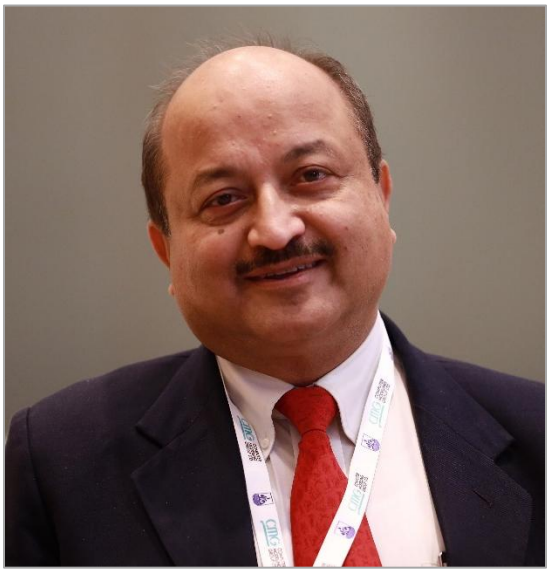
‘I always believed in the power of teamwork and in emphasizing the three H characteristics – Honest, Humble, and Humane’

- *A memoir by Debashish Purkayastha*



Debashish Purkayastha, former Executive Director, ONGC, is a distinguished Explorationist, known for his exemplary academic achievements and deep expertise in Geophysics. He joined ONGC in 1982, after completing his M.Tech. in Applied Geophysics from the University of Roorkee (now IIT Roorkee) in 1981, graduating with First Rank and receiving the Gold Medal. He was also honored with the Chancellor’s Gold Medal for being the Best Postgraduate Science Student of the university.

Over the course of his career in ONGC, Debashish successfully handled a wide spectrum of responsibilities—from data acquisition and interpretation in field operations to strategic planning and execution of short-, medium-, and long-term initiatives at the corporate level, including bidding processes and forming alliances. He possesses a strong command of all types of geo-scientific data related to exploration and exploitation, both in regional and local geological contexts. His solid understanding of geological processes, combined with practical knowledge in log analysis and reservoir performance, enabled him to effectively lead a multidisciplinary team in ONGC's E&D Directorate for nearly a decade, fostering seamless collaboration. Additionally, he has extensive experience in evaluating both domestic and international acreages from technical and commercial standpoints.

He possesses a comprehensive understanding of various fiscal regimes in the Exploration & Production (E&P) sector, including Production Sharing Contracts (PSCs), Revenue Sharing Contracts (RSCs), and Technical Service Contracts (TSCs). His expertise extends to the nuances of contractual obligations, commercial terms, techno-economic evaluations, and portfolio analysis. He has also been actively involved in business development through strategic alliances under diverse frameworks.

Debashish served as the President of SPG India from 2017 to 2019, during which he successfully led the SPG International Conference held in Jaipur in 2017. Under his leadership, SPG India organized several impactful workshops in collaboration with global geoscience bodies like SEG and EAGE, addressing critical challenges such as Fold Belt Imaging and Sub-basalt Imaging.

Following his superannuation in 2019, he continued to contribute his deep industry knowledge in an advisory role to the Director (Exploration), ONGC and still disseminates knowledge to young executives of various companies on E&P Regulations & Processes through workshops.

- *Rajeev Tandon*

A few months ago, I received a call from SPG informing me of their intention to publish my memoir in GEOHORIZONS. I was truly overwhelmed by this offer and felt incredibly fortunate and privileged to receive such recognition.

In the initial days of contemplation, I found myself scratching my near-bald head, struggling to decide what to write about and which part of my life to focus on. In my search for clarity, I looked up the precise meaning of ‘memoir,’ and the most fitting phrase I came across was ‘a collection of memories.’ After much introspection, I realized that every stage of my life has taught me something valuable, and each one holds interesting and memorable anecdotes worth sharing. Memories, after all, are a collection of moments intertwined with the people who shaped them. So, as I

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share my experiences, with particular reference to my journey of **Understanding the Earth**, I also wish to pay homage and respect to those who mattered along the way. At the outset, I must apologize to anyone I may have inadvertently overlooked due to sheer oversight or my fading memory.

First Gurus – Parents and guardians

I was born into a middle-class family, one that bore the scars of the partition of India and faced the harsh realities in its aftermath. In those challenging circumstances, my first teachers were my parents. Despite their own limitations, they made every possible effort to provide me with the best education and instilled in me the virtues that have guided me through more than six and a half decades of my life.

My belief – Fate

Personally, I am a strong believer in the concept of destiny, a belief that has been strengthened by several experiences in my life, a few of which I will share at appropriate moments. These examples will highlight the undeniable truth that, no matter what one does, the *inevitable* will eventually unfold.

What is destined to happen, will ….

Tryst with Geoscience: The beginning

Born in the late fifties in the picturesque town of Shillong, which was then the capital of the state of Assam (and later became the capital of Meghalaya), I had little awareness of the field of geoscience during my early years.

Though I was an above-average student and could have easily pursued an engineering degree after my intermediate studies, circumstances led me to make a different choice. Due to my father's ill health, and following his advice, I decided to complete my graduation in science. I had a strong passion for Mathematics and Physics, and as a result, I graduated with Honours in Physics. Following this, I logically sought to pursue my passion further by securing admission to IIT Kanpur to pursue a master's degree.

However, at that point in time, the situation in the country was such that a master's degree in physics was not considered sufficient to secure a job easily, unless one had a Ph.D. As advised by my mentors in college, and inspired by some of my seniors, I began to explore alternative options.

I vividly recall an important event in my life that catapulted me into the geoscience ecosystem, shaping my career and future in ways I could not have imagined at the time. As I mentioned earlier, as an alternate option for the Master's in Physics program at IIT Kanpur, I had also applied for the Applied Geophysics course at the University of Roorkee (UOR) following the footsteps of a few seniors of mine from the college. However, I had not received any communication from the University in this regard.

Having already paid the initial acceptance fee of Rs 100 at IIT Kanpur, I, along with my elder cousin, decided to visit Roorkee to check on the status of my application. When we landed at Roorkee Railway Station in the early evening, I was taken aback by the dim lights and the rural ambience, which made me very sceptical about the place. I even suggested to my cousin that we should head back to Kanpur. However, my cousin encouraged me to stay overnight and decide after getting a feel of the place.

The next morning, we ventured out into the University campus and were immediately awestricken by the grandeur of the University's sprawling main building. It was truly love at first sight. All the doubts I had the previous evening vanished in an instant. As we made our way through the campus, we eventually arrived at the Department of Geology and Geophysics (later renamed the Department of Earth Sciences), where, to my pleasant surprise, I found my name on the notice board as a selected candidate for the three-year M. Tech course in Applied Geophysics.

