ethos

made its management risk-averse. It was wary of waiting in the face of what appeared to be an entirely unanticipated adverse development. But despite the setback, the company did not face any organisational upheaval that would surely have happened in a private company. This continuity was of some considerable value in obtaining support for its eventual revival, as we shall see later on in this narration.

Balance Sheet Awash in Red Ink

An enduring piece of folk wisdom says that hardships always come in bunches. That would seem to be true of GACL in the period immediately after the collapse of the Euro issue.

First, GACL now could not go to the Indian market to raise the Rs 90 crore it had planned to, as that scheme was linked to the Euro issue. The consequence was an acute cash flow crisis. Its expansion project, now in full swing, had to suffer some delays in view of GACL's inability to meet. It progressed in a halting fashion thereafter, resulting not only in delays but a cost escalation to Rs 754 crore, or 20 per cent over the original estimate.

Second, it had perforce to seek funds from any source to keep not just the project going, but also for the working capital. Short- and medium-term inter-corporate deposits and short-term bridging loans were some of the avenues open to it, but resorting to them entailed high cost, as much as 19 per cent a year. At one time, the GACL loans had shot up to Rs 540 crore and its debt:equity ratio had risen to 4.3. These were truly black swan events in the 20-year spotless financial history of the company.

Third, GACL had begun facing adverse market conditions due to increased supply in the caustic-chlorine market from both domestic and foreign sources. Price under-cutting and dumping were rife. They eroded GACL's top line.

Fourth, its bottom line, already under pressure due to high financial costs, was further stressed due to increased power costs, because of rising prices of the fuel for the captive plant, naphtha. The situation was exacerbated when GACL met with delays and difficulties in obtaining natural gas. The GEB-supplied power was both erratic and costly. The silver lining of this otherwise very dark cloud was that the plant itself was deemed to be a most valuable

asset and a store of negotiable value.

All these affected the company's financial health badly. Its enviable balance sheets from the first half of the decade of the 1990s quickly turned into shades of red. That brought no cheer to the shareholders. Uncertainties about GACL's ability to meet its payment deadlines affected both suppliers and the staff.

Mankad was transferred at the start of 1997. R N Das served a brief term of 15 months thereafter. Luke had assumed charge of the company in April 1998 under these circumstances. He took stock of the situation. To say that it was challenging would be an understatement. He found that the cash flow was the most immediate problem. The inflows were not adequate to meet even the variable costs of manufacture, leave alone fixed ones. Many years later, he called the GACL condition in his first year as its Managing Director as that of "patient bleeding to death." That was no hyperbole.

The balance sheets of this period tell the same story succinctly, in numbers.

Parameter	Rs crore for year ending 31 March					
	1997	1998	1999	2000	2001	2002
Gross income	440	366	576	790	992	931
Earnings before interest, depreciation and tax as % of income	117 26.6	67 18.3	131 22.7	128 16.3	183 18.4	162 17.4
Interest as % of income	29 6.6	31 8.5	85 14.8	126 16.0	142 14.3	124 13.3
Profit before tax	59	1.3	(16)	(72)	(33)	(41)
Profit after tax	51	1.3	(16)	(72)	(33)	(41)
Shareholders' funds	437	429	411	413	368	327
Loans	638	913	999	954	995	1,028
Debt: Equity	1.5	2.1	2.4	2.3	2.7	3.1

The last good year in the decade that the company enjoyed was 1996-97. It took no more than a year for earlier positive or stable trends in most parameters to reverse and start declining or being unstable. GACL had the ignominy of facing losses after two decades of profits.

Just as alarming were the trends of increasing loans, declining shareholders; funds and worsening debt:equity ratio. Interest payments mounted and were now in double digits as percentage of gross income.

GACL was now leading a precarious existence. It could repay deposits or short-term loans only through incurring further such debts or loans with rising costs of servicing them.

However expensive this avenue was, it was not available to meet the claims of a major group of stakeholders, the workers. Luke had to face agitated workers almost daily amidst this spreading of red ink all over the balance sheets. A way out of this quagmire was not yet visible.

Phoenix Rising

Desperate Measures for Desperate Times

7

Desperate Measures for Desperate Times

Fighting Fires, Discovering Cost Control...

The amicable settlement of the bonus issue on Diwali-eve 1998 was just a palliative. It bought GACL much needed peace at home and some time, but Luke and the management knew that was just one step. Much more needed to be done to provide the cash-strapped company some breathing space first and longer term relief later on.

It was obvious to the entire management team that their overriding priority was to reduce cash losses, or staunch the bleeding, to use Luke's analogy. That in turn required reducing variable costs since the company had little control over the prices it realised from the market or the fixed costs, at least in the short run. The trouble was GACL was a multi-product company and some of the inputs – such as steam and power - were common for many of them. Measuring their use for individual products separately had not been attempted, because it was thought to be difficult.

Moreover, there were no benchmarks available to compare actuals. Not many chemical industries used standard costs of products as a management tool at that time. Those who actually did so were hardly expected to part with what they rightly considered to be their proprietary information. Data from abroad were irrelevant and useless because of the vast differences in surrounding conditions

and basic prices.

As the old saying goes, necessity is the mother of invention. As a starting step, leakages and loss of material through careless handling of material also had to be checked so as to ensure that only the minimum necessary amounts of inputs were actually used.

Benchmarks of chemical and energy consumptions could be established on the basis of stoichiometry, which is the quantitative relationship between reactants and products in a chemical reaction, and minimum quoted market prices of the chemical involved. Specific use of common inputs for a particular product could be measured by installing power and steam flow meters at appropriate locations.

Putting this into practice was not as simple as it reads on paper. Engineers and accountants had to be literally wheedled into taking up these tasks, which had never been done before in GACL and even in many other chemical plants. Their importance had to be stressed again and again: Any wastage directly affected the bottom line and caused additional cash outflows. Economies and efficiencies led to better results. And these were not to be treated as one-off concerns. They had to be parts of the daily routine.

After many trials and errors involving a very great deal of collective effort, GACL had elements of a cost control system in place. The managing director and heads of department could now see the approximate variable cost of each product on a daily basis. That system has been further refined in the years since. It is now available on-line and an integral part of the controls in place.

The importance of this step cannot be overemphasised. Once again, GACL had learnt and put into practice a critical management concept, by the seat of its pants, this time of continuous cost control and efficiency monitoring. This wisdom came not from external consultants or recommendations of lenders. It emanated from a

wholly internal desire to start setting things right. It required the same set of key ingredients that had served it so well in the previous decade in its battle to get permissions – belief in technology, innovation, persistence and team work. This way of working, which guided its upward journey, it would seem, had been institutionalised and came to its rescue in its darkest period as well. Lessons learnt through the school of hard knocks proved far easier to internalise and more durable than preaching of lofty principles.

...Pushing Capacity Use, Sales...

But yet again, this necessary step was just that: necessary. It was not sufficient by itself to pull GACL out of the doldrums. For a true turnaround, improvements to the top line and control of fixed costs were both needed. Together with control of variable costs, they would be necessary and sufficient.

The GACL attention turned again to what appeared to be under its control. For some time during this phase, capacity use of several plants was falling due to sluggish markets and competitive pressures. Luke decided to tackle this problem head-on. He ordered that plants must be run to their capacity. That was an aggressive strategy, entailing considerable risk. GACL was sitting on inventories of unsold stocks and its tank storage of chlorine was near full. This implied that the added production must find markets in a hurry.

That was easier said than done. Marketing meetings, chaired by the Managing Director, were held every afternoon. The day's production and sales were reviewed in these meetings as also what offers for sale were on the table. There was one significant difference now. The production and sales management teams now knew what the variable costs of production were for all the products in the pipeline every day. It was evident that as long as the price offered was higher than this cost, GACL could afford to accept it and generate a positive cash flow, however modest it might be. Dealers were often present in these meetings and they shared their market intelligence, reciprocating the company's gesture of sharing the cost data. Decisions were immediate. If some dealers demurred, others would come forth. Thus an atmosphere of greater competition came to prevail in GACL's marketing strategy.

GACL yet again discovered the principal of marginal costing and contribution analysis through its own hands-on experience. That

was a major gain. But it need not have worked in this fashion. Given the unpredictability of the market, the strategy of maximising production could have backfired and the company would have been caught in the tailspin of mounting stocks and a recourse to distress selling. It did face such situations a few times in the next couple of years and had to rein in its aggressive production-and-sales drive. GACL also set up a product application centre which directly provided advice and technical services to actual users. This created confidence and loyalty among its buyers.

The immediate consequence of this was seen in the top line beginning to rise again. The GACL gross income had declined by nearly a fifth to Rs 362 crore in 1997-98 from Rs 440 crore the previous year. In 1998-99, the first year in which the plants were ordered to run to full capacity, it rose dramatically to Rs 581 crore, or an increase of 60 per cent in just one year. It continued to show this uptrend for the next couple of years as well, before declining again in 2001-2002.

...but Not Selling Family Silver!

The increase in sales in 1998-99, however spectacular it might have been, did not lift the company from the pool of red ink. It still reported losses of Rs 16 crore for the year. Its interest burden had nearly trebled, from Rs 31 crore to Rs 85 crore. Shareholders' funds had declined by about 5 per cent to Rs 411 crore and loans had increased by about 9 per cent to nearly Rs 1,000 crore.

