AQUASOURCE COMPONENTS LIMITED

Introduction on TriSep Membrane

http://www.aquasource.hk

目的 Purpose

- 使用逆滲透技术分离技术, 给客戶提供创新方案
- To support our customers by providing innovative solutions for membrane separation processes

核心价值 Core Values

- 給客戶提供超卓质量产品及服务

  Providing excellence in quality of products and services to our customers

- 所有产品致力于贡献环境

  Dedication to products which respect the environment

- 尊重团队精神，彼此相互尊重和重视员工福利

  Value and regard for teamwork, mutual respect, and employee welfare

- 经卓越领导才能，可观利润及创新，业务可稳定及增加

  Stability and growth through leadership, profitability and innovation

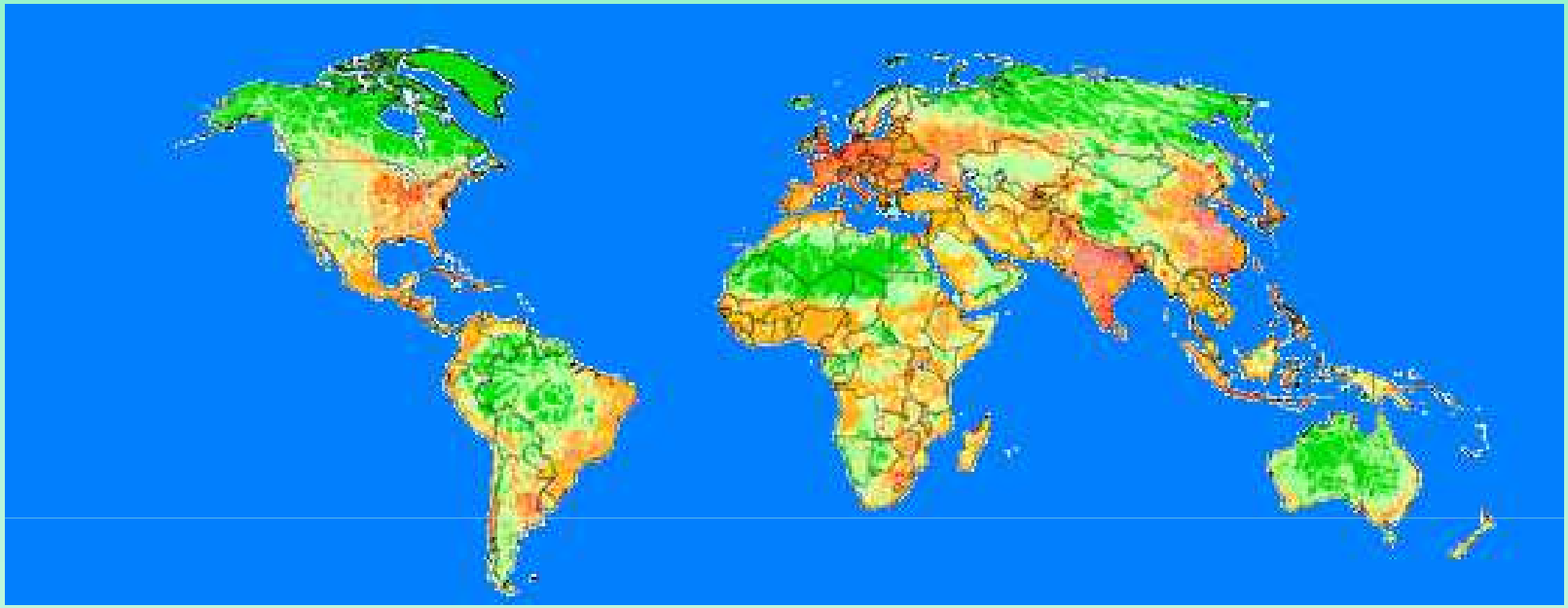
TriSep 的历史

History of TriSep Corporation

- 建立于1989年，主要膜研发及设计
- Founded in 1989 for Membrane Element Research and Design
- 超过65名员工
- 65+ Employees
- 工厂位于戈莱达，加利福尼亚州，占地4万平方尺
- 40,000 ft.² facilities - Goleta, CA, USA
- 于1992年，收购杜邦卷式膜资产
- Purchased DuPont Spiral Assets in 1992

