In May 1985, Dennis Laubscher, a crusty geologist who joined SRK from Zimbabwe as a leading expert in block-cave mining, had a telephone call from Fluor Daniel in South America. The Chilean state-owned mining corporation, Codelco (Corporación Nacional del Cobre de Chile, the national copper corporation of Chile), wanted him to look at the Andina Mine, about 50 kilometres northeast of Santiago. He was soon on a plane to South America.
My first task was to generate as many mass mining methods as I could for the mine,” Laubscher says. “I think I managed 23! Anyway, having developed the use of 3D physical models carved from Styrofoam in Zimbabwe, I got the two draftswomen to model the Andina Mine ore bodies to show why I thought the underground mine should be turned into an open pit — and they needed Oskar Steffen for that. That wasn’t my area.”

Steffen and his team arrived, and proposed transforming the operation into a humungous open-pit mine with a wall 1,900 metres high — deeper than any in the world. Even if the technical aspects had been in the ordinary range, such a move was a hard sell for political reasons.

“A general was still in charge of mine management in those days, and he told me it snowed too heavily at that elevation in the Andes for an open pit,” Laubscher laughs. “My reply was, ’Nonsense, I’ve worked at the open pit in Cassiar, northern B.C., where they mine all year round.’”

Regardless, it was SRK’s entrée into South America and the beginning of a lasting and incredibly close relationship between Codelco and Steffen.

The international mining industry aggressively moved into the southern cone in the 1980s, partly because permitting, environmental laws and endless cycles of consultation were making First World projects almost impossible to green-light. Most of South America, with its more laissez-faire regulatory culture, was viewed as fertile ground, albeit politically risky because of the threat of nationalisation. More than a decade after the late President Salvador Allende nationalised Chile’s mining market, it was reopened to international investment in 1982 and the country was again seen as a major opportunity.

Fernando Fuentes, a mining engineer who joined Codelco just after it was formed in 1976, said the dropping of market barriers to international firms also created a need for consultants. Until then, the government employed most of the professional staff involved in mine planning and operations; there was little need for consultants. In 1982, the secretary of Mining, José Piñera, passed the Constitutional Mining Law, which opened up the domestic market. Golder, Knight Piésold, Bechtel Corporation and Fluor Daniel soon arrived.

Fuentes and two of his colleagues saw an opportunity, and in early 1985, they formed NCL Ingeniería y Construcción S.A. in Santiago. That first year, they found themselves working with Steffen and SRK. As a result of Steffen’s initial trip, SRK received a number of contracts from Codelco, and NCL was involved in many of them. Richard Connelly, Dick Stacey, Chris Page, Cam Scott and other SRK specialists soon started arriving in Chile to do one contract after another.

Steffen was then asked to undertake a comprehensive review of what was, at the time, the world’s largest copper mine — Chuquicamata, about 1,650 kilometres north of Santiago, in the Atacama Desert. He led a team of eight to the massive operation that sat on a deposit that had been exploited for millennia.
THE ATACAMA IS THE DRIEST REGION ON THE PLANET, AN AUSTERE MARTIAN LANDSCAPE OF PAINTED HILLS, ARID PLAINS AND SALT FLATS.
PROJECT: Chuquicamata Open Pit

**CLIENT:** Codelco

**SCOPE:** The Chuquicamata open-pit mine in Chile’s Atacama Desert started operating in the early 1920s, setting the stage for it to become the world’s biggest open-pit copper mine. The initial waste stripping was carried out by the large shovel used in the earthmoving program for the Panama Canal. The large B-E stripping shovel was used at Chuquicamata to load waste material into train wagons for transport to dumping sites. This shovel is still on display in front of the mine offices.

The eminent geotechnical engineer Dr. Bruce Kennedy was a pioneer in monitoring — and setting standards for managing — slope instabilities at Chuquicamata. Laubscher and Dr. Oskar Steffen were invited to visit Chuquicamata in the mid-1980s to give their opinion on the stability of the slopes, having previously participated in the development of Codelco’s Andina operations. Following this visit, SRK worked with mine-planning

Owned and operated by the Chilean state enterprise, Codelco, Chuquicamata boasts the largest total production of copper in the world at ~30 million tonnes. After more than 90 years of mining, it is still the largest known copper resource.

Its historic importance to the Chilean economy was commemorated on the Chilean 500 Escudo bill.
staff in the early 1990s to develop alternative mining plans. The new procedures brought about a significant reduction in stripping requirements through slope angle increases.