Clearly, growing sales and controlling costs were not going to restore profitability to the company. Its management knew that more funds had to be brought in to reinforce the equity. Going to the market was not an option in the prevailing circumstances. Financial markets are at all times governed by that indefinable factor called "sentiments." Part analysis of the past performance, part rumour and part gut feel of the large players, sentiments decide not just the daily ups and downs of the listed shares but also response to new share and debenture offerings. To say that the sentiment was not favourable to GACL in the late 1990s would be an understatement.

The GACL management led by Luke approached the state government several times for an injection of equity. The government response was predictable: Sympathetic noises, but a polite rejection of the request in view of the government's overriding commitments for developmental rather than commercial activities.

Ever since the first signs of the crisis at GACL, it was offered advice to cash in its investments and reach safety. The clear implication was that GACL should sell off Dahej, if not in its entirety, then at least the captive power plant. This could very well have been "inspired" by parties who would contemplate the purchase of these assets, but this even now remains only a conjecture. There were no offers of this sort, not even trial balloons.

These matters came to a head in meeting with the Chief Minister Keshubhai Patel and senior government officials on 22 September 1999. Luke made a presentation pleading the case for government funding. Several officials pointed out that the captive plant was running on by then quite expensive naphtha. As power accounted for 70 per cent of the cost of production of the company's bread-and-butter line of caustic-chlorine, there was a strong case of seeking a cheaper source of power. The suggestion was that GACL should sell the power plant. GEB would help in finding a good offer and also provide cheaper power. The GACL team opposed this idea vehemently, citing GEB's failure to provide adequate power and at affordable costs in support of their arguments. The meeting adjourned for the day without reaching a decision.

The Chief Minister summoned Luke the next morning and told him that the plant was not to be sold. But there were no funds to be had from the government either. The company had managed to stave off the sale of its family silver, just barely at that, but the wolf was still at the door, baying for funds.

And so Onward to Debt Restructuring

GACL continued to grow its top line for the two years following 1998-99, in quite spectacular fashion, by Rs 200 crore a year or more. Its thrust on increased production and dynamic marketing seemed to be paying off. More importantly, from the management point of view, the true measure of effectiveness of enterprise-controlled actions, earnings before interest, depreciation and taxes was increasing in proportion to the sales. But so did interest payments and company's debt.

Numerous small and not-so small, conventional and non-conventional, actions were contributing to the company's strenuous and so far successful efforts not to go under. Some of these deserve mention.

The company staff displayed sterling character. They did not press for the acceptance of their rightful demands in view of the company's precarious finances. That included not just the willingness to settle for token bonuses, but even more importantly, not asking for normal increments and reducing voluntarily some of their perquisites. Despite the tense situation, there were no work stoppages or violent protests. The Uhde chief on a visit to GACL in 1999 remarked that judging from the body language of the staff, and the looks on their faces, nobody could have known that the company was facing an existential crisis.

This spirit spread even to contract labour. Loaders came to know that chlorine tonners fetched better and faster contributions from Maharashtra as compared to Rajasthan. They would start loading the Rajasthan-bound tonners only after the trucks heading to Maharashtra were loaded and dispatched.

The cash crunch was a constant source of worry, with possible defaults on payments due to suppliers and even staff salary weighing heavily on the minds of the finance managers. The

company's principal bankers, State Bank of India, refused to sanction emergency limits for salaries. GACL management scrambled to secure deposits from some cash rich state public sector enterprises in Gujarat. The necessary approvals were managed through the strong network of the IAS community which was in charge of these enterprises and their controlling parent departments of the state government. The company thus never faced the ignominy of not being able to meet its payroll. That helped keep up the staff morale no end.

There were sticky situations galore. A cash management system was put in place to meet the payment demands for various purposes from the limited availability as per company priorities. All departments had to submit in advance their cash requirements for the next 30 days and manage them according to the funds made available to them. Cheques were issued only after the approval of the cash management cell.

At this time, GACL's purchase of naphtha was severely constrained as the suppliers, Indian Oil Corporation (IOC) and Bharat Petroleum Corporation (BPC), imposed strict credit controls on such deals. Supplies were sometimes blocked for want of funds. GACL then reached an informal understanding allowing it to deposit cheques with IOC after 2:30 PM on the days the payment was due (even when it did not have adequate balance), causing the supplies to be made available. It collected the tanker loads it had ordered from the IOC depot before the gates closed. The delayed deposit of the cheque provided two or three days' of leeway before it came for clearance, allowing GACL to make good the shortfall from its receipts in that interim. This practice, popularly called cheque kiting, is not strictly illegal but it is normally considered not prudent and frowned upon. That helped save the situation for GACL on many a day in this period.

These acted, in effect, as band-aids do on a bleeding wound. They stop spot bleeding, but neither stem the haemorrhage nor heal the injury. All the surplus the company generated, it appeared, went to its bankers as interest and loan repayments, leaving GACL absolutely no flexibility. Faced with this impossible situation, Luke decided to stop further payments on these accounts. That caused much chagrin to his own finance department. Dire consequences were foreseen. Luke's standard response was that the company had no money to pay.

IDBI was the leader of the consortium, but there were 36 banks in all involved, including some foreign ones. As expected, they did not react kindly to this decision. Their response varied, from stern letters and warnings to personal visits of their managers to somehow cajole GACL into paying, which did not succeed as the company stood its ground.

IDBI provided some relief by way of rescheduling but no relaxation of interest. It advised GACL to seek a total restructuring of its debt through the corporate debt restructuring scheme details of which was still being worked out. It should hire financial consultants to work on this and negotiate a deal. GACL had no choice but to bite the bullet. But it took until 2002-03 to sort out this. The company's ordeal and pressure on it to part with assets continued for some more time.

Gujarat had a new Chief Minister in October 2001. As was customary, Luke offered to move out of GACL since he had served more than three years. He had made similar offers to the state government earlier as well, which were all turned down. This time, though, he received transfer orders in December 2001.

Luke's eventful tenure thus ended on not too happy a note, since GACL was still not back among profitable entities despite operating at full capacity and making positive contributions, debts and

interest burdens were mounting and long-term in the form of debt restructuring still not in sight.

After a couple of years in administrative positions, Luke was appointed Managing Director of GSFC, where he was again expected to restore health to that body which, too, faced problems similar to those of GACL.

Calmer Seas, Steadier Ship, Smoother Sailing

8

Calmer Seas, Steadier Ship, Smoother Sailing

Towards Profits Once Again, with Caution...

“Are you sure these figures are real and correct?” inquired Manu Shroff, the noted economist and independent director on the GACL Board, who chaired its Audit Committee. He was focussing sharply on the quarterly results P K Taneja, the Managing Director had placed before him in October 2002. GACL was actually showing profit before tax, albeit small, something that had not happened in the 13 quarters preceding. Shroff, a veteran independent director of many companies, both in private and public sectors, knew only too well that managements beleaguered under financial stress sometimes took recourse to what is euphemistically called creative accounting: they claimed return to health through some skulduggery, which could later turn out to be without foundation. Taneja reassured Shroff that the figures were indeed correct and accurately represented the ground reality. They were then placed before the board, which recorded its own relief and satisfaction at these green shoots of recovery.

Taneja had been appointed the Managing Director of GACL at the end of 2001. The government had transferred A K Luke, much to his own surprise, after he had waged for over three years an unrelenting and reasonably successful struggle to steer the

company's through the financial straits it had been struck in. Taneja was an engineer by training, as was Luke, and like Luke, this was his first stint as the head of a commercial enterprise.

Corporate Debt Restructuring: Innovation in Engaging Consultants

Taneja knew well that GACL was facing problems even before he was appointed; just how many and how deep they were he was to find out in the first few days after his appointment. His first act was to approach the state government for some relief in the form of funds, in addition to the sales tax deferment that GACL was already enjoying. But that request met with the by then standard response of the government facing its own resource shortage, especially in light of the commitments it had to make for providing rehabilitation after the Kutch earthquake in January 2001. Within a couple of months of Taneja's arrival at GACL, Gujarat faced the aftermath of the Godhra train tragedy. State elections followed later in the year. That meant the company fell completely off the government's radar for the next several months. Thus, GACL and its management had to perforce fall back on their own resource for most of the calendar year 2002 to meet their still quite bothersome situation.

IDBI as the lead of the consortium of bankers was the next on Taneja's list to approach. It, too, gave him the same advice as it had to Luke: seek formally corporate debt restructuring with professional help from reputed consultants. IDBI further counselled that the consultants should be given a full and factual account and complete access to all financial and technical data to help them conduct an objective analysis of the company performance. A restructuring plan based on this foundation was more likely to be acceptable than one emanating entirely from within the company.

GACL floated an inquiry among financial consultants for this assignment. Leading firms including SBI Capital Markets, PriceWaterhouseCooper, Ernst and Young responded to this. Two

smaller firms, Allianz Securities and Brescon Capital Advisors were also among those who had shown their interest. The board, guided by Shroff's cautions, voiced some apprehensions given the hitherto less than enthusiastic response of the lenders. It worried about the company being stuck with useless expense of engaging big-name consultants if this exercise led to nothing. Taneja's reaction was to carry this concern to the bidders. He asked them whether they would be willing to work on a success rate basis, i.e. payment to be conditional on the plan they proposed being acceptable. The bigger agencies all demurred, demanding at least a part of the payment to be fixed regardless of the outcome. Allianz and Brescon, however, indicated their willingness to accept such an arrangement.