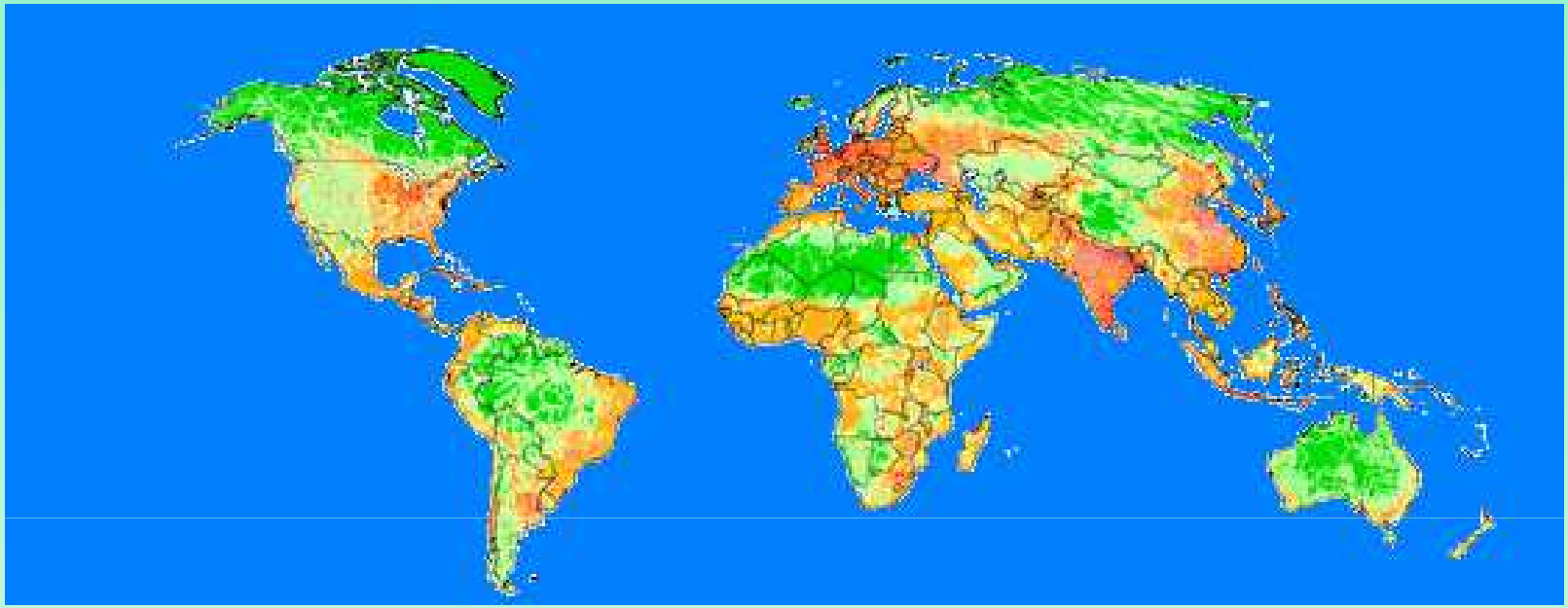
销售与分析事务所

Sales and Distribution Offices



- 美国/加拿大：戈莱达，加州
  USA/Canada : Goleta, CA
- 亚洲，中东：圣地牙哥，加州
  Asia, Middle East : San Diego, CA
- 南非：迈阿密，佛罗里达州
  South America : Miami, FL
- 斯堪迪纳维亚半岛（北欧）：丹麦
  Scandinavia : Denmark
- 德国，法国：荷兰
  Germany, N.L., France : Holland
- 西班牙：马德里
  Spain : Madrid
- 土耳其：伊斯坦布尔
  Turkey: Istanbul
- 印度：孟买
  India: Mumbai
- 巴基斯坦：拉哈尔
  Pakistan: Lahore

生产地点
Production Locations



- 戈莱达，加利福尼亚州：所有产品

  Virginia: Chemical products

- 维吉尼亚：化工产品

  Goleta, CA USA : All products

- 德国：化工产品

  Germany: Chemical products

TriSep 的创新

TriSep Innovations

- 全球第一膜生产公司发展及开拓抗污染膜，**X-20**
- First company to develop and market a low fouling RO membrane, the X-20

- 全球第一膜生产公司发展及生产低压力聚酰胺膜元件
- First to develop low pressure polyamide membrane elements

- 全球第一膜生产公司发展及生产完整膜清洁剂及前处理化学品
- First membrane company to offer a complete line of cleaning and pretreatment chemicals

