

Steve Chesters - Innovation Advisor



NOVEMBER 2022

Wife Gill & dog Jen



*Please
Wave*

INNOVATIONS IN LAST 50 YEARS

- RING PULL ON A CAN
- INTERNET
- ELECTRIC CARS
- SOLAR PANELS
- MOBILE PHONE
- MICROWAVE
- WHEELS ON A SUITCASE



Innovation - What is it?

1.
2.
3.
4.
5.



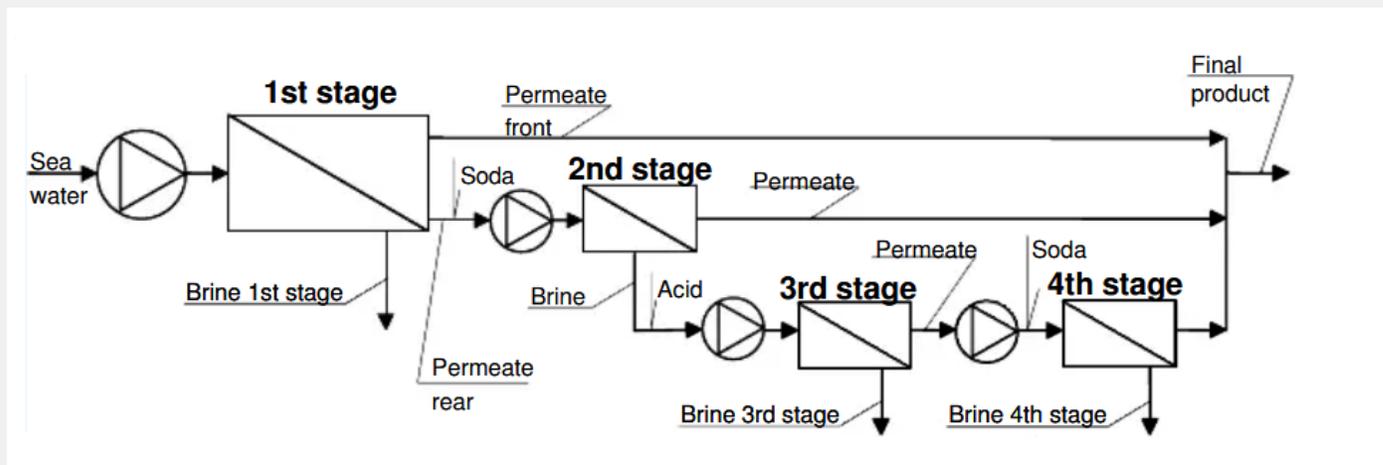
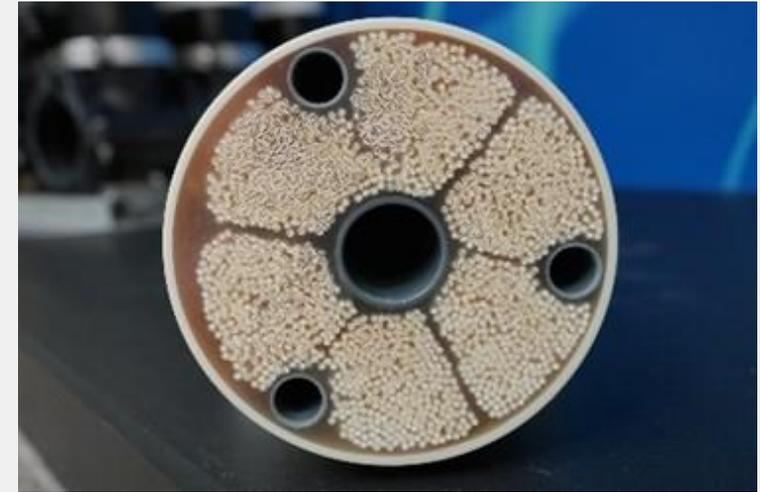
Innovation – What is it?

