



From Cane

to



Sweet Solutions for the Sugar Industry
from Ion Exchange

New

INDION[®]
Decolourisation
of
Cane Sugar Remelt



India is among the largest producers and consumers of sugar in the world. About 3% of India's cultivable land is under sugarcane and around 50 million farmers and their families are dependent on sugarcane cultivation. Sugar is also India's second largest agro-processing industry. The sugar industry is therefore vital to our country's economy.

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Due to the poor monsoons of the last few years and resultant shortfall in sugar production, the Government of India decided to import and reprocess raw sugar to produce plantation white sugar. Another Government



decision was the blending of 5% ethanol with petrol; hence many sugar factories have also diversified into byproducts by establishing distilleries, ethanol plants, organic chemical plants and power cogeneration plants. Some sugar mills have also upgraded their plants to produce refined sugar of EC grade in order to better compete in the international market.

The Sugar Industry and Water

Sugar mills require huge volumes of water for their production processes. They typically consume 900–1000 litres of water and generate about 300–400 litres of waste water per tonne of cane crushed. The conventional water demand of a 2500 TCD (tonnes of sugarcane crushed per day) plant producing 200 to 300 tonnes sugar/day is 1–2.5 million litres/day. From 2005, the sugar and associated industries such as distilleries and ethanol plants will need to meet the regulation of zero discharge of liquid effluents into surface water.

Water Treatment for Boiler Feed: The manufacture of sugar

generates large quantities of biomass waste such as rice husk, bamboo dust, bagasse, coconut coir, jute and sticks. This waste is ideal for use as fuel to generate power and is one reason why most sugar mills have set up captive biomass cogeneration plants. The high-pressure boiler and the turbine form the heart of the cogen plant. The quality of water used for cogen boiler feed is critical to avoid scaling, corrosion and fouling in the boilers and the turbine blades, and consequent loss of energy.

As most plants are located near surface water sources, there is a need to address the problem of non-reactive silica or colloidal silica as well as Total Organic Carbon (TOC) present in most feed surface waters, especially during periods of high run-off. While

demineralisation (DM) and reverse osmosis (RO) effectively remove inorganic constituents from feed water, contaminants like colloidal silica and TOC are not removed and will slip through the ion exchange beds. When carried into the boiler, colloidal silica converts into reactive silica at high temperature and pressure, leading to formation of scales on the turbine and a subsequent drop in efficiency.

A solution to treat colloidal silica is to integrate DM and RO with ultra filtration (UF) as pre or post treatment to meet required boiler feed water quality. The UF based membrane process has proved the best technology for effective and consistent removal of colloidal particles and silica required values.

Additionally,

considering the level of organics and colloidal impurity in most sources of water, effective

Process Chemicals

IEL also offers the sugar industry a wide range of INDION speciality process chemicals for use in solid and liquid sugar production. These include:

- Mill Sanitation Chemicals (Biocides)
- Sugar Enhancer (Bagasse Pol Reducer)
- Flocculants for juice clarification
- Scale Inhibitors or Antiscalants for evaporators
- Viscosity Reducers in pan crystallisers, for massecuites
- Ion Exchangers and Adsorbents/Activated Carbon for sugar decolourisation and refining
- Colour Precipitant
- Flotation Aid
- Boiler Water Treatment Chemicals
- Bagasse/Fuel Additives
- Cooling Water Treatment Chemicals
- Water & Juice Analysis Kits

pretreatment to the RO plant will also require the use of hollow fibre UF membranes to block contaminants which would otherwise foul the RO membranes. Use of UF in the pretreatment to RO significantly reduces the size of RO plant, lowers the operating cost and at the same time enhances the performance and life of RO membranes.

Sugarcane Water Treatment: The sugar industry is also trying to conserve water by reusing cane water, generated in the form of vapour condensate. Cane comprises 70% water which, after passing through the milling and juice processes, is available as condensate (in a 2500 TCD plant the condensate available is around 1500 tonnes/day). This vapour condensate contains large amounts of organic impurities and therefore cannot be used directly as process water. However, with additional treatment such as condensate polishing to remove the high organics, the condensate water can be reused directly in the process of macerations, juice heating and as a substitute for DM water in boilers and cooling towers.

Waste Water Treatment & Recycle: The combined waste water generated from the various manufacturing processes has high COD, BOD, suspended and dissolved solids and acidic pH. Therefore its

treatment is a must prior to disposal. Increasing scarcity of water is also compelling a focus on water conservation. A well designed effluent

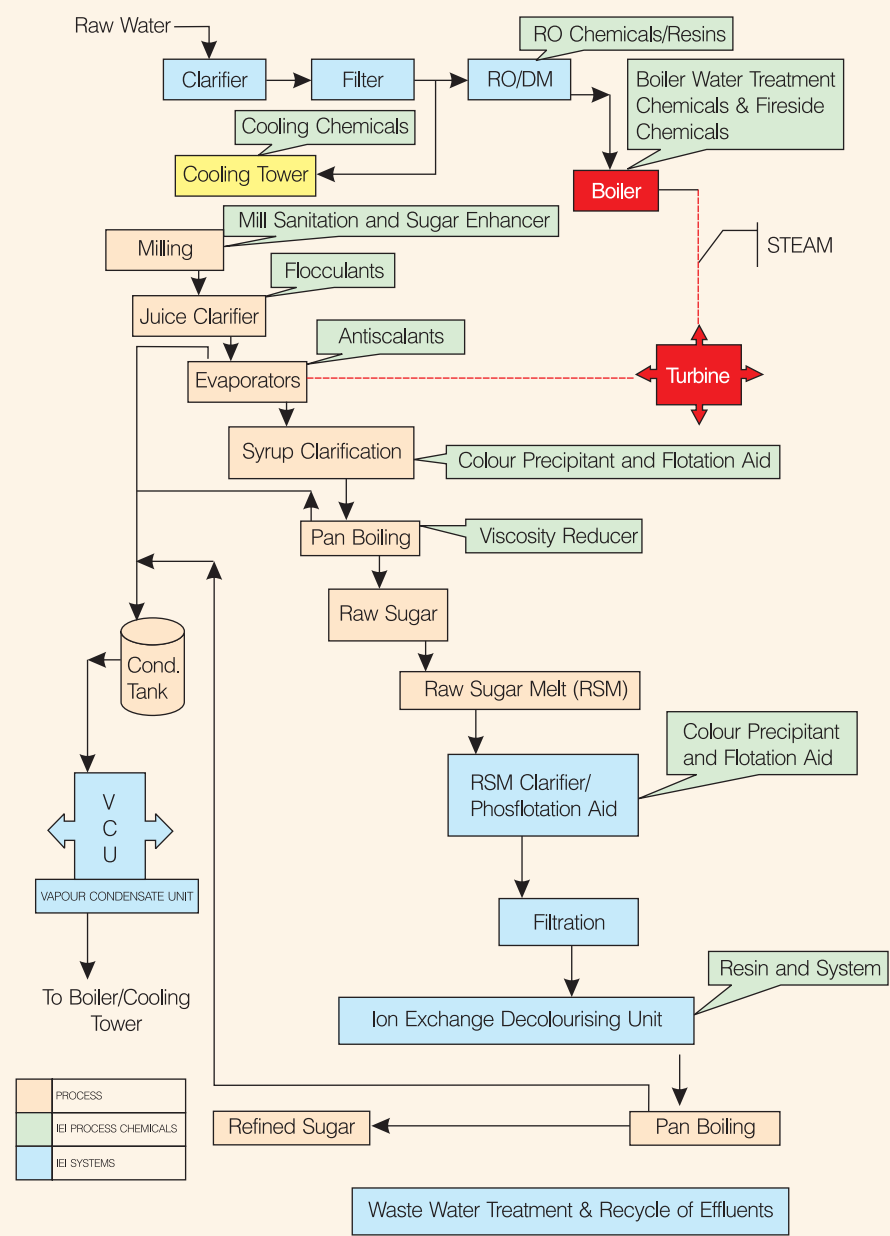
treatment plant comprising anaerobic and aerobic treatment, followed by membrane separation processes will help reduce 70 to 80% of

the effluent load and enable reuse of the water.