- 全球第一膜生产公司发展及生产完全卫生级膜元件
- First company to develop a totally new sanitary element

- 全球第一膜生产公司发展及生产可反洗超滤膜
- First company to develop a back-flushable spiral wound UF and MF element

我们的焦点
Our Focus

- 我们核心生意：生产卷式 反渗透，纳滤，超滤和微滤膜
- Our core business: manufacturing of spiral wound RO, NF, UF and MF membranes

- 化工清洁剂应用于纯水及污水
- Chemical support products for water & wastewater applications

- 产品反正集中于特殊分离及浓缩膜元件
- Product development focussed on process membrane elements

- 市场及销售推广也集中于特殊分离及浓缩膜元件及化学品方面
- Marketing and sales activities focus towards specialty Elements and Chemicals

膜元件
Our Membrane Products

- 膜种类
  Membranes Types
  - 反渗透Reverse Osmosis ACM1-5, X-20, SB20, SB50
  - 纳滤Nanofiltration.....TS80, XN45, SB90
  - 超滤Ultrafiltration..... UE10, UE50, UA60
  - 微滤Microfiltration.....TM10
  - 可反洗超滤及微滤Back-flushable UF MF.....UB50, PB10

我们的卷式膜元件
Our Spiral Element Products

- 卷式膜构成 Spiral Configurations
  - 纯水膜为标准玻璃纤维外壳
  - FRP outerwrap standard water elements
  - 加强清洗的卫生级膜元件
  - Turboclean Sanitary Elements
  - 高温结构膜元件
  - High Temperature construction
  - 高压力结构膜元件
  - High Pressure construction
  - 自定流水宽度及形状
  - Custom feed spacer thickness and geometries
  - SpiraSep可反洗卷式超滤及微滤膜
  - SpiraSep backflushable spiral UF/MF element

我们的化学品
Our Chemical Products

- 化学品Chemicals
  - 防垢剂Antiscalants
    - TriPol.....8010, 8510, 9010, 9510
    - 美国国家卫生基金会，NSF认证
    - NSF approved
    - 于三个不同城市，生产化学品，可减少运费
    - Produced in three locations to minimize shipping costs
    - 提供固体包装
    - Solid versions available
  - 清洁剂Cleaners
    - TriClean..... Powder cleaners 210, 212TF
    - 液体清洁剂Liquid cleaners
  - 特殊产品Specialty Products
    - 生物，细菌控制Bio-control products
    - 储存溶剂Storage solutions

膜元件直径（英寸）
Membrane Diameters (inch)

标准玻璃 纤维外壳 Standard FRP wrapped	加强清洗 卫生级膜 TurboClean™ Sanitary Element	浸入式 超滤/微滤 Submerged SpiraSep™ Element
2.5	3.8	9.3
4	4	
8	4.2	
8.3	6.3	
8.5	8.0	
	8.3	

TriSep销售焦点
TriSep Sales Focus

- 工程项目膜解决方案
  - Engineered Membrane Solutions
  - 标准膜元件及化学品
  - Standard water elements and chemicals
  - 领导于特殊膜产品
  - Leader in process membrane products
  - 卫生级元件用于饮料，透析及乳制品
  - Sanitary style elements for beverage, dialysis, dairy
  - SpiraSep超滤应用于高含量悬浮颗粒
  - SpiraSep for high suspended solids UF applications
  - 污水解决方案和其他高污染应用方案
  - Solutions for wastewater and other high fouling applications

TriSep 膜市场应用

TriSep Applications Served

- 污水Wastewater
- 水回用Water re-use
- 饮料及瓶装水Beverage and Bottled Water
- 透析补给水Dialysis Make-up Water
- 食物及乳制品Food and Dairy
- 工艺用水Process Water
- 饮用水Drinking Water
- 锅炉给水Boiler Feed
- 半导体冲洗水Semiconductor rinse water

未来发展
Future Developments

- 扩建及提升生产设备
  - Expansion and upgrade of Production Facility
- 无水箱式的SpiraSep超滤
  - Tankless design for SpiraSep
- 增加面积及通量于SpiraSep超滤
  - Increased area and flux rates for SpiraSep.
- 新工艺技术钠滤
  - New Process Nanofiltration membrane