Allianz claimed expertise in merchant banking and dealing with banks to organise relatively lower cost finance, while Brescon were more experienced in restructuring *per se*. GACL felt that a combination of these domain specialisations would work well for it. They were requested to jointly take up the assignment. Taneja got them to agree that they were to be paid a proportion of the savings of the interest cost after the package was accepted and implemented. The consultants would not even receive any payments or advances to meet their out-of-pocket expenses until this happened.

This seemingly simple move is of considerable significance. Consultants then as now are extremely reluctant to take on assignments on success-based payments, as was evident from the response of the established firms. Using this strategy was thus fraught with a possible risk of having to entrust the task to more adventuresome and likely less discreet agencies. The world of finance is known for its innate conservatism and risk aversion. On the positive side, GACL was engaging relatively newer and less-known agencies which would be naturally eager to grab the

opportunity offered and establish their credentials.

In the event, the latter turned out to be the case. Not only did the combination of Allianz-Brescon succeed in its immediate task of helping GACL restructure its debt, but also in their continuing association with GACL over most of the decade helped it gain access to cheaper and more convenient finance. The calculated risk and Shroff's caution paid off for GACL and Taneja, but the situation could have been just as easily the other way around.

But the relief arising from debt restructuring was still some while away. In the interim, the cash crunch remained just as severe as it had been in Luke's tenure. GACL received a great deal of help in the form of short-term deposits from cash-rich state public sector enterprises such as Gujarat Mineral Development Corporation. These funds not only kept the company going on a day-to-day basis, but more importantly, provided the breathing space it needed to pursue its efforts with its lenders. Such deposits also helped send a very positive message to the bankers that the company continued to enjoy the protection of the government, albeit in an indirect way. That was the much needed reassurance which spurred them into a favourable consideration of the company's request.

Corporate Debt Restructuring in Action: Who Blinks First?

In principle, debt restructuring ought to be a simple and straightforward exercise. It should entail the lender agreeing to waiving off penal interest on past overdues, capping the applicable interest at some reasonable level and rescheduling the repayment to mesh with the cash generation potential of the borrower based on an agreed plan of operation. In return, the borrower provides assurances or guarantees for meeting the agreed terms and penalties in case of defaults along with periodic reviews and audit of its working.

In practice, however, this turned out to be quite a complex and tiresome task for GACL and its consultants to manage. Although there was a general consensus within the consortium, the specific terms had to be negotiated and agreed upon with each of the 36 lenders. That required not only much back-and-forth communication, but also having to deal with somewhat different expectations and conditions of each individual lender. One lender having agreed to a specific set of conditions did not necessarily act even as a guiding precedent for the others.

The company provided a plan of operation which was essentially a revised and refined version of the production and marketing strategy it had been following for the preceding two years. Plants were to run at optimum capacity in accordance with market conditions, the cost of production was to be minimised through a strict adherence to efficient practices and the company was to realise its dues from the market in the fastest possible time.

This plan worked quite well. Some dealers, however, did not initially comply with the demand for prompt payments. They would post their cheques which would in effect give them an extra period of 10 days or so in which to make good the payment. Having used the same tactic itself not too long ago, GACL was wise to it and

sought banks' help to overcome this. A cash management system was evolved whereby dealers had to directly deposit cheques in designated branches and GACL would be given instant credit for these deposits. Most dealers followed this practice and even those initially reluctant fell in line.

Most banks agreed to reduce the term loan interest rates to the range of 11 to 12.5 per cent under advice from IDBI and IFCI. Working capital interest was also capped at 12 per cent. The Unit Trust of India, however, was not agreeable and demanded interest in the range of the original 14 to 15 per cent on the debentures it held. The company managed to get a cheaper loan from UTI Bank and redeemed the high cost debentures.

Some sceptical lenders said that they would prefer to take over the management of the company. In anticipation of such an eventuality, the GACL board had fully empowered the managers trusted with the restructuring to deal in a manner they thought fit. Taneja took this challenge head on and said that the lenders were most welcome to take over the reins of the company. Stunned by this unexpected response, the lenders backed down.

The group included two foreign bankers. Their representatives had earlier met Luke to press their claims for urgent repayment, but Luke had, as always, pleaded that he had no money at all to do so. These banks now demanded that the state government stand guarantee for the repayment according to the revised terms. That demand was rejected right away as not being even remotely in the realm of possibilities. Irked at this response, they threatened to start winding-up proceedings against the company. Again, GACL representative countered this by telling them that as their loans were unsecured, they would get the lowest priority in the event of the company being legally closed. They would not recover even a rupee of their loans in such a situation. That ploy worked and the

lenders relented, joining the others.

GACL was required to bring in additional equity through a rights issue as an integral part of the restructuring. The company planned to issue some 27.5 million shares in the ratio of three new shares for every five held. Since this decision was taken in late 2002, the management felt that it could at best get only a small premium of Rs 2.50 per share. It took over a year to get government approval of this issue. By this time, the market had well aware of GACL's steady progress towards recovery. A higher premium may have been in order, but the board was influenced by Shroff to stick to its earlier pledge. The issue was made in February 2004 and was immediately oversubscribed, as the market price was already crossed Rs 30.

Under normal conditions, GACL would have taken over 14 years to repay the loans, but restructuring envisaged the period to be about eight years. The company took care to also negotiate a clause of prepayment of loans without additional charges in its restructuring agreements. Most lenders were amused by this because they deemed this to be improbable, but accepted this more as an academic possibility.

GACL went ahead with the planned repayments. Meanwhile, its consultants managed to find newer sources of funds at lower rates of interests, which included term loans from other banks (obviously impressed by the success of restructuring until then), loan swaps and conversion of loans into other lower cost instruments such as foreign currency loans (FCNR B) at half the interest. There was an inherent risk of rupee depreciation more than offsetting the savings in interest, but in this period of global buoyancy, that did not come to pass.

With a combination of tight discipline in production and cost control, timely realisation of sales dues, smart strategies, out-of-

the-box thinking, persistence with bankers and other stake holders, and last but not the least, some good fortune coming its way at last, GACL was not only able to exit the debt restructuring in just four years by the end of 2006, but also meet the deferred sales tax obligation and redeem the expensive debentures.

Maintaining Good Corporate Health

“We will now follow cost-plus pricing from next month onwards,” Taneja announced in a sales meeting one afternoon in 2005. That was a brave move, some might say even foolhardy, because GACL was sitting on a sizeable inventory of unsold goods at that time. The room fell silent. One major dealer excused himself from the meeting, to return only after half an hour or so. Taneja wondered whether he had acted hastily. Later that evening he received a call from his representative in Mumbai to tell him that the dealer had contacted the Mumbai office to corner all available trucks to lift the stocks from GACL in the next two weeks before the price went up. The inventory cleared quickly and the cost-plus pricing formula was met with trade acceptance.

Until then, GACL had followed the marginal costing principle, accepting orders as long as they resulted in positive contribution. It was a price-follower in this sense. Gaining confidence from the smooth progress of the debt restructuring, Taneja felt that the time was ripe to become not just the production leader of the industry, but also the price leader.

“You do not rearrange the living room furniture when the house is on fire” is an accepted piece of folk wisdom. The GACL management would have been free of any opprobrium had it allowed routine management concerns slide during the period it was consumed by the crisis of debt restructuring. That did not happen. It continued to be diligent about managing its regular activities with by-now customary efficiency and despatch. The above pricing strategy is but one example of its attention to on-going management concerns.

Even though Taneja had some reservations about full-capacity production in view of periodic market gluts, on the whole, GACL kept its production in top gear. Its capacity use was always well

ahead of the industry average. During 2003-06, it was above 100 per cent and with an increasing trend, as against the industry average ranging between 65 and 85 per cent.

The company also paid careful attention to the product mix to enhance its market realisations. It was already selling caustic soda as flakes for better prices and convenience of handling. Now it added caustic potash flakes as well. Production of value added products such as chloromethane and hydrogen peroxide was stepped up instead of plain chlorine and hydrogen respectively.

The phenomenon of South Korea and China mainly, but also European Union, the United States and Russia on occasion, dumping chlor-alkali and related chemicals in India first experienced in the mid- and late 1990s continued in the next decade as well. As the industry leader, GACL strongly lobbied in the concerned government departments. It provided detailed data on all its products and managed to get anti-dumping duties enacted and enforced.

Of People and Chemicals

The staff contribution and forbearance in the days of acute cash flow problems always weighed on Taneja's mind. They had voluntarily foregone normal wage increases and reduced some of their entitlements. That did not affect their morale, as reflected in continued improvements in production efficiencies and good housekeeping practices all around. The company, too, had reciprocated. At the very worst period in 1998, Luke had paid a bonus 40 per cent higher than the amount accepted by the staff. Now in 2005, some seven years later, as the company was well into the recovery phase, Taneja announced major revisions in the salaries. The impact on the staff morale was electric.

Taneja's abiding concern for people was evident much earlier. Like every year, 5 September 2002 was observed as Teachers' Day. Taneja, who was serving also as Director (Finance) of Gujarat Urja Vikas Nigam, was in a meeting that morning at Vidyut Bhavan, located about 17 km from the GACL plant. He received an urgent call from his office that there had been an accident, an explosion, at the plant, the first ever in its history. He cut short the meeting and drove straight to the plant. After surveying the site and setting in motion the beginnings of an inquiry, he went back to the city, this time to the Bhailal Amin General Hospital where the victims had been taken.