Though I felt a sense of happiness, I was still uncertain about what to do, as I had very little knowledge about the subject. With this uncertainty in mind, I sought advice from Professor V. K. Gaur, a senior faculty member in the Department and a renowned Geophysicist, who later became the Director of NGRI and Secretary of the Ministry of Ocean Development. I candidly explained my dilemma to him, torn between Physics and Applied Geophysics. He asked me whether my priority was to secure a job or to pursue research. Without hesitation, I expressed my requirement for a job, given my family's circumstances. Professor Gaur

assured me that, should I choose Geophysics, I would have a job within six months of passing out—a promise that, remarkably, came true, even though by then he had moved on from the Department.

His brief but insightful discourse on Geophysics as a subject was so enriching and motivating that it convinced me to join the course, setting me on the path into the realm of Earth Science.

Coping with Geoscience – University days

In 1978, when I started attending classes to unravel the mysteries of the Earth—subject matter that was completely unfamiliar to me at the time—we were initially exposed to subjects like structural geology, stratigraphic sequence, geological time scale, mineralogy, crystallography, sedimentology, paleontology, and more. To be honest, it was incredibly difficult to comprehend and internalize these topics, as they required a lot of memorizations. We resorted to creating slang anagrams to help us recall the information when needed.

Among all these subjects, the one that sparked genuine interest in me from the very beginning was structural geology, a subject taught by Professor Arun K. Awasthi. He had a distinctive teaching style, giving us surprise tests every second day, with negative marking. Scoring a cumulative zero by the end of the semester in his class was considered an achievement. Looking back, I deeply respect that great teacher, whose teaching helped shape my career in oil and gas exploration.

As the semesters went by, the applied aspects of the subject gradually became clearer. Our learning was enriched through various course contents and field excursions, which involved geological traverses across sedimentary and metamorphic terrains, gravity-magnetic traverses across mines, and exposure to seismic surveys for oil and gas exploration. These experiences provided a comprehensive understanding of earth sciences. By the time I completed my dissertation in 1981, I had become fully immersed and deeply passionate about Geoscience in its entirety.

In this context, I would be remiss if I did not mention a few teachers who played a pivotal role in nurturing my love for Geoscience. Professors K.N. Khattri and Ramesh Chander, both former ONGCians, taught us seismic exploration, presenting it as a perfect blend of signal processing theory combined with the raw ruggedness and logistical constraints of field implementation-an aspect which was of immense help during my professional assignments.

One teacher who made an indelible mark on my memory and significantly shaped my knowledge base was Professor P S Moharir, an IIT graduate in Electrical Engineering. In addition to teaching us the basics of signal processing, he expanded our horizons by introducing us to subjects like geo-hydrology and mineral economics. He also exposed us to geo-statistical analysis, including scatter diagrams and principal component analysis, which laid the foundation for the development of algorithms that led to software advancements in pattern recognition (which later became precursors to AI and ML), neural networks, AVO analysis, and inversion techniques. I will always remain immensely grateful to this great soul, who is no longer with us.

There are many more mentors who have influenced my training and life at various stages, and I deeply respect them all. But above all, I consider myself extremely fortunate to be an alumnus of the prestigious University of Roorkee (now IIT Roorkee) and of the Earth Sciences Department in particular.

Tryst with geoscience continues in ONGC

After graduating from the University of Roorkee, I joined ONGC as a Graduate Trainee in the discipline named Geophysics (Surface). My entry into ONGC, however, comes with an interesting anecdote, spiced with a touch of destiny.

The story dates to October 1981, shortly after I completed my master's and had started applying for jobs at various places. I had returned home to Shillong for the Durga Pujas, having missed the celebrations in the previous years. At the time, my sister-in-law, who was expecting her first child, was staying with her parents in Digboi, the birthplace of oil exploration in India. My brother decided to visit Digboi during the Pujas to be with his wife, and I joined them.

We had a wonderful time during the Pujas, but on the 14th of October, 1981, I received a telegram from my father in Shillong. The telegram, dated October 10th,

informed me that the admit card for the ONGC written test had arrived, with the examination scheduled for October 18th at Delhi Public School, R.K. Puram, New Delhi. At that time, we did not have the means to communicate via phone, and receiving a telegram that took four days to reach me was a bit of a shock. I was stranded in Digboi and, given the logistics, it was impossible to reach Delhi on time, especially since I would have had to go back to Shillong, collect the admit card, and then travel to Delhi. Traveling by air was beyond our means, so flying to Delhi was unthinkable. Faced with the looming uncertainty of missing this job opportunity, I immediately sent a telegram to my father in Shillong, asking him to send someone with my admit card to Gauhati (now Guwahati) the next morning. I hoped against all odds that the telegram would reach him on time.

I then took a night bus from Digboi and arrived in Gauhati early the next morning, still unsure whether I would be able to make it to Delhi. To my immense relief, around 10 a.m., a cousin of mine arrived from Shillong with my admit card. It turned out that my telegram had reached my father within a few hours, compared to the four days it had taken to reach me, and he was able to coordinate with my cousin to send him by the first bus leaving Shillong at 6 a.m. With this timely turn of destiny, I was able to travel that same day from Gauhati to Delhi, under a pseudo-name, and reached on time to appear for the entrance examination.

After successfully completing the entrance exam and an interview in December, I was selected for ONGC. I went on to serve the organization for thirty-seven years and continued my association even after retirement, in the capacity of an Advisor. I strongly believe in the phrase often referred to in ONGC parlance: "Once an ONGCian, always an ONGCian."

Journey in ONGC, Kolkata – The field party

I joined ONGC on March 22, 1982, in the Geoscience Division in Calcutta (now Kolkata) along with fourteen more. On the very same day, all fifteen of us received orders to proceed to field camps. For me, it was GP-1, stationed at a village called Borsul, near the town of Burdwan.

At that time, many of us, including myself, did not have enough money with us and had to approach the authorities for financial support. After a lot of deliberation among the senior officials, we were informed that normally, travel allowances (TA) would be provided for field duties, but since we were still on probation, we were not eligible for those. Instead, the alternative offered was a pay advance. We had joined the service at a basic pay of Rs 820 per month, so the competent authority sanctioned an advance of Rs 820 for one month's pay, but with the condition that someone from ONGC would provide a security guarantee for the advance.

The problem was, none of us were known to anyone in the office at that point, and we were at a loss, not knowing who would vouch for us. But as fate would have it, a good Samaritan in the form of Mr. D. P. Sinha, a renowned geophysicist who was later to specialize in processing at GEOPIC/SPIC, came to our rescue and kindly agreed to provide the required guarantee for all fifteen of us. This gesture allowed us to secure the pay advance and in the process, we got the first glimpse of bondage and camaraderie amongst ONGCians besides a glimpse into the personnel, administrative, and financial workings of the organization.