卷式膜如何制造

How a Spiral Wound Element is Made

卷式如何制造

How a Spiral Wound Element is Made

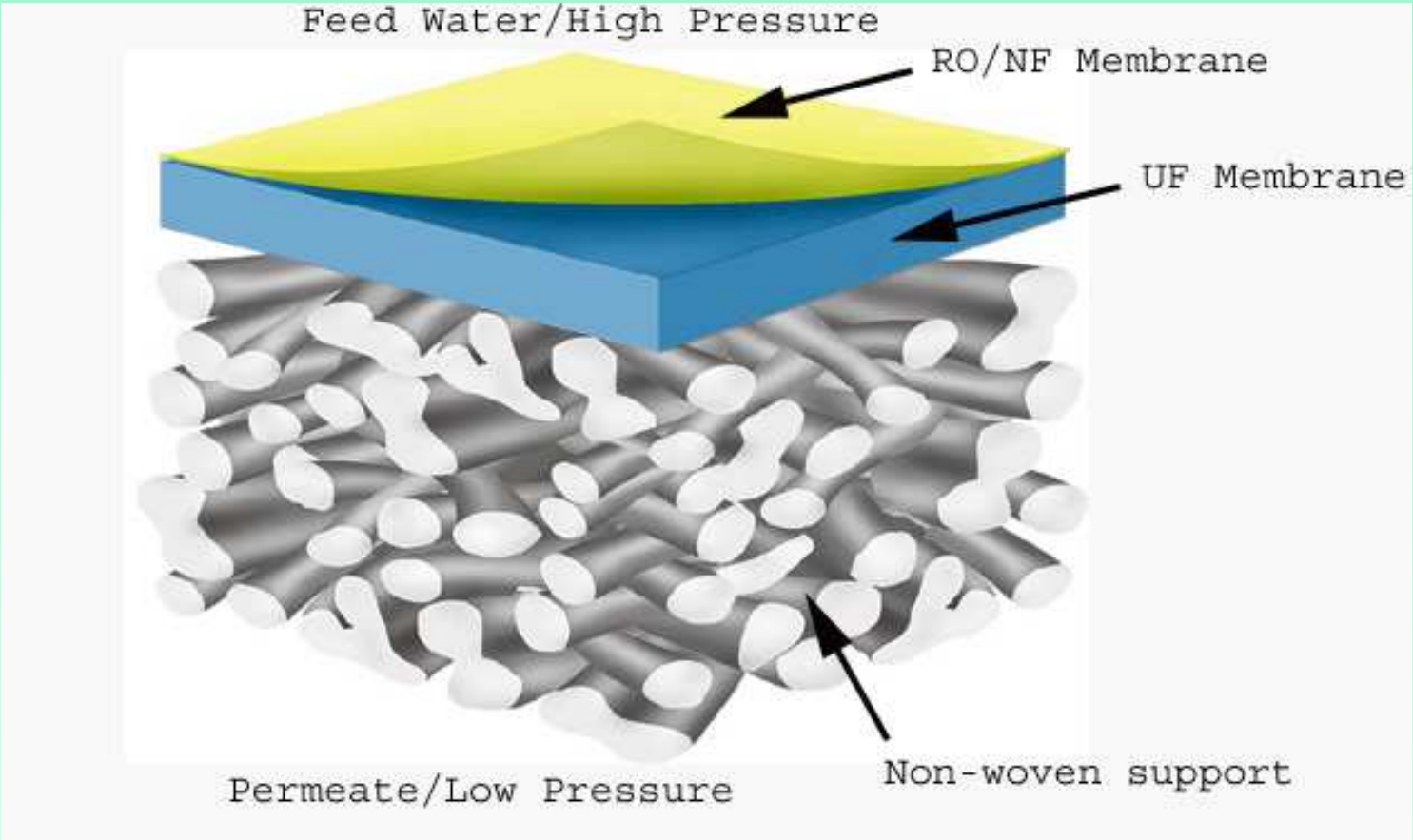
- 卷式膜元件包括三个主要部分：膜片，进水流道及中间纯水管
- **A spiral wound membrane element contains three major textile materials: the membrane, the feed spacer, and the permeate carrier**
- 所有以上配件可以改变以优化膜元件性能
- **All of the above materials can be easily changed to optimize the performance of the module.**
  - 不同膜种类和化学性能
  - **Different membrane types and chemistries, that is. MF, UF, NF, or RO as well as CA, PA, or PAU chemistries,**
  - 不同进水流道宽阔或几何形状可以选用
  - **Different feed spacer thickness's or geometries can be used,**
  - 不同进水流道厚度或压力等级可以选用
  - **Different permeate spacer thickness's or pressure ratings may be used.**