- **SOMETHING NEW THAT CREATES VALUE**
- **APPLICATION OF USEFUL, NOVEL IDEAS**
- **FINDING, TESTING IMPLEMENTING SOMETHING NEW**
- **SOMETHING BETTER THAN WHAT WE HAVE NOW**
- **COMMERCIAL EXPLOITATION OF IDEAS**



NOTABLE INNOVATIONS IN LAST 30 YEARS IN OUR INDUSTRY

- **UF MEMBRANES**
- **ERI ENERGY RECOVERY**
- **BORON REMOVAL CASCADE ASHKELON**



PX S Series cutaway view

Notable Innovations in last 20 years from S3C

1.
2.
3.
4.
5.



NOTABLE INNOVATIONS IN LAST 20 YEARS IN S3C

- FRP FILTER HOUSINGS
- PIPER LINK
- INTERNAL SUPPORT ROD
- SG111 SUPER CONCENTRATE ANTISCALANT
- GENAIRCLEAN 700 SERIES POWDERS



What drives Innovations?

1.
2.
3.
4.
5.



WHAT DRIVES INNOVATION?

- **PROBLEMS**
- **OPPORTUNITIES**
- **GLOBAL TRENDS**
- **CUSTOMERS**
- **NEED FOR GROWTH**



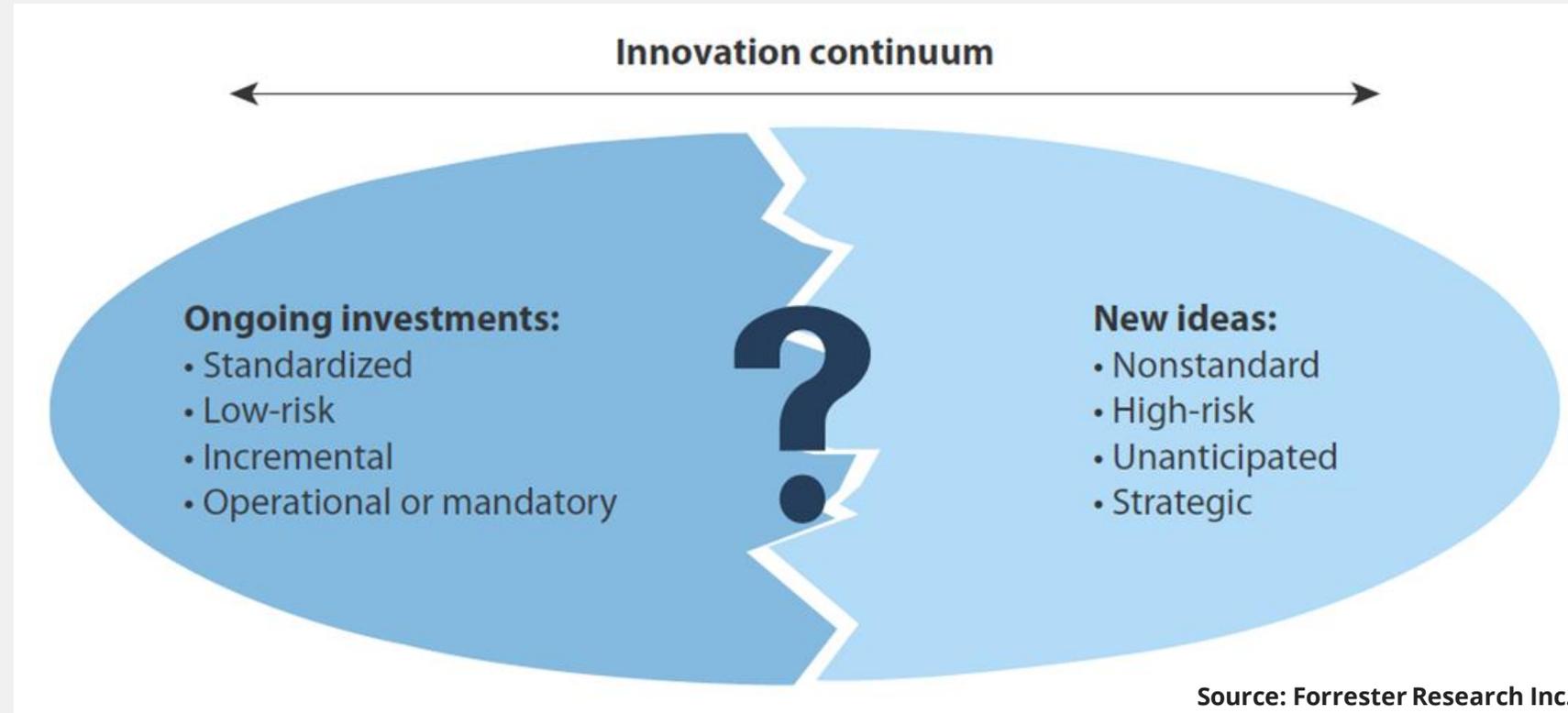
WHAT SHOULD WE DO?

