



Sui Northern Gas Pipelines Limited

# sng

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# Change Of Guard

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**T**he month of November witnessed change in the management of the company with Amir Tufail taking over as acting Managing Director after retirement of Uzma Adil Khan. His appointment was followed by a traditional farewell party by SNGPL which was attended by the top management of the Company. The management appreciated dedication and integrity of the ex-Managing Director and said that her services for the Company will always be remembered.

This issue of 'SNG' includes a brief on a top Russian delegation visit to Pakistan in connection with the North – South Gas Pipeline (NSGP). MD SNGPL was part of the Pakistani delegation led by the federal minister for Petroleum and Natural Resources. Report on the OGRA hearing held in November for revision of security deposit for domestic consumers is also part of the newsletter. The hearing provided SNGPL with the opportunity to present its stance on the issue.

Sui Northern Gas Training Institute (SNGTI) has always played a key role in human resource development. MD SNGPL paid a visit to the institute in November and a brief on the visit has been added to the issue. Also covered in this newsletter are reports on the SNGPL-WWF Pakistan campaign for gas conservation; SNGPL memorial cricket tournament held in Multan along with write-ups on topics of your interest. ■



It is my goal to create an enabling environment where everyone plays to his/her strengths, lives a balanced life and applies ethical principles to make a significant difference.

It is true that we are facing enormous challenges today amid limited resources. It is also a fact that the current energy demands of the country are continuously pushing us to go an extra mile and in doing so we often find ourselves in the midst of criticism. We, as a Company, have always been trying our best to cater to the domestic, industrial and commercial needs of the consumers. My vision is to bridge the demand and supply gap through sustainable development in the company.

I believe that challenges will always be there and criticism will never cease to exist. So we need to focus on one thing i.e. team work. I can recount a number of organizations and states which came out of more severe crises through mutual efforts. Let me remind you that the management or the manager alone can never make a difference until they are supported by their team.

I assure you of putting in my best efforts for the improvement in the Company performance. And while doing so I will always keep the interest of our employees as supreme for they are the real backbone of SNGPL. In return, I expect your utmost dedication and commitment. You have always invested best of your strengths and expertise towards your work. We only need to continue to work with the same devotion. No matter how big the challenges are, I have a firm belief that together we can change things.

My door is always open for my team. I will always welcome any suggestions and feedback which can help us improve ourselves and our Company. Come, let us work together to serve people better. ■

## LNG STATUS UPDATE

Role of SNGPL is of vital importance to the success of the LNG supply chain by acting as a link between the LNG suppliers and the end consumers. Ever since the inaugural supplies of LNG in March 2015, SNGPL has been supplying the imported gas under a SWAP arrangement with SSGC. However, with increased supplies of upto 400 MMCFD envisioned for 2016 onward, the need was recognized to augment the SNGPL's network capacity.



PROJECT 1

Accordingly SNGPL embarked on an augmentation plan of its system downstream Sawan, which is the starting point of SNGPL pipeline system in District Khairpur, Sindh; to receive additional LNG supply of up to 1.2 BCFD on the basis of two Projects under the nomenclature i.e. Project-1 & Project-2.

Project-1 includes construction of a 42-inch diameter and 111 km long pipeline from Sawan to Qadirpur, along with installation of 5,000 HP compression system at an estimated cost of PKR 18,543 million. The project is near completion and was recently tested successfully for gas supply at

the designated delivery point. It is expected to be inaugurated by the Prime Minister of Pakistan. After completion of this segment, SNGPL will be able to transport 400 MMCFD RLNG from the delivery point into the SNGPL system.

Meanwhile, ROW acquisition, Engineering and Material Procurement activities are also in progress for the Project-2; which consists of a 762 km long pipeline ranging from



PROJECT 2

16-inch to 42-inch diameter pipeline segments, starting from Qadirpur in Sindh upto Lahore. Once completed, at an estimated total cost of PKR 57,941 million, this project will raise the system capacity by upto 1.2 BCFD of RLNG supplies in 2017, when the new public sector RLNG based power plants are expected to become operational.

Thus, SNGPL, being aware of its immense national responsibility, is playing its constructive role in the government policy of alleviating the gas and power shortages being faced by the country. ■



# A fond farewell to the outgoing Managing Director





▶ Amjad Latif, Deputy Managing Director (Operations) presenting bouquet to the outgoing Managing Director Uzma Adil Khan.



▶ Liaqat Raza, Senior General Manager (HR - LS) presenting bouquet to the then MD Uzma Adil Khan.



▶ Sagheer ul Hasasan, Senior General Manager (Audit) presenting bouquet to the outgoing MD Uzma Adil Khan.