IEI in the Sugar Industry

Ion Exchange (India) Ltd. (IEI) offers sugar mills a wide range of products, processes and services, specially developed for diverse applications in sugar manufacture. An exclusive Sugar Division caters to the industry's need of water management, process engineering and speciality process chemicals; its synergistic approach provides total solutions to sugar mills and refineries enabling them to achieve significant competitive advantage.





INDION[®] Decolourisation of Cane Sugar Remelt using Ion Exchange Process

The sugar industry faces the dual problem of quality (colour) of sugar produced and of limited seasonal production. The INDION decolourisation solution using the ion exchange process has been developed by IEI to help sugar mills solve both these problems while increasing their profitability.

Colour of sugar is mainly due to the carryover of colour-causing complex bodies present in the sugarcane. Further colourants are formed during process stages, especially during juice concentration. The colour may be either from inclusion inside the crystal or even on the crystal surface, imparting a brownness on ageing.

The colour range acceptable to most countries is <50 ICUMSA. However, because of limited efficiency of clarification and decolourisation in conventional sulphitation, the colour of the final sugar is 150 to 300 ICUMSA. Even with the phosflotation process for clarification, colour levels of 100 to 150 ICUMSA are obtained. Thus, there is a need for decolourisation of melt subsequent to clarification to achieve the desired colour of sugar.

Realising the potential of refined sugar for the sugar industry, IEI undertook intensive R&D, working in close conjunction with a leading sugar mill in North India, to successfully develop and commercialise ion exchange resins Polystyrenic INDION 830S and Polyacrylic INDION 930A for decolourisation of cane sugar. We undertook conversion of the sugar mill's existing plantation white sugar plant based on double sulphitation process to a raw sugar-cum-refinery plant. The sugar produced by the refined sugar plant, after the addition of ion exchange columns supplied by us, qualified as EC Grade 2 sugar; it was exported to Europe against their quota for India and also sold in the Indian market at a premium. This ion exchange technology, which has a synergistic effect with phosflotation and carbonation, has replaced conventional colour removal methods with an economical operating cost. *On crystallisation, the final colour of the sugar is in the range of 20–40 ICUMSA units and is known as refined sugar.*

Currently very few mills manufacture refined sugar and IEI is the only company providing the technology to them.



Benefits to Industry and Nation

Using the INDION ion exchange decolourisation process, sugar mills in India are now able to produce EC1 and EC2 quality of sugar, with manifold benefits:

- The value-added product opens new avenues for exports of quality sugar by the sugar industry, thus also generating valuable foreign exchange for India.
- Sugar is a very important ingredient in traditional sweets and in the confectionery, beverage and pharmaceutical industries. Enhanced quality of sugar results in a general improvement in these products, gives a better shelf life, and enables optimum inventories without the risk of colour degradation. The decolourisation process reduces/eliminates their need to import high quality refined sugar, thereby also considerably reducing foreign exchange outgo.
- Sugar mills are dependent on the availability of cane, yield and quality of which in turn depend on agro-climatic conditions that are favourable only for a limited period during the year. Accordingly, the crushing duration is limited to 150 to 200 days, while the mill remains idle for the remaining period. This makes operations of most sugar mills unviable, especially in North India, where the season is the shortest in India. Sugar mills can now use their otherwise idle capacity to undertake sugar refining even during the off-season; this will create opportunities for employment as well for establishment of stand-alone refineries in coastal areas, which can reprocess imported raw sugar for manufacture of refined sugar for Indian and overseas markets. They can also utilise off-grade sugar which is otherwise wasted during the off-season or reprocessed only during the next season (which used to result in further deterioration of the sugar).

(See page 20 for more information)



Prestigious Orders for **Sugar Decolourisation**

From **Uttam Sugars**, Rourkee, Uttar Pradesh, system comprising four ion exchange columns with 24 cu.m. of speciality resin **INDION 830S** for decolourisation of sugar remelt.

At **Simbhaoli Sugar Mills**, Dist. Ghaziabad, Uttar

Pradesh, the sugar decolourisation unit enables production of refined sugar of <70 ICUMSA. The system is designed for sugar melt flow rate of 48 m³/h. The ion exchange system comprises two resin columns – an acrylic (loader) column followed by a styrene (polisher) column.

Sugar **Refining Chemicals**

Orders for sugar refining chemicals for another breakthrough application – colour precipitation and flotation aid – were received from **Dhampur Sugar Mills**, Uttar Pradesh, for their refinery units at Rauzagaon and Mansurpur, and from **Simbhaoli Sugar Mills**, Simbhaoli, Uttar Pradesh. Repeat orders were received from both these customers.

An annual order from **Haidergarh Chini Mills Ltd.**,

Haidergarh, Uttar Pradesh, for circulating water treatment chemicals for the bagasse-based cogen power project at their sugar plant complex.

Repeat order from **Balrampur Chini Mills**, Balrampur, for their Balrampur and Haidergarh units in Uttar Pradesh, for cooling water treatment chemicals for the bagasse-based cogen power projects at their sugar plants.

Powering the Sugar Sector

The spate of orders from the sugar sector, for captive power plants, include:

For their bagasse-based cogen power plants, **Davanagere Sugars Limited**, Kukkuwada Village, Karnataka (see photos), and **SCM Sugars**, Mandya, each ordered a 200 m³/h high rate solids contact clarifier; a 2 x 20 m³/h demineralisation plant for boiler make-up, and 2 x 80 m³/h softening plant for cooling tower make-up.





From **Haidergarh Chini Mills**, a unit of **Balrampur Chini Mills Ltd.**, Haidergarh, Uttar Pradesh, two side stream filters, capacity 125 m³/h each and one multi-grade filter, capacity 40 m³/h.

From **Balrampur Chini Mills Ltd.** (the Bhabhnan unit – Chemical Division), Bhabhnan, a 125 m³/h multi-grade filter, a 48 m³/h activated carbon filter and a 77 m³/h softener.

From **GMR Sugars Ltd.**, Sankli, Andhra Pradesh, a 25 m³/h demineralisation plant. Another order from this client is for a 160 m³/h high rate solids contact clarifier and a filter.

From **Rajshree Sugars & Chemicals Ltd.**, Coimbatore, for their plant at Villupuram, Tamil Nadu, a 30 m³/h reverse osmosis, demineralisation and mixed bed plant.

A prestigious contract for water treatment plant from **Nizam Deccan Sugars Ltd.**, Hyderabad, for the cogen power plant of their Bodhan plant in Andhra Pradesh. The plant comprises 70 m³/h high rate solids contact clarifier, 55 m³/h ultra filtration, 41 m³/h reverse osmosis and 38 m³/h mixed bed. The treated water will be used for boiler feed and process applications.

Order for a 30 m³/h demineralisation plant from **Jeypore Sugars Ltd.**, for their cogen unit at Chagallu, West Godavari District, Andhra Pradesh.

A 30 m³/h reverse osmosis/mixed bed for **Sri Vani Sugars**, Punganur, Chittoor Dist., Andhra Pradesh, for boiler requirement at their cogen unit.

From **Ghagra Sugars Ltd.**, Azbapur, Uttar Pradesh, two softeners, each 100 m³/h.

*At **Sakthi Sugars**, Erode, Tamil Nadu, for their 32 MW cogen plant, a 260 m³/h high rate solids contact clarifier, 60 m³/h ultra filtration plant, 45 m³/h reverse osmosis plant and 45 m³/h mixed bed unit. Both the client and their consultant, Avante Garde, greatly appreciated the timely completion of this contract to requirements.*



Mobilising Drinking Water Relief for Tsunami-affected

Responding to the critical need for safe drinking water in tsunami affected areas, IEI took the initiative to manufacture and supply a containerised sea water desalination plant to the Tamil Nadu Government in Nagapattinam. It will provide drinking water for the impacted population at the rehabilitation camps in Nagapattinam district. The 1,000 litre/hour membrane based plant incorporates state-of-the art treatment systems that enable it to treat contaminated water from any source – ground water to sea water, to produce pure drinking water. The plant has been contributed by Ion Exchange India and its employees; it incorporates membrane pressure tubes contributed by



component supplier Pentair. IEI representatives will also be training the local people in O&M of the plant.