- TALK TO CUSTOMERS
- TALK TO COLLEAGUES
- AWARE OF NEW PRODUCTS
- AGREE PROJECTS
- EXPERIMENT
- **EXECUTE**



HOW CHOOSE PROJECTS?

- SPEED
- PROFIT
- EASE
- NEED
- GRANTS
- **FAIL FAST**



What do you want us to work on?

- 1.
- 2.
- 3.
- 4.
- 5.



CURRENT PROJECTS

- DENDRIMER **E-SUPER** CONCENTRATE ANTISCALANT
- ISR – INTERNAL SUPPORT ROD
- CARTRIDGE FILTER CLEANING
- PIPER LINK
- SLOW RELEASE TABLET
- NON HAZ OPTICLEAN
- **PROtect**TM



Piedmont



PROtect™

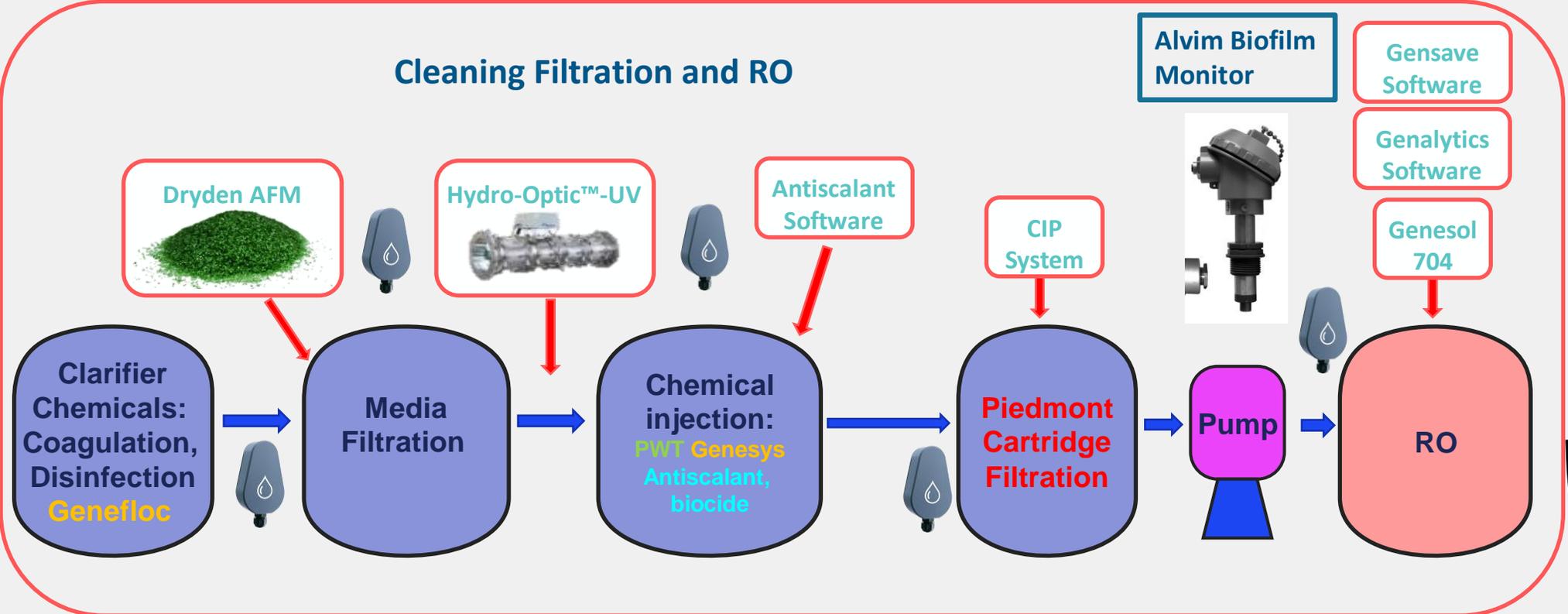
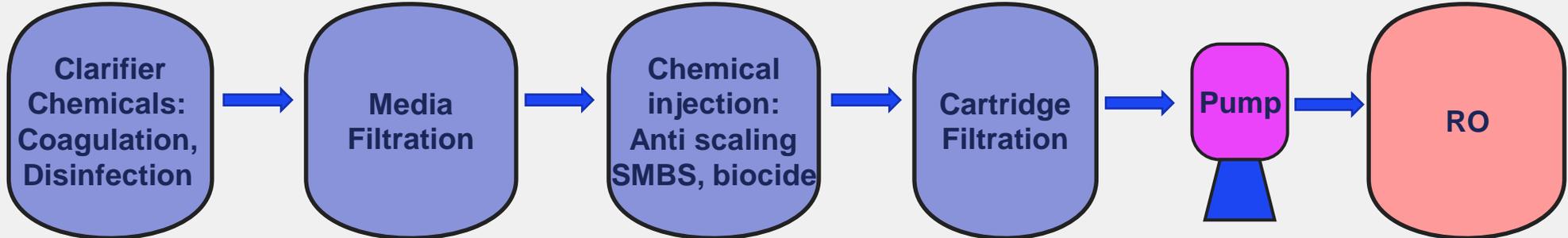
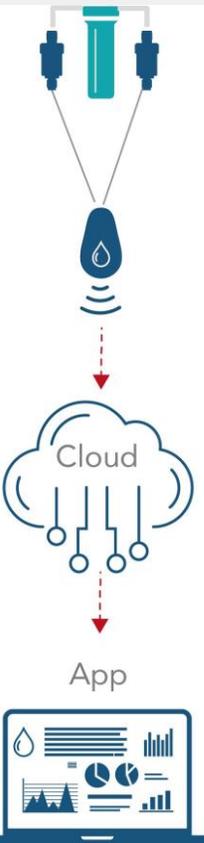
RO Membrane Fouling Protection Solution