卷式如何制造

How a Spiral Wound Element is Made

复合膜

Composite Membrane

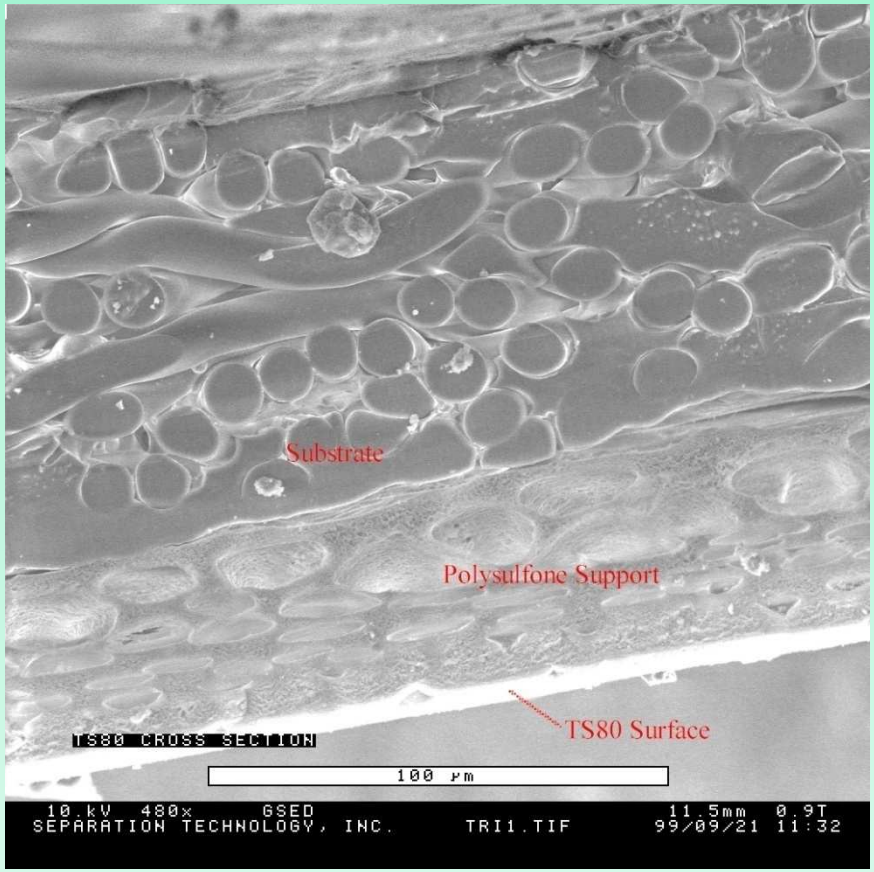


卷式如何制造

How a Spiral Wound Element is Made

复合膜的横切面

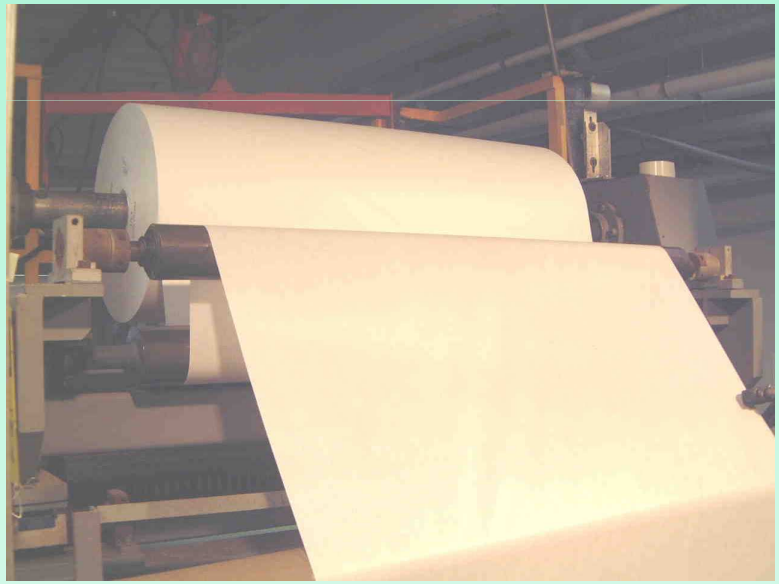
SEM Cross Section of Composite Membrane



卷式如何制造

How a Spiral Wound Element is Made

- **膜片是由特别设计连续方式40英寸阔铸造机**
- The membrane is made on specially designed “casting machines” as a continuous web 40” wide.