Our INDION disaster management unit (DMU) provides safe drinking water during disasters such as droughts, cyclones, floods and earthquakes. Membrane processes and ozonation modules can be used in combination depending upon the quality of water to be treated; treatment for removal of iron and

Engineering Hi-Lites

From **Neepaz Metaliks Ltd.**, Kuarmunda, Orissa, a 45 m³/h softening plant and a 210 m³/h filtration plant.

For **Brakes India**, Sholingar, a 35 m³/h filtration plant, a 20 m³/h softener and a 400 l/h drinking water RO system.

A repeat order for a 150 m³/h auto valveless gravity filter for their butadyne expansion project, from **Reliance Industries Limited**, Hazira project.

DM plant, 2 x 1000 m³/day, for **Star Paper Mills**, Saharanpur, Uttar Pradesh.



arsenic can also be incorporated. The compact and skid mounted DMU can be truck mounted for easy and quick transportation to affected sites.

IEI had also shipped 50 point-of-use Zero-B Puriline drinking water purification units to Sri Lanka where the on-line units were installed in Hambantota district by Government Water Board engineers. Our



responsiveness with short-time delivery of the much needed purification equipment has been appreciated by the Sri Lankan Government. Currently, our

Consumer Products Division is executing an order from the

Government of India for 7500 Zero-B Srijal water purifiers for the Tsunami relief operations in the Andaman & Nicobar Islands.



For **Uranium Corp. of India Ltd.** Jaduguda, Jharkhand, for their uranium liquor purification project, a 170 m³/h semi-auto PLC based plant comprising four chains of fixed bed ion exchange system, each chain consisting of three special grade ion exchange columns. Our scope consists of civil, mechanical, electrical and instrumentation work, with a delivery of 13 months.

For **Chemplast Sanmar**, Mettur Dam, a 45 m³/h effluent recycle (ultra filtration followed by reverse osmosis) system.

Always on Top

IEI was rated 'A' category by JK Paper Ltd., in their performance evaluation of suppliers – testimony to our reliable, prompt and timely service.

Recycle Plant Commissioned at MFL



Designed to treat cooling tower blowdown that was earlier wasted to drain, the 160 m³/h recycle plant supplied to Madras Fertilisers Ltd. (MFL) incorporates pretreatment followed by ultra filtration which feeds the existing reverse osmosis plant. Besides enjoying the distinction of being the largest ultra filtration plant commissioned in India, this plant has acquired critical importance as Manali, Chennai, where MFL is located, suffers from perennial water shortage.



Supplied to **Associated Cement Companies Ltd. (ACC)**, Mumbai, for the Chaibasa cement works for boiler make-up water, for their 1 x 15 MW captive power plant, and cooling tower cycle make-up. The water treatment plant consists of a single chain DM plant and two streams, each 45 m³/h, of softening along with auxiliaries such as 2 x 50 m³/h filtration plant, chlorination systems for cooling water and drinking water, and low pressure dosing. It will receive and treat clarified water to produce DM grade water and soft water.



Order for supply of a 140 m³/h DM plant for 3 x 30 MW power plant at Lanjigarh, Orissa, for Sterlite (Vedanta Group) from China National Machinery & Equipment Import & Export Corporation (CMEC), the largest Chinese EPC contractor for power utilities. Successful execution of the contract will no doubt mark the beginning of a long term and mutually beneficial business relationship with CMEC and other Chinese EPCs. This prestigious order was awarded against competition from both Indian and Chinese manufacturers.

From **Jindal Steel & Power Ltd.**, Raigarh, Chattisgarh, a 700 m³/h pretreatment plant, 3 x 350 m³/h rapid gravity filter, 2 x 50 m³/h demineralisation plant, 4 x 150 m³/h side stream filter and 6 x 10 kg/h chlorination. This is the seventh contract we will be executing for this client, the fifth in two years.

Customer Confidence

A spate of orders from **Sterling Gelatin**, Vadodara, Gujarat:

- 6 m³/h ultra filtration system for gelatin concentration – our third order from this customer for this application.
- Activated carbon filters for deodorisation of gelatin, for their Ooty unit.
- Additional stream of DM plant for the unit at Karakadi, Vadodara.



Our first order for the ORION high purity water system (above) is from **Ranbaxy Laboratories Ltd.**, for installation at Devas, Madhya Pradesh. We also received an order for the ORION system from **Torrent Pharma Ltd.** for their new project at Baddi, Himachal Pradesh, along with another order for pretreatment plant consisting of two stream filters and softener of 55 m³/h each.

Auto DM plant of 2 x 16.25 m³/h, 60 m³/h lamella clarifier, multi grade filter and activated carbon filter, 2 x 50 m³/h from **Saint-Gobain Glass**, Sriperumpudur, Tamil Nadu, for their Float II Project.

From **Hima Ispat Pvt Ltd.**, Barpada Village, Keonjhar, Orissa, order for a cascade aeration system and high rate solids contact clarifier, each 100 m³/h, and an RO and mixed bed. From **Harihar Power**, Pudukottai, Tamil Nadu, a 43.6 m³/h pressure sand filter, activated carbon filter, 40 m³/h softener, and an RO and mixed bed. Cethar Vessels is the EPC contractor for these jobs.



225 m³/h lamella clarifier supplied to **Northeast Frontier Railway**, Guwahati. The treatment system includes lime, alum, polymer and sodium hypochlorite dosing systems, 4200 mm dia. static mixer-cum-flocculation tank of lamella clarifier with 118 FRP plates, and two 3000 mm dia. multigrade filters.



Two orders from **Nahar Spinning Mills** for their 3.5 MW cogen units – Nahar Fabrics, Ludhiana (pressure sand filter 44 m³/h, RO and mixed bed 33 m³/h each) and Oswal Woollen Mills, Sherpur (pressure sand filter 30.7 m³/h, RO and mixed bed 23 m³/h each).

An order from **Hai Medicare and Research**, a major hospital in Patna, Bihar, for artificial kidney dialysis (AKD) application; the system comprises RO with pretreatment. We have also supplied two units to **Wockhardt Kidney Research**. With this the number of hospitals in the Eastern region using our AKD systems stands at 42.



200 l/h pretreatment RO system with UV, to treat water for aircraft use installed at **Indian Airlines**, Chennai. Mr. Vishwanathan (right), Dy. Manager – Ground Support Division, Indian Airlines, with Mr. Rajesh Sharma, Managing Director, IEI.

Reed Bed for Dhirubhai Ambani Institute



A specially engineered simulation of a natural wetland ecosystem, the 100 m³/day reed bed system at the Dhirubhai Ambani Institute of Communication Technology, Gandhinagar, Gujarat, treats sullage and sewage for reuse in the institute's gardens.

Overseas

A prestigious order from PT Riau Prima Engineering (RAPP), Indonesia, for supply of a 254 m³/h condensate polishing unit.

From R.L. Yarn Dyeing, Bangladesh, against competition from European and Indian suppliers, a 1200 m³/day waste water treatment plant.

From Gulf Farabi Petro Chemicals, Saudi Arabia, a 120 m³/day RO plant. The client's consultant is UDHE India and the main contractor is SNC Lavin, Canada.



Successfully commissioned at **Oman India Fertilizer**, Oman, 750 m³/h condensate polishing unit and 288 m³/day waste water treatment plant.