▶ SNGPL management and staff bidding farewell to Uzma Adil Khan on the day of her retirement.



## SIGNING OF GAS PIPELINE AGREEMENT BILATERAL TALKS BETWEEN RUSSIA AND PAKISTAN

A top level Russian delegation led by Alexander V. Novak, Minister of Energy of Russian Federation landed in the capital to have bilateral talks with Pakistan Government on cooperation in Petroleum Sector and especially signing the Government - to - Government agreement for laying of 1100 KM long Liquefied Natural Gas (LNG) Pipeline from Karachi to Lahore and has been named as North-South Gas Pipeline (NSGPL). This pipeline is dedicated to transport imported LNG from Karachi to Lahore as Punjab Province is worst-hit by gas shortage.

NSGPL Project will be capable of transporting 1.2 billion cubic feet of gas from Karachi to Lahore by laying 42-inch diameter pipeline and would be built by state-run Russian

Company, RT Global Resources - a part of Russian State Corporation. The first phase of the project is expected to be completed by December 2017.

Uzma Adil Khan, Managing Director, SNGPL was part of the delegation led by Shahid Khaqan Abbasi, Federal Minister for Petroleum and Natural Resources (P & NR), who held talks with Russian delegation. Minister of State for P&NR, Secretary (P&NR) and heads of all state owned oil & gas companies also participated in the talks. Sartaj Aziz, Advisor to Prime Minister on Foreign Affairs attended the talks as well and said that this project will go a long way in strengthening the ties between two countries and would mark a new milestone in bilateral energy cooperation. ■

## Revision of Security Deposit for Domestic Consumers

# SNGPL presented its stance in OGRA hearing



### Regulatory Affairs Department

A public hearing was conducted by the Oil and Gas Regulatory Authority (OGRA) for Revision of Security Deposit for domestic consumers in November in Lahore.

This was done in accordance with the procedure mentioned in the OGRA Ordinance 2002 after SNGPL filed a Review Petition against Authority's decision of July 03, 2013, under section 13 of OGRA Ordinance, 2002. SNGPL requested that minimum threshold of Gas Security Deposit (GSD) may be fixed at Rs. 4,500 which will be recovered in 12 equal installments and would be refundable on termination of the

contract.

The SNGPL team was led by Managing Director, Deputy Managing Director (Services)/ Chief Financial Officer, Deputy Managing Director (Ops), Senior General Managers and other senior officers of the Company.

The Registrar OGRA read out the rules and procedure of the hearing while the Chairman OGRA requested SNGPL to present its stance.

The then Managing Director Uzma Adil Khan gave the opening remarks highlighting the facts that Security Deposit of Rs.1,500 for house up to 10 marla and Rs. 2,000/- for house more than 10 marla was determined by DG(Gas) in 1996.

This amount was fixed based on gas prices of Rs.83.16 per MMBTU which has now increased to Rs.530.69 per MMBTU (highest slab).

Syed Jawad Naseem, General Manager (Regulatory Affairs) in his presentation highlighted the following main points of the Company's stance on Revision of Security Deposit for domestic consumers:

i) There is no floor / minimum threshold for security deposit from domestic consumers in the absence of which replenishment and or refund of security deposits of domestic consumers will be a continuous exercise spread over every six months of the year creating hardship for both consumer and the Company.

ii) Large numbers of domestic households reside in rented premises where the consumption pattern varies from one tenant to another. Similarly, government officers residing in allocated premises would also face the same situation where security shortfall may have been replenished based on a consumption pattern of one particular consumer and will be refunded on the basis of consumption pattern of another consumer.

iii) Gas is sold on credit for at least 45 days and another 45 to 60 days are required for disconnection. The amount of security deposit based on three months bill on annual average is not sufficient to cover the outstanding amount from consumers as most of the defaults occur in winter months. The gas consumption in winter months is 3 to 5



times higher of the annual average.

iv) Based on the maximum billing for the period March 2014 through February 2015, it is transpired that nearly 60 per cent of the consumers' security deposit required for three months consumption is above Rs 3,700.

v) Presently, disconnection/ visit of a consumer costs around Rs.3,600/- to the Company and as such disconnecting a consumer of a value less than Rs. 3,600/- would not be commercially / economically feasible.

vi) Based on limited resources, Company's first priority remains to disconnect high value defaulted consumers.

vii) Since the security deposit from new consumers has already been fixed at Rs 4,500 and any variation from the same for existing consumers may result in discrimination, it is suggested to continue the same as a minimum threshold for all consumers.



