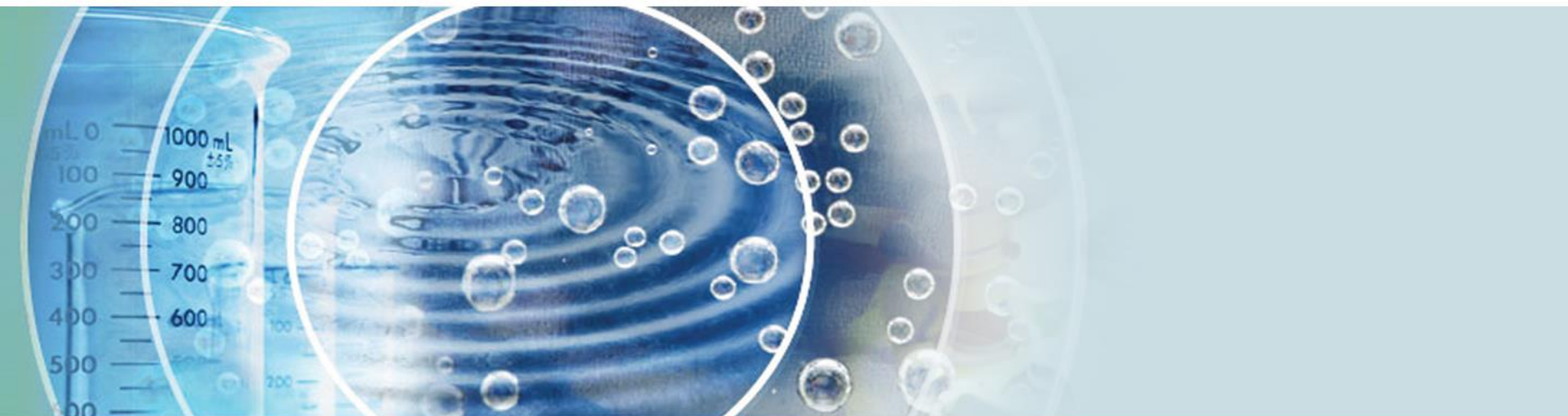




*Room Temperature Sterilization
with Nitrogen Dioxide*



Nitrogen Dioxide (NO₂) Rapid, Room Temperature Sterilization



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Noxilizer, Inc.
800 West Baltimore Street, Suite 151 | Baltimore, MD 21201 | 443-842-4401
www.noxilizer.com

Noxilizer Organization Overview

- Formed in 2004
- 25 Associates Globally
- Offices in Baltimore, MD & Wakayama, Japan
- World Class Board and Leadership
- Facility Space:
 - BioPark: 3,596 sq ft office space , 13,039 sq ft lab and assembly space
 - Noxilizer Japan KK: 750m2 on 2 floors



Why NO₂ for Medical Device Sterilization?

Manufacturers and Providers under Cost and Productivity Pressure

The Infection Control Problem



■ Difficult Challenges in Device Sterilization

- Painfully slow cycle times (Hours vs. Days)
- Noxious/dangerous materials
- Expensive and time consuming logistics

■ New Paradigm of NO₂ Sterilization

- Shift Medical Device Sterilization to the Manufacturing Floor
- True room temperature, uniquely suited to modern devices such as Pre filled Syringes, bioresorbables
- Scalable, with the capacity of EtO
- Cycle speed of H₂O₂ without moisture sensitivity
- Typical 40%-60% annualized savings and 12-18 Mo. ROI