In the mid-1990s, Professor Evert Hoek suggested that a geotechnical review board (GRB) be established in accordance with standard practices in large civil engineering projects. Chuquicamata’s management gave the go-ahead and the mining industry’s first GRB was set up. The original members of the GRB were Professor Hoek, Dr. Steffen and Dr. John Read. It was agreed that GRB membership span three to five years and that replacements be recruited by GRB members, with mine management approval. This process is now standard practice in the mining industry worldwide.

**OUTCOME:** SRK has been actively involved with the Chuquicamata operations. Technologies within the Chuquicamata and Codelco group have been continually updated, with external consultants participating as required. During the current conversion from open-pit to underground mining of the ore body, extensive investigations have been conducted to ensure a smooth production profile for the long-term underground operation.
The modern Chuquicamata Mine was enormous. Heap leach pads extended to the horizon and the huge rock dumps grew to heights of 100 metres and more. Scarred by desiccation cracks 100 millimetres wide and 1 metre deep, the tailings impoundments seemed equally boundless. A fine dust covered everything.

The mine was a mammoth conventional truck-and-shovel operation, with much of the crushed ore shunted by underground conveyors to the mill that produced both copper and molybdenum concentrates. For years, Chuquicamata had been the most prolific copper producer in Chile, until the Escondida Mine overtook it. The open-pit mine's productivity was declining, and Codelco was looking into ways of extending its life. One option was to go underground, and Jarek Jakubec was later brought in to consult on that issue as well.

Meanwhile, Stacey and Dave Ortlepp, “Mr. Rockburst,” who had joined SRK from Anglo American, continued investigating the problems at El Teniente. Legend has it that mining began there after Chile gained its independence in 1810. It ended up as a subsidiary of the Kennecott Copper Corporation until Allende nationalised the industry in 1971. Although large-scale mining of the ore body started in the early part of the 20th century, the rockbursts only began after the block-cave mining encountered more brittle rock in the late 1970s. Stacey and his team developed designs for better tunnel support. By the early 1990s, Rob Dorey and the Denver office were also working in South America through a contract with Fluor Daniel Chile. Dorey was retained to design and develop an innovative heap leach pad for the high-altitude Quebrada Blanca Mine, located about 240 kilometres southeast of Iquique (1,500 kilometres north of Santiago).

With the assistance of Chilean subcontractors, Dorey directed the field exploration, engineering design, operations planning, construction technical oversight and quality assurance.

Various SRK offices also began working together in Suriname for Billiton Maatschappy’s Onverdacht and Accaribo properties, where SRK designed post-mining reclamation plans. Dave Bentel said the aim was to strike a balance between the imperative to develop and the need to protect the environment and an age-old culture. In Venezuela, SRK UK was doing a feasibility study for increasing ore production at CVG Minerven’s Columbia Mine, reopening the Sosa Méndez Mine and providing multidisciplinary work to Monarch Resources’ Canaima and La Camorra gold mines. SRK produced guidelines for infill exploration, sampling, grade control and ore-reserve evaluation procedures. This led to more resource and mine-planning work for other clients in Venezuela, and McCracken, Evans, Potts and Armitage were regular visitors there in the early 1990s. In Brazil, SRK South Africa was working for Rio Tinto at the Rio Paracatu Mineração gold mine, and in Mexico, Canadian SRK consultants Page and Dan Charbonneau were involved with Exploraciones Eldorado and Minerales de Sotula, co-owners of La Colorado, a broad property of attractive deposits that had produced more than 1 million ounces of gold since the 18th century.

Everything suggested that SRK should have a much greater presence in South America and a far more serious commitment to the region, given the market it represented.
**PROJECT: Escondida Heap Leach Facility**

Escondida Mine, Atacama Desert, Antofagasta Region, Chile

**CLIENT:** Minera Escondida Limitada

**SCOPE:** In 1995, Minera Escondida Limitada retained SRK to perform the engineering design and construction quality assurance for a new copper heap leach facility. The design criteria included an ore loading rate of approximately 53,000 tonnes per day and a leaching rate of 15 litres per hour per square metre. This project was the first large-scale oxide leach project at a site that would become one of the world’s biggest copper producers.