Five persons had succumbed to their injuries and about 20-odd were in serious condition. There were several cases of serious chemical poisoning, with the sufferers at death's door. Deeply shaken, Taneja took charge of the situation. He was to remain in the hospital until the next morning, without break even for food. By the evening, Taneja and the doctors were engaged in an intense search for an antidote. None was to be found. Soon it was daytime in the United States as well. Leading researchers abroad were

identified and contacted. There was an experimental antidote under trial at that time. It had never been tried on human patients and the results from animal trials were not entirely satisfactory. After long, agonising discussions, the doctors and Taneja came to the conclusion that trying out the experimental treatment was far too risky. They opted for the conventional line of treatment. No more lives were lost, thanks to the conservative approach and the intensive care provided by the hospital and its staff.

Taneja's vigil may have ended on the morning of 6 September, but not his concern. His conduct came in for commendation at the Annual General Meeting of GACL shareholders a few days later.

Taneja retired from the civil service on 31 January 2017 after turning 60. It is in the fitness of things that he has now been appointed as the Director General of Gujarat Institute of Disaster Management.

The Proof of the Pudding

When GACL was in the thick of its debt restructuring programme, another development with potentially far-reaching consequences for it was in the works. The prevailing mood in policy circles was in favour of governments reducing their share in public sector companies, if not their outright privatisation. The central government had carried out a reasonably successful disinvestment programme at the beginning of the century. The Gujarat Chief Minister called Hasmukh Shah, elder statesman of industry and former chairman-Managing Director of IPCL in October 2004 for a discussion of Gujarat state public sector companies. Some of these, including GACL, GSFC and GNFC had not done too well in the recent past. The meeting led to the formation of an expert committee on restructuring Gujarat public sector companies with Shah as the chairman and A K Rakesh, IAS as its member-secretary. The term restructuring was meant in the broadest possible manner, covering Governance issues, possible disinvestment and its modalities.

The committee called for expression of interest from consultants to take up analytical studies of select companies leading to comprehensive recommendations for their restructuring. The consultants were shortlisted after they had made a general presentation to the committee and were invited to make detailed proposals for the assigned specific companies in January 2005.

By this time, word was out in the administrative service circles regarding the committee and its mandate. There was much agitation. Taneja and Luke, who was then the Managing Director of GSFC mounted a campaign against possible disinvestment in or privatisation of their respective companies. They believed that in view of the likely success of their rehabilitation measures, the companies were already back to profits or would soon be.

Therefore, there was no risk of value-erosion of government investments in these companies. There could well be, in fact, a considerable appreciation of these investments. Since this turnaround was achieved within the confines of public sector working, all credit must go to their managements and the nature of public sector functioning in Gujarat. There was thus no case for disinvestment or privatisation.

This view gained ground as news of improving fortunes of the companies that reported sickness not too long ago kept coming out in a steady stream. The government put the committee on the back burner in a manner of speaking. The proposals were not acted upon, even after being asked to be revised later on in 2005. Nothing further has been heard on the subject after 2005 until now.

GACL's recovery from its crisis was as rapid as its decline was. The first green shoots had begun to appear at the end of 2002-03. Two years later, the company was not only firmly in the profit-making list but also paying dividends. That position has continued for over a decade since then.

Once again, the numbers in the balance sheets tell the story succinctly.

Parameter	Rs crore for year ending 31 March				
	2003	2004	2005	2006	2007
Gross income	672	701	911	977	1,087
Earnings before interest, depreciation and tax as % of income	227 33.8	246 36.9	405 44.5	413 42.5	399 36.7
Interest as % of income	93 13.9	85 11.3	60 6.6	39 4.0	38 3.5
Profit before tax	53	88	269	295	273
Profit after tax	28	63	144	148	187
Shareholders' funds	319	410	542	723	888
Loans	888	771	540	423	401
Debt: Equity	2.8	1.9	1.0	0.7	0.5

Positive results of earlier measures such as cost controls had begun to show significantly in the third year of restructuring, 2004-05. The contribution improved dramatically, with earnings before depreciation, interest and taxes rising by nearly two-thirds in the year. All absolute and relative indicators and ratios – margins, profitability, interest liability, debt burden – were in better than acceptable range. Shareholders' funds had nearly trebled, while the debt burden had fallen by over a half. Interest costs were well under control. Thus, the cash-flow nightmare was well and truly over, but not before it tested the GACL management like never before and hopefully, after either.

Taneja had reason to nurse a sense of achievement when he left GACL in November 2006 after nearly five years at its helm, the longest tenure of any Managing Director so far. The successes in

cost management were palpable and recognised by way of awards. GACL's concern for environment also merited several awards.

These achievements are remarkable, especially since they came in a relatively short period. Once again, in a period of great crisis, it was to discover its innate strengths and virtues of sound management practices it had learnt and internalised in earlier times. There was a renewed sense of self-belief throughout the company. It had rediscovered its soul, in a manner of speaking.

That is of greater and longer-lasting significance for the organic whole that is GACL.

War Won,
Battles Still to Fight...

9

War Won, Battles Still to Fight...

Challenges New and Old

The reader of this saga could be forgiven for thinking that having successfully overcome the financial crisis, which threatened its very existence, in the early years of the present century, GACL would have embarked on a trouble-free onward journey in the decade since. Such was not the case. The company continued to face challenges, albeit not quite of the same degree of severity.

Some of GACL's problems in this period were inherent in the very nature of the business it was in. Some others were due to the economic environment of the country and the world, which had changed almost unrecognisably in the preceding decade. GACL also had to cope with a few unique situations which arose from the manner in which it had conducted its business. Finally, like many another organisation, it had to come to terms with some housekeeping headaches.

Guruprasad Mohapatra took over as Managing Director from P K Taneja at the end of 2006. Taneja had served almost five years as the chief executive of GACL, the longest such tenure. Mohapatra had the second longest innings at the helm, just a few weeks shorter than that of Taneja. Mohapatra had other responsibilities as well during the last two years he was at GACL, just the same as Taneja

did. Thereafter, M S Dagur, Atanu Chakraborty and A M Tiwari had another four-and-a-half years between them.

Growth of Dahej and Chlorine Constraint

“There was enthusiasm and a buzz about GACL when I joined,” Mohapatra was to observe. By the middle of 2006, the expansion projects at Dahej had finally been completed. The operations had been stabilised by early 2007, with the start-up snags all ironed out. The effective caustic-chlorine capacity at Dahej was 785 tons a day, among the largest in the country. With its other plants – phosphoric acid, caustic potash, hydrogen peroxide – it now produced a larger physical and commercial volume of products than Vadodara did.

The GACL capacity decision was primarily based on its assessment of the caustic soda demand, but it also factored in reasonable expectations of the chlorine it could sell to IPCL/Reliance for their PVC production. Reliance had resorted to using both ethylene and ethylene dichloride as raw materials for PVC. It had also set up its own caustic-chlorine plant, which met a part of its chlorine requirement. GACL therefore could not count on Reliance as a captive market for chlorine. As discussed earlier, chlorine price negotiations also were problematic from time to time.

The somewhat uncertain offtake of chlorine thus became the proverbial fly in the ointment. The open market demand for chlorine followed a cyclical pattern during the year. For some period, it fell well short of what GACL could produce. Not being able to store chlorine for more than a few days at a time, the fall in demand meant effectively a cut in caustic soda production as well. Its market was booming and marked by intense competition. If GACL, the leading supplier, had to curtail its supply for any reason, its rivals such as the Tatas, Kanorias, DCM or Grasim would easily fill the void. GACL's market share was under a constant threat because of this factor.

At times, GACL resorted even to free supply of chlorine, especially

to civic bodies for water treatment, so as to be able to continue caustic soda production without interruption and maintain its market share and goodwill. But clearly, this amounted to an emergency response and could not be continued for long. GACL had to seek long-term solution to this vexing problem which could possibly go out of hand without much prior warning.

Using the available chlorine to make products with ease of handling and storage as well as less toxicity was clearly indicated as a strategy. This could well add value to the by-product also. Taneja had already started the process to identify possibilities of this nature. Aluminium chloride, polyaluminium chloride and bleaching powder were some of the products under consideration. But setting up facilities to make these or other products would entail further investment. The GACL board and management were understandably wary of this, having still to cope with the problem caused by earlier ambitious investments. The focus was on a relatively risk-free way of achieving such desirable outcomes.

Hindustan Uniliver and Colgate, leading marketers of consumer goods such as soaps, detergents and toothpaste have always had very little owned manufacturing capacity. They have long practised outsourcing production to numerous units owned by others. The brand-owners supply raw materials or exercise control over their quality, strictly supervise and monitor manufacturing and market the production. These companies enjoy large market presence with almost negligible investment in manufacturing facilities. The units actually engaged in production get a fee based on their volume of output. This system is called toll manufacturing, toll being the fee received by the producer firm.

GACL found that aluminium chloride had a surplus manufacturing capacity and also exported over one-fourth of its production. It floated inquiries with two leading firms, offering to supply the raw

material (aluminium ingots and chlorine) and taking back the output which it would then market. The producer gained the toll and an increased utilisation of a part of its idle capacity. GACL would use its surplus chlorine and realise higher revenues in the process as also gain experience of a new business without having to invest. In retrospect, it had offered earlier a similar approach, but in reverse, to Reliance, by taking over the latter's caustic-chlorine project and giving back the output.