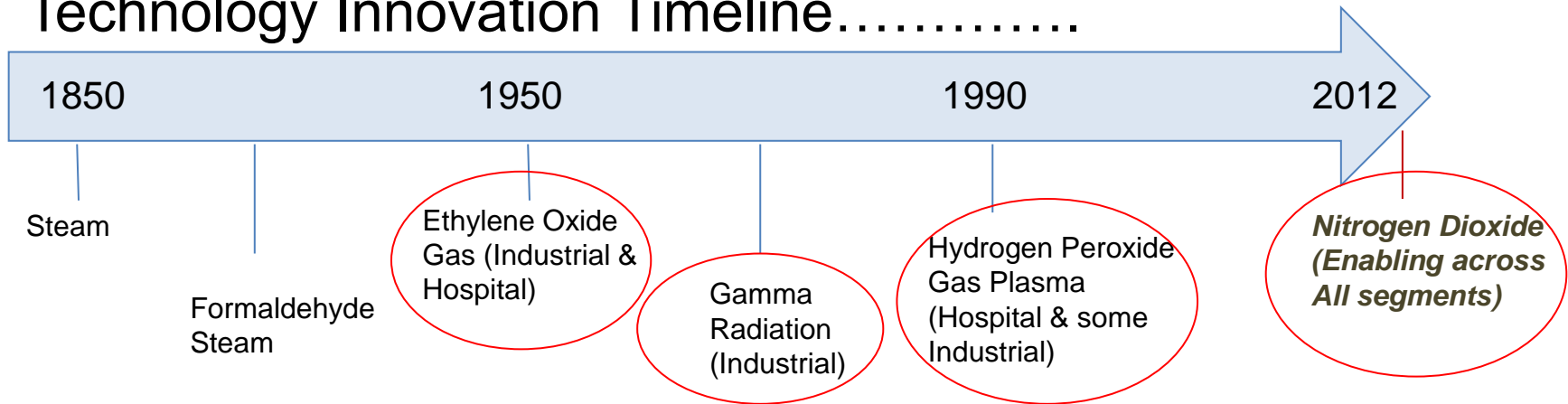
Throughput, Turnaround Time, Safety & Cost



Medical Device Sterilization

Establishing a New Player in Global Sterilization Solutions

Technology Innovation Timeline.....



Feature	Parameter Range
Nitrogen dioxide gas sterilant	Boiling point 21°C
Low sterilant concentration	10 mg/L – 15 mg/L (less than 1%)
Room temperature process	Consistent results from 10°C to 65°C
Humidity reduces cycle time	70% - 80% RH provides rapid lethality, 0% RH requires longer exposure time
Fast cycle exposure times	Typically less than 20 minutes
Low sterilant residuals	Residuals often not measureable, no increase in cytotoxicity observed

Medical Device Sterilization

NO_2 Safety Profile (Safety Data Sheets)

- Smells like bleach & almonds
- Yellowish-brown or reddish-brown fumes
- NO_2 odor threshold is below the OSHA PEL

Safety-related Properties	NO_2	Hydrogen Peroxide	Ethylene Oxide
Color	Reddish-Brown	Colorless	Colorless
Odor Threshold	0.1 ppm	Odorless	200 – 400 ppm
OSHA PEL	5 ppm	1 ppm	1 ppm
NFPA: Health	3	3	3
NFPA: Flammability	0	0	4
NFPA: Instability	0	1	3

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The Opportunity in Medical Device Sterilization

Nitrogen Dioxide Sterilization Benefits Multiple Markets



Pharmaceutical Isolator Disinfection

(VHP) H_2O_2

*NO_2 Decontamination
System provides 70% faster
aeration.*



Industrial Batch Sterilization

EtO or Gamma

*RTS-360 Industrial Sterilizer
delivers 50% Cost savings,
rapid aeration, much safer
than Ethylene Oxide*

6

Hospital Sterilization

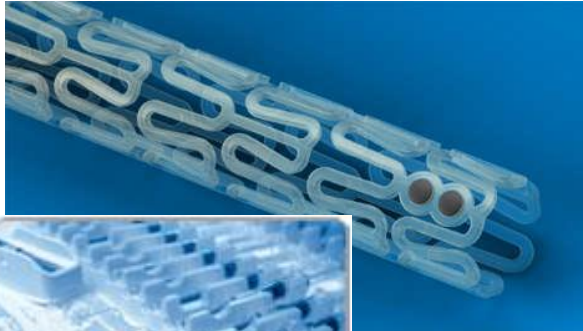
Some EtO , H_2O_2 ,

*NO_2 can provide 3x's
the capacity, 50% cost
savings.*



The Noxilizer EtO Alternative Industrial Opportunities

Value Proposition of Throughput & Cost Savings



**Industrial Batch
Sterilization**

***Contract Services
& Systems***



NO₂ Opportunities:

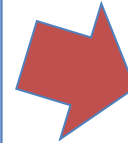
PFS

Bioresorbables /Implants

***“Bulk” EtO Contract
Sterilization (25% Goal)***

Shifting sterilization in house

***Sterrad 200 Replacement
(1100 Units Total, 250 in the
industrial market)***



Key Advantages over EtO Sterilization

- 1. 90% improvement on aeration**
- 2. Inventory Release in Hours versus Weeks**
- 3. >50% sterilization cost savings**
- 4. Non Carcinogenic out gassing**