卷式膜如何制造

How a Spiral Wound Element is Made

膜片检查**Membrane inspection**

卷式膜如何制造

How a Spiral Wound Element is Made

- 膜片切成50至90英寸长“段”.流道置放于膜片上，而膜片折叠于流道上，1至30套“段”会组合成不同直径及类型元件
- **The membrane is cut into “leaves” that are 50” to 90” long. A piece of the feed spacer is place on one side of the membrane face, and then the membrane is folded over the feed spacer. Depending on the element diameter and type, 1-30 leaves will be used to make an element.**

卷式膜如何制造

How a Spiral Wound Element is Made

- 当膜元件卷成后，膜元件使用胶粘带固定形状直至固化成形
- After the element is “rolled”, an adhesive tape is applied to the outside of the element to hold it together until the adhesive cures.

卷式膜如何制造

How a Spiral Wound Element is Made

- 当粘合剂固化后，两端切齐同时加上盖板**ATD**于膜元件上
- After the adhesive has cured, the end is trimmed off and a molded plastic ATD is placed on the element.

卷式膜如何制造

How a Spiral Wound Element is Made

- 膜元件外加上玻璃纤维涂料加强结构性
- The element is then wrapped with a FRP coating for structural strength.

卷式膜如何制造

How a Spiral Wound Element is Made

- 膜元件会进行测试及加上防腐剂
- The elements are wet tested and treated with a preservative solution.

卷式膜如何制造

How a Spiral Wound Element is Made

- 膜元件会包装成真空状态，并放入防氧袋及塑料袋内
- The elements are packaged in a vacuum sealed, oxygen impermeable bag then covered with a secondary plastic bag.

卷式膜如何制造

How a Spiral Wound Element is Made

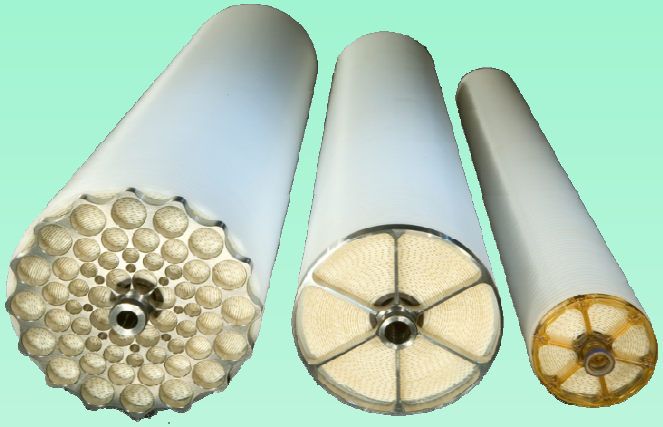
- 膜元件置于贴有标签纸板箱内
- The elements are placed in individual cardboard boxes and labeled.

卷式膜如何制造

How a Spiral Wound Element is Made

- 膜元件置于仓库，可准备快速出交付
- Elements may be stored in our warehouse for quick delivery.

TriSep General Sales Presentation



turboclean™

X-20™ FoulGard™ TECHNOLOGY

SPIRASEP

Ultrafiltration Membrane Technology

X-20 Advanced Membrane

Engineered Membrane
SOLUTIONS

X-20™ Advanced Membrane

- 在恶劣困难环境下，提供抗污染及出色表现
  - Provides low-fouling and superior performance in difficult applications
- 新一代先进复合膜
  - New generation advanced thin film composite membrane
- 独特的聚酰胺-脲 化学性
  - A unique polyamide-urea chemistry
- 减少有机物污染
  - Minimizes fouling of organic elements

X-20™ Advanced Membrane Chemistry

- 标准‘344膜片携带羧酸群组，而羧酸群组是带有阴性电荷
  - Standard ‘344 Membranes have residual carboxylic acid groups which are normally negatively charged.
- X-20 膜片是携带氨基群组，而这群组是中性电荷
  - The X-20 Membrane has residual amino groups which are normally neutral.
- 阳离子聚合物容易吸附‘344膜片
  - Cationic polymers are attracted to ‘344 membrane surface.
- 自然地，有机物会吸附‘344膜片上，做成清洗困难
  - Naturally occurring organic materials are adsorbed onto ‘344 membrane surface making it difficult to clean.
- X-20 膜片是中性电荷，容易清晰污物
  - The X-20’s neutral surface charge makes it easy to clean.