GM (RA) further stated that in order to safeguard the financial interest of both Company and consumers at large, the minimum threshold should be fixed at an amount higher than the cost of disconnection. Company is of the view that since such policy decisions are viewed from a long term perspective, it is therefore important to account for projected future increases in the estimated cost of disconnection as well as sales price.

After the presentation by SNGPL representatives, the Chairman OGRA requested the interveners to present their point of view on the "Revision of Security Deposit for Domestic Consumers". Various interveners including nominees of different consumer groups and media persons gave their input on the subject. The Intervener also gave suggestions to improve the overall natural gas sector in Pakistan. The Authority as well as the Management of SNGPL appreciated the suggestions and concerns of the interveners / consumers while assuring them of their full cooperation. ■





## SNGPL and WWF Pakistan join hands for energy conservation

**M**edia Affairs Department of SNGPL has always been working efficiently to promote and highlight Company's image and uplift the existing standards of services; either regarding the complaints of its consumers or the existing standards of social services associated to it. This includes awareness campaigns on conservation of Gas, Anti Gas Theft Campaigns, Timely Bill Payment, Bill Management and Timely release of information to the public.

The department has a credit to collaborate with other departments of different Governmental, Semi Governmental

and Non Governmental Organizations on issues of public interest. Media Affairs Department started collaborating with the World Wildlife Fund (WWF - Pakistan) four years back to deliver an extensive program of Gas Conservation Awareness to the youth of Pakistan through a series of Spellathon contest, a nationwide spelling competition in selected schools of SNGPL's franchise areas. The main objective of this program is to foster a sense of responsibility and accountability in future generation, towards gas conservation.

The plan includes a total of 60,000 students from all age

groups at Primary, Middle and Secondary levels at a cost of 4.5 million rupees. The students undergo a structured spelling test from the story books on Energy Conservation enabling them to understand the better ways of energy utilization, the significance of its conservation and impart such knowledge to their families in the larger interest of the country. The strategic results of this program are:

- To curtail misuse of gas.
- Students to get proper information and better understanding of the significance and use of natural gas.
- To proliferate and cascade a greater understanding of energy issues and their impacts on society at large.



- To add value to Company's Corporate Social Responsibility portfolio.

For continuation of this collaboration for the fourth consecutive year, an MoU signing ceremony was organized at Gas

House. Uzma Adil Khan, the then MD, SNGPL and Hammad Naqi Khan, DG/ CEO WWF- Pakistan signed the agreement. Liaquat Raza, SGM (HR); Syed Jawad Naseem, GM (Media Affairs); Ali Raza Awan, Executive Officer (Media Affairs); Awais Bajwa, PRO; and Sania Khan, Head of CP&F (WWF) were also present on the occasion. At the end of the ceremony, Hammad Naqi Khan, DG, WWF - Pakistan presented souvenirs to Uzma Adil Khan and the team. ■





▶▶ Delegation from Ministry of Water and Power meets with MD SNGPL Amer Tufail and Senior Management of SNGPL at Gas House, Lahore.



▶▶ Delegation from World Bank called on the then MD SNGPL, Uzma Adil Khan and the Senior Management of SNGPL at Gas House in pursuance of Pakistan Energy Sector reform Support.



▶▶ MD PPL, Wamiq Bukahri payed a visit to MD SNGPL, Amer Tufail at Gas House, Lahore.



▶▶ MD SNGPL, Amer Tufail and the Senior Management in a meeting with delegation of All Pakistan CNG Owners Association.



▶▶ Minister of State for Religious Affairs, Pir Amin-ul-Hasnaat Shah calls on MD SNGPL, Amer Tufail in his office.



▶▶ Delegation of LTIA (Lahore Township Industries Association) pays a visit to Amer Tufail, MD SNGPL and the Senior Management of SNGPL.



▶▶ Delegation of Gujrat Chamber of Commerce in a meeting with Senior Management of SNGPL at Gas House, Lahore.



▶▶ Sarmad Ali, Group Managing Director, Jang Group, along with his team called on the then MD SNGPL Uzma Adil Khan at SNGPL Head Office in Lahore.

## SNGTI: Training and developing skills of human resource

**Asad Fawad**

**S**ui Northern Gas Training Institute (SNGTI) was established with the aim to help SNGPL improve capacity and skills of its human resource. It organizes courses programs from time to time based on the need of employees and the company. Recently, Ex-Managing Director Uzma Adil Khan visited SNGTI where she was briefed about the overall activities and progress of the training institute. She was informed that during the FY 2014-15, SNGTI offered and conducted 253 training courses relevant to the organizational working, culture and Training

needs of the employees and trained 3,911 organizational employees in thirteen (13) different types/categories i.e. Technical Trainings, Soft Skill Trainings, External-Domestic Trainings, External-Foreign Trainings, Orientation Programs, Management for Junior Executives (MJE), Developing Future Leaders (DFL), Executive Development Program (EDP), Guest Speakers, Gas Control, Regional Trainings, Certification Training for Welders, and Helper Trade Test etc.