Connect - Treat - Monitor - Predict - Protect



Standard scheme Vs. PROtect™ scheme

Droople



What can we clean?

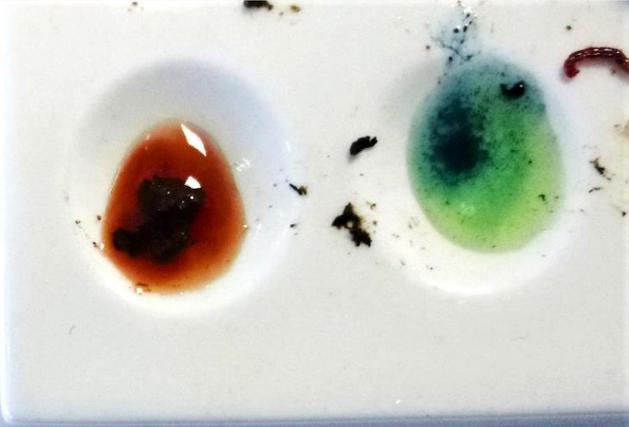
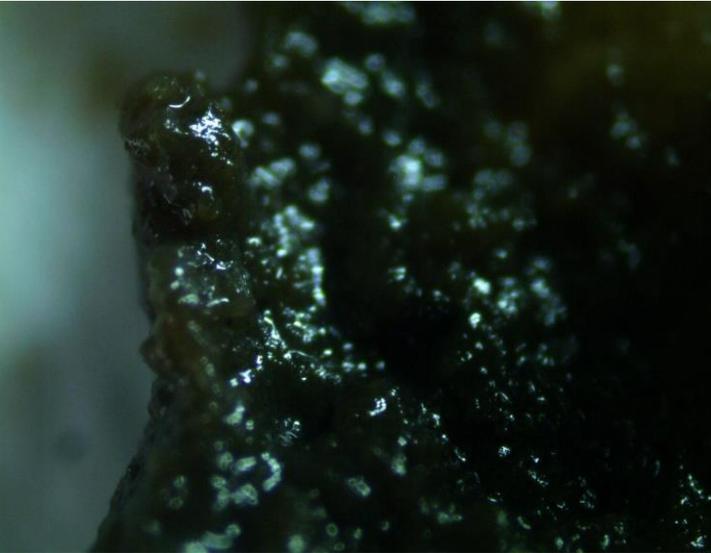
- **Membranes**
 - RO,NF,UF,Ceramic
- **Filtration**
 - Media
 - Sand, anthracite, zeolite, garnet,
 - Cartridge elements
 - Spun, Wound, Pleated
 - Rollers, pads, bags, sponges, socks
- **Equipment**
 - Membrane Bio Reactors
 - Sewage Plant Cloth Filters
 - Pressure Vessels
 - Softeners
 - Thickeners