The very next day, with a holdall and a trunk, I boarded the Burdwan Local at Sealdah and, as advised, alighted at a station called Shaktigarh, which was famous for its delicious sweet, Langcha. From there, I took a rickshaw to Borsul, where Geophysical Party No. 1 was camping. Upon arrival, I met Mr. K. J. M. Rao, the Party Chief, whom I still remember as a thorough and polished gentleman and an excellent manager. Since I had joined midway through the field season, I was asked to share a Swiss cottage tent with a surveyor named Mr. B. C. Chakrabarty, a kind and fairly aged person who gave me my initial lessons on the intricacies of field operations and nitty-gritty of camp life. I was also fortunate to have Mr. Himadri Ghosh, a geophysicist, as a mentor during those early days, as I was inducted into the common mess run by Mr. Chakrabarty and Mr. Ghosh.

In terms of seismic operations, I clearly remember that the party was conducting a 2D survey, possibly 12-fold and 24 channels, using a DFS-IV recording unit with a 50 m group/shot interval and dynamite as the energy source, placed just below the weathered layer for effective signal transmission. I was sent to the field the

very next day and, as was the practice at the time, I was assigned to supervise the geophone layouts, which meant I would hardly get a chance to observe the recording unit during operation. So, most of the time, I was with the contingent workers who were on the muster roll, working for a meager daily wage, despite many of them being fairly well-educated.

Interacting with these workers gave me valuable insight into the unemployment, poverty, and financial hardships they faced. I learned that, despite having worked for many years, even decades, in the field and mastering a significant amount of skill, they still continued to work on the muster roll. Being fresh out of university and inexperienced, I was unaware that beneath the surface, there was an undercurrent of unrest and frustration among these workers, which was soon about to come to a head.

In this context, it would be fitting to share a truly eye-opening incident. To provide some perspective, Borsul was a developed village with water supply connections, one or two of which catered to our camp. On the morning after I had joined the camp, I was heading toward one of those water taps with a bucket to collect water for bathing when I suddenly heard voices calling me back. Initially, I thought I had transgressed into a prohibited area. However, when I returned, I was informed that, as an officer, I was not supposed to fetch water on my own. Workers had been deputed in the camp to do such tasks for us. As a 23-year-old, I felt elated and proud of my newfound status as an officer and may have even developed into a sense of snobbery. Fortunately, my exposure to the ground realities came very quickly in the days that followed. A strike was called by the workers, demanding permanency in their appointments, among other things, which meant there was no one left to cater to our "officer" ego.

As a result, rosters were formed from among the ONGC officers/officials, to guard the camp, including during night shifts. With some free time on my hands, I took the opportunity to rigorously go through various technical manuals, especially the one for the DFS-IV recording unit, which allowed me to participate effectively in the technical discussions conducted periodically by our Party Chief.

Operating instrument in Field Party

There was a nearby jute mill, and the workers' union there also supported the striking ONGC contingent workers. One day, our Party Chief called me and another junior executive and asked us to approach the union leaders of the jute mill. I was initially surprised, wondering why the two of us were chosen for this assignment. Later, I realized that we had been selected because we were Bengalis, and the Party Chief, with his experience, knew that sometimes a shared language—especially your own mother tongue—can make discussions more amicable and effective. At this point, I am reminded of a well-known quote by Nelson Mandela: "If you talk to a man in a language he understands, that goes to his head. If you talk to him in his own language, that goes to his heart." This quote highlights the power of communicating in someone's native language to establish a deeper connection. I later experienced the truth of this when I was in Rajasthan, which I will narrate later.

Coming back to the meeting with the Jute Mill union leaders, it was only natural that we were very apprehensive and a bit scared about the whole situation. At the time, the Communist Party of India (Marxist), or CPM, was the ruling party, and the unions they supported were very powerful. So, we walked into the union office with a lot of skepticism and trepidation. However, to our surprise, the union leaders received us with warmth and respect, far beyond what we had anticipated. The conversation quickly turned cordial, and we struck a good relationship with them that continued even after the meeting.

It seemed that they recognized our position as young university pass-outs, holding positions at the lowest rung of the hierarchy. They emphasized that their strike was not directed at us personally or at the ONGC personnel but rather was a pressure tactic aimed at the management. They had no animosity toward us and, in fact, appreciated the fact that we had taken the time to come and meet them. The strike lasted for over two months, only being called off after continuous efforts by the ONGC management and intervention from office of the then state Chief Minister.

The experience of being surrounded in the camp for weeks with harsh slogans and chants was a tough but effective baptism early in life. It gave me a deep understanding of the critical importance of man-management, especially in such high-pressure and tense field operations. This was a lesson in leadership and diplomacy that I would carry with me throughout my career, learning that even in difficult situations, communication, empathy, and mutual respect can go a long way.

Induction training – Dehradun

After returning to Kolkata, we were sent for a three-month training program at the Training Division at KDMIPE, Dehradun, which was an earlier incarnation of what would later become the ONGC Academy. This was a defining chapter of our journey, as it brought us together with our entire batch of geophysics graduates, half of whom had joined at the Baroda office, as well as our Graduate Trainee (GT) mates from other disciplines such as mechanical engineering, electrical and telecommunications (E&T), finance, and more.

The camaraderie formed during this time was invaluable, as we not only strengthened our professional relationships but also built lasting personal connections with colleagues from different fields.

Challenging experiences in Tripura

In November 1982, after completing my training, I was assigned to GP-31, a Soviet-Indian Party, and posted to Tripura. One morning, I boarded a flight from Kolkata and landed in Agartala, where I reported for duty to the Party Manager, Mr. A.C. Bagchi, at the ONGC Colony camp in Badarghat. I was promptly instructed to head to the advanced or partial camp at Teliamura, about 50 kilometers from Agartala.

It is important to note that the Soviet-Indian Party consisted of a Russian Party Chief and an ONGC Party Manager. Both Russian and ONGC executives worked together in the field, operating the seismic recording unit and supervising the geophone lay-outs. Language interpreters were assigned to facilitate communication.