910 m³/h pretreatment plant and 120 m³/h demineralisation plant supplied to **EPC Alstom Power Italia SpA for Nigerian Agip Oil Company's Okpai power plant**. The job involved 175 tonnes of steel fabrication, a single largest rubberlined tank of 4.2 x 12.5 dia (LOS) with a shipment weight of 3.8 tonnes. Our export oriented unit at Rabale arranged to move 180 truckloads of material in a fortnight for a specially chartered barge mounted shipment.



Bringing Safe Drinking Water to Rural India

Our partnership approach for sustainability of solutions is amply demonstrated in these projects undertaken in Raigad and Yavatmal districts of rural Maharashtra.

INDION™ Fluoride Removal at Yavatmal

The level of fluoride in ground water is as high as 10 ppm at several sites in Yavatmal district. This provided an opportunity to IEI to demonstrate the INDION Handpump Attachment for Fluoride Removal at Mangikolam, Yavatmal. Our pilot unit successfully treated ground water fluoride contamination of 8.73 ppm, reducing this to 0.34 ppm, well below the WHO limit of 1 ppm. Its continuous good performance, as well as that of our pilot defluoridation installations at Nanded and Nagpur, resulted in the Government of Maharashtra's approval of our technology for fluoride removal from ground water. Subsequently, we received an order for 67 handpump attachments for fluoride removal from the Zilla Parishad of Yavatmal.

A Learning Process

All the units were successfully installed and commissioned. In course of time, however, several unanticipated problems cropped up.

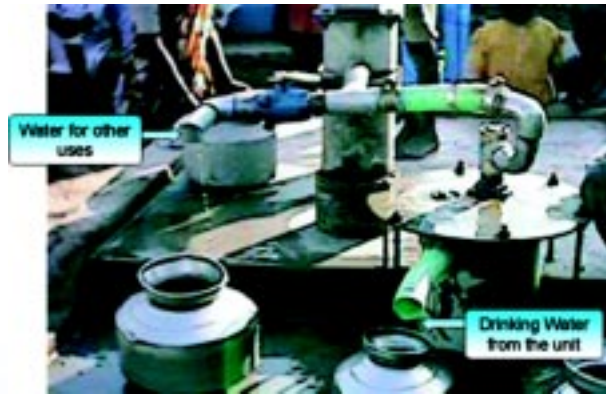
- As the units had been installed on the ground, many of them got partially submerged with the onset of the monsoons.
- The PVC pipe connecting the unit to the handpump, was not sturdy enough to withstand rough handling.

- There was no provision to isolate water for drinking from water for other uses such as bathing, washing, etc.

Working Together for Solutions

We entered into an agreement with various NGOs for the operation and maintenance (O&M) of the units as well as to educate the village community – the ultimate users and beneficiaries. The NGOs were thoroughly trained in O&M.

The units were reinstalled after the following modifications at site:



- Provision of a control valve in the inlet line facilitates separate collection of drinking water and water for other uses.





Committee formed by NGOs for maintenance of the unit.

- The unit was moved closer to the handpump and connected with a shorter, sturdy GI pipe.
- A common platform was constructed for the unit and the handpump, with the help of the local community. The raised height eliminated the problem of submergence during the monsoons, and also made it much easier for the villagers to collect water.
- The NGOs created awareness on the adverse effects of fluoride contamination on health, so that the villagers realised the benefits of the project and the importance of proper handling, use and care of the treatment units.

Today, the village community has in turn been trained in O&M by the NGOs. To ensure project sustainability, maintenance committees from among the villagers have been formed by the NGOs to monitor the functioning of the units while the NGOs coordinate and monitor the project.

Water Resource Project at Village Tondsure

It is a model example of cooperation for other water starved villages in India to draw inspiration from. Tondsure Jagamwadi in Maharashtra's drought prone Raigad district is helping create its own water resource through an integrated and participative project that has brought together villagers, corporates, NGOs and philanthropic organisations to develop safe drinking water and sufficient water resource for the villagers.

The Inspiration

It all started with a rainwater harvesting (RWH) project

at village Vihule Kond, near Mangaon in Raigad. IEI provided technical consultancy for NGO SHARE's RWH project. This participative project where villagers contributed *shramdaan* (voluntary labour) resulted in the construction of an RWH pond of 4.2 million litres storage capacity. Its success inspired several surrounding villages to start RWH projects and currently NGOs SHARE-SCESA are implementing RWH projects at 10 villages in six talukas of Raigad.

Water Problems at Tondsure

Tondsure Jagamwadi in Mhasala Taluka is one such village that requested for help to solve its water problems. A medium sized village of 60 households (350 – 375 population), Tondsure experiences severe water shortages every year. While the SHARE-SCESA team was surveying the village for potential RWH sites, the villagers informed them of contaminated water in the borewell, complaining that the water emitted a foul smell, tasted metallic and unpalatable, turned yellow after 15 minutes of collection, and exhibited suspended particles when kept longer. This prompted SHARE to send the water for analysis and potential solutions to IEI. Results revealed iron contamination of 5.2 ppm (the WHO limit is 0.3 ppm for drinking water).

IEI's Solution

We recommended our INDION Handpump Attachment for Iron Removal, designed specially for rural India and using iron specific resin developed by our R&D. The



INDION Handpump Attachment for Iron Removal installed at Tondsure.

INDION iron removal process using this special catalytic granular media, is a completely self-contained solution, making it highly suitable for rural areas. It overcomes the disadvantages of current methods that require sizable space, multi-stage treatment, use large quantities of chemicals, need electricity and require reasonably skilled manpower, careful monitoring and high capital outlay.

Although we have supplied such units to PHEDs in Orissa, Chattisgarh and West Bengal, *this was the first such handpump attachment for iron removal to be deployed in Maharashtra.*

Rainwater Harvesting to the Rescue

Whereas IEI supplied the technology to solve the problem of iron contamination at Tondsure, the Rotary



Rooftop rainwater harvesting at Tondsure.

Club of Mumbai Downtown and the SUNRICH Group financially supported the cost of raw material and skilled labour to construct a large RWH pond (storage capacity 4.5 million litres of water), gabions to recharge open wells and a rooftop RWH system to recharge the borewell along with the iron removal unit. Voluntary, manual, unskilled labour was contributed by the villagers while SHARE-SCESA monitored activities and ensured that the interests of all – villagers and the donors, were met, and the benefits to the villagers sustained in the long term.

Collaborative Success



Handing over the project to the villagers, Rotary District Governor Nitin Mangaldas said, "This is truly a project for the people, by the people and of the people – a model project that addresses both drinking water as well as water scarcity problems and will inspire villages all over India." Several surrounding villages of Shrivardan taluka have expressed interest in replicating such projects in their own communities.



We have successfully installed and commissioned our first **INDION Power Pump Attachment Fluoride**



Removal Unit, at village Lamkani, in Akola district of Maharashtra. The raw water with fluoride contamination of 2.34 ppm is pumped from the well through the fluoride removal unit which has a 10 m³/h flow rate. The treated water is stored in an overhead storage tank from which it is distributed to three villages having a population of around 1,000. The treated water has fluoride content of 1.3 ppm, well below the WHO limit of 1 ppm.



A second handpump attachment for iron removal has been successfully commissioned at village Maneri, in Maharashtra's Shrivardhan district. The iron content in the raw water was 2.5 ppm and nil in the treated water. This order was also received through NGO SHARE.

We have received an order from Society for Eradication of Rural Poverty (SERP) for 1,032 domestic point-of-use defluoridation units. These are for supply to Cuddappa and Nalgonda districts in Andhra Pradesh, where SERP is associated with the State Government's Velugu project for uplift of rural communities. Fluoride contamination in these districts is around 4-5 ppm.

PHED Rajnandgaon, Chattisgarh, has placed an order for two handpump attachments for iron removal.

IEI's Water Assurance for Building Projects

A serious problem that new residential complexes experience is water shortage. The problem is worsening throughout India, and stringent regulations to conserve water are being introduced. For example, The Brihanmumbai Municipal Corporation proposes to reduce per capita water supply from 140 to 90 litres per day. In several metros, incorporation of rainwater harvesting and water recycle plants has been made mandatory for large building complexes.