The Noxilizer Industrial Application Opportunity

New Sterilization Capabilities with *Pre-Filled Syringes*



REGENERON
science to medicine™

ALLERGAN
Our pursuit. Life's potential.®

- PFS market of \$2.7b in 2010 to \$3.9b in 2015, moving earlier into the drug development cycle
- Current sterilization penetrates syringes and contaminates contents.
- NO₂ sterilization is a surface process, able to sterilize a pre-filled syringe after primary packaging stage. ***NO IMPACT TO PREFILLED CONTENTS..***
- ***Cost of sterilization at 1.5% -2.5%, or a \$50m – \$100m savings opportunity***

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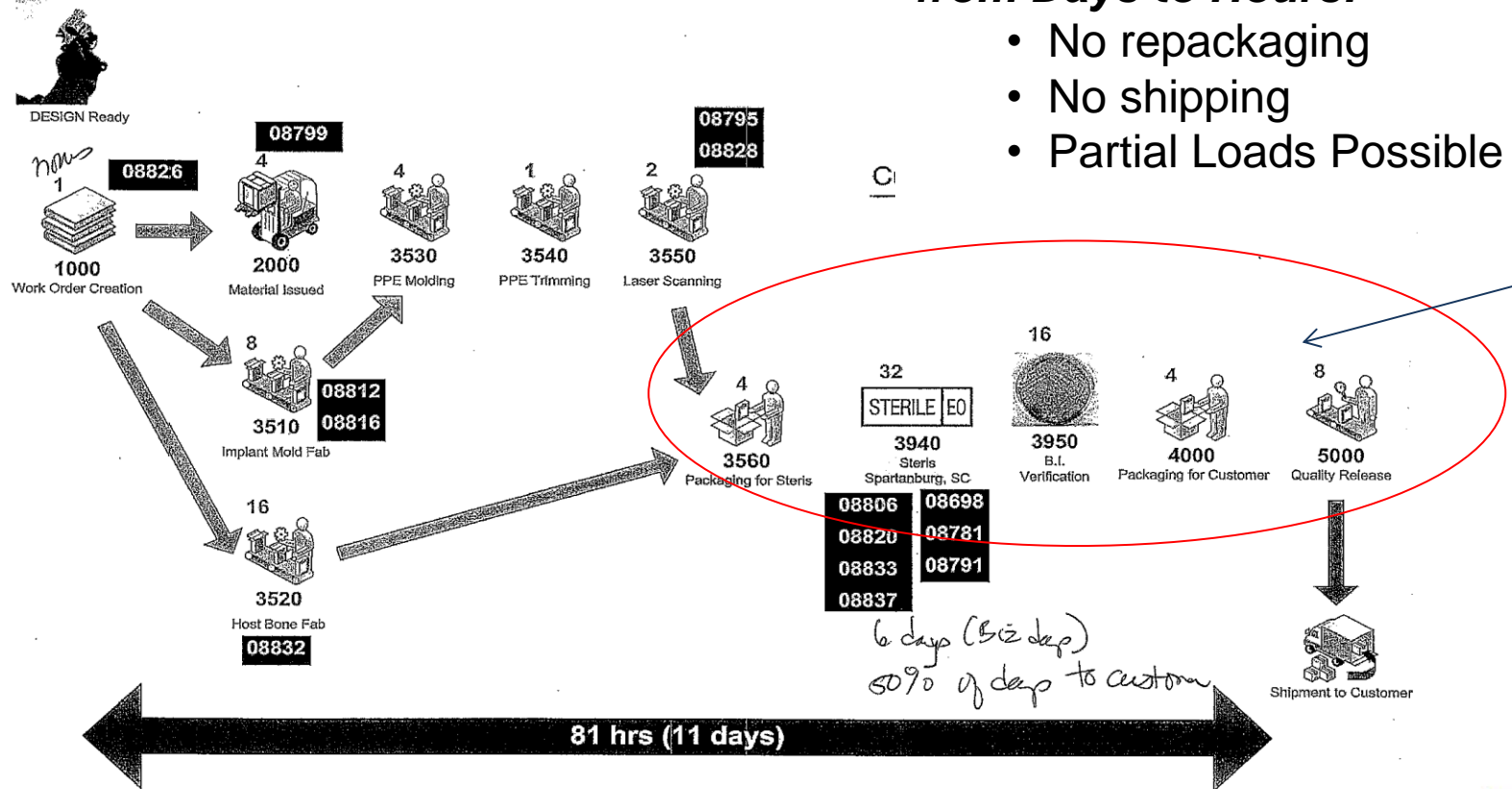