SRK reviewed metallurgical, geotechnical and related data to assess the technical and economic viability of different design options for a 90-metre-high heap leach facility. Given the significant seismic risk, SRK analysed heap stability and the potential for earthquake-induced deformation. To minimise solution collection disruptions caused by slope displacements, SRK designed an internal inter-lift solution collection process.

SRK conducted site investigations to identify construction materials and characterise the foundation conditions for the leach pad, SX/EW plant, crushers and ponds. The company devised laboratory- and field-scale testing to evaluate the performance of components for the proposed liner and solution collection system.

SRK produced detailed engineering design plans for the four-phase construction of a 4-square-kilometre pad. It also prepared technical specifications and quality assurance procedures for construction, then monitored quality assurance during construction.

**OUTCOME:** The heap leach facilities operated successfully.

The heap leach concentrate is processed by electrowinning – an electroplating process that deposits the copper on large sheet cathodes, ready for re-manufacturing.
PROJECT: Los Sulfatos Exploration Tunnel
Near Los Bronces Mine, Andes Mountains, Chile

CLIENT: Anglo American Sur Exploration Division (Chile)

SCOPE: Upon exploring the area around the existing open pit, Anglo American Sur Exploration Division (Chile) identified a promising new deposit with underground mining potential. SRK was appointed to design a 4.5-metre-diameter, 8-kilometre-long tunnel to provide access to the potential ore body so that an exploration campaign could be initiated.

The deposit’s 3,500-metre elevation in the Andes presented significant construction challenges. Ventilation and health and safety issues had to be addressed during the excavation process. There was a risk of rockbursts in zones with more than 1,000 metres of rock overhead.

On top of the harsh terrain and extreme winter conditions, the mining boom had caused a shortage of key people and other logistical difficulties.

After conducting geological and geotechnical site investigations, and a thorough assessment of tunnel-design options, SRK recommended excavation with a double-shield tunnel boring machine (TBM). This was approved by Anglo American Sur Exploration Division (Chile), and SRK produced all the technical designs and specifications for the tunnel, evaluated bid documents from tunneling contractors, and provided management and site supervision services during construction.

OUTCOME: The tunnel was successfully completed on time — with a record 47 metres excavated in one day — and with an outstanding safety record. It was the first time a double-shield TBM had been used in the Chilean Andes.

above: New TBM at SELI’s plant in Italy before being disassembled for shipment to Chile.

right: Alejandro Palma, SRK’s general manager, Diego Gajardo, senior geotechnical engineer and Sergio Roman, senior geotechnical engineer, in front of the northeast entrance of the nearly completed tunnel.
Choosing Chile

“Establishing a Santiago office was Oskar’s brainchild in about 1993,” Allan Haines says. “Oskar and I were traveling there every few months and he said, ‘It makes sense to be here.’”

It also made sense to partner with NCL, as the two companies had grown increasingly close while working together over the previous seven years. They had complementary skill sets in mining, and Steffen, who had been a professional and business mentor to the firm and its principals, keenly wanted NCL to become part of SRK.

“We gained a lot of experience working with Oskar,” says Fuentes. “It was great, and we grew a lot over those years. So by the time we were talking about a partnership, we were about 25 or 30 people in Santiago, and my partners and I wanted to retain our identity. We were proud of what we did and what we had achieved, so we didn’t want to give up NCL.”

Although SRK wanted to merge with NCL and grow its own brand in South America, Fuentes and his partners insisted on autonomy within Chile. They agreed to a joint venture in which NCL continued providing its mining services within Chile while SRK provided other services in Chile, and elsewhere on the continent the companies operated together under the SRK banner.

Haines volunteered to run the Santiago office.

“I opened it in July 1994,” Haines says. “NCL transferred one of their mining engineers — a rock mechanics consultant — and two consultants from their environmental group. We appointed a receptionist/secretary. The five of us started Steffen, Robertson and Kirsten (South America) S.A. My Spanish was limited to what I knew from Western movies: Dos cervezas, por favor. I also knew how to say hola, but that was about it. I took two classes a week for six months until I felt comfortable enough to have my first Spanish conversation with anyone. Luckily the staff was bilingual.”

Maria Inés Vidal, one of the environmental specialists, said SRK’s arrival roughly coincided with the implementation of the country’s first meaningful environmental legislation and the establishment of proper permitting processes. “We did some of the first environmental studies in Chile for mining projects,” she says proudly.

“For me, to develop those was a great experience, but I had terrible trouble initially because I was a woman and nobody believed me. I’m not kidding. For meetings with clients, I used to ask Allan Haines to come with me, because nobody in the Chilean mining community could believe that a woman was doing this work.”