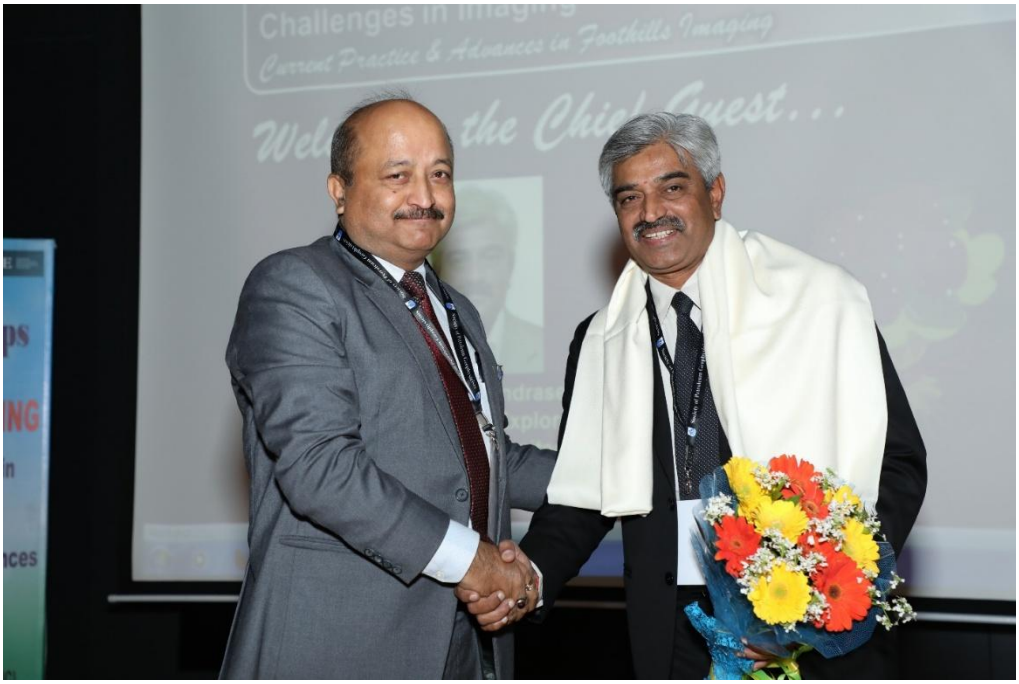
Working with the Soviet team was a valuable experience, particularly in understanding how to ensure the quality of data at the acquisition stage. If I recall correctly, we were acquiring 2D seismic data over the exposed Baramura Anticline, including the concealed Agartala Dome under investigation (TR-7). The data acquisition parameters involved end-on 48 channels

and 24-fold coverage using the DFS-V unit, along with I/O devices like synchrophones to detonate dynamite sources placed below the weathered zone through shot holes (the drilling of which was outsourced).

To ensure high-quality data in the challenging, rugged terrain, the Party, under the technical supervision of Soviet experts, implemented several key measures. These included crooked line shooting, with bunched geophones, moving along streamlets into the hills, and reversing the spread when crossing the central highs and cliffs. Adequate offset and recovery shots were taken, and the "shooting through the spread" technique was employed to ensure full-fold coverage of the subsurface. Special attention was also given to static corrections, with separate crews conducting uphole surveys every 500 to 1000 m along the profile, depending on the need.

The observer at the recording unit was extremely meticulous, ensuring that no channels with even minor resistivity variations were recorded, let alone dead channels. They coordinated closely with line supervisors to implement all possible corrective actions. The data acquired was eventually processed in Moscow, and the resulting quality of imaging was simply outstanding.

As mentioned earlier, the survey area posed significant logistical challenges. As a result, the seismic recording unit, along with all its accessories, cables, and geophones, had to be carried by workers. Cables and geophones, once spread out and set up in working condition, were left overnight in the field. However, defective equipment, including the seismic unit and batteries, were brought back to the camp for repair or recharging. Many nights, we had to stay back in the field, using abandoned bamboo huts—constructed by the locals for jhum cultivation—as makeshift shelters. The workers who stayed behind with us would cook food, and we would drink water from bamboo cut at the nodes, which served as temporary glasses to quench our thirst. It was a rare and memorable experience that I deeply cherish.



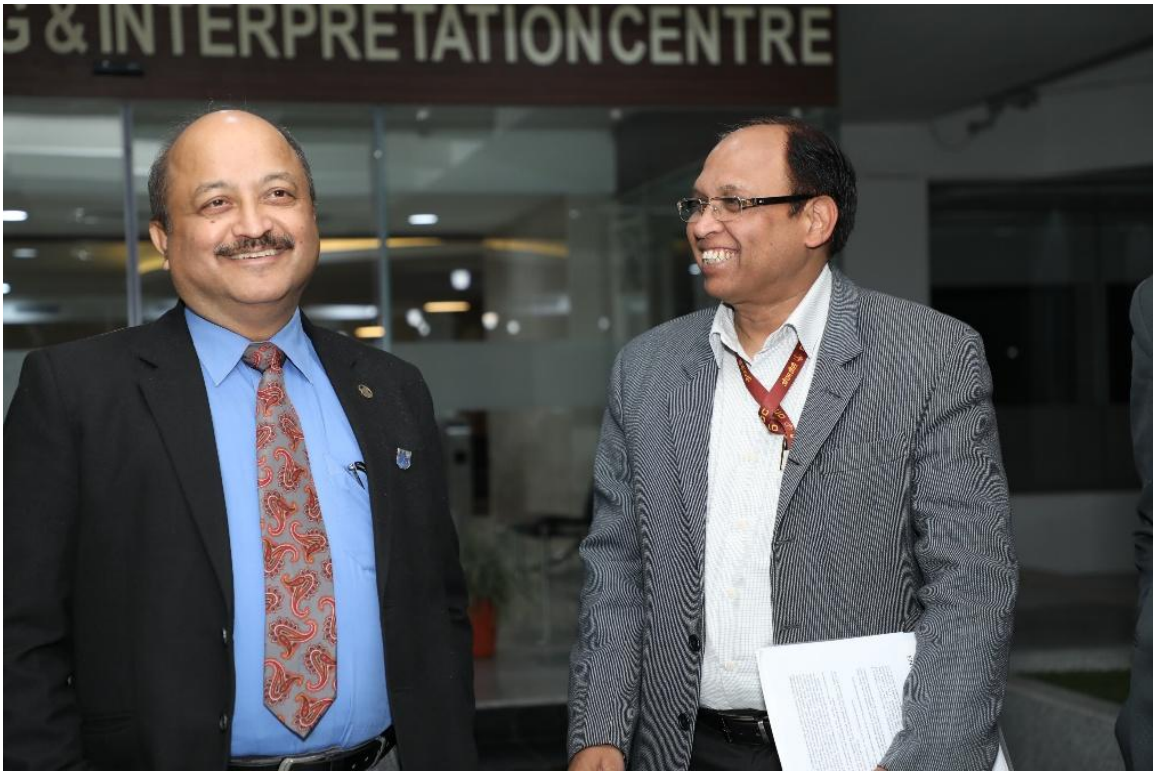
Welcoming Dr. P. Chandrasekaran, Director E&D,OIL at SPG workshop at Dehradun

Another frightening personal experience occurred when I got trapped in quicksand. I was sinking rapidly when one of the workers threw me a broken branch of a tree, allowing me to cling to it for support and gradually pull myself out of the mud. I was incredibly grateful to both the Almighty and my co-workers for saving my life. After escaping, I noticed my trousers were soaked in blood from leeches that had attached to my legs. We managed to get rid of them by applying salt.

While technical quality assurance and logistical challenges were critical, it is also important to address the human aspect of data acquisition. In this regard, I would like to share two incidents that were particularly valuable learning experiences for me.