X-20™ Advanced Membrane

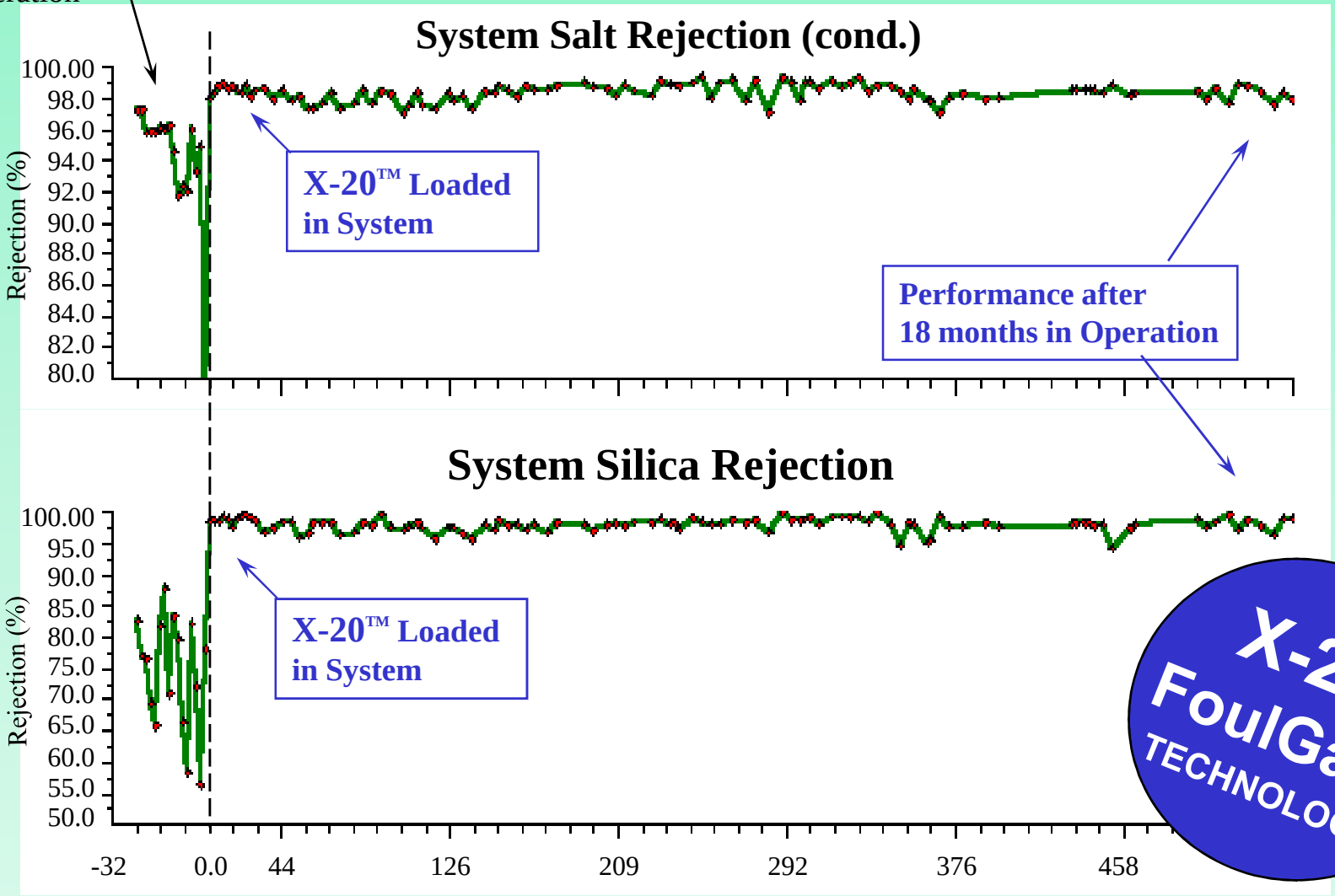
部分业绩

Partial List of Installed Base

- 120枝 8040 膜：德克萨斯州 电厂
  - 120 8040 elements Texas power plant
- 336枝 8040 膜：印度三级污水项目
  - 336 8040 elements in tertiary wastewater plant in India
- 300枝 8040 膜：沙乌地阿拉伯三污水项目
  - 300 8040 elements in tertiary wastewater plant in Saudi Arabia
- 862枝 8040 膜：非洲矿山废水
  - 862 8040 elements in mine waste water in Africa
- 280枝 8040 膜：欧洲MDF污水项目
  - 280 8040 elements in MDF wastewater plant in Europe
- 在美国加州炼油厂，并排测试竞争者抗污膜
  - Side by side test with new competitive LF membrane in California refinery.