The Noxilizer Industrial Application Opportunity

New Sterilization Capabilities with *Revised Workflow*

Reduce Sterilization Time from Days to Hours:

- No repackaging
- No shipping
- Partial Loads Possible



2.5 - 12 day
turnaround
reduction



The Noxilizer Industrial Application Opportunity

New Sterilization Capabilities with Cost Reduction

	EtO	In House Noxilizer
Sterilization Cost per \$000/Vials	\$3.96	\$5.67*
Inventory Carrying Cost per \$000/Vials	\$3.27	\$0.00
Transportation Cost per \$000/Vials	<u>\$3.02</u>	\$0.00
Total Cost per \$000/Vials**	\$10.25	\$5.67
Annual Sterilization Cost	\$583,873	\$324,573
Potential Savings		\$259,300

- **Provides 44% savings**
- **Investment payback in ~16 months.** Includes validation, installation, etc.
- In-house sterilization eliminates Inventory Carrying Cost and Transportation expense.
- Eliminates concern about EO residuals on vials.
- No investment in explosion proof facilities and associated compliance expense

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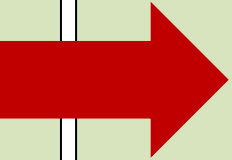



*Quoted cost per vial includes: depreciated equipment, consumables, maintenance and

Medical Device Package Sterilization

Growing Customer Relationships, Feasibility Studies

Medical Device Package Sterilization



CFI

BLUE TORCH MEDICAL Technologies Inc.

BD

Hospira

REGENERON science to medicine™

Scient'x AlphaTec Spine Solutions for the Aging Spine*

ALLERGAN Our pursuit. Life's potential.®

zimmer Personal Fit. Renewed Life.™

COOK PHARMICA

Pepex BIOMEDICAL

stryker®

TERUMO We keep life flowing

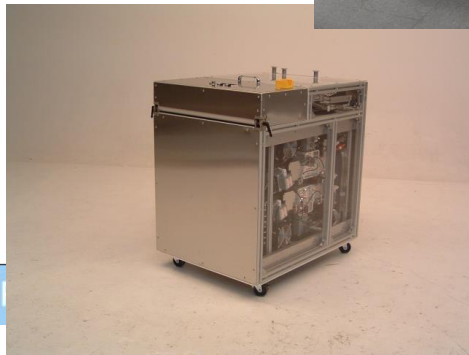
Abbott

M EMD MILLIPORE

Noxilizer's RTS 360 Sterilization System

Expanded Product & Service Offering for Industrial, Pharmaceutical & Hospital Customers

RTS-360 Sterilizer



NO₂ Industrial Generator

Recurring, Cycle Driven:

NO₂ Liquid
Biological Indicators
Chemical Indicators
Process Challenge Devices
Scrubber Material
NO₂ Sensors
Service Contracts

Sterilization Services:

Feasibility, Cycle Optimization
Contract Sterilization

Safeguarding Solutions Through **Innovative**

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Noxilizer RTS 360 NO₂ Sterilization System

Differentiation versus Ethylene Oxide (EtO)

Simple, effective and economical in-house sterilization

- Operates at Room Temperature
- Maintains Material Properties
- No Residuals
- No Aeration Required (*Avoids Out-Gassing*)
- Shorter Cycle Time (*Inventory release in hours versus weeks*)
- Free Standing/Non Hazardous Bi Product
- Safer than Ethylene Oxide (*Known EPA Carcinogen*)
- Fully Scalable (*Larger Chamber & In line Potential*)
- Permits partial Pallet Loads
- No need for Safety Reinforced Facilities
- >50% sterilization cost savings



Patented Noxilizer
Sterilization System



Noxilizer RTS 360 NO₂ Sterilization System

Differentiation versus Hydrogen Peroxide (Sterrad 200)



Patented Noxilizer RTS360
Sterilization System

1. **Rapid Cycle times**
COMBINED with capacity
 - Capacity 2.5x greater than 200NX,
 - 10% less cycle time
2. **No moisture or weight/load aborts – leads to flashing**
3. **No package residuals**
4. **50% less expensive to operate**
 - Less cycles, comparable consumables
5. **REAL ambient temperature**
 - 70 degrees versus 115 degree temperature