It is worth noting that the Workers' Union in Tripura, a CPM-ruled state at the time, was as well-organized and effective as their counterparts in West Bengal, as I had already experienced during the previous field season. Contingent workers, under muster roll, were recruited through the state government's employment exchanges. Due to the severe unemployment situation at the time, educated but relatively fragile workers were hired at a meager daily wage of Rs. 11.40 per day, in place of the tough, unskilled labor force that was ideally needed for the job.

A particularly logistically challenging line was being shot across the Baramura. Following the standard procedure, workers' attendance was taken at the camp, and trucks transported them to the closest point on the profile. From there, the workers were tasked with spreading or lifting cables and geophones as required, then crossing the Baramura to be picked up from the opposite side of the anticline. However, during the actual fieldwork, it became apparent that the number of workers carrying out the tasks and crossing over was significantly lower than the number reported for attendance.



Sharing lighter mood with then Chief E&D Dte, Shri. R. K. Srivastava during SPG workshop

Upon investigation, we discovered that many workers who had alighted from the trucks did not proceed to the profile as expected. Instead, they returned to the camp in the trucks, leaving the work to be carried out by the dedicated and diligent workers who were willing to stay on the job. This caused a significant undercurrent of frustration and discontent among the workers, as the burden was falling disproportionately on a few.

The partial camp in-charge called me urgently to address the situation and resolve the issue as soon as possible, in order to ensure the completion of the profile on schedule.

I took on this challenging assignment with a strong sense of determination, eager to complete the task successfully. From an early age, I have believed in inclusivity and making sure to bring everyone along. As a result, I had built good rapport not only with my peers but also with the workers. The next day, I gathered all the workers, along with their self-appointed leaders, and discussed the assignment thoroughly. Everyone acknowledged that the job at hand was logistically extremely difficult.

I assessed that I could complete the toughest part of the profile in the next three days if I could get assistance from one-third of the workforce each day. Understanding their difficulties, I emphasized the urgency of completing the task on time. I came up with an innovative offer: I suggested that the workers divide themselves into three sub-groups, with each group sending one-third of its members to the field each day while the other two-thirds stayed back in the camp. I assured them that they would receive compensation for all three days, even if they only worked for one day.

I also informed them that the muster roll attendance would be taken by me in a very remote village along the profile, and I would provide the day's instructions there. However, I warned them that if anyone was absent for all three days, they would be marked absent for all three days. The proposal was agreed upon by everyone, including the so-called leaders, and we went ahead with the plan. We successfully completed the task in three days, although it required me to traverse about thirty kilometers each day. Both I and my co-workers were satisfied with the results.

However, an anti-climax came when I went through the muster roll to mark attendance. I found that one person, a self-proclaimed leader, was absent for all three days. As per the agreement, I marked him absent for three days, which meant he would lose around Rs. 33 in wages. This person became very vocal, threatening me and shouting outside my tent. I called him and his fellow leaders to discuss the matter. I asked them if they were working under this person and if he had received wages for the work done by others. Naturally, everyone supported my position.

The person then became very apologetic and started pleading, citing his poverty and begging for the three days of attendance. Although I sympathized with him, I decided to pay him his compensation from my own pocket on humanitarian grounds, but I reiterated that I would not mark his presence. This act helped to turn the situation around, and he later became a strong support for me in the days to come. This experience in man-management remains one I deeply cherish and has influenced my career significantly.

Another smaller, yet significant, incident occurred due to a similar logistical issue. One of my colleagues, by oversight, failed to gather all the workers and returned to camp short of five or six people. I was unaware of this situation since I was in the camp that day. Around 9:30 pm that night, a contingent driver and a few workers came to report the incident to me. I realized that if we didn't take corrective action, it could escalate into a labor dispute the following morning.

I immediately acted. Along with the driver—an ex-army person, disciplined and dependable—and two or three workers with high-powered torches, we set out on a search operation in the middle of the night. We eventually found the missing workers sleeping in a tribal village near the profile. We safely brought them back to camp well past midnight, thus averting a potential crisis.

Exploring the Thar desert, Jodhpur

In July 1983, my next posting took me to the Geoscience Division in Jodhpur, where I spent nearly a decade Although I had visited Rajasthan before this was my first footstep on the western side of the Aravallis. During this time, I got married and was blessed with our elder son.

I joined the Geoscience Division Office, which was located at the Suresh Kothi, Rai Ka Bagh Palace, an old heritage building that stood as a testament to the royal lineage of the region. The senior officers in the office included Mr. N. N. Rao, deputy superintending geophysicist and officer-in-charge, and Mr. P. A. N. Raju, senior geophysicist. The office headquarters were in Jodhpur, but the actual exploration work was happening in the Jaisalmer Basin, and our campsites were right in the heart of the desert, about 150 kilometers from Jaisalmer.

The office, which was under the administrative control of the Baroda office and responsible for exploration in the Jaisalmer Basin, managed one field party, GP-26, while a second party, GP-14, was deployed from Dehradun. However, in 1983, it was decided to establish GP-14 in Jodhpur itself, with personnel drawn partially from the Jodhpur office and the rest supplemented from Baroda. I soon found myself as part of this newly formed GP-14, which was led by Mr. P. N. Mathur from Baroda as the Party Chief. Our camp was set up near the ruins of an old fort at Ghotaru, deep in the heart of the Thar desert.

Presenting a memento to a foreign delegate during SPG

The 2D seismic survey being conducted in the desert presented several challenges that needed to be addressed. The surface topography of the area was characterized by longitudinal sand dunes, oriented NNE-SSW. The sand velocities were very low, just above the sonic velocity in air (approximately 330 m/s), underlain by a weathered zone with velocities ranging from 1000 to 1200 m/s. Beneath that, the sub-weathered layer had velocities around 1800 to 2000 m/s. The thicknesses of the sand and weathered layers varied significantly, introducing unpredictable delays in seismic wave transmission and arrivals, which made the computation of static corrections particularly difficult.

In addition to this, the loose sand cover posed a major challenge to both the transmission of energy from the source and the detection of seismic signals by the recording sensors (geophones) due to poor coupling. To address these issues, we adopted a 100-hole shot pattern, with half a kilogram of dynamite placed in each hole. The shot holes, 2 to 3 meters deep, were drilled

using air compressors, and the dynamite was loaded immediately—a hazardous process that carried a significant risk of fatal accidents, requiring extreme caution during implementation.

To aid in the computation of static corrections, shallow refraction surveys were conducted nearly every kilometer. These surveys provided crucial data on the thickness and velocities of the sand and weathered layers, which greatly assisted in the correction process and improved the accuracy of the seismic results.

The logistics of operating in the desert and coping with its extreme climatic conditions presented another significant challenge. During my tenure, I experienced temperatures ranging from 52°C in the scorching summers to about minus 7°C in the freezing winters. The intense summer heat forced us to adjust our operational hours, typically starting at 4 a.m. and wrapping up by noon, as the sand became unbearably hot during the day.