On one project, a particularly difficult environmental audit, she said, people at the mine would not even speak with her. It took a long time in South America, with its traditional machismo and conservative Catholic view of women, for gender barriers to fall; they came down only a little quicker in the rest of the global, male-dominated mining and engineering fraternities. There was also culture shock for the Chileans when they became part of SRK, she added. Employee ownership and the absence of a hierarchical organisational structure were novel concepts.

Initially, the SRK staff worked out of NCL’s office until a small office was found nearby. Most of the first contracts came from NCL as well; SRK offered geotechnical, environmental and groundwater services.

With the work that the U.K. and Denver offices were doing in Peru in 1993, Carlos Soldi, one of the principals of SVS Ingenieros in Lima, and a former classmate of Neal Rigby, suggested a partnership might be a good idea in that country. But the discussions with NCL to create a continental office in Santiago were already well underway by that point.
“They were not very keen on setting up a new unit in Lima,” Soldi says. “They preferred to have office space and work on a project-by-project basis with us.”

SRK had work on the go across the continent: Cam Scott from the Vancouver office moved down to Santiago for a few years to work on tailings; starting in 1996, Andy Barrett began making quarterly trips to Santiago to help with management and co-ordination.

By late 1997, Haines had grown the South American practice to roughly 45 people. Deb Lord, who had been working in Santiago for EHW of Australia, joined for a two-and-a-half-year stint before her husband got a job back home.

In July 1997, Haines hired Dermot Ross-Brown from Denver, ostensibly to run the geotechnical division.

Born in Jamaica to British parents who returned with him to the U.K. when he was five, Ross-Brown was an old Africa hand. After completing a master’s degree in soils and foundations, he worked at Ashanti Goldfields in Ghana, the richest mine in the world at the time and rumoured to be the legendary source of the ancient Egyptian pharaohs’ wealth. Located at Obuasi, just south of Kumasi, it was one of the world’s 10 largest major deposits — alluvial gold has been mined in the area for more than 2,000 years, and underground mining started in 1897.

Ross-Brown bumped into SRK regularly during his time in Africa. He valued the technical papers written by Steffen and others from the firm, and he respected their work. Four years after moving to Africa, Ross-Brown returned to London to do a PhD in rock mechanics at Imperial College. He joined Dames & Moore afterwards and consulted with them for five years before joining Science Applications International Corp. For the next 20 years, Ross-Brown worked primarily on classified projects connected to the nuclear industry and atomic weapons production.

Cam Scott first met Andy Robertson on the Thompson Creek project in Idaho, about six years before he joined SRK in 1986. He has remained with the company, working out of Vancouver, except for two years from mid-1996 through 1998 when he was based in Santiago. He had visited Chile in 1993, loved it and, as a result, became heavily involved in SRK’s burgeoning South American practice in the 1990s. “It was a very, very rewarding experience,” he remembers. “At the time, my friends were asking what the hell we were thinking. Why were we going down there? Yet it was absolutely the best thing that we did as a family. It was an incredible growth period and I still enjoy getting involved in projects there whenever I can.”

In 1997, Cam Scott began work on SRK’s closure plan for Minera Escondida Limitada. Their open-pit copper mine in Chile still had sufficient reserves for another 40 to 50 years of mining, but planning for closure early promised to improve closure quality and minimize closure expense.
By the time Ross-Brown arrived in Santiago, though, in September 1997, Haines had returned to South Africa. Fuentes was again doing double duty as general manager of NCL and the joint venture with SRK. Complicating his task, Haines had initiated the opening of a Peruvian office prior to his leaving.

“Let’s just say there was some confusion about how the office was going to be run,” Ross-Brown says. “That was exacerbated by a downturn in the markets. The copper price was very low … 85 cents a pound, hardly anybody had any chargeable work, and so we struggled.”

Still, all of the major consulting companies wanted an office in Santiago because Chile was producing at least one-third, perhaps half, of the world’s copper and the price would eventually rebound. But for the moment it was tough. International firms were clamouring for work, and the Chileans were beating them down on price.

“Everybody was working at cost,” Ross-Brown says. “I mean, that’s how I would describe it. Basically, we were all trying to retain our staff and break even. NCL was very supportive and introduced us to clients who eventually gave us work.”

About six months after he arrived, Ross-Brown was officially appointed the general manager. It was a very difficult period.