Sterrad 200



Replacing Discontinued ASP 200 Systems with RTS360 units:

Large Loads, overnight
Batteries, scope sets, implants
60 minute cycle
Research/Animal work



RTS-360 Roadmap of Global Commercial Traction

Moving to the Hospital

Global Medical Device
Package Sterilization



Released RTS360

Hospital Sterilization
Europe & China



CE Mark Required

Hospital Sterilization
United States



FDA Clearance Required

RTS 360 passed UL, IEC testing, Masterfile submitted to FDA

ISO 13485 – scope includes design and manufacturing of sterilization equipment

ISO 14937 – scope includes cycle development, validation, consulting on sterilization and contract sterilization

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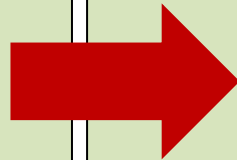
Hospital Sterilization in the US

Initial Relationships and “Seeding” Plans

Hospital Sterilization
United States



FDA Clearance Required



Methodist Hospital & Physicians

stryker[®]

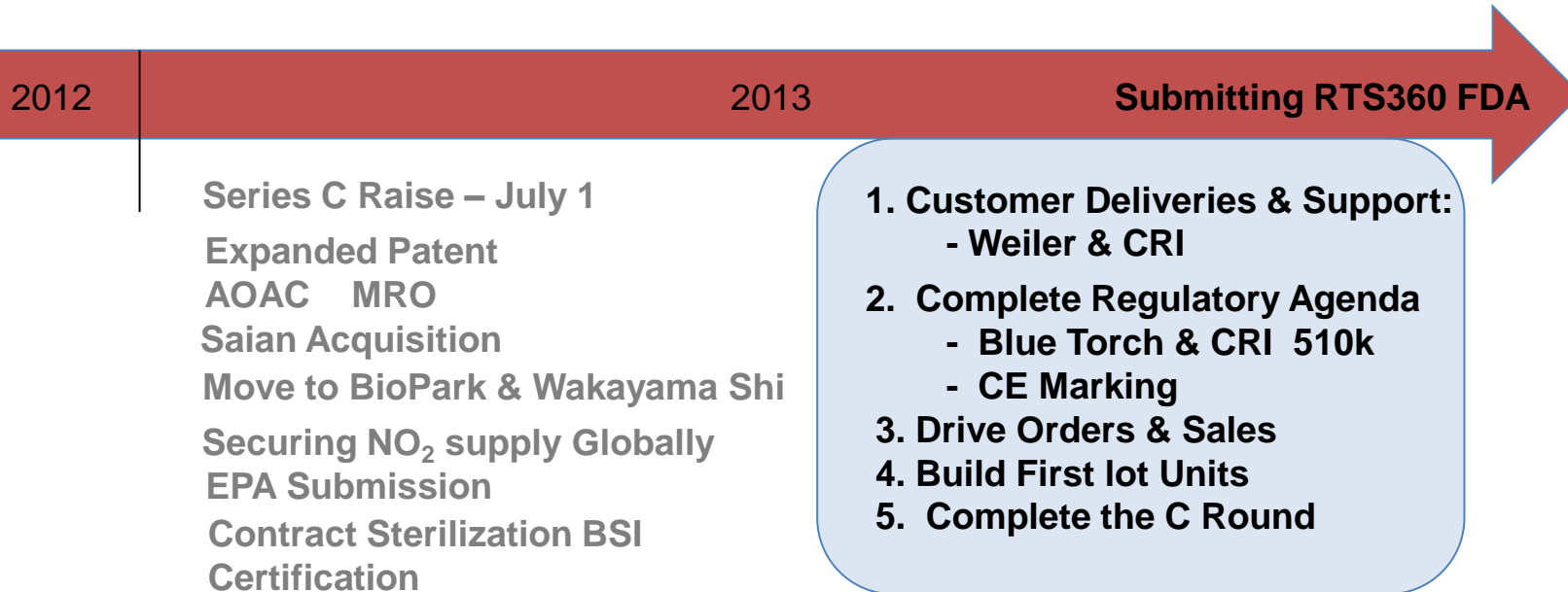
**LEE MEMORIAL
HEALTH SYSTEM**



FDA Submission Target 2013/2014

Next Steps for Noxilizer

Accelerate Value Creation in 2013





***Nitrogen Dioxide (NO₂)
Rapid, Room Temperature
Sterilization***