Enhanced System Performance
X-20™ FoulGard Technology

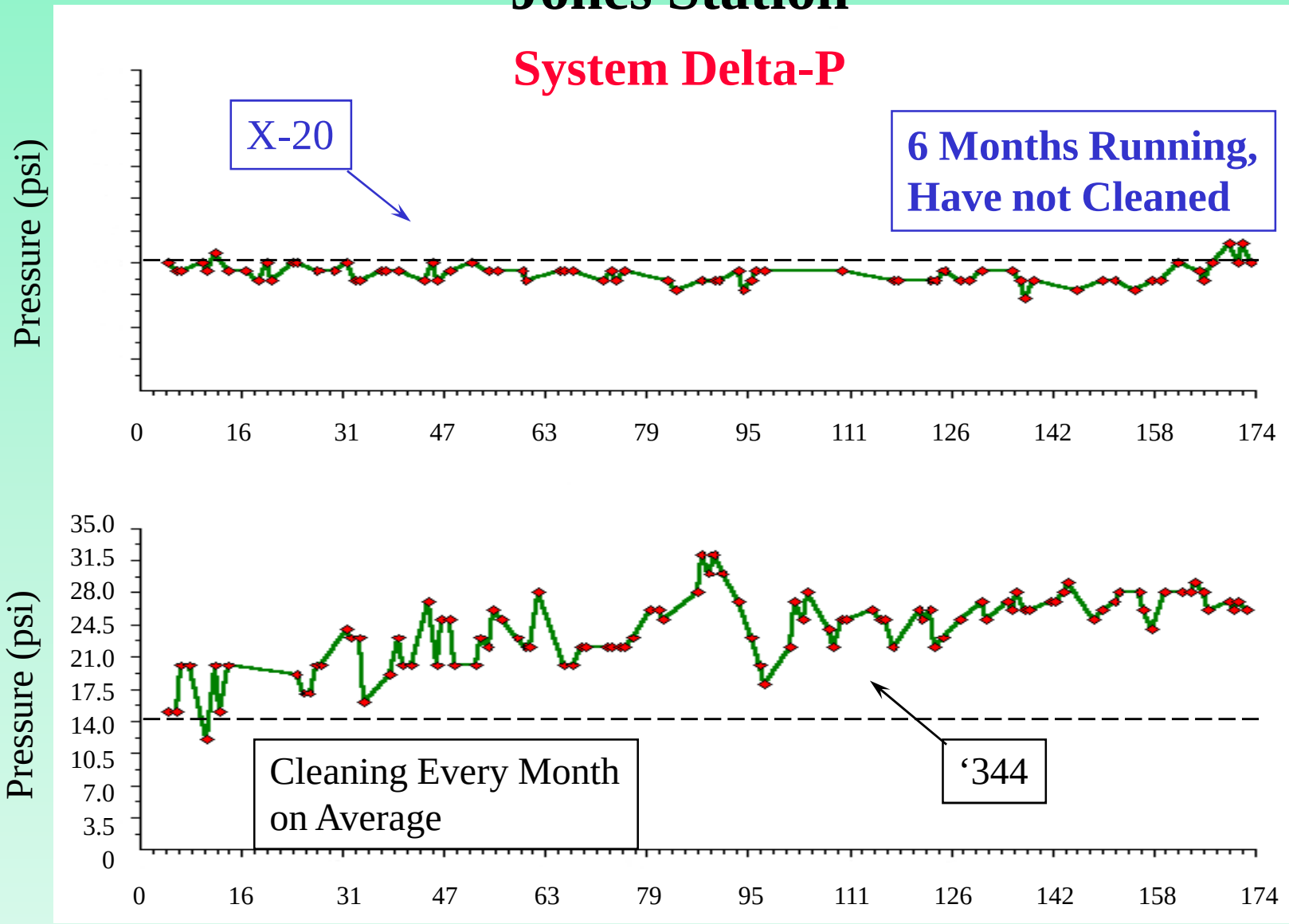
'344 Performance after 14 months in Operation



Application: Zero-Discharge Cogeneration Plant

Jones Station

System Delta-P



X-20 Side by Side Test

Competitive LF Membrane