“There was no money in the bank one month,” says Sergio Orellana, the firm’s accountant. “The bank manager did not want to lend us more. Dermot and I delayed taking a salary those months. But we survived.”

Los Pelambres provided most of the work that saw the office through the roughest patch.

“Nobody thought the project would get the funding to start,” Ross-Brown says. “It was a very unusual kind of deal with a pair of Japanese consortia, and two of the companies involved — Japanese Nippon Mining & Metals and Mitsubishi Materials — were taking about half the concentrate output. Haines had done all the preliminary work. Los Pelambres turned out to be a very good client. We worked on their conveyer tunnel, which was about 11 kilometres, basically doing all the geological and geotechnical control. Later, we went on to do other work for them, including the design of their tailings dams.”

But opening the Peruvian office in May 1997 proved to be a mistake. Lionel Ocampo from the Santiago office was initially going to relocate to Lima as the general manager, but this did not happen. SRK hired a specialist from SVS Ingenieros in Lima, Aldo Brigneti, to lead the practice. He had worked with Dorey and was familiar with SRK.
“Initially, there was a lot of business development, a lot of sharing of new opportunities, working with the Cardiff and the Vancouver offices,” Brigneti says. “It was a very dynamic environment. I acquired a lot of technical experience and picked up business skills in terms of administration and financial analysis from working with SRK.”

The office, however, didn’t stand a chance in the depressed mining market at the end of the millennium — work dried up and the downturn lasted so long that NCL was forced to abandon its continental vision and partnership with SRK. It was still a relatively small consulting firm, and the investment in Peru drained it.

“We understood what happened,” says Barrett. “Everyone expected we would do well with the joint venture but the market turned in 1997 — SRK Chile had been through a bit of a leadership vacuum, and SRK Peru was hemorrhaging. We quite understood why they had lost their appetite for investment.”

SRK bought NCL out of SRK South America, but continued with the joint venture, SRK Chile. And in 2002, SRK closed the Peruvian office and re-established a casual relationship with SVS Ingenieros in Lima.

Work eventually picked up for SRK Chile as a result of its long-standing relationship with both Codelco — at El Teniente, El Salvador (an old Anaconda copper mine that was a combined open-pit and underground operation about 1,000 kilometres north of Santiago — the smallest and most costly of Codelco’s operations) and Codelco Norte — in the Chuquicamata and Radomiro Tomic mining areas.

“Oskar Steffen was responsible for it,” Ross-Brown says. “He was held in such high regard by the executives at Codelco. They brought him in to review their projects or anytime they wanted an independent review of their own division’s plans for the future. As a big bureaucracy, the Codelco board was often presented with projects that made sense for those involved, to keep everyone busy, but from a mining standpoint were not a good use of Codelco’s money.”

The office got so busy that Ross-Brown, to his regret, never found the time to learn Spanish. SRK moved out of the original office and into a larger, modern office across the street.

“There were some cultural challenges,” Ross-Brown acknowledges. “I was very lucky in that way. I picked very good people and persuaded them to join us and, after making the right introductions for a couple of weeks, they just took off.”

New recruits included Lyle Davis, who transferred from SRK North America; Luis-Fernando Contreras and Sandra Linero, who were recruited from Colombia; and Alejandro Palma, a geotechnical engineer who had done his master’s in Germany before returning to Chile where he had worked for a handful of companies before founding his own consulting firm.
Another recruit was a veteran South American prospector named George Even, who arrived to lead the geology team. His valise was stuffed with expertise in exploration, development, technical modeling and due diligence. Originally from San Diego, Even held a BSc in geology and economics from San Diego State University, and had worked in both underground and open-pit mines in Tucson for Newmont and Anaconda.

Even worked across the southwest, mostly searching for base metals, until 1982 when Freeport, the company he was with, opened an office in Santiago and he moved with his family from Tucson to South America. He found gold and opened a mine, before returning to the States in 1986 so that his children could get to know their relatives. For three years, Even applied his geotechnical skills for a San Diego firm doing slope-stability studies and site-investigation work. He returned to Santiago in 1989 to work as an independent consultant.

In July 2001, Ross-Brown telephoned. It coincided with Even wanting to return to a corporate environment. “I took a cut in pay to start at SRK,” he says, “but it proved to be very, very rewarding in many ways. There were 22 of us at that time. Our big project was a tailings dam facility and I was part of the geotechnical group on that.”