Another critical concern is the deteriorating quality of water due to the increasing pollution of water supply sources, both surface and ground water.

Residents increasingly have no alternative but to depend on borewell water which is usually hard and brackish with microbial contamination. This can affect their health as well as quality of hair and skin, and the life of expensive sanitaryware and kitchen appliances. Tanker water is of unknown quality and also very expensive. Besides, as water gets scarcer, from where will tankers get their supplies?

Indeed water – its availability and its quality, has become a priority item on the agenda of builders, architects and housing societies who are seeking solutions that incorporate advanced technologies and are at the same time cost-effective, with a good payback period, and also compact (space being at a premium).



20 m³/h reverse osmosis (RO) system for drinking, cooling tower and boiler purposes at CGO Scope Office (20,000 inhabitants) at Lodhi Road, New Delhi. Five year annual maintenance contract.



45 m³/h iron removal and softening system at Military Engineering Services' Dumayun Army Housing Complex, Garden Reach, Kolkata.

And this is why IEI's Water Management Solutions, customised to specific needs of residential and commercial complexes, are becoming increasingly popular. These include point-of-use drinking water purifiers as well compact, centralised drinking water systems that can turn borewell water soft and potable (because of its high levels of calcium and magnesium salts, borewell water requires softening as well as further RO (reverse osmosis) purification before it is used for drinking or cooking). IEI's compact, modular, sewage treatment & recycle systems too are much in demand – using advanced treatment processes, they enable saving of upto 60% fresh water as the treated, recycled water can safely be used for toilet flushing, gardening and car washing.

Thus, with IEI's water assurance solutions, building complexes are assured of:

- safe and pure water for drinking and cooking,
- soft water for bathing and washing clothes,
- clean and crystal clear swimming pools,
- protection against water shortages with water recycle,
- freedom from hassles of operation and maintenance services, by opting for our O&M services.





At Bengal Ambuja's City Centre Multiplex, Salt Lake, Kolkata – eastern India's largest mall, designed by Charles Correa, centralised treatment plant comprising iron removal and softening of 36 m³/h capacity. In addition, a drinking water RO system of 1 m³/h with complete pretreatment.



Installed at premier housing properties in Kolkata – iron removal filtration system, 8 m³/h, for Mani Group, and iron removal and softening system, 8 m³/h, for MK Jalan Properties.



5 m³/h RO system for drinking and other applications, caters to the 180 flats in Shakti Apartments, Dwarka.



For drinking water, RO system of 0.6 m³/h capacity, with full pretreatment consisting of filtration, iron removal, activated carbon, softening and ultra violet sterilisation, at Defence Complex, Hastings, Kolkata.



25 m³/h iron removal and softening system at Middleton Mansion Housing Society, Kolkata.



At Indian Navy's INS Netaji Subhas, Hastings, Kolkata, RO system of 0.6 m³/h capacity for drinking water, along with full pretreatment consisting of filtration, iron removal, activated carbon, softening and ultra violet sterilisation.



15 m³/h iron removal and softening system at Tolly Residency Housing Society, Kolkata.

New generation packaged sewage treatment plant at S. Tech P. Ltd. call centre at New Delhi.



Tata Chemicals Limited – Fertiliser Works at Babrala



The Problem: The DM plant – two strong acid cation exchangers in series – had been manufactured, erected and commissioned by the client using resins supplied by IEI. The scheme was based on the expected water quality at site. However, during commissioning, it was found that the acid consumption was very high and the actual water analysis showed high M-alkalinity and hardness; and the sodium to total cation ratio was differing from the design. As the original resins were supplied by IEI, the matter was referred to us. During the visit for troubleshooting, IEI suggested that, based on the actual water quality, the scheme of two strong acid cation in series required review and the resin in the first vessel needed to be replaced with weak acid cation resin to improve regeneration efficiency. The original scheme envisaged such flexibility for changeover in future if necessitated by water quality.

Solution: IEI immediately offered weak acid cation resin with short delivery.

The amount of saving estimated was such that the client was not fully convinced, as it seemed too good to be true. IEI then supported the proposal with thorough design calculations and guaranteed the implementation of the project all of which helped the client to decide to try it in one of the three streams.

Results: The scheme, when implemented in the first vessel, was an immediate success. Based on the savings achieved, the client immediately placed an order for the balance two streams. These also gave similar results.

Savings: The total cost of Rs.2.7 million involved in the project was recovered in a period of just six months. The unit is benchmarked in the industry for low chemical consumption.

Badarpur Thermal Power Station (NTPC)

Problem: Due to pretreatment problems on account of high suspended solids, muck and turbidity, the middle collector system frequently failed. Because of this the system had to be operated in co-flow mode – resulting in high acid consumption, high sodium slip and inconsistent quality.

Solution: A new type of a much sturdier middle collector was specifically designed to tackle the problem. With the new collecting system, the client could go back to countercurrent operation and obtain full benefits of the countercurrent system such as consistently low sodium slip and reduced acid consumption. After much follow-up with the client, our proposal was accepted on condition that it be first tried in only one of the four vessels.

Results: The system was implemented in one of the strong acid cation vessels, executed while the plant was in operation, within the stipulated time. The vessel was commissioned and the system ran successfully without any problem.

Savings: The client was able to achieve a 30% reduction in chemical cost due to implementation of this project. The cost of Rs.600,000, incurred in modifying one vessel, was recovered in one year's time due to savings in chemical consumption. Additional benefits were consistent quality. And low sodium slip resulting in lower silica slip from strong base anion.

The client decided to go in for a similar modification in the balance three vessels and the system has now been successfully commissioned in all four vessels.



Adding to its solutions bouquet, IEI has developed and recently launched several advanced products and processes for diverse applications such as treatment and recycle of waste water and sewage, iron removal and decolourising of cane sugar remelt.

INDION[®] Membrane Bio-reactor (MBR)

Designed to produce high quality treated water from waste water, the INDION membrane bio-reactor (MBR) is among the latest technologies in biological treatment. The revolutionary MBR uses submerged membranes in the biological process water tank so as to produce high quality permeate from domestic sewage, primary and secondary waste water, cooling tower blowdown, etc. Available in standard and customised modules, the INDION MBR is also ideal for retrofitting and for augmenting capacity/quality of existing waste water treatment plants.

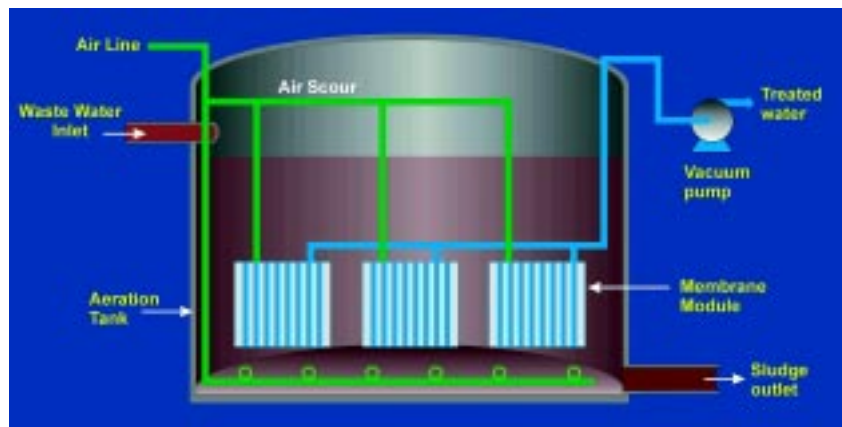
INDION MBR can handle very high sludge concentrations in the aeration tank because of which the size of the aeration tank reduces four to fivefold. As the membranes act as a fine filter, no further treatment using sand filters, activated carbon filters, etc. is required.