SNGTI management briefed the ex-MD about training methodology which includes Class room lectures, Technical work-



shops, Hands-on Trainings, Case studies, Assignments, Presentations, Interviews, Trade tests, and Theoretical and Practical examinations.

She visited training halls and personally observed the orientation program and International Financial Reporting Standards training sessions. Ex-MD was highly impressed by the efforts of SNGTI in training

and preparing the SNGPL manpower for the future challenges. She also praised SNGTI team for working with unremit-



ting zeal, effort and commitment not only to fulfill but exceed the training requirements and demands of each



employee to strengthen their skills.

Ex-MD Uzma Adil emphasized that investment in Training and Development is perhaps the single most important way that manifests the Top Management's recognition that People are our greatest asset. Training of Human Resource is crucial to any organization's success and growth. ■

*The writer works at the Sui Northern Gas Training Institute (SNGTI)*

## 1st SNGPL Deceased Employees Memorial Cricket Tournament Maintenance Warriors crush Distribution Lions to lift the trophy



### USMAN KARIM BAIG

A day-night cricket tournament was organized by SNGPL to provide the employees of SNGPL with some form of leisure and entertainment. The tournament took place at Transmission Office, Multan from 11 to 14 November 2015. Imran Ahmed, Station Incharge Multan (T) inaugurated the tournament.

A total of 16 teams representing various departments of transmission and distribution participated in the event. Maintenance Warriors from Transmission and Distribution

Lions from Distribution qualified for the final contest. After a neck to neck and thrilling final match between the two teams on 14 November, Maintenance warriors claimed victory on the very last ball of the event and became the first champions of the memorial cricket tournament.

The event was organized to promote healthy sports activities among the SNGPL employees but more importantly as a tribute to the deceased employees to make their descendants realize that SNGPL still remembers and acknowledges services of the employees in the Company even after their demise.

Imran Ahmed Khan, Station Incharge Multan (T) and Hanif Ramey, General Manager, Multan (D) were Chief Guests at the prize distribution ceremony. Trophies were given to the winner team (Maintenance warriors), runner up (Distribution Lions), 2nd runner up (Admin/ HRS Leopards), man of the match and man of the series. Honorary shields were given to organizing committee, umpire panels, CBA, Chief Engineer (T), Station Incharge and GM Multan (D). The chief guest praised the organizing committee and Administration In

charge for their efforts and encouraged the employees for participating in sports activities in future. He emphasized that more such events should take place to keep the spirit of employees high, enhance their productivity and to bridge the communication gap between the executives and subordinates and last but not the least; to provide the employees a sense of joy and replenishment. ■

*The writer is Senior Admin Officer  
at SNGPL Multan (T)*

## Retirement



*Mohammad Iqbal Rana, Driver, Logistics Support (LS), retired after serving the company for 20 years.*

# Retired Officers Forum organizes party for the retired and serving Managing Directors

**Naeem A. Khan**

The Executive Committee of SNGPL Retired Welfare Forum (Floret Clan) arranged a lunch on 29 November at Gymkhana Club to acknowledge the services of the retiring Managing Directors, M. Arif Hameed and Uzma Aadil Khan and to welcome the serving MD and Chief Executive, SNGPL Amer Tufail. The distinguished guests were warmly received by the President and Executive Committee members. Muhammad Ilyas, President of the forum, presented a welcome address wherein he himself and on behalf of the SNGPL Retired Officers Welfare Forum uttered appreciation on the incredible and valuable services rendered by the both outgoing MDs and wished the wholesome sentiments and luck for the serving MD and Chief Executive, Amer Tufail. Muhammad Ilyas declared full and unconditional support from SNGPL Retired Officers Welfare Forum for the present MD SNGPL. Thereafter, Forum's Patron-in-Chief, Abdul Rashid Lone expressed his views. In response to speeches by the members of the Forum, M Arif Hameed and Uzma Adil Khan thanked the Forum for arranging the auspicious event and anticipated that during the tenure of Amer Tufail, SNGPL will become more flourishing

and profitable institution.