Crewe Wastewater Treatment Plant – Dec 2020



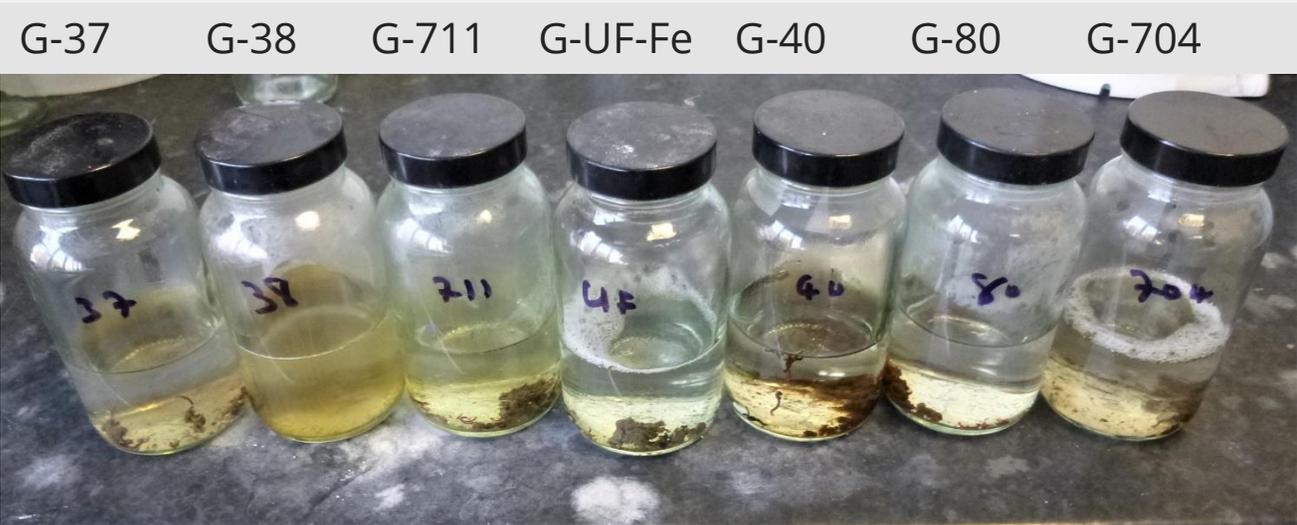
Fouled Filter Cloth



What can we clean?



Simple sample soak tests



Start of soak test



After 2 hour soak test



Is iron present after cleaning?



Cleaned with
water



Cleaned with
water and
soap



Cleaned with
water, soap
and bleach.
Positive for
iron(II) AND
iron (III)*

>>>> **yes!!**

* Previous report stated only positive for iron(II), however blue colour indicating iron(III) developed during/after that presentation