Even’s forte was exploration and mining geology, and he was qualified to report for banks, author technical reports and lead project teams.

“I still liked to get out in the field a lot,” Even says, though a lot of his time was spent mentoring.

But there were challenges. It took time to erase the residue of the Chilean patronage culture in which people expected work to be given to them rather than earning it. The system was a holdover from the government monopoly era.

“We needed the support from North America when we got the big tailings jobs. These projects really stretched our resources,” Ross-Brown says. “We also needed the leadership the people in North America were able to provide and we did a lot of joint projects. Our philosophy was, we have to offer the best people to our clients, and we would bring them from anywhere within SRK.”

Ross-Brown stayed until 2003. “My parents were not very well and couldn’t live on their own,” he says. “I was 63, I thought it was good to retire early and I could afford to do it. But the main consideration was to look after my parents. I was with them for seven years before they went. My dad was 100 and my mother was 93, so I’m very pleased that I did that.”

Before he left, Ross-Brown prepared Alejandro Palma as his successor.

Palma grew up in Chile and earned his master’s in civil engineering in Germany. He worked for a handful of companies doing geotechnical work, and joined SRK in November 2001. In April 2003, when he took over as general manager, there were 22 people.

Another major change occurred around that time — NCL decided to sell out of SRK Chile.

“SRK was a big international firm and we really didn’t see the sense in continuing,” says Fuentes, whose firm had grown to about 50 professionals and didn’t want to be any bigger.
“We had doubled in size and had grown a great deal in the relationship, but we did not want to be part of SRK and we did not want to do a broad range of work — we realised that we wanted to just do mining. We liked to work with SRK. We had a very good relationship with many of them — Neal Rigby, Chris Page, Cam Scott, Allan McCracken, Dick Stacey … and of course, Oskar Steffen. But the partnership was no longer a good fit. We sold out so they could carry on with their strategic development and we could focus on our practice.”

The move allowed SRK Chile to market SRK’s mining services and helped transform the office. The culture change that occurred under Palma’s leadership was also significant — he persuaded people to invest in themselves and successfully promoted the employee-ownership plan. It made all the difference. By the end of 2008, SRK Chile had 80 employees, 144 projects and more than 60 clients.

“It’s not SRK that makes it work. Yes, the name is there and the reputation facilitates and adds support, but it’s really the people and their attitude that produces success,” Palma says. “You have to have the confidence to say, ‘This is my company, and I can make the difference and invest in it.’ We had a good name, but we hadn’t really marketed SRK’s full range of skills in Chile. Once that changed, the office took off.”

“Our performance was going up and down in South America while our local leadership was provided by ex-pats,” Barrett says. “Local companies recognised that. As Oskar Steffen often said, we want to be seen as Chilean in Chile, Canadian in Canada and Russian in Russia. Not that we want to hide our global credentials, but we want to bring the best of both worlds, and certainly Alejandro coming into the general manager role in Chile was transformational in many ways, because he helped crystallise our thinking about that issue.”

**PROFILE: Marco Aurélio Nascimento**

Marco Aurélio Perez do Nascimento started his career in the 1970s, working as a mining technician in mine planning for large iron ore projects. During the 1980s, he worked as an engineer in Paulo Abib Engenharia, a leading consulting company in the mineral industry, continuing with mine planning but beginning to work with geostatistical techniques and developing computational routines. During the 1990s, he created Geopit, a set of computational routines for use in mine planning, with an emphasis on blending control. In 2000, he joined Gemcom Software to work as a consultant in mine planning. In 2005, he became a founding partner of SRK Brazil; in 2006, he became the president of SRK Brazil, which quickly grew to more than a dozen people. However, in 2008, Nascimento decided to move to the Fortescue Metals Group (Australia) to gain international experience and work in developing Geopit for strip mining. “I was very sorry to leave SRK,” he says. “I very much liked the environment and the corporate culture.”

After he became an Australian citizen, Nascimento returned to Brazil in 2012 to continue his dedicated work with Geopit and act as a consultant on projects in both countries. He is working with SRK Brazil again, as technical director, and continues to work on the development of Geopit.

This image shows a sequence of surfaces modeled with Geopit. The software allows control of blending, strip ratio and surface restrictions on mining. It also helps reconcile the mining plan with actual field operations.