At the end, Amer Tufail thanked the Forum for inviting him and assured of undertaking all the possible steps to reform and strengthen the Company. He also assured that he will always be available to redress the legitimate problems of the retired executives on priority as the retired executives have served for decades, are the pioneers and real assets of the Company. ■

*The writer is ex-GM (Media Affairs) and currently associated with SNGPL Retired Officers Welfare Forum.*

## Achievement



▶ Zeeshan Manzoor s/o Manzoor Ahmed Shaheen (Secretary to GM HSE) obtained 1059/1100 marks (96.27 %) in Matric examination 2015 from Board of Intermediate and Secondary Education, Lahore.



# Prevention Against Ransomware

## IT/MIS Department

**R**ansomware is a type of malware that restricts users from accessing their important file/folders. This type of malware, forces its victims to pay the ransom through certain online payment methods in order to grant access their files.

NO antivirus and other security software can recover the data encrypted by ransomware.

Cryptolocker, Simplocker and CBT locker are few examples of ransomware. The malware are targeting Windows PCs and Android devices.

### Method of Infections:

- a. Links received in emails
- b. Payload embedded in legitimate documents or software received through emails or USBs.
- c. Files downloaded from torrent sites.
- d. Fake or free software.
- e. Encrypts all documents and files.

- f. Encrypts drives and folders
- g. Shows a warning screen where user is asked to pay ransom within specific time. If the payment is not carried out, all files will be lost permanently.

### Recommendations:

In order to prevent from ransomware, following preventive measures are suggested:

- a. Backup your files regularly.
- b. Download email attachments from trusted resources only. Even if a known contact sends a file, open it after confirmations.
- c. Scan system regularly with antivirus.
- d. Apply software patches regularly as some ransomware exploit vulnerabilities.
- e. Install well reputed firewall with built-in HIPS (Host Intrusion PreventionSystem).

# FULL - ENCIRCLEMENT SLEEVES

Asif Riaz

**D**ifferent methods are used in the world for the repair of pipelines to restore their serviceability and rectify defects such as external repair due to external corrosion, dents, gouges, defective welds and leaks which are major concerns for pipeline operators. These methods include the following techniques:

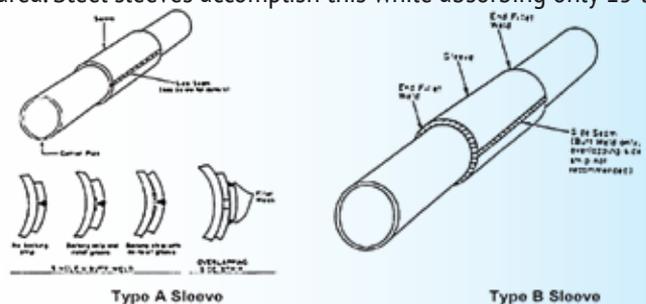
- Grinding out/recoating
- Installation of leak clamps
- Steel reinforcement sleeve repair (Type “A” Sleeve)
- Steel pressure-containing sleeve repair (Type “B” Sleeve)
- Composite wrap repair
- Pipe replacement

A repair can be considered temporary or permanent. Temporary repairs are made when the operator plans to complete a more comprehensive repair or replacement in a later time and its duration is commonly specified by the pipeline operator. A permanent repair is typically intended to restore the pipeline to service for longer period of time.

When areas of corrosion or other damage on operating pipelines are identified, there are significant economic and environmental incentives for performing repair without removing the pipeline from service. Though the option of

pipe replacement is generally a conservative and safe one since the damaged pipe section is removed and replaced, however pipe replacement is expensive and causes service interruption. From an economic viewpoint, a shutdown involves revenue loss from the loss of pipeline. In addition, for gas transmission pipelines, a shutdown typically involves a significant quantity of gas that is lost to the atmosphere. Since methane is a so called “greenhouse gas”, there are also environmental incentives for avoiding the venting of large quantities of gas into the atmosphere.

Pipe grinding is used to produce smooth surface and remove the harmful stress concentration of defects and micro cracks. Repair of mechanical damage by grinding has historically been allowed by several standards. The ASME-B31.8 permits repair by grinding to a depth of 10 per cent of the pipe wall thickness during the installation of new pipes and provides certain criteria for grinding of dents with gouges for in-service pipelines. The use of nonmetallic composite materials to repair damage has increased in recent years; the most predominant method of reinforcing damage in cross-country pipelines is to install a full-encirclement steel sleeve. The use of steel sleeves has some advantages over other repairing methods in terms of both performance and cost. The early work showed that steel sleeves are effective because they restrain bulging, or accumulation of strain, in the defective area. Steel sleeves accomplish this while absorbing only 15 to