In contrast, the severe winters brought their own set of problems. Diesel vehicles, for instance, often refused to start because the fuel in the pipelines would congeal in the cold. To resolve this, we had to heat the vehicles externally by burning firewood, which led to delays in our operational activities.

The logistical story would be incomplete without mentioning the role of ARDCO (American Research & Development Corporation) vehicles. These specially manufactured vehicles, imported from the USA, were equipped with huge tubeless tires—about 4 feet in diameter and 2.5 feet in width—designed specifically to navigate the sandy terrain. While these vehicles were highly effective in dealing with the harsh desert landscape, they had their own drawbacks. They ran on petrol, with an average fuel consumption of just 1 km per litre, and the tire spindles broke down frequently. So much so that we had to indigenize several parts of these imported vehicles by working with local manufacturers in Jaisalmer and Jodhpur.

Eventually, the ARDCO vehicles were replaced by Tata vehicles, which featured power steering and sand tires, making them more suited to the terrain and significantly improving operational efficiency.

Professionally, my posting in Rajasthan turned out to be a boon in disguise. Out of the blue, I was assigned the challenging task of leading the seismic field party GP-14 as Party Chief for the 1985-86 field season. At the time, I had been with ONGC only for about three years and was still at the Geophysicist (E-1 level), whereas the norms for leading a field party was a Deputy Superintending Geophysicist (E-3 level). Initially, I hesitated, pointing out that there were other executives, senior to me posted at Jodhpur. However, the ONGC management, led by Mr. Dular Singh Chauhan (a 1956 batch Geophysicist), thought otherwise and insisted with full support.

So, at the age of 26, I found myself leading a field party of about 50 regular personnel and around 250 casual workers. Most of the regular personnel were significantly older than me, with some having been in ONGC even before I was born. They were highly experienced in the operational aspects of fieldwork, and from day one, I understood that these individuals deserved the utmost respect for their individual skill sets, experience, and age.

This assignment was an incredible opportunity to learn about management in general, and human-ware management in particular. I delegated authority with responsibility and accountability to each sub-crew, making the senior-most person the First Person Responsible (FPR), whether it was for the survey crew, shot-hole drilling crew, shooting crew, heavy vehicle operators, or even the casual workers. This approach fostered a sense of inclusivity and belonging, and it paid off when the party was awarded for our performance in the very first field season.

The lessons I learned during this period carried forward into my later years when I took over as Party Chief of the Vibroseis Party, GP-26 and in my subsequent assignments as I climbed the corporate ladder. I always believed in the power of teamwork and made sure to spread this belief by emphasizing the three H characteristics—Honest, Humble, and Humane. This approach not only helped me as a leader but also strengthened the cohesion of the teams I worked with, ensuring continued success throughout my career.

A glimpse of ARDCO vehicle with its unique tyre along with fellow colleagues

Working in the deserts of Rajasthan, near the international border with Pakistan, we encountered a unique set of challenges, particularly in our interactions with the Border Security Force (BSF), army personnel, nomadic tribes, and illegal traders. During the 1980s, there was no barbed wire fencing along the border, and the border was marked by pillars placed at intervals of about 150 to 200 meters. As a result, there were a few occasions where we inadvertently crossed into Pakistan. On one such occasion, one of our executives, along with several workers and vehicles/equipment, was arrested by the Pakistan Rangers. It took intervention from the BSF at the highest level to secure their release the next day. The overnight stay of the executive in the camp of the Pakistan Rangers must have been a harrowing experience, though it was somewhat mitigated by the common language of Punjabi, spoken by both our executive and the personnel of the Pakistan Rangers.

After completing a five-year tenure as Party Chief in the field, I transitioned to the Headquarters in Jodhpur. Here, I gained experience in areas such as planning, provisioning, and budgeting, and had my first exposure to seismic data interpretation on paper sections, as workstations had not yet been introduced. During this period, I also took my first steps in proposing locations for exploratory drilling and made my maiden presentations at the Regional Exploration Board (REXB) meetings held at Baroda, our functional headquarters.

As reflected in my narrative, my professional experience thus far had been primarily focused on seismic data acquisition in the field, with only brief forays into related areas.

Experience of fold-belt of Cachar-Mizoram

During the early summer, I received my transfer order for the Geoscience Division in Jorhat, then headed by Mr. A. C. Bagchi, who had been my Party Manager during my time in Tripura. Based on my past experience, I was set to take over a field party in Jorhat, as informed by some of my friends posted there. I began preparing for the move, including arranging for an advance for the transfer. However, destiny had other plans for me, and the developments that followed dramatically altered the course of my professional career.

A few days before my release from Jodhpur to Jorhat, a telex message arrived at the Jodhpur office revising my transfer order. Instead of Jorhat, I was now directed to report to the Head of the Exploration Business Group (EBG) at the Cachar Project in Silchar. This news came as a surprise, as we had never heard of a Geophysicist being posted to a Drilling Project before.

To understand this unexpected posting, it is important to mention the backstory. Mr. B. K. Bose, a renowned Geophysicist (later awarded the Lifetime Achievement Award by the Society of Petroleum Geophysicists), was assisting the then Member (Exploration). Mr. Bose believed that Geophysicists, throughout their career, were typically confined to the realms of acquisition, processing, and interpretation of geoscientific data, without exposure to the full spectrum of the exploration and production life cycle. He envisioned a new career path for Geophysicists, one that would involve engagement across a broader range of work centers, including drilling and production.

I, along with a few colleagues, became part of the first batch to embark on this new career development policy. As a result, we found ourselves posted to projects like the Cachar Project, marking the start of a completely different trajectory for our careers.

It was indeed a challenging posting, as initially, both the project management and I were at a loss in determining the role of a geophysicist in a drilling project, especially given the lack of any precedence. I had to explore and define my own role within the system, which required considerable effort on my part to understand the processes, technical jargon, and the complexities of drilling, particularly in a fold belt ecosystem.

By the end of the first year, I had managed to establish myself as an integral and essential member of the geology department under the EBG. In fact, on several occasions, I even officiated in the role of head of geology in the absence of the incumbent. This accomplishment was the result of hard work and a steep learning curve, and I owe much of my success to the support and guidance of a few key colleagues during those initial, challenging days.

First, Mr. Sudhir Sharma, an exceptional geologist who later became Director (Exploration) of OVL, was instrumental in my development. I shared an office room with him, and his guidance and peer support played a crucial role in helping me propose the exploratory location for the REXB at Nazira that year, which ultimately led to the Bhubandhar gas discovery.

I also received immense support from Mr. Debdas Pal, the head of geology, and Mr. Dinesh Gupta, a junior colleague who helped me navigate the intricacies of the work. Additionally, Mr. J. M. Kothe, a geologist and the project head, was a wonderful source of strength and guidance, and his noble character made a lasting impact on me.

My posting at Silchar, which lasted for over four and a half years, was professionally enriching and transformative. It marked my transition from being a core geophysicist to becoming a geoscientist with a much broader and deeper understanding of the E&P ecosystem. This experience was a significant milestone in my career, broadening my expertise and shaping my professional growth in ways I had not imagined before.