A small initial contract for three months and 250 tons per month of aluminium chloride was negotiated with Base Metal Corporation (BMC) in 2003, during Taneja's tenure. This worked out well and with some modifications, was continued for the next three years from April 2004. The quantity steadily increased to 8,000 tons in 2006-07, from the initial 3,000 tons a year. Both companies found this to be a win-win situation and the arrangement was extended first to 2010 and later to 2015. The GACL board formed a sub-committee to monitor toll manufacturing every quarter and decide on changes as necessary.

The original toll manufacturing sufficed to deal with the chlorine from Vadodara. Buoyed by this experience and having come out of debt restructuring, GACL contemplated in early 2007 investing in an aluminium chloride unit of its own at Dahej. A plant of 50 ton per day capacity costing Rs 24 crore was commissioned in April 2008. Unlike caustic-chlorine, however, the manufacturing process here was completely manual. It was also hazardous because of the high temperatures. The control was purely visual. Thus, the plant required specialised, experienced labour to operate it. Such competence was not available in-house to GACL. Hiring such labour would have been time-consuming and expensive. Therefore, the management decided to offer the operations and maintenance tasks on contract to qualified and experienced

organisation. BMC, with happy experience, emerged successful, as was to be fully expected. Thus, the GACL-BMC association covered both sides of the coin, as it were. The original contract for eight years was extended to 2020 by mutual consent.

GACL and BMC are now in a happy position of being leading exporters of the product to the quality conscious European markets. The volume has gone up to 35,000 tons a year, or a more than ten-fold increase from the original.

GACL continued to explore other possibilities for using surplus chlorine. Its search led to two other products, both under toll production. These are chlorinated paraffin wax and benzyl alcohol (using toluene from Reliance and chlorine as raw materials). After some initial, relatively minor, problems regarding partner selection, these activities are now well established as avenues for using chlorine.

Despite these developments, Dahej continued to suffer from a reputation of being a bit of a backwater. Mohapatra's response was to rotate some of the staff between the Vadodara and Dahej facilities and simultaneously offer greater facilities for Dahej staff such as a well-planned residential colony with access to the neighbouring GNFC township.

Mohapatra realised that the Dahej location could prove to be of great advantage in future. There was already a great deal of interest in international firms such as Evonic and Dow Chemicals. They were quite keen to build relationships with existing companies in Dahej. GACL ranked high among these. Mohapatra decided that GACL must acquire additional land at Dahej while it was still available. He enlarged the GACL holdings to four parcels of land.

He also sought to improve the image of a dull and drab production facility engaged in the production of odorous and hazardous

chemicals by landscaping and beautifying the campus by adding greenery and water-bodies. He introduced ducks, which he called Kloribirds. These innovations added to the visual appeal of the facility. These measures caught the eye of the then Chief Minister Narendra Modi during his three visits to inaugurate various plants.

Continuing Quest of Input Efficiency, Alternative Energy Sources

The GACL profit before tax as a proportion of its sales revenue fell to just over 10 per cent in 2009-10 from the earlier level of around 20 per cent. It declined further in the following year. Alarmed by this situation, the management also turned its attention to efficient use of inputs in this period. It undertook a comparison of GACL consumption parameters of Uhde cells in 2009-10 (treating Dahej and Vadodara separately) with those of three Birla group companies (Indian Rayon, Grasim and BCCL) with a view to improve its performance.

The results were not flattering to GACL. While the Vadodara power and chemical consumption per ton of production was in between the range of the Birla plants, that at Dahej was consistently on the high side. To be completely fair, the Dahej power consumption was higher partly as a result of the many additional auxiliaries in place there as compared to other plants. But the consumption in the cells themselves was higher as well. The most likely reason for this was that over 80 per cent of the cells at Vadodara and over 60 per cent of those at Dahej were of the least efficient first and second generation. The proportion of such cells in the Birla plants was somewhat lower. Moreover, the number of cells at each of the GACL plants was larger than that at the Birla plants. This would naturally lead to a relatively higher consumption in GACL.

This was a matter of great concern to the management. The power cost amounted to over 80 per cent of the variable cost and 65 per cent of the total cost of production. Achieving better efficiency, i.e. lower power consumption, was accorded the highest priority. Several measures were planned, which included added investment in the most energy efficient fifth generation cells, improving the coating of electrodes and using better rectifiers as time-bound

improvement activities.

Although many of the activities proposed were of somewhat long payback period (noticeably the investment in fifth generation cells and rectifier transformers), results started showing immediately. The 2011-12 PBT was nearly twice as much as that in 2010-11, on sales revenue that was only 25 per cent higher. As proportion of revenue, it was over 13 per cent as compared to just 9 per cent earlier. It has continued to be around that level ever since.

GACL's unit cost of power in 2009-10 at Vadodara was Rs 4.10/kWh and at Dahej, Rs 4.36/kWh. The company wanted to bring this down as well through all possible means. Its own power plant at Dahej unfortunately was of not much help because of the high fuel cost regardless of which fuel it used. It invested in windmills and the power wheeling schemes to reduce the cost of electricity. The beginning was in 2008, with a 23.75 MW unit in Kutch. This was followed by additions of 39 MW in 2009, 21 MW in 2010, 10.5 MW in 2013, 21 MW in 2014, 10 MW in 2015 and 21 MW in 2016, adding up to 157 MW. That represents an investment of over Rs 800 crore up to now.

Although salt formed only a small proportion of around 10 per cent of the variable cost and 7 per cent of the cost of production, GACL was keen to reduce this further. This became more pressing as some salt suppliers tried to exert pressure on GACL for getting higher prices. The company applied to the government for getting land for developing and running its own salt farms. It sought advice and assistance from the Central Salt and Marine Research Institute at Bhavnagar.

GACL's landed cost of salt at that time was Rs 852 per ton at Vadodara and Rs 772 per ton at Dahej. After preparing detailed project reports on two possible sites, it discovered that only one of them was capable of offering a lower landed cost at Dahej of Rs 669

per ton, provided it yielded 250 tons of salt per ha. The landed costs in all other scenarios were higher than what GACL was paying.

Nevertheless, that exercise provided some grist to GACL's efforts to break the salt suppliers' cartel. It succeeded in this effort and was able to get better prices.

GACL in the Time of Globalisation

From its very inception, GACL was made aware of the global situation, albeit only on the fringes. It had used technology and equipment provided by international firms even at the height of the protectionist period of Indian economy. It had not only shown very good awareness of developments in fields of relevance to it, but had also actively sought further information to continually update its knowledge and data base. Armed with this expertise, it had succeeded in obtaining for itself relatively attractive deals from its suppliers. It also continued to deepen its relationship with its main supplier, Uhde, through repeat orders. That created an atmosphere of trust and mutual appreciation. It came to Uhde's assistance when the German company was temporarily under a cloud in Gujarat.

All these factors were material when GACL made a foray in the export market in about a decade ago with its anhydrous aluminium chloride manufactured on a toll basis by BMC. Initially, the understanding with BMC was that GACL would concentrate on domestic marketing leaving exports to its partner. But the company had all along nursed the ambition of exporting. Mohapatra backed this fully, realising all too well that there was an element of risk inherent in this. As the relationship with BMC deepened and as production volumes grew, BMC raised no objection to GACL's entry in export markets.

GACL found that the relationship it had nurtured with Evonic would be very useful in entering the European market, especially as it would be competing against leading European suppliers such as BASF. With Evonic help, it was able to take on lease 14 ISO certified containers on lease for the export of aluminium chloride. As the volume of exports grew, BMC-GACL had to adopt additional practices of debagging the material in Europe for its movement to

the ultimate destination. All of these boosted the two organisations' confidence and standing in the global trade of this product.

After the recession of 2008, GACL had to face another aspect of globalisation. World commodity prices, especially those of oil, started rising. This immediately impacted energy costs in India. GACL faced the consequence of shrinking margins on this account, as discussed above. The recession had also another dimension. Faced with lower demand for some manufactured chemicals, many countries resorted to dumping their surplus volumes, especially in emerging markets such as India. China and South Korea dumped caustic products in India, depressing the local market. This was a continuation of the practice first experienced a decade earlier. GACL thus faced a double whammy.

GACL's reaction was two-fold. It started setting its own house in order, by improving its input use efficiency. It had already lobbied the concerned government agencies for enforcement of anti-dumping duties. By 2011, they were effective for caustic soda, hydrogen peroxide and phosphoric acid from among the GACL basket of products. GACL filed additional applications to include caustic potash in the purview of such orders.

Games People Play

One day in the mid-1990s, the GACL managing director received a call from a high dignitary. He was asked, albeit very politely, for a GACL dealership in the main commercial centre of another state in the name of the worthy's relative. Equally politely, the managing director replied that GACL already had a dealer in that city and a very good one at that, and there simply was not enough business for two dealers there. Unfazed, the dignitary asked for dealership in that state's capital or failing that, any other major city in that state. The managing director had to use all the considerable persuasion at his disposal to convince the said dignitary that the concerned state being relatively less industrialised at that time, there were hardly any commercial prospects worth the name in cities other than the commercial centre, already spoken for.

That incident illustrates how even in a company such as GACL, the human element often assumed critical position. Ordinarily, an organisation that dealt with only industrial buyers far removed from final consumers and employed a relatively small number of people would be expected not to experience much difficulty originating from the people dimension. But in case of GACL, a set of people external to it, the dealers, and its own employees did play important roles.