Some of the advantages of the MBR process over conventional treatment:

- Consistent treated water quality, independent of feed variability. The MBR produces high quality treated water which can be directly fed into the reverse osmosis (RO) system; it also removes bacteria and viruses upto 4 to 6 log.
- Submerged applications do not require expensive "out of tank" pressure pipe work.
- Single packaged unit, minimal civil work and pretreatment. It is a compact system (occupies 1/2 to 1/3 the space of a conventional system) as the aeration tank size is very compact. All clarifier related problems such as sludge bulking, sludge rising, etc. are avoided as the clarifier unit itself is eliminated.
- Complete automated system, minimal attention and maintenance.
- Because of high concentrations of sludge and long sludge age periods, it generates highly stabilised

sludge of low volume. It does not require sludge recycle, thus avoiding complicated sludge recycle controls. This also saves energy as recirculation pumps are absent.

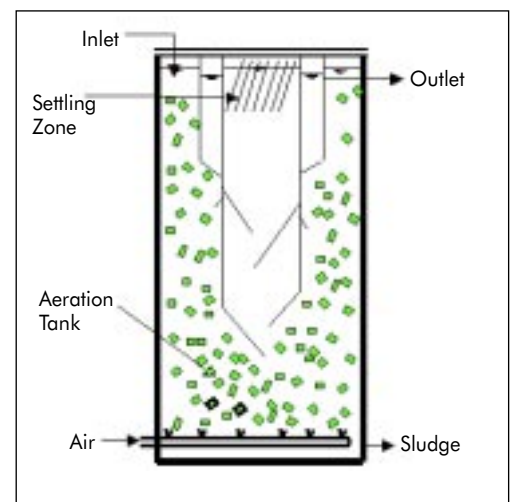
- It does not require costly tertiary treatment units to make the effluent suitable for recycle. This also makes the treatment scheme short and compact. It does not require any chemicals such as coagulants, polymers, etc. which are required in tertiary treatment by conventional sewage treatment plants.
- It has more than five years of membrane life.



INDION[®] Fluidised Media Reactor (FMR)

The INDION Fluidised Media Reactor (FMR) uses the attached growth process for waste water/sewage treatment and recycle. It incorporates a single tank unit, consisting of a bar screen chamber, specially designed floating media to facilitate the attached growth process, oxygen transfer through diffused membrane aeration, lamella settler and chlorine contact tank. The system is available in mild steel and reinforced concrete.

The FMR works on the same principle as the submerged fixed film process with only one exception – the media is not fixed and floats around in the aeration tank. The main advantage of this system over the submerged fixed film



process is that it prevents choking of the media. This also avoids sludge recirculation. Compared to conventional technologies the FMR is compact, energy efficient and user friendly. It also allows flexibility in design of the reactor tank. The advantages of the INDION FMR are many:

- Unique single tank design, no moving parts and easy maintenance.
- Attached growth process, with specially designed moving media.
- Compact and modular design.
- Minimal pumping and chemical cost, low operating cost.
- Flow rate for sewage treatment exceeding 100 m³/d.

Applications of FMR include decentralised compact sewage plants for housing complexes, hotels, commercial complexes, industries and rural communities. It can also be used in industrial waste treatment in industries such as food & beverage, textile, pulp and paper, chemicals, pharmaceuticals, petrochemicals and dairy production.

Orders for the INDION fluidised media bed reactor for sewage treatment include **Reliance India Ltd., ICC – Pune, SDM Technoengrs (Satyam Computers) and JK Cement, Rajasthan.**



200 m³/day fluidised media reactor (inset) and tertiary treatment at Satyam Computers office complex. Sewage is oxidised in the tank to reduce BOD. Tertiary treatment recycles waste water for toilet flushing and gardening.



INDION® Vehicle Wash Recycle System

Vast volumes of water used by vehicle wash stations are sent to drain, thus wasting an increasingly scarce and valuable resource. The wash water contains high levels of COD/BOD, oil (free floating/emulsified) and grease, heavy metals, suspended solids, cleaning fluids and detergents. These contaminants, when discharged untreated, reduce dissolved oxygen levels in water bodies affecting aquatic life, accelerate growth of disease-causing pathogens and reduce the load bearing capacity of soil.

IEI offers the first-of-its-kind membrane-based INDION vehicle wash recycle system in India. This system removes free floating and



emulsified oil, grease, suspended organic/inorganic particles, as well as colour and odour, thereby making the treated waste water fit for reuse for vehicle washing. The system aids in recycling 85% - 90% of the waste water generated, thereby eliminating offsite discharge into sewers/open water bodies.

The INDION vehicle wash recycle system comes with a small footprint mounted on a single compact skid. It reduces pollutants and disinfects water without using chemicals. The system is automated which eases operation, reduces operator dependence, produces treated water with consistent quality and reduces maintenance. It is resistant to upset conditions and can be operated for extended hours. The system is low in operating cost and is techno-commercially attractive with typical payback period of less than three years.

It is ideal for automobile manufacturers, car wash and truck service stations, bus depots, railways/wagon yards and golf cart owners.

Our INDION Vehicle Wash System has been installed at:

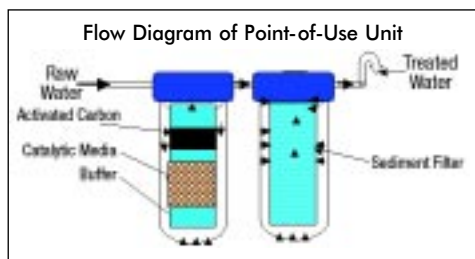
- Maruti Udyog Ltd (export unit at JNPT)
- Concorde Motors
- Bafna Motors (dealer for Tata Motors)



D-Ferrous 500 unit.

INDION[®] ISR (Iron Specific Resin)

Developed by IEI after extensive laboratory and field studies, INDION ISR (Iron Specific Resin) is an excellent catalytic media for removal of dissolved iron from ground water. Its size ranges from 0.3 to 1.2 mm, making it an ideal filter media. It produces iron-free (<0.3 ppm) water, even with water containing upto 10 ppm iron. Being a catalyst, INDION ISR is not consumed in iron removal and this gives tremendous life to the media. It does not require chemicals for



regeneration; only periodic backwashing is needed to remove the precipitated iron and the media can be easily backwashed due to its low density.

Our iron removal process using this INDION ISR can be used for domestic as well as industrial purposes, including as pretreatment to reverse osmosis systems. A very user friendly and completely self-contained solution, it is ideal for rural areas; it can be used in either gravity flow or pressurised water treatment systems with varied temperature range. It overcomes the disadvantages of current methods that require sizeable space, multi-stage treatment, large quantities of chemicals, electricity, reasonably skilled manpower, careful monitoring and high capital outlay.

An order for a 45 m³/h iron removal filter, with our newly developed INDION iron specific resin media, was received from **Nagaland State Transport Corporation** for installation at Dimapur bus terminal.

INDION[®] Decolourisation of Cane Sugar Remelt using Ion Exchange Process

Through extensive R&D, IEI has successfully introduced and commercialised ion exchange resins Polystyrenic INDION 830S and Polyacrylic INDION 930A for decolourisation of cane sugar remelt, with economical operating cost. The resins are produced in our state-of-art and automated, ISO 9001 certified manufacturing unit.

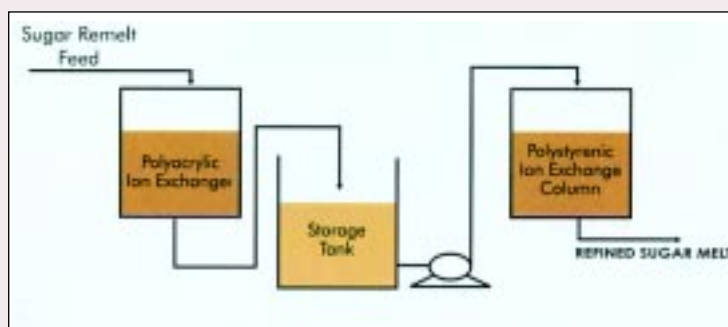
This effective and economical technology has synergistic effect with pretreatment methods like phosfloatation or carbonation phosfloatation and carbonation and offers economical operating cost.