I was able to gain a much clearer understanding of the challenges involved in fold belt exploration, especially in terms of data acquisition geometry. The region's first-order topography, characterized by exposed and highly dissected anticlines and flatter synclines, demanded an interactive and customized processing workflow to achieve better imaging of the subsurface. My insight into the genesis of the subsurface high-pressure zones of the area was also crucial in designing the exploratory wells.

Moreover, the experience and meticulous documentation from our predecessors in the project, along with the invaluable records from the Burmah Oil Company (BOC) during their pre-independence exploration and production ventures, provided us with a treasure trove of knowledge. This wealth of information helped us overcome many of the challenges we faced.

As a team in the geology section, we diligently continued our exploration efforts, closely monitoring the exploratory wells under drilling while regularly proposing the release of new exploratory locations at the REXBs held in Nazira. These sessions allowed us to pitch our proposals in front of industry experts from E&D Directorate, KDMIPE, GEOPIC, and IRS, the premier institutes of exploration within ONGC. Additionally, a brainstorming session on exploration, conducted at the Cachar Project in Silchar in 1995, provided a valuable opportunity for interaction with experts from across the country. This exchange of ideas and insights proved to be incredibly beneficial.

When it came time to choose my next posting at the end of my tenure in Silchar, I submitted my preferences:

1. GEOPIC, 2. KDMIPE, and 3. Retention at Silchar. To my surprise, I received my transfer orders for the E&D Directorate in Dehradun—a work center known for its extremely high workload and typically staffed by personnel who had undergone rigorous selection processes. Later, I learned that I had caught the attention of Mr. V. Sankaran, the then Head of E&D Directorate, who had seen me present at the REXBs and was impressed by my work.

This unexpected move marked a new chapter in my career, bringing new challenges and opportunities that would shape my professional journey in the years to come.

Transformation to an explorationist at E & D, Dehradun

Here I was, at E&D Directorate, an esteemed institution created in 1982, led by Mr. P.K. Chandra, who later became Member (Exploration) and also Vice Chairman. This center was the backbone for planning and monitoring exploration and development activities, and it directly reported to Mr. S.N. Talukdar, the then Member (Exploration). Over the years, almost everyone who mattered in the exploration and development space had served at least once at the E&D Directorate, making it an institution of the highest repute within the organization.

Though I initially felt a bit skeptical about my ability to contribute meaningfully, given my lack of exposure to corporate requirements, I soon realized how fortunate I was to be posted at such a prestigious center. My first role there was a six-month stint in the Petroleum Exploration License (PEL) and Petroleum Mining Lease (PML) section. This was quite a different experience from my years in the field, as it involved regularizing the existing acreages of ONGC in terms of both area and coordinates, especially with the announcement of the New Exploration Licensing Policy (NELP) on the horizon. Though alien to me, this experience proved essential for my growth in the corporate framework.

Before long, at the level of superintending geophysicist, I was entrusted with a much larger responsibility: leading a multi-disciplinary team composed of geologists, geophysicists, reservoir engineers, and Petro physicists. Our mission was to plan and monitor exploration and development activities across various regions, including Assam & Assam Arakan Basin, Bengal-Purnia Basin, Mahanadi Basin, Andaman Basin, and even Coal Bed Methane (CBM) projects. This assignment continued for almost a decade, and it was during this time that I truly grasped the essence of synergistic teamwork and began to assimilate knowledge about the entire spectrum of Exploration & Production activities, with particular focus on exploration and development.

Throughout this journey, I was fortunate to have the mentorship of senior colleagues like V. Sankaran, Y. B. Sinha (former Director of Exploration), R. Venkatarangan, A. K. Srivastava, and S. V. Rao (former Director of Exploration). Their guidance, along with the support of my peers and junior team members, played a pivotal role in transforming me from a geoscientist to an explorationist.

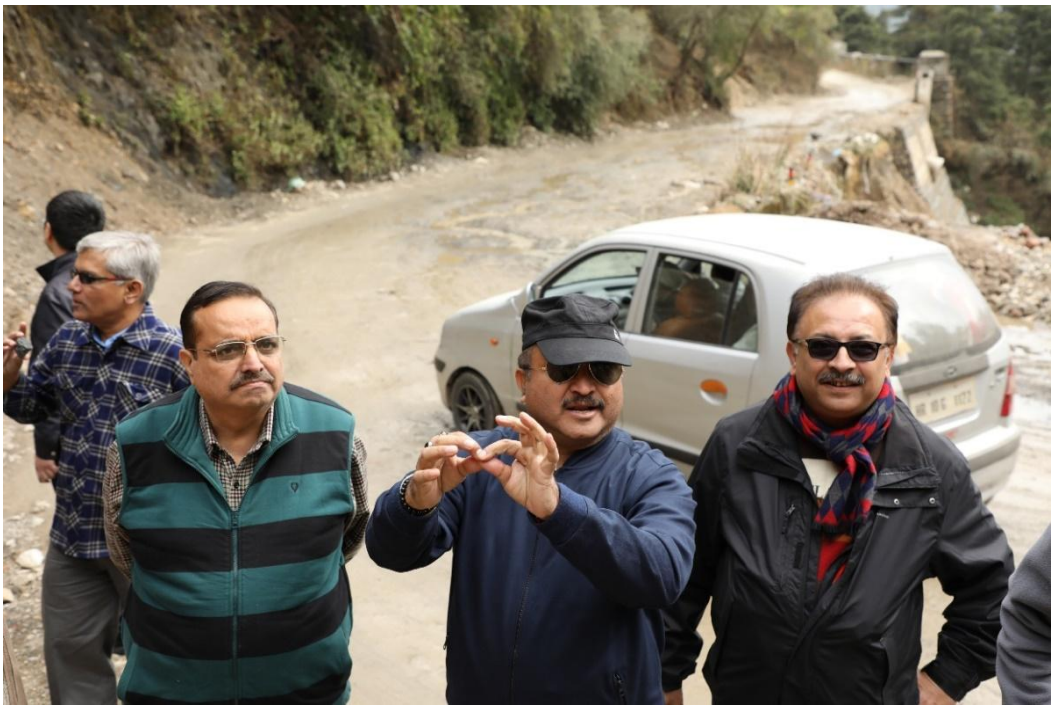
It was through enriching technical interactions in various forums such as Regional Exploration Boards (REXB), Regional Development Board (RDB), and Reserve Estimates Committee (REC) meetings that I gained invaluable insights into the exploration and development process.

I am deeply grateful to the Almighty for providing me with this opportunity to serve at E&D Dte. More importantly, I am immensely indebted to my mentors, peers, and colleagues for their unwavering support. Their encouragement and guidance have been instrumental in shaping me into the professional I am today.