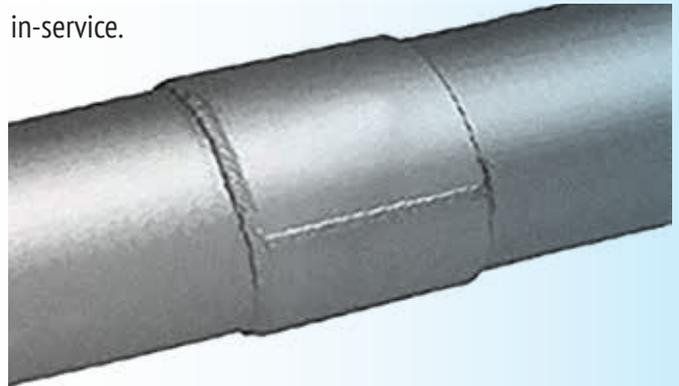
20 per cent of the hoop stress in the carrier pipe. Steel sleeves are effective because the stiffness (elastic modulus) of the sleeve material is equivalent to that of the line pipe steel. The Full Encirclement Sleeve is designed to provide additional reinforcement and strength to pipeline sections that are damaged or weakened. Full Encirclement Sleeves are fabricated from a variety of steel grade materials and can be designed to provide both non-pressure rated structural reinforcement or to provide a pressure rated design reinforcement. There are two basic types of full encirclement steel sleeves; Type-A and Type-B (Figure 1).

This type consists of two halves of a steel cylinder which are placed around the pipe and welded to fully encircle the damaged section and restores the strength of the pipe. Type-A sleeves require no in-service welding, can have fillet-welded overlapping side strips (Figure 2), and are very simple to fabricate and install.

They can be supplied with the side strips fillet welded to the bottom half of the sleeve so that the only welds required in the field are the fillet welds on the top of the side strips. These welds can be readily made by welders without special training or qualification. The raw materials required to make Type-A sleeves are significantly less expensive and these sleeves can be fabricated in the field by simply splitting a

length of pipe of equal, diameter, wall thickness and grade as the line pipe material. Unlike composite materials, steel sleeves have no finite “shelf life”. Also, the stiffness and long term performance of Type-A sleeves are equivalent to that of line pipe steel. It can be used for temporary and permanent repairs but it is not used to repair circumferentially oriented defects and leaking defect.

Type-B sleeve is similar to Type-A sleeves, except that the ends of the sleeve are welded onto the pipe with full encirclement fillet welds as shown in Figure 3. Appropriate procedures for welding and inspection of the sleeve are required when the sleeve is installed while the pipe is in-service.



The thickness of the sleeve is designed to contain the Maximum Allowable Operating Pressure (MAOP) and the axial stresses imposed by secondary loads. Thus, Type-B sleeve can be used to repair leaks and to reinforce the circumferentially oriented defects. Several research studies evaluated the characteristics of types A and B welded repairs in addition to the deposition of weld metal directly into a defect. In these projects, pipe samples were prepared with varying dents and gouges, and were pressurized to simulate conditions which a defect would develop in the field.

The article was also prepared with the permission of the author, Senior Engineer (PL).

# The Infinity Illusion

Javed Ashraf

**I**NFINITY. It is a concept that defies imagination. We have a hard-enough time trying to wrap our minds around things that are merely extremely big; our solar system, our galaxy, the observable universe.

But we cannot avoid it. Mathematics as we know it is riddled with infinities. Whether geometry, trigonometry or calculus, the mathematical manipulations we use to make sense of the world are built on the idea that some things never end.

Trouble is, once unleashed these infinities are wild, unruly beasts. They blow up the equations with which physicists attempt to explain nature's fundamentals. They obstruct a unified view of the forces that shape the cosmos. Worst of all, add infinities to the explosive mixture that made up the infant universe and they prevent us from making any scientific predictions at all.

All of which encourages a bold speculation among a few scientists and mathematicians; can we do away with infinity? From Aristotle to Newton and Gauss, the only infinity was a "potential" infinity. This type of infinity allows us to add 1 to any number without fear of hitting the end of number line. That is a long way from accepting "actual" infinity – one

that has already been reached.

Things changed in the 19th century when German mathematician Georg Cantor invented set theory, the underpinning of the modern number theory. He argued that sets containing an infinite number of elements were themselves mathematical objects. This masterstroke allowed the meaning of numbers to be pinned down in a rigorous way that had long eluded mathematicians.

For physicist, however, the infinite paradise has become more like purgatory. To take an example, the quantum theory of electromagnetic force initially showed the mass and charge of an electron to be infinite. Decades of work, rewarded by many a Noble prize, banished these nonsensical infinities – or most of them.