The INDION ion exchange sugar refining process operates by passing the pretreated sugar melt through a combination of specially suited ion exchange resin columns. These resins have the capacity to adsorb the colour precursors. The exhausted resin bed can be effectively regenerated using sodium chloride salt solution.

Sugar juice/syrup requiring treatment has the following characteristics:

- A colouring matter content that varies according to whether the juice is factory/refinery liquor/machine syrup. The molecular weight of the colourants is usually high.
- A high concentration, in the range of 58-60 Brix. or 65 Brix maximum
 - a) in most cases slightly alkaline pH
 - b) a temperature around 80°C

A thorough understanding of these constraints made it possible to develop INDION 930A and 830S for



colour removal. Their distinguishing features are:

- pH of the juice is not materially changed.
- High porosity required fixing high molecular weight colourants by adsorption.
- High resistance to osmotic shock to withstand sudden changes in concentration between the regeneration and exchange steps.
- A specially designed particle size – very fine beads, associated with the viscosity of the juice would cause excessive head loss; very coarse beads would have less power of adsorption.
- Cleaner to handle than traditional carbon based adsorbents and cheaper than transporting the carbon to a furnace to burn off the impurities.

Benefits: Good colour capacity • High efficiency • Good adsorption • Works at higher mechanical and osmotic pressure, hence longer life • High resistance to fouling • Simple and economical.

Sustainable Solutions for Water Security – A Partnership Approach

Even in this age of technological advancement, over 75% of our country's population lack access to safe and sufficient water and basic sanitation. The need of the hour is efficient water management and the creation of an infrastructure that assures sustainable water security. This can only be achieved



Mr. Rajesh Sharma



Mr. B.N. Kirpal



Mr. Sushil Gupta

through an integrated, collaborative approach by Government, municipalities, NGOs, donor aid agencies, the corporate sector, research & educational institutions, media and communities, all working together.

IEI therefore organised a high-powered, day-long symposium *Sustainable Solutions for Water Security – A Partnership Approach*, in New Delhi where captains of industry, distinguished civil servants, representatives of leading NGOs, international aid agencies and environmental organisations met to deliberate on critical issues relating to effective water management for the country's water security. The objective was to arrive at a shared perspective and synergistic thinking on problems and solutions through exchange of experiences, networking and implementation of joint initiatives.

Interactive sessions covered availability of water through watershed development, rainwater harvesting and water recycle, solutions and technology options for safe drinking water, and sanitation. The seminar



sessions were chaired and addressed by eminent experts from the public, private and NGO sectors.

These included IEI's Managing Director Mr. Rajesh Sharma, and Mr. Ajay Popat, Vice President, Corporate Marketing; former Chief Justice of India Hon'ble Shri B.N. Kirpal; Director, Rotary International

Mr. Sushil Gupta; Mr. Vijay Sardana, Advisor IEI, former CEO Aga Khan Foundation and Program Director Plan International; CEO of NGO Srijan

Mr. Ved Mitra Arya; Executive Director, Mr. D.K. Manavalan and Field Manager Mr. S.C. Jain, Action for Food Production (AFPRO);



Mr. Rajesh Sharma interacts with delegates.

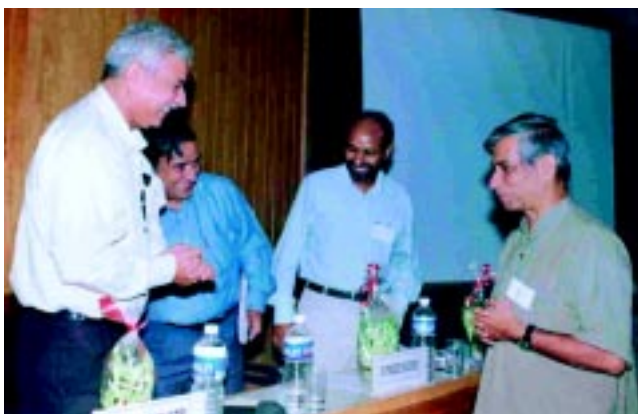
and Dr. Kamla Chowdhry, Member, Millenium Development Goal Committee & Chairperson of the Vikram Sarabai Foundation; Mr. Anupam Mishra, Secretary, Gandhi Peace Foundation; Mr. Pradeep Chaturvedi, Advisor, FAO; Mr. Niranjan Khatri, General Manager, Welcome Environs ITC Hotels; Mr. A.K. Sengupta, National Professional Officer, World Health Organisation; Dr. D.K. Biswas, President Earthcare Foundation & former Member Secretary, Central Pollution Control Board, and Dr. Neemat Hajeebhoy, Program Manager, Aga Khan Foundation.

During his inaugural address, Mr. Rajesh Sharma said the need of the hour is to develop water security for the country through good water management and called for collaborative initiatives by various



NETWORKING INITIATIVES

sectors as the key to creating sustainable water resource in the country. The objective, he said, of IEI convening the symposium is to develop a framework and strategies to implement partnerships for water management between the public, private and NGO sectors, with participation and involvement of local communities. The partnership approach for watershed development, rainwater harvesting, safe drinking water and sanitation, can serve as a platform for successful and rapid progress in other infrastructural areas too



L-R: Mr. Niranjan Khatri, Mr. Pradeep Chaturvedi, Mr. Ved Mitra Arya, Mr. Anupam Mishra.

such as health care, primary education, population control, and vocational training in different technologies.

Stating that the country would need to double water supply by 2025 at a cost of Rs. 5,000 billion during the next 20 years, Mr. Sharma nevertheless asserted that the solution lay not as much in funding as in proper allocation and effective use of resources to create an infrastructure that assures water availability. It is the most critical and urgent infrastructural programme for our country and can only be solved by the joint effort of public, private and voluntary sectors, and the people, the end beneficiaries. The task is so enormous and the need so urgent, it requires using the strengths of all sectors, synergistically, to create the infrastructure for sustainable water security. Above all, what is vital is the participation of the people who would themselves be affected, whether in villages or cities.

Delivering the keynote address, Hon'ble Shri B. N.

Kirpal, former Chief Justice of India and active environmentalist, emphasised that India receives sufficient rainfall and maintained that the problem was not water scarcity so much as the misuse and mismanagement of water. It is human tendency, he said, to devalue any resource that is abundant. The problems too are known; what is needed is the



L-R: Mr. Ajay Popat, Mr. Vijay Sardana, Mr. Rajesh Sharma.



courage and the will to resolve them. He advocated that watershed development, rainwater harvesting, water recycle, revegetation and tree plantations be undertaken on priority on a national scale, and the use of borewells be banned for about two years; free power too results in increasing number of borewells and overextraction of ground water, he maintained. Attention must also be paid to choice of crops and cropping patterns, avoiding water intensive crops and reverting to traditional cropping patterns.



L-R: Dr. D.K. Biswas, Dr. Kamla Chowdhry, Dr. Neemat Hajeebhoy.

In his special address, Mr. Sushil Gupta, Director – Rotary International, applauded the theme of the symposium and emphasised the importance of the role of the private sector. Efficient water management, he reiterated was not the job of government alone but the responsibility of all stakeholders and consumers, and emphasised that the water stress experienced in rural areas is perhaps beyond the imagination of urbanites.

The symposium was attended by over 100 participants representing Government, United

Nations organisations, leading NGOs, the corporate sector, international aid agencies and environmental organisations, institutions like Rotary Club and user communities. Chairpersons, panelists and participants enthusiastically and passionately shared their experiences, concerns, ideas and plans to achieve water security.

On Board

Mr. P. Sampath Kumar joined IEI's Board of Directors on March 22, 2005.