From the very beginning, the preferred GACL way of selling all its products was through a network of dealers. A simplistic statement of the function of these intermediaries would be that they booked orders from actual users and passed them on to the company. But in reality, they performed a number of other tasks as well. In Mohapatra's words, they were the conduit between the company and the market, a statement that almost all the chief executives would readily agree with. They collected relevant market information within their allotted regions and shared it with the

company, along with their own intelligence about it. The company, of course, did its own market scanning diligently, thus minimising the possibility of manipulation by the dealers.

GACL has never had field marketing offices or warehouses, either its own or hired. The sale of most products is to the dealer while the supply from the GACL plants to the buyer or ultimate user as consignee, often in trucks or tankers hired by the concerned dealer. The dealers pay GACL directly and collect payments from the buyers as per their terms. GACL thus avoids the hassle of bill collection from its numerous buyers. That is perhaps the single greatest benefit in the company's eyes. The idea of direct selling came up from time to time, but it gained traction only in case of a few major buyers. Most managing directors, who are vested with the overall responsibility for marketing and consider it their prime task, have readily accepted the benefit of selling through GACL's robust network of dealers of long standing.

The open marketing meetings introduced by A K Luke in 1998-99 where dealers were welcome to participate and would receive almost instant decisions based on marginal costing on their offers worked quite well to everybody's satisfaction. Subsequent decisions, such as P K Taneja choosing to make GACL the market leader setting the price, rather than being a follower accepting the ruling price also met with dealers' acceptance. For dealers with long relationship with the company, GACL introduced price ceilings and floors for its main products, which, too, worked. GACL could also resort to differential discounts, selling the same product on the same day at two different prices to two different dealers.

The dealership experience was not without its problems. Many dealers worked with competitors as well. At times, this was to cause some difficulty to GACL, since the dealers' advice and information had always to be vetted for possible conflict of interest.

There have been instances of GACL chlorine tonners taking much longer to complete their return to the company, most likely because the dealer in question diverted the empty tonners to a competitor, facilitating a shorter turnaround cycle for the rival company.

Some too-smart-by-half dealers employed delaying tactics in settling their dues to the company even during its financial crisis, when it was leading a hand-to-mouth existence. With the help of its bankers, GACL had to enforce a strict cash management system to bring some discipline.

The short point is that for the most part, there has been a symbiotic relationship between the company and its dealership network, extending to personal relationships as well. That is also the main reason for a GACL dealership being coveted by the trade.

Loyalty of its staff had been a major source of strength for GACL during its worst phase. Not only were there no major departures in this period, but the staff also voluntarily decided to forego their increments and some of their perquisites to help the company tide over its difficulties. Of course, the company saw to it that they were duly rewarded as soon as it could afford to do so.

The older staff did not leave GACL except in small numbers. The remuneration package, quite attractive initially, began to be less so as competitors started to match or better it for their own recruitment. Mohapatra studied the practice of performance-based pay, relatively unknown in public sector company. Midway through his tenure, it was introduced in GACL to facilitate lateral entry of experienced, senior personnel. Some senior staff were provided extensions on reaching superannuation. They often received further extensions as well.

GACL always had a relatively lean structure. As its volume of business increased, it began to employ contract workers to meet its

requirements. This class of workers outnumbered the regular staff by a factor of 2.5. They were well-paid, but did not enjoy all the benefits of the regular staff. That caused some heartburn. The company had to seek legal advice and support from unions to ensure that this did not become an intractable problem. The harmonious history of labour relations in Gujarat also helped.

In the latter period of Mohapatra's tenure, some murmurs about an emerging coterie of senior managers, some of whom were on long extensions began to be heard. Some influential dealers were also supposed to have taken sides in some incipient disputes.

Mercifully, most of the rumours were quite understated and never gained much currency. But they were serious enough to claim the attention of M S Dagur, who followed Mohapatra as the Managing Director. He terminated all extensions relatively early on in his tenure lest the vested interests theory again gain ground. He also carried forward the practice of direct recruits even at general manager/executive director levels. He also strengthened the position of the executive director in overall charge of Dahej. At the end of his two-and-a-half year term, there was little trace of what would have been at worst a storm in a teacup in GACL.

Newspapers, especially one leading Gujarati daily, were not always well disposed towards GACL. Reports critical of the company appeared periodically. When Chimanbhai Patel visited Vadodara during his second tenure as Chief Minister in the early 1990s, he asked his Chief Secretary, H R Patankar about the state of affairs at GACL, knowing full well the latter's continuing interest in and affinity for the company. Patankar seized the opportunity and requested the Chief Minister's help in dealing with mischievous press reports. "Funny you should ask me that, because I was myself going to ask your help in dealing with the same problem as far as I am the target!" was the Chief Minister's response.

During Luke's stewardship of the company, the same paper carried some "exposes" of GACL. Luke was somewhat worried about the impact of these on the company image, especially its standing in the share market. But investors, individual as well as institutional, always carried a very positive impression of GACL. The expose died down quickly.

GACL as a company was off the public radar for the most part. But where it mattered, among all its stakeholders - investors, clientele and staff - it enjoyed a fair amount of goodwill and a largely positive image. Even today, the company annual general meetings attract a sizeable gathering, numbering about 500. That is no mean achievement for a company whose business does not have a significant people interface.

GNAL – Win-Win Joint Venture with NALCO

The aluminium industry is a major user of caustic soda. GACL had long wanted to capitalise on the synergy with this major user. K C Mahapatra's efforts in the 1990s to establish a plant in Odisha in the vicinity of the manufacturing facilities of NALCO, the public sector giant, was a step in this direction. This was perhaps a bit ahead of its times and had to be abandoned. But the germ of the idea remained alive.

NALCO invited expression of interest from existing caustic soda manufacturers to set up a plant in Odisha in 2010. Ever on the lookout for such opportunities, GACL followed up. Gulati was negotiating on behalf of GACL. He was able to persuade NALCO to enter into a joint venture with GACL which would set up a new caustic soda unit in Gujarat, in view of the abundant and economic availability of the principal raw material, electrolysis-quality salt, in the state. The location would also be of advantage to GACL, since it would be able to use the resulting chlorine in its proposed chloromethanes plant. This was to be a part of its joint venture with Dow Chemicals of the United States, which just remained on paper. The plant would now be a part of GACL.

It took considerable time to work out the details of the joint venture, although the memorandum of understanding was signed in December 2011. The agreement was finally signed in June 2015, when A N Tiwari was the GACL Managing Director. Thus was born GACL-NALCO Alkalies and Chemicals Ltd (GNAL), which was incorporated in December 2015. GACL holds 60 per cent of the equity and NALCO the remaining 40 per cent.

The new company will establish a caustic soda plant of 800 tons per day capacity at Dahej, along with a captive power plant based on imported coal. The total cost is expected to be Rs 2,000 crore. The target date of completion is April 2020.

On completion, NALCO is committed to take a substantial part of the caustic soda for its own consumption. GACL will market the remaining caustic soda and other co-products. It will use the chlorine partly for its own chloromethane production and pipe additional supplies to the toluene di-isocyanide plant of GNFC. Additional quantities of chlorine are likely to find use in the manufacture of derivatives in the chlorine park planned in the vicinity. The hydrochloric acid will be sold to Ecophos, a GNFC joint venture. GACL also plans set up a plant to manufacture epichlorohydrin based on hydrochloric acid as one of the raw materials.

The project involves movement of caustic soda from the west coast to the east. While rail and road transport will be the initial means, plans have been drawn up to use the far more economical coastal barge transport between Dahej and Vishakhapatnam. A pipeline is proposed between the GNAL plant and the Gujarat Chemical Port terminal at Dahej.

GNAL is expected to register an annual turnover of Rs 800 crore at full capacity operations reckoned at current prices. The GNAL strategy of using all products gainfully, as opposed to having to look for even uneconomical ways of disposing of some of them, is indicative of how GACL plans to secure its future in an increasingly competitive world

Rising Topline, Steady Bottomline

A succinct story of this period is reflected in the numbers in the balance sheets.

Parameter	Rs crore for year ending 31 March				
	2008	2010	2012	2014	2016
Gross income	1,206	1,334	1,723	1,926	2,012
Earnings before interest, depreciation and tax	399	290	411	404	380
as % of income	33.1	21.7	23.9	21.0	18.9
Interest	25	17	21	6	8
as % of income	2.1	1.3	1.2	0.3	0.4
Profit before tax	236	146	223	247	265
Profit after tax	224	172	154	185	222
Shareholders' funds	1,078	1,391	1,608	1,964	2,319
Loans	315	328	311	156	225
Debt: Equity	0.3	0.3	0.2	0.1	0.1

Two salient points stand out:

First, the company's margins took a hit in the post-2008 period. This was because of the double whammy of rising costs of production and pressure on prices of the chlor-alkali products. The margins recovered a little thereafter thanks mainly to a rigorous cost-control programme adopted by the company. But they did not reach the glory levels of the pre-2008 period. It does not look quite likely that the company will see such margins in the foreseeable period.

Second, the company learnt its lessons from its near-bankruptcy experience rather well. It is now nearly a debt-free company, with a negligible proportion of outgoes as finance charges. The possibility that it will face a debt trap anytime soon is extremely remote,

almost non-existent.

The performance ought to be considered satisfactory, since the revenues grew steadily by 67 per cent over the decade. This was not at the cost of profits. They too grew, albeit more slowly and fluctuated somewhat. That is not in the least unusual in the present circumstances.