It is the big bang that infinity wreaks the most havoc. According to the theory of cosmic inflation, the universe underwent a burst of rapid expansion in its first fraction of a second. Inflation explains essential features of the universe, including the existence of stars and galaxies. But it cannot be stopped. It continues inflating other bits of space-time, long after our universe has settled down, creating an infinite "multiverse" in an eternal stream of big bangs. In an infinite

multiverse, everything that can happen will happen an infinite number of times. Such a cosmology predicts everything – which is to say, nothing.

This disaster is known as the “measure problem”. Most cosmologists believe it will be fixed with the right “probability measure” that would allow us to restore our predictive powers.

There are also good reasons to think it is an unwarranted one. Studies of the quantum properties of black holes by Stephen Hawking and Jacob Bekenstien in 1970s led to the development of Holographic principle. The largest number of informational bits a universe of our size can hold is about  $10^{122}$ . If the universe is indeed governed by holographic principle, there is simply not enough room for infinity. Certainly, we need nothing like that number of bits to record the outcome of experiments. The world’s most accurate measuring device, an atomic clock can measure increments of time out to 17 decimal places. The electron’s anomalous magnetic moment has been measured out to 14 decimal places, but even the best device will never measure with infinite accuracy, and that make the physicists like Raphael Bousso very itchy. “I don’t think anyone likes infinity, it is not the outcome of any experiment”.

Modern physicists want to dispose off potential infinity as well. Forget everything you know about mathematics: there is a largest number. Start at 1 and just keep in counting and eventually you will hit a number that cannot exceed - a kind of speed of light for mathematics. That raises a host of questions. How big is that biggest number? The answer comes by analogy to a computer processor.

At first glance, that would seem to be no problem for those wishing to banish infinity. Quantum physics was born when, at the turn of 20th century, physicist Max Planck showed how to deal with another nonsensical infinity. Classical theories at that time were indicating that the amount of energy emitted by a perfectly absorbing and radiating body should be infinite, which clearly was not the case. Planck solved the problem by suggesting that energy comes not as an infinitely divisible continuum, but in discrete chunks - quanta.

Tegmark is unfazed by the arguments of physicists opposing the idea to banish infinity. “When quantum mechanics was discovered, we realised that classical mechanics was just an approximation. I think that another revolution is going to take place, and we will see that continuous quantum mechanics was just an approximation to some deeper theory, which is totally finite.”

Scientists like Woodin, separate the two issues of physical and mathematical infinities. “It may be that physics is completely finite, but mathematics is not. Tegmark on the other hand, thinks the mathematical and physical are inextricably linked - the further we plunge down the rabbit hole of physics to deeper levels of reality, the more things seem to be made purely of mathematics. For him, the fatal error message contained in the measure problem is saying that if we want to rid the physical universe of infinity, we must reboot mathematics, too. “It is telling us that things aren’t just a little wrong, but terribly wrong.” ■

*The writer is associated with Compression department as Senior Engineer.*

## Asma Maqbool

**S**NGPL Management is committed to promote Health, Safety and Environment (HSE) culture in the Company. As such, a medical camp was conducted at Faisalabad Distribution and Compression

and all the stakeholders of the company.

HSE Team performed blood sugar test; height and weight monitoring, blood pressure test, food handler stall, eyes



## Medical Camp at Faisalabad

office on 12 and 13 November 2015 for promoting awareness among the employees regarding Health care.

The objective of these camps is to carry out a Health survey of the employees involved in critical operational activities. HSE Focal Persons emphasized on the importance of Occupational Health & Safety of the employees, their coworkers

refraction, pulmonary function for welders/ field staff, Hepatitis B and C test, and general medical examination. Relevant literature, brochures and posters were also distributed among the Executives and subordinate staff. ■

*The writer is Executive Engineer at Health, Safety and Environment (HSE) department.*

# Surveillance audit conducted at SNGPL

**S**NGPL being an International Organization for Standardization (ISO) certified Company, undergoes surveillance audit every six months. This third party audit, performed by external auditor, is an essential part of certification carried out to ensure effectiveness of HSE Management system. SNGPL has been successful in retaining its ISO 14001:2004 & OHSAS 18001:2007 certifications due to strict and effective management.

For the purpose of audit, sites are nominated by HSE Department. As a regular biannual exercise, 15th Surveillance Audit was conducted by URS, certifying body on ISO 14001:2004 & OHSAS 18001:2007 Standards, from 24 to 27 November 2015.