A Chartered Engineer from the Council of Engineering Institution, UK, Mr. Sampath Kumar has more than four decades' rich and varied professional experience in the fields of Engineering and Project Management. He has worked in senior management positions with Glaxo Laboratories, Oberoi Hotels, Wockhardt, Grand Hyatt and Taj Group of Hotels. Currently, he is President – Project Management & Implementation with Makers Development Services and In-charge for developing the prestigious Bandra-Kurla Maker Township.



Taking the Floor

A series of interactive meets were organised by IEI in Delhi, Chennai and Bangalore.

- For the builders & architect community, the hospitality & construction industries, symposia on *Planning for Water Security* were held at Delhi,



Bangalore and Chennai.



- For our customers, a symposium meet was held at Chennai. The theme again was *Planning for Water Security*.

All the meets saw extremely good participation. The keynote addresses by Mr. Rajesh Sharma, Managing Director, were followed by in-depth and informative presentations by Mr. Ajay Popat, Vice President – Corporate Marketing, on the emerging trends and technologies for water management with the stress on conservation. A presentation on services offered by Ion Exchange Services, by Mr. Dinesh Sadasivan, the company's Managing Director, found keen interest among the participants. The interactive session saw enthusiastic dialogue and incisive questions from the audience.

Innovative, Cost-Effective Solutions for the Dyeing Industry

Cost Effective Zero Discharge was the theme of the seminar organised by IEI with the help of the Dyers Association of Tirupur and the Federation of CETPs at Tirupur. The keynote address by Mr. Rajesh Sharma, IEI's Managing Director, was followed by the address by Chief Guest Mr. N. Kandaswamy, President, Dyers' Association, Tirupur. Other speakers included Dr. S. Appuswamy and Mr. K.M. Subramaniam, President and Secretary respectively of the Federation of CETPs, and Mr. K.V. Giri, General Secretary, Tirupur Bleachers Association.



IEI presented an extremely cost-effective technology to address the waste water problems posed by the widespread textile dyeing industry in Tirupur district. The unique membrane-based ultra filtration (UF)-reverse osmosis (RO) combination system offered by IEI is a huge improvement over conventional RO systems. IEI had installed such an effluent recycling system, capacity 200,000 litres/day, at Arora Fashions, Veerapandy village, Tirupur. Around 75% of the influent to the plant is recovered and recycled. This project was discussed as a case in point during the seminar.

Tirupur has about 700 textile dyeing units located in different parts of its outskirts. All these units produce large volumes of waste water containing colour, total dissolved solids (TDS) and other impurities rendering it unfit to be discharged into the soil or river. With conventional RO systems, only 60% – 70% of the water can be recovered while the balance 30% – 40% goes as reject. To handle this reject again a huge amount of money has to be spent in evaporation, etc. This turns a project for treatment of the waste water into a very expensive and uneconomical proposition. The only solution to overcome this issue is to treat the waste water through a UF-RO combination system.



HAPPENINGS

Mr. Ajay Popat, Vice President – Corporate Marketing, made a presentation on *Challenges of Waste Water Treatment & Recovery* at CII's Enviro Conference on Hazardous Waste & Water Management, Chennai.

He also chaired a session, was an invitee on the panel to make recommendations to State & Central Government on Desalination and presented a paper on *Advances in Sea Water Technologies* at the seminar organised by Technology Advance Centre, Chennai. It was inaugurated by Mrs. C.K. Gariyali, Secretary to Government and in charge of Municipal Administration



Mrs. C.K. Gariyali visits our stall.

and Water Supply Dept., Tamil Nadu. The papers and presentations were well received by the delegates and added great value to the content of the discussions.

Our stall at Indowater 2005, Jakarta, Indonesia, saw a stream of visitors.



Our stall at the Pharma Expo, Mumbai.



Mr. L.V. Keshav, Vice President – R&D, Quality & Environment Management, was invited by the Asian Productivity Organisation, Tokyo, to present a country paper *Status of Occupational, Environmental Health and Safety in India* at the workshop on *Green Productivity and Occupational, Environmental Health and Safety* at Yogyakarta, Indonesia. He also made a presentation on IEI's capabilities on water and waste water treatment and recycle. The sessions were highly appreciated by the participating delegates. Mr. Keshav also visited Singapore on the invitation of the Asian Productivity Organisation to speak on water and waste water treatment technologies at a symposium on *Water Resources Management and Green Productivity*. He made similar presentations at the workshop on *Green Productivity and Urban Environment Management* in Hanoi, Vietnam, and at a seminar organised by Asean Hotel & Restaurant Association (AHRA) in Indonesia. Substantial interest was evinced in the recycle of sewage using IEI's INDION packaged sewage treatment and reed bed systems, as well as the recently launched INDION fluidised media reactor and membrane bio-reactor systems.

On display at India International Bottled Water Technology exhibition, Chennai, was IEI's capability in designing, executing and operating packaged drinking water/natural mineral water plants. The pre-validated projects are undertaken on a turnkey basis complete with water treatment, blow moulding and filling machines, labeling and packaging machinery, and a full fledged lab facility for mineral and bacteriological analysis.



ZERO-B Spreads Water Awareness

World Water Day, March 22, saw Zero-B tying up with Helen O'Grady Children's Drama Academy to promote awareness on pure water in Mumbai.

As part of the drive the Academy, in association with our Consumer Products Division, organised a play

highlighting the issues of water scarcity and water contamination in Mumbai, which has recently been plagued by jaundice and other water-related problems.

This initiative followed a 'Free Water Testing' drive for Mumbai city by the division, wherein a workforce of about 200 people was deployed to attend helpline calls and conduct tests on the level of contamination in household water supplies. As aptly put by Mr. R.S. Rajan, Vice President – Consumer Products Division, "We see it as our social responsibility to ensure that the people are educated about the inadequacies of current practices and look forward to safer and healthier living. The kind of response we have received from the public

in our endeavours so far has been very encouraging."



L-R: Academy's Principal Ms. Arpita Mittal with IEL's Mr. R.S. Rajan and Mr. Sanjay Mathur.



ZERO-B Mera Brand Say Consumers

In an independent nationwide consumer survey conducted to select Mera Brand – India's Most Preferred Brand by Consumers, Zero-B was awarded the Consumer World Award for 2004 as the most preferred brand in the Reverse Osmosis category, among 40 contestants. The survey was conducted through face-to-face interviews of consumers across 31 major cities and 225 towns as well as online voting.



Mr. R.S. Rajan (left) receives the award.

Some of the other awardees in the durables category were Nokia – mobile phone category, Samsung – refrigerators, LG – air conditioners, Onida – televisions, Bajaj – bikes, etc.



Our Zero-B range of domestic reverse osmosis drinking water purifiers.

The conducting agency, AMGF Inter Corp Limited had launched the first ever FMCG Awards in 2003 and, in 2004, included the Consumer Durables and Media Habits categories in their Consumer World Awards 2004. Partnering them were: Ernst & Young (Official Notary), TNS (official research partner and analyst), Rediff.com (official online media partner), Business Standard (media partner), Radio 93.5 FM (radio partner), Pitch Impact (associate partner), Dainik Jagran (print Hindi media partner), Exchange 4 Media (official online new media partner), Wizcraft (event partner) and Zee Business (telecast).

HAPPENINGS

Jal Tarang

A variety of entertainment of enthralling music, songs, graceful dances and entertaining skits marked IEI's annual bonding celebration *Jal Tarang*. This IEI family gathering was a fitting occasion

indeed to honour those who have served the company for many years with dedication, and long servers were felicitated for their loyal service at the long service award ceremony – a highlight of the celebrations. The


evening also saw the presentation of awards to the winning cricket team and the Man of the Match of the recent cricket matches held between our head office and Rabale office teams. *Jal Tarang* was indeed

Mr. G. Ranganathan, Chairman (centre), and Mr. Rajesh Sharma, Managing Director, light the traditional lamp.

a memorable event, characterised by camaraderie, fun and team spirit.



ION EXCHANGE
THE POWER BEHIND WATER
(INDIA) LTD
Total Water Management

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