Experimental washes

Raw sample



Wash with water



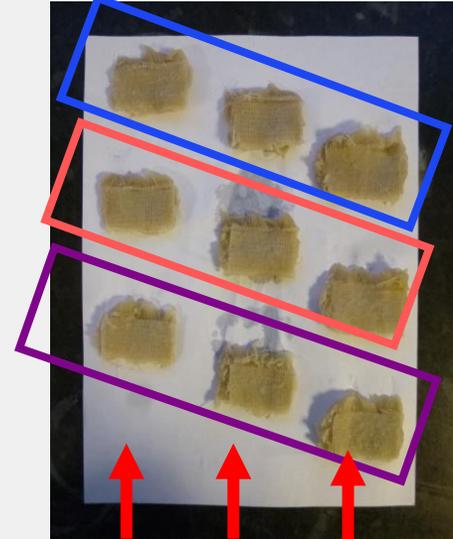
2 hour:
Genesol 704



Wash with water



2 hour:
1, 3 and 5 %
each acid



Ascorbic

Citric

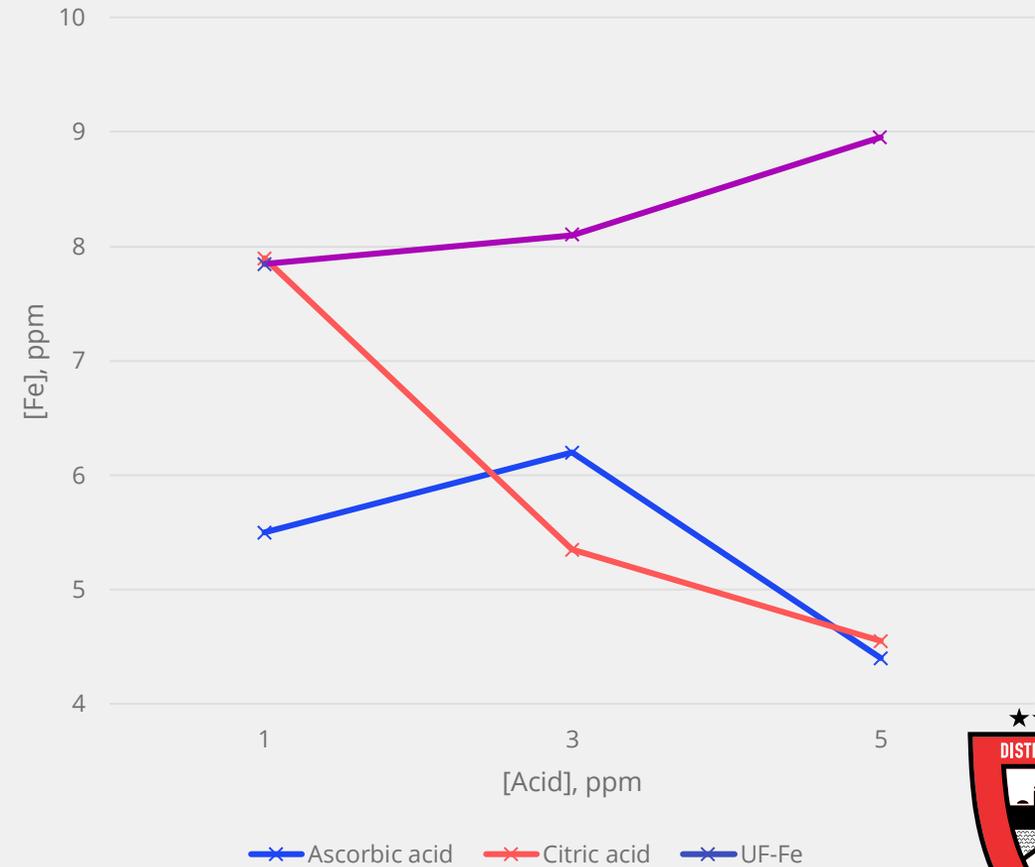
UF-Fe

1% 3% 5%

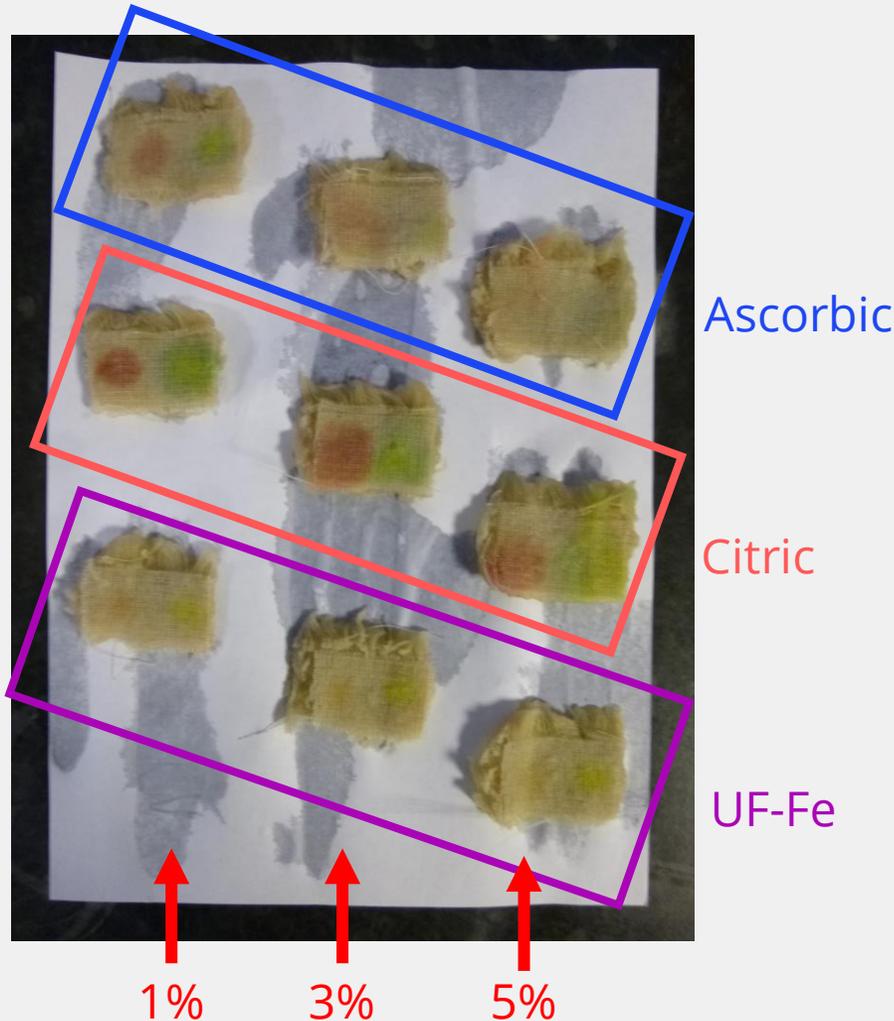


Results

Acid	pH	[Fe] in solution, ppm
1 % Ascorbic acid	2.87	5.5
3 % Ascorbic acid	2.81	6.2
5 % Ascorbic acid	2.66	4.4
1 % Citric acid	2.55	7.9
3 % Citric acid	2.23	5.35
5 % Citric acid	2.08	4.55
1 % UF-Fe	2.47	7.85
3 % UF-Fe	2.12	8.1
5 % UF-Fe	< 2.00	8.95



Does any iron remain?



Darker red = more iron(II)

Darker blue = more iron(III)

Iron still present on citric acid cleaned coupons

Some iron remains on ascorbic acid cleaned coupons

Virtually no iron remains on UF-Fe cleaned coupons



Outcome

- **PURCHASE ORDER**
- **4 TONS OF GENESOL 704**
- **1 TON GENESOL UF-FE**
- **NEW POTENTIAL MARKET**



S3C Innovation Projects FY23

UK DENDRIMER PRODUCTION

PROTECT

SLOW RELEASE TABLET

CARTRIDGE FILTER CLEANING

CHEMICAL SOFTWARE INTEGRATION

MEMBRANE CLEANING SOFTWARE

NANO-PARTICLES FOULING (LHOIST)