Following sites were selected by the HSE Department for the audit:

- 1) Faisalabad Distribution
- 2) Faisalabad Compression
- 3) Central Meter Shop, Lahore
- 4) Head Office - Civil

5) Head Office - Shaheen Complex

During the Surveillance audit, URS Auditor visited office blocks, store, store yards, workshops, kitchen and parking area at all sites. URS Auditor also visited AC-8 Faisalabad, as sub site of Faisalabad Compression. A closing meeting was held at Head Office regarding the MR functions. Some minor



observations were highlighted by the auditor for betterment of the sites, which are being addressed at present.

It is pertinent to mention that all sites are prepared on ISO 14001:2004 & OHSAS 18001:2007 Standards by in-house resources & without the engagement of consultant. Auditor appreciated the overall commitment of Management towards HSE. ■



# SUI NORTHERN GAS PIPELINES LIMITED

## Wellbeing at the workplace

### Safety Habits



Wear gloves at all times when working on the factory floor



Wear your gloves, helmets, goggles and boots when moving chemicals



Don't block vision with load and always ensure your load is stable



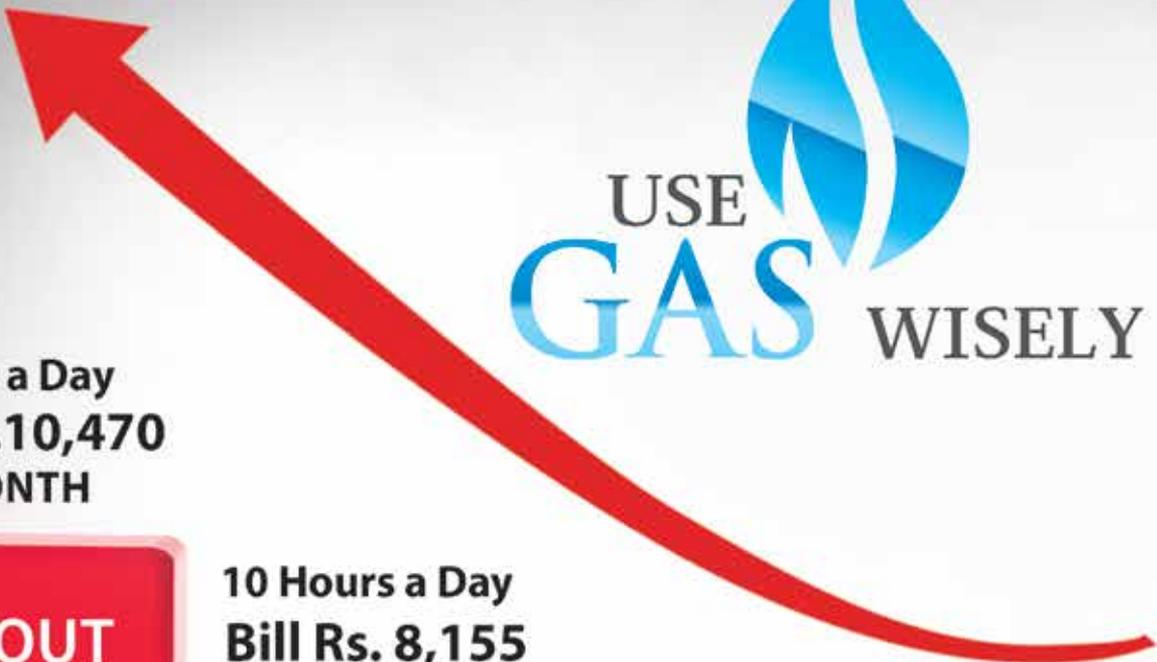
Clean spillage as soon as it occurs



**HEALTH SAFETY & ENVIRONMENT DEPARTMENT**



15-SP-HSE-04



USE  
**GAS** WISELY

6 Hours a Day  
Bill Rs. 10,470  
PER MONTH

**WITHOUT  
CONICAL  
BAFFLE**



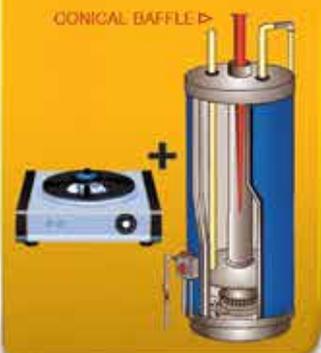
10 Hours a Day  
Bill Rs. 8,155  
PER MONTH

**WITHOUT  
CONICAL  
BAFFLE**



10 Hours a Day  
Bill Rs. 2,390  
PER MONTH

**WITH CONICAL  
BAFFLE**



6 Hours a Day  
Bill Rs. 280  
PER MONTH



**Save Gas Save Cash**



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