GACL investors certainly thought so. Its share price generally moved upward, keeping pace with the market trends. In the last year or so, it has zoomed ahead of the market trends. It now trades at over Rs 600 or more than three times what it was 10 years ago. GACL is now in the elite category of market outperformers.

Epilogue

Basking in the Afterglow of Success

10

Basking in the Afterglow of Success

Accidental Public Sector Unit Makes Good

If it doesn't walk like a duck or doesn't quack like a duck, surely it cannot be a duck. That is the reverse of a popular piece of folk wisdom, true nevertheless. If we were to look dispassionately at the journey of Gujarat Alkalies and Chemicals over its 44 years of existence, we would hardly find any event, achievement or element of substance or style of its operating in common with those associated with organisations in the public sector in India. That should lead logically to several questions: Why was it in the public sector? What made it function differently? Can it continue to function in future the same way as it has so far? And finally, should it be in the public sector in the twenty-first century of liberalised, globalised India?

India wanted to develop rapidly immediately after Independence. That objective had the prerequisite of a modern industrial base, comprising basic infrastructure, capital goods, machinery, utilities, among others, leading to a growing, maturing economy. The trouble was that the Indian private enterprise was emasculated through long periods of colonial exploitation and barring textiles, had hardly any presence in other activities worth the name.

Neither was international capital flowing freely into what were then poorer regions of the world, engaged as it was in reconstructing war-ravaged economies of Europe.

The erstwhile Soviet Union regime appeared to have transformed in just three decades a continent-sized underdeveloped feudal nation into a modern economy by the expedient of the state investing in large-scale enterprises to make steel, build infrastructure and run a military industrial complex capable of matching that of any large country. India's leadership was not the only one to be impressed by this performance. In India's case, the Soviet model seemed an attractive alternative route to follow, especially for setting up major industries. Therefore, large state-owned basic metallurgical enterprises emerged as the first members of the nascent public sector.

Yet other activities, such as power generation and distribution, railway transport, telecommunication, among others, had to be carried out on large scale. They were described then as natural monopolies. The scale factor and the essential nature of the output or service they provided mandated their public ownership.

The Indian National Congress held its 60th annual session at Avadi near Chennai in 1955. It adopted a resolution to usher in a socialist pattern of society in India. That in turn enjoined the state to control the commanding heights of the economy. State ownership of most essential industry and service providers was mandated. Most large existing corporate bodies in areas as far afield as banking, mining, insurance and transport were nationalised and strict laws for what private enterprise may do and how were enacted. That was to be the defining parameter of the Indian industrial scene for the next three-and-a-half decades.

None of these grounds seem to have been relevant or applicable to the establishment of GACL in 1973. The initial investment of Rs 10

crore was not beyond the means of even medium-sized industrial houses of that era. The chlor-alkali industry had been in existence in India for over 30 years at that time, with a number of privately-owned companies actively engaged in it. It was not marked by any particular scale preference for a natural monopoly to be the preferred form of organisation. While the industry was useful, it was by no means a critical one for the development of the country. Unlike the predecessor of GACL in public sector, Gujarat State Fertilizer Company, GACL produced no commodity of interest to users who needed to be protected. Lastly, a planned capacity of just 100 tons a day would not have provided GACL a controlling share of the industry, leave alone being in any way a part of structure required for commanding the heights of the economy.

GACL was in the public sector for one and only one reason: A powerful politician had taken a dislike for the person who was then the Managing Director of Gujarat Industrial Investment Corporation, the late S J Coelho. The leader exercised his prerogative and had Coelho transferred to a new posting of the managing director of a new project, as yet to be finalised, and with no company in existence then to take it up. GIIC perforce became the promoter of GACL. This outcome of a patently political whim, and not any aforethought plan, was the reason for GACL coming into existence as a public sector organisation. And that is where it has remained all through its existence.

Strictly speaking, GACL is not a public sector organisation. It is a company with private shareholding. It is listed on stock exchanges. Its shares are actively traded. But the state government is effectively in control. Along with its associates, it holds over 50 per cent of the equity, and qualifies to be formally considered the promoter. The state government nominates the chairman and the managing director of the company. GACL enjoys a fair degree of

autonomy, but is still largely considered a public sector unit for understandable reasons. It shares this distinction with GSFC and GNFC

The *esprit de corps* of the public sector is now firmly embedded in the value systems of GACL. When faced with the possibility of the government contemplating restructuring the company including divesting a part of its equity, it was not political interests but the management that put up a strong and effective resistance, to nip that proposal in the bud.

Efficient management and profitability are generally not part of the popular perception of public sector companies. The fact that only about 100 of the over 300 central public sector companies have been awarded the ratna status on the basis of their turnover, asset base and consistent profitability would tend to suggest that this perception is not without basis.

GACL would have easily earned the elite status had it been a central government company. But the reality is that it has always had to function within a space constrained by both state and central government regulations and stipulations regarding their companies.

It has also not had the benefit of the protection and other facilities generally enjoyed by the government companies. During its financial crisis, it received no government bail-out; the state government did not even offer a guarantee for the outstandings some foreign bankers had requested. On the contrary, it had to wage a struggle to withstand pressure to divest its prized asset, the captive power plant, as a means of raising funds it needed. It had to fall back upon the strong network of IAS officers to raise corporate deposits from other state public sector companies at that time to tide over the difficult situation. Its managing directors had to use their goodwill and respect within the administrative structure for

obtaining several permissions and clearances from time to time. These benefits arose largely from the strength and loyalty of the IAS fraternity rather than the public sector status of the company *per se*.

At least eight managing directors of GACL went on to serve as chief executives of either GSFC or GNFC. It appears as if service in GACL had been mandated as apprenticeship for future appointments in the fertiliser companies!

GACL USP: Evolution of Vibrant Organisational Culture

This saga has narrations of the numerous decision challenges GACL has faced throughout its existence and how it responded to them. It also draws attention to the factors underlying them. Pulling them together makes it possible to discern a clear underlying pattern. The GACL journey is marked by:

Clarity of objectives and commitment to them: From the very start, GACL management could clearly identify and focus on the main objective it ought to be pursuing, be it starting the company, raising initial capital, seeking technology and equipment suppliers, efficient production, higher capacity, value-addition, overcoming the financial crisis and harmonising and consolidating its operations and industry positions. It had shown an extraordinary ability to steer clear of diversions or detours on the way, with complete dedication to the destination it wanted to reach.

Unflinching belief in technology: GACL has demonstrated its commitment to seek the best available technology at every stage of its existence and growth. As an organisation working in a competitive environment, it realised early that it could afford to forgo efficiencies in the production processes it employed at its grave peril. It also realised that optimising production and protecting the environment were not contrary objectives but were compliments to each other. It undertook a thorough search of what was on offer, what worked and what did not, and made the optimal choice under the circumstances. Even when it faced obstacles due to the existing administrative framework and had to defer its choice of the ideal, it never lost sight of what was best for it.

Spirit of innovation: Regardless of whether it was raising funds from possible investors, seeking permissions, leading a precarious existence of meeting today's expenses from yesterday's receipts, putting together a debt restructuring plan or spreading risks to

ensure smooth running of the company, GACL displayed an enviable ability to think out of the box and take the road less travelled, being fully aware of the risks involved. Remarkably, it had the full backing of its board in such cases.

Team spirit: GACL never thought of its situation in silos and sought compartmental solutions. Instead, it focussed on the entirety of concerns, which necessarily meant deploying diverse competences and abilities to deal with them. It realised that technical issues often required strategic responses going beyond just the technical parameters, as did marketing, which was not just selling and distribution, but also the underlying concept. Various disciplines may have been highlighted at specific junctures, but at the end of the day, it was always the whole management team that was responsible for the decision and its success.

Along the way, GACL was to discover for itself a number of basic concepts of sound management. When it analysed its costs of production in depth, it understood that it could accept orders if the incremental costs of meeting them were less than the revenue they would generate, even if the price offered was lower than the average revenue it earned. When it invited potential buyers to its sales meetings and shared its costing data with them, it showed the value it attached to transparent processes of decision-making.

It also learnt the value of networking. Its managing directors belonged to a culture of fraternal relationships in the administrative service. The organisation as a whole realised that maintaining good relations with the dealership stood it in good order in a tough marketing environment. The dealers delivered for the most part on the promised help. The company evolved into what is still called "the GACL family" and not without ample justification.

Internationally, GACL and Uhde quickly started a relationship

based on mutual trust and respect. That was to pave the way for smooth transactions between them. More importantly, it helped both the organisations create positive images across other interfaces as well. GACL helped Uhde overcome the motivated charges made against it in India and Uhde helped GACL's initial forays into exports to Europe.

External consultants were used sparingly, mainly for limited tasks that called for domain expertise, such as comparing technical offers or preparing debt restructuring plans. Remarkably, for all the GACL managing directors to date, their stewardship of the company was their first ever experience of the commercial world. They learnt on the job, often with remarkable speed, and led their teams by example. They eschewed the temptation to venture far afield when the going was good and did not lose their composure in tougher times, sticking to the knitting, as it were. Without exception, they were as generous in sharing credit with their colleagues for the varied achievements of the organisation as they were forthcoming in taking it upon themselves all the responsibility for many decisions fraught with risk. This sterling display of leadership has been one of the greatest assets of GACL.

This recipe for GACL's success reads veritably like a synopsis of a curriculum in a school of management. The company gleaned its management competence from the severest school of all, that of hard knocks, and internalised the learning well. That is why this narrative reads like a case study of a reputed business school.

Can Good Times Last?