Geopit is used by Vale Iron Ore and Fertilizers, Votorantim Cements, Holcim Cements, Unamgen Iron Ore, AMEC Consultancy, and FMG Australia, among others.
PROFILE: Alejo Sfriso

A civil engineering graduate from the University of Buenos Aires, Alejo Sfriso has 20 years of geotechnical experience in the construction and mining industries. He has participated in over three thousand geotechnical investigations for civil and infrastructure projects, including conducting and interpreting geological surface investigations.

Sfriso has worked in tunneling and underground projects since 1998 and is an expert in underground construction procedures and the application of numerical methods to geotechnical design and analysis. He has published more than 40 papers and continues to impart his knowledge through professorial roles in soil mechanics, geology and geotechnical engineering at the universities of Buenos Aires and La Plata.

Having co-founded the SRK Argentina practice, Sfriso is now a principal engineer in the Buenos Aires office. He attributes the success of the practice to the SRK philosophy. “People see themselves not just as employees but as business partners,” he says “and the ‘we’re all in it together’ concept has really taken hold.”

“We had always believed strongly in investing in local experts who embraced the corporate values and added to the international skill set,” says Barrett. “Adding local leadership gave us access to networks and facilitated communication in a profound way. We have applied those lessons elsewhere.”

SRK Chile was building tailings impoundments for Antofagasta Minerals, conducting construction inspections for Anglo American Tunnel Sur, overseeing the design and construction of a major TBM Chilean tunneling project and deriving resource estimates for a host of clients. About 30 percent of the office’s work involved geotechnics. Other projects included designing waste dumps and carrying out geotechnical site investigations for mine infrastructure, pit slopes and underground excavations.

“We grew our skills, adding hydrogeology services to deal with water supply, management and modeling, and later also added our own mining engineering team,” adds Palma.
South American Expansion

The recovery of the international mining market spurred growth across the continent over the next decade. SRK Consultores do Brasil Ltda was launched in 2005 and SRK Argentina in 2009.

In Brazil, SRK recruited Beck Nader and Marco Aurélio Perez do Nascimento, and opened an office in Belo Horizonte in 2005. Nader had been leading Gemcom in South America; Nascimento specialised in computer applications for resource and reserve evaluation, mine design and planning. Under SRK’s banner, the office grew quickly, with supporting work from Denver and Vancouver, as North American mining companies aggressively moved into the Amazon.

One of the big early projects involved the Corumba Iron Ore Project, a US$800 million open pit in western Brazil near the border with Bolivia. The ore was to be partially processed onsite before moving by barge along the Paraguay and Paraná Rivers. SRK reviewed the reserves, mining methods and costs of the proposed mine. After the review, it completed an independent technical study required by markets to protect against fraud. The work had become a staple of SRK’s business and its financial services.

In Argentina, VS Consultores, which was owned by Alejo Sfriso and Alejandro Verri, merged with SRK in 2009. During the mining downturn, Sfriso and Verri had flown to Chile to find work and had developed a close relationship with Alejandro Palma. They had sub-consulted for SRK Chile from 2002 until the recovery of the industry in Argentina encouraged them to join SRK.

With continued support and work from SRK Chile, the office has been successful, though the Argentine mining industry remains small. In 2011, they opened an office in Mendoza, on the eastern side of the Andes near the Chilean border, about five hours’ drive from Santiago. That office now has 10 staff.

“We used to be a small company for 10 years with two partners, three employees,” Sfriso says. “We are now 40 — most of our employees are partners or shareholders and most are under 27 — very young people who embrace SRK’s philosophy. That augurs well for the future.”

“Both of us continue to work at the university — it’s a funny connection we have with the founders of SRK, who also maintained their academic connections,” Sfriso adds. “It’s like a vice, you need to do it. It keeps you on the cutting edge of your practice. And in a country like Argentina, which has still a small mining sector, and maybe across South America, there is prestige with being associated with the university; it is a huge asset.”

In 2011, SRK also finally established a formal relationship with Peru’s SVS Ingenieros — Rigby’s old pals Antonio Samaniego and Carlos Soldi. The Peruvian merger coupled SVS’s strong capabilities in tailings, environment and rock mechanics with SRK’s mining and geology skills. Mining investment activity in the country was expected to grow by some $US4 billion a year over the coming half decade.

SVS had a staff of about 120 engineers and scientists offering services that included the design of mine tailings and waste facilities, mine services and field construction supervision. About 90 percent of their work is in Peru with the rest in Mexico, Ecuador, Bolivia and Argentina.