Exposure to E & P regulations at EXCOM, New Delhi

My transfer from the E&D Directorate brought me to a significant institution in Delhi known as the EXCOM-BD-JV group, which stood for Exploration Contract Monitoring (EXCOM), Business Development (BD), and Joint Ventures (JV). Established in the 1980s under the then Member (Exploration), this section initially focused on providing technical assistance to the Ministry of Petroleum & Natural Gas. In a broader sense, it can be seen as a precursor to the Directorate General of Hydrocarbons (DGH), especially during the pre-NELP

(New Exploration Licencing Policy) Exploration & Development rounds.



Sharing the field details to the participants

The experience at EXCOM was a unique one, as it involved dealing with acts and rules, various government policies like Pre-NELP, NELP, and later HELP (Hydrocarbon Exploration and Licencing Policy), as well as different fiscal regimes, including nomination, production sharing, and revenue sharing. This role also provided an opportunity to delve into the complexities of business development, including the formation of joint ventures, strategy development, documentation, and the legal, financial, and administrative implications of these processes. Additionally, I had the chance to interact with a variety of E&P companies, including multinational corporations and prominent National Oil Companies (NOCs), whose insights further enriched my understanding.

Over the years, I came to realize the critical importance of gaining experience in this facet of the upstream hydrocarbon industry, and I consider myself fortunate to have been selected for this assignment. I had the honor of leading the EXCOM team in two separate stints before I superannuated. The learnings I gained during this period, including direct involvement in addressing high-profile company issues, were instrumental in my transformation from a pure explorationist into a well-rounded upstream professional.

Exploration and Development overview at Director's office

Between my two stints at EXCOM, I was assigned the role of G&G (geology and geophysics) Coordinator in the Office of Director (Exploration) at ONGC, which essentially meant serving as the Chief Executive Assistant to the Director (Exploration). I was selected for this role by Mr. S. V. Rao, a geoscientist I hold in the highest regard, not only for his professional expertise but also for his remarkable qualities as a human being. I continued in this position under the leadership of Mr. N. K. Verma, and later Mr. A. K. Dwivedi, as well as during an interim period under Mr. D. K. Sarraf, the then CMD of ONGC, who also held the additional charge of Director (Exploration). Working with these individuals was a highly rewarding experience, as each brought their unique style of leadership, influenced by their distinct professional backgrounds.

Being in the Director (Exploration)'s office gave me the invaluable opportunity to engage with the full spectrum of activities related to exploration and development, technical and financial to administrative aspects. Additionally, I gained exposure to the core corporate affairs of the Company's Board and associated committees.

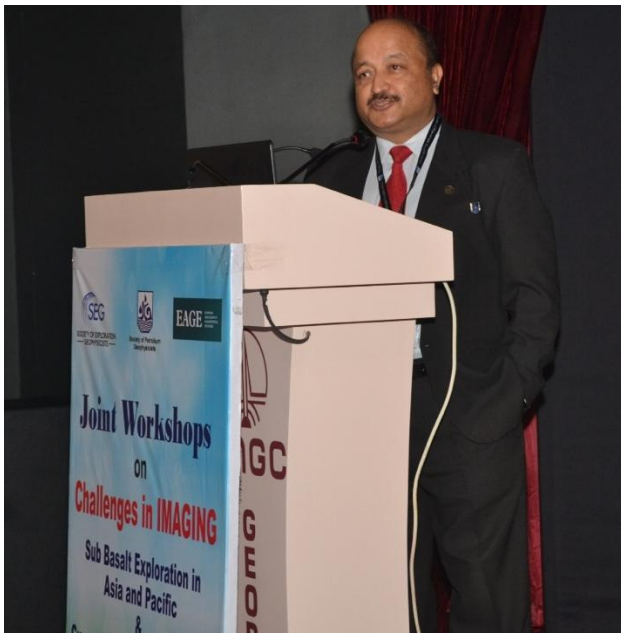
Looking back today, I realize how fortunate I was to serve in three pivotal roles: the E&D Directorate, EXCOM-BD-JV, and the Office of Director (Exploration). These experiences were instrumental in shaping my comprehensive understanding of the entire E&P cycle which was further augmented during my engagement as an Advisor to the Director (Exploration) after my superannuation, a position I held until I turned sixty-five. The varied experience helps me to continue to disseminate knowledge on E&P regulations & processes, through workshops, to young executives across disciplines in several companies.

Inaugurating the SPG Joint Workshop souvenir at Dehradun

President of Society of Petroleum Geophysicists (SPG)

I was incredibly fortunate to be entrusted with the responsibility of leading SPG India as its President in the final years of my tenure at ONGC. One of the highlights of my leadership was successfully steering the SPG International Conference held in Jaipur in 2017, which also marked the Silver Jubilee year of SPG India. I would like to extend heartfelt appreciation to the working group of SPG India for their exceptional professionalism and efficiency in organizing the conference. It was during this event that we were able to reaffirm our strong alliances with renowned organizations like SEG and EAGE.

Additionally, I am deeply grateful to SPG India for the opportunity to conduct, in collaboration with SEG, workshops on the highly relevant and challenging topics of "Fold Belt Imaging" and "Sub-basalt Imaging" during my tenure as President. These initiatives were vital in advancing knowledge and addressing critical issues in the field.



Addressing the SPG workshop at Dehradun

Epilogue

So, that has been the journey so far—transitioning from an acquisition geophysicist in the field to a well-rounded upstream professional at the corporate office/industry.

This journey provided me with the opportunity to travel across the country and even abroad, allowing me to experience diverse cultures and interact with people from all walks of life. These interactions not only changed my outlook and perceptions but also broadened my vision, contributing to my growth and maturity as a human being.

One invaluable lesson I have learned over the years is the importance of "respect for people and their skills." It is essential to remember that no one should ever be deemed useless, as every individual has their own unique strengths, and recognizing this is key to unlocking their full potential.

Another principle I have always emphasized is the importance of teamwork. Synergistic teamwork, rather than individual brilliance, brings greater success. When working as a team, everyone grows together. I take great pride and feel a sense of accomplishment when the juniors working closely with me achieve remarkable success. Some of the individuals who come to mind are Mr. Ajay Kumar (who retired as MD, BPRL), Mr. R. K. Srivastava (who retired as Director (Exploration) and officiating CMD, ONGC), and Mr. G. S. Chaturvedi (who retired as Director (Exploration), OVL). I am truly grateful for the experiences and wisdom I gained through my associations with each of them.

In conclusion, the experiences over the decades have taught me that the three most important qualities to nurture in life are to be humane, honest, and humble. I consider myself incredibly fortunate to have had the opportunity to become a geoscientist, unravelling the mysteries of Mother Earth with a particular focus on exploration, discovery, development, and the production of "black gold".

I remain highly grateful and indebted to my family - my wife Luna, my sons Deepit and Divyang and my daughter-in-law Swarnima for their unstinted support during various phases of my professional pursuit.