“Well, in our country,” said Alice, still panting a little, “you'd generally get to somewhere else - if you run very fast for a long time, as we've been doing.”

“A slow sort of country!” said the Queen. “Now, here, you see, it takes all the running you can do, to keep in the same place. If you want to get somewhere else, you must run at least twice as fast as that!”

That excerpt from Lewis Carrol's *Through a Looking Glass*, the sequel to his classic *Alice in Wonderland*, is the perfect prescription for GACL has to maintain its pre-eminence in the industry and in the mid-cap section of listed companies.

The chlor-alkali industry is a mature one, with limited scope for product innovation and value-addition. Nor can it find ever newer uses for its existing product mix. A shakeout within the foreseeable future is thus inevitable, as has been the case elsewhere in the world. Invariably, that would lead to the demise of the less competitive units, either through a buying out by the stronger ones or outright bankruptcy. Companies such as GACL would have to relentlessly seek ever greater efficiencies and the edge they would provide. That task is bound to suffer from diminishing returns.

GACL may be the current industry leader in terms of competition, if not volume in all products, but all its major competitors belong to larger, well-established groups such as Reliance and Aditya Birla, for whom funds will not be a constraint. The industry today is in an unprecedented expansion phase with all major and even some minor players adding substantial capacity. Almost all of them are integrated units, with considerable in-house downstream

capacities. In bad times in the future, they would be shielded by their own captive consumption and the resources of the parent group. That comfort was not available to GACL at the turn of the century nor will it be the case in future either, as it continues to be a stand-alone entity. The company can ill afford to lower its guard against such eventualities.

GACL also cannot take for granted the extraordinary luck it has enjoyed so far in the availability of talented and dedicated managerial personnel. It will be hampered in tapping the open market for personnel since the chlor-alkali business is not exactly where ambitious managers of proven capability seek careers, fame and fortune.

GACL must carefully rethink all its choices, including the pattern of its ownership and the composition of its stakeholder to gear up for the uncertain future.

Salt, Sea and Greater Glory

This saga must conclude by returning to the origin of GACL, as indeed all life on Spaceship Earth, the sea. Unlike most chemical industry, GACL enjoys an inexhaustible and cheap source of raw material. Salt can be harvested for eons to come from the sea, without causing ugly eyesores of mines or scarring the earth. And what converts the sea brine to usable salt is an eternal and boundless source of energy, the sun. Economic compulsions may have pushed GACL to seek wind power as a wheeling option for the electricity it needs, but by staying invested in it in a major way, GACL today would have a very small net carbon footprint. Not many companies, certainly not those engaged in the chemicals business, either in India or abroad can make such a claim. GACL is thus on the way to be fully compliant with the environmental requirements of the twenty-first century world.

The sea also inspires and informs Gujarat's quest for a place in the sun. For millennia in the past, Gujarat enjoyed exposure to the world as it was then and developed through maritime trade. Gujarat was India's window to the world. The sea is again powering the Gujarat drive. It now has several world-class ports in addition to the half-century old Kandla. In Dahej and Hazira, it has specialised chemicals and gas ports with adequate terminal facilities and infrastructure to connect it to the hinterland. These are invaluable assets in an interconnected, globalised world economy.

Lands eroded and degraded by the sea may be cause of worry in other geographies, but in Gujarat, they have allowed the state additional land required for industrial development without having to disturb its thriving and productive agriculture. The new industrial hubs that have emerged around Pipavav, Mundra, Dahej and Hazira would not have been possible without such land.

A picture is said to be worth a thousand words. The cover of the 35th annual report of GACL (2007-08) has two shells resting on a pristine beach off the blue sea, with glistening pearls in them. It is also the cover of this volume.

Nothing could sum up the GACL Saga better.

Annexes

1

GACL Mileposts

Formative phase

- November 1972 S J Coelho appointed Managing Director of caustic/chlorine project
- March 1973 Company registered under the Companies Act
- June 1973 Certificate of Commencement of Business
- June 1974 Foundation stone laid
- July 1974 Licence issued for 37,425 tons annually of caustic soda
- June 1975 Public issue of GACL equity
- October 1976 First caustic soda plant on stream

Operational phase

- 1977 Rights issue
- 1981 First expansion to double the capacity
- 1982 Sodium cyanide plant with 2,000 tons annual capacity commissioned
- 1986 Diversification into chloromethanes with 10,560 tons annual capacity

1987 Caustic soda flaking unit of 26,400 tons annual capacity commissioned

1988 Another rights issue

1989 First conversion to membrane cells

1992 Chloromethane plant expanded to 21,120 tons a year
Sodium ferro-cyanide plant of 100 tons a year commissioned

1993 Rights issue again
Second conversion to membrane cells with total annual capacity of 153,500 tons
Caustic flaking unit expanded to 53,000 tons a year
Caustic potash plant of 16,500 tons annual capacity and potassium carbonate plant of 15,000 tons annual capacity commissioned

1995 Acquisition of Dahej and start of phosphatic acid plant of 26,730 tons annual capacity
First certificate of IS/ISO 9002 1994

1996 Euro issue planned and abandoned after major road shows
Hydrogen peroxide plant of 11,000 tons annual capacity commissioned

1998 Caustic soda plant of 300 tons daily capacity at Dahej commissioned
Captive power plant of 90 MW capacity at Dahej commissioned

2001 Hydrogen peroxide capacity increased to 12,500 tons

2003 GACL enters corporate debt restructuring
ISO certificate upgraded to 9001 2000

2004 Rights issue post debt restructuring
Calcium chloride plant of 16,500 tons annual capacity commissioned at Dahej

2006 Caustic soda plant of 209,550 tons total annual capacity commissioned at Dahej
Poly-aluminium chloride plant of 24,000 tons annual capacity commissioned at Dahej
ISO 14001 2004 upgrade for Vadodara and Dahej
GACL exits debt restructuring

2007 Poly-aluminium chloride plant of 24,000 tons annual capacity commissioned at Vadodara

2008 First wind power project of 23.75 MW capacity commissioned

2009 Second wind power project of 39 MW capacity commissioned

2010 Third wind power project of 21 MW capacity commissioned

2011 Stable bleaching powder plant of 15,000 tons annual capacity commissioned at Dahej

2013 Fourth wind power project of 10.5 MW capacity commissioned

2014 Sodium chlorate plant of 20,000 tons annual capacity commissioned at Dahej
Further addition to wind power capacity of 21 MW

- 2015 Further addition to wind power capacity of 10.75 MW
- 2015 GACL-NALCO Alkalies and Chemicals registered
- Further addition to wind power capacity of 21 MW
- 2017 Caustic potash capacity expanded to 120 tons a day
- Second generation membrane cells being replaced by fifth and sixth generation cells

2

GACL Chairmen and Managing Directors

Chairman	Tenure	Managing Director	Tenure
B P Patel, IAS	1973	S J Coelho, IAS	1973-76
		Y V Pai, IAS	1976-77
J J Mehta	1973-81	H R Patankar, IAS	1977-81
		C B Giridhar, IAS	1981-83
		P V Swaminathan, IAS	1983-85
H R Patankar, IAS	1981-89	P K Das, IAS	1985-90
		P V Swaminathan, IAS	1990-90
		K C Mahapatra, IAS	1990-92
H K Khan, IAS	1989-93		
R Balakrishnan, IAS	1993-94		
S K Shelat, IAS	1994-95	K C Kapoor, IAS	1992-95
N D Padihar	1995-96		
Gitesh Shah	1996-97	S G Mankad, IAS	1995-97
		R N Das, IAS	1997-98
C R Patil	1997-2001	A K Luke, IAS	1998-2001
P K Laheri, IAS	2002-2004		
		P K Taneja, IAS	2001-06
S G Mankad, IAS	2004-07		
Manjula Subramaniam, IAS	2007-08		
D Rajgopalan, IAS	2008-10	G P Mohapatra, IAS	2006-11
A K Joti, IAS	2010-13	M S Dagur, IAS	2011-14
Varesh Sinha, IAS	2013-14	A Chakraborty, IAS	2014-14
G R Aloria, IAS	2014-15		
		A M Tiwari, IAS	2014-16
J N Singh, IAS	2015-	P K Gera, IAS	2016-

3

GACL Product Mix and Capacities

Product	Installed Annual Capacity, tons		
	Vadodara	Dahej	Total
Caustic soda lye	1,69,950	2,59,100	4,29,050
Caustic soda flakes, prills	53,000	1,65,000	2,18,000
Caustic potash lye (100%)	26,000	-	26,000
Caustic potash flakes	16,500	-	16,500
Chloromethanes	37,950	-	37,950
Potassium carbonate	13,200	-	13,200
Hydrogen peroxide (100%)	12,540	26,540	39,080
Phosphoric acid (85%)	-	26,730	26,730
Anhydrous aluminium chloride	10,800	22,150	32,950
Poly-aluminium chloride	-	45,000	45,000
Chlorinated paraffin	12,000	-	12,000
Stable bleaching powder	-	15,000	15,000
Sodium chlorate	-	19,000	19,000
Chlorine gas	1,69,956	2,29,563	3,99,519
Liquid chlorine	1,32,000	1,98,000	3,30,000
Hydrochloric acid (100%)	55,000	59,000	1,14,000
Sodium ferrocyanide	100	-	100
Sodium hypochloride	2,500	10,000	12,500
Compressed hydrogen gas (lakh nm ³)	271	779	1,050

Further updates coming your way soon