UK DENDRIMER PRODUCTION

NEW SULPHONATED DENDRIMER

GREEN FLOCCULANTS

PHOSPHONIC ACID NEUTRALISATION

MINING – UF/RO RENTAL FLEET

BIOREMEDIATION CHEMICALS

HYDROPONICS

INTERNAL SUPPORT ROD

PIPER LINK

POWDER 700 SERIES IN BAGS

NEW LIQUID CHEMICAL PACKAGING

PTSA TRACED DENDRIMER WITH GREEN
COLOUR



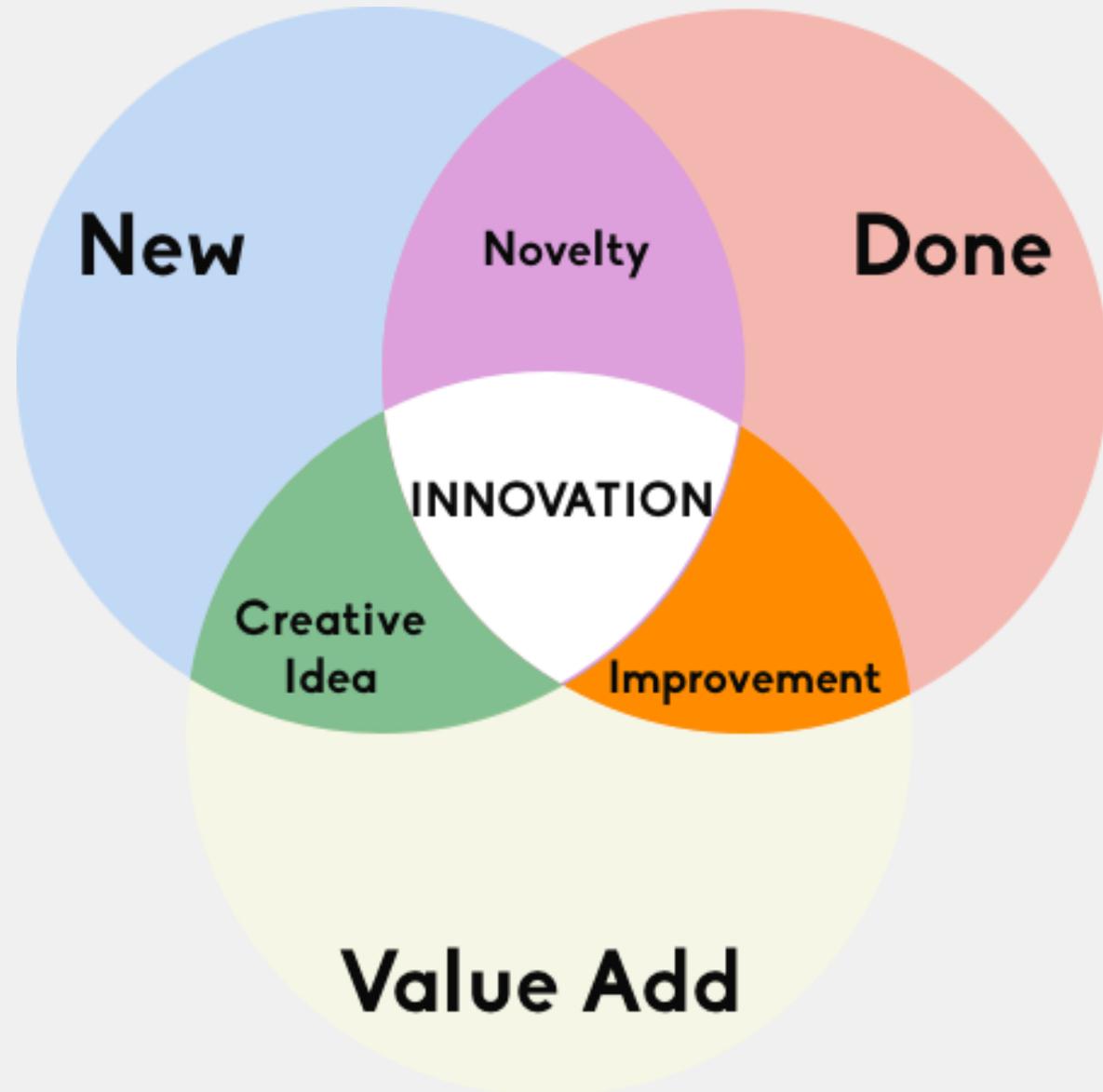
Do you agree - No idea is a bad idea?

1. AGREE
2. DISAGREE



No idea is a bad idea! Is actually a bad idea.

- Too many ideas waste time
- Oversaturation
- Well thought out
- Commercially viable
- Easy to implement
- Quick to have impact
- Generate profit



Innovation

DISCUSS IDEAS WITH ACCOUNT MANAGERS

OUTLINE IDEA & POTENTIAL MARKET

SUBMIT TO GREG MADDEN AND STEVE CHESTERS

THANK YOU



h₂O innovation[®]

Piedmont  PWT[™]

WATER COMPANY
OF THE YEAR 2020

