Keystone Environmental

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WATER FOOTPRINT AND NEUTRALITY: CHALLENGES & OPPORTUNITIES

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THINKING GLOBALLY

Global water use increasing at 2.4x population growth rate.

Over 1 B people w/o clean drinking water.

Over 2 B people w/o adequate sanitation.

Over 5 M deaths annually from preventable waterborne diseases.

97.5% salt water; 1.5% frozen fresh water

Fresh water use: 70% irrigation; 22% industry; 8% domestic use.

How much water
is consumed in a country?

Benchmark of
National Water Footprints

Country	m3 / yr / capita	Comments
Global	1,385	= 380 L/d/cap

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UK	**1,750**	97% external
Germany	**1,940**	Mainly a water importer
Spain	**2,000**	Water importer for agricultural products Water exporter for livestock
Netherlands	**2,300**	89% external

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Spain	**2,000**	Water importer for agricultural products Water exporter for livestock
Netherlands	**2,300**	89% external
Canada	**2,333**	21% external

How much water is needed to make a commercial product?

18,000x its weight


[redacted]
litres
100 gr of
chocolate

[Hoekstra & Chapagain, 2008]

*30L for one cup of tea

[Hoekstra & Chapagain, 2008]

Definitions

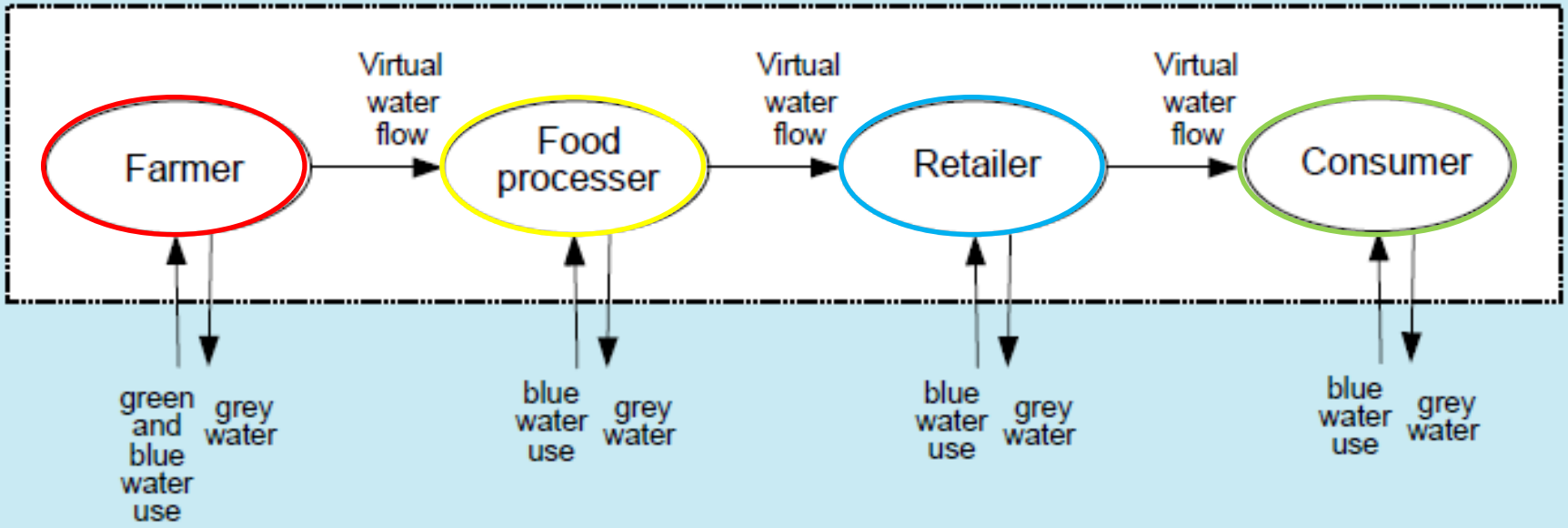
Water Footprint of a Business (Product)

- Total volume of fresh water used directly or indirectly to run and support a business (or to produce a product)
- Includes blue, green and grey water

Water Neutrality of a Business (Product)

- Reducing water footprint as much as reasonably possible and offsetting remaining negative externalities
- It doesn’t mean water use is zero

The virtual water chain



[Hoekstra, 2008

Market Trends

1 in 5 consumers is sustainability-driven
in brand and store choice.

Water efficiency is a sustainability component.

What are the trends?

Market Trends

General Mills

- 5-year goal to reduce water use by 5%

Coca-Cola

- Began reporting water issues as a material risk to investors
- System-wide goal of returning all water used back to nature

Market Trends

Anheuser-Busch

- Currently 5.5 L of water per L of beer packaged.
- Goal is 4 to 1.
- Decreased water usage by 37% since 2000.
- One plant reduced its water ratio to 4.3

Cadbury (now Kraft Foods)

- Goal to reduce water usage by 20% by 2020

Market Trends

Colgate - Palmolive:

- Their 2002 to 2010 target was to reduce water use by 25% and attain a 40% reduction of water use per unit of production worldwide.

ConAgra Foods:

- In April 2010 announced a goal to reduce water use by 15 percent per pound of product produced by 2015.

Market Trends

Who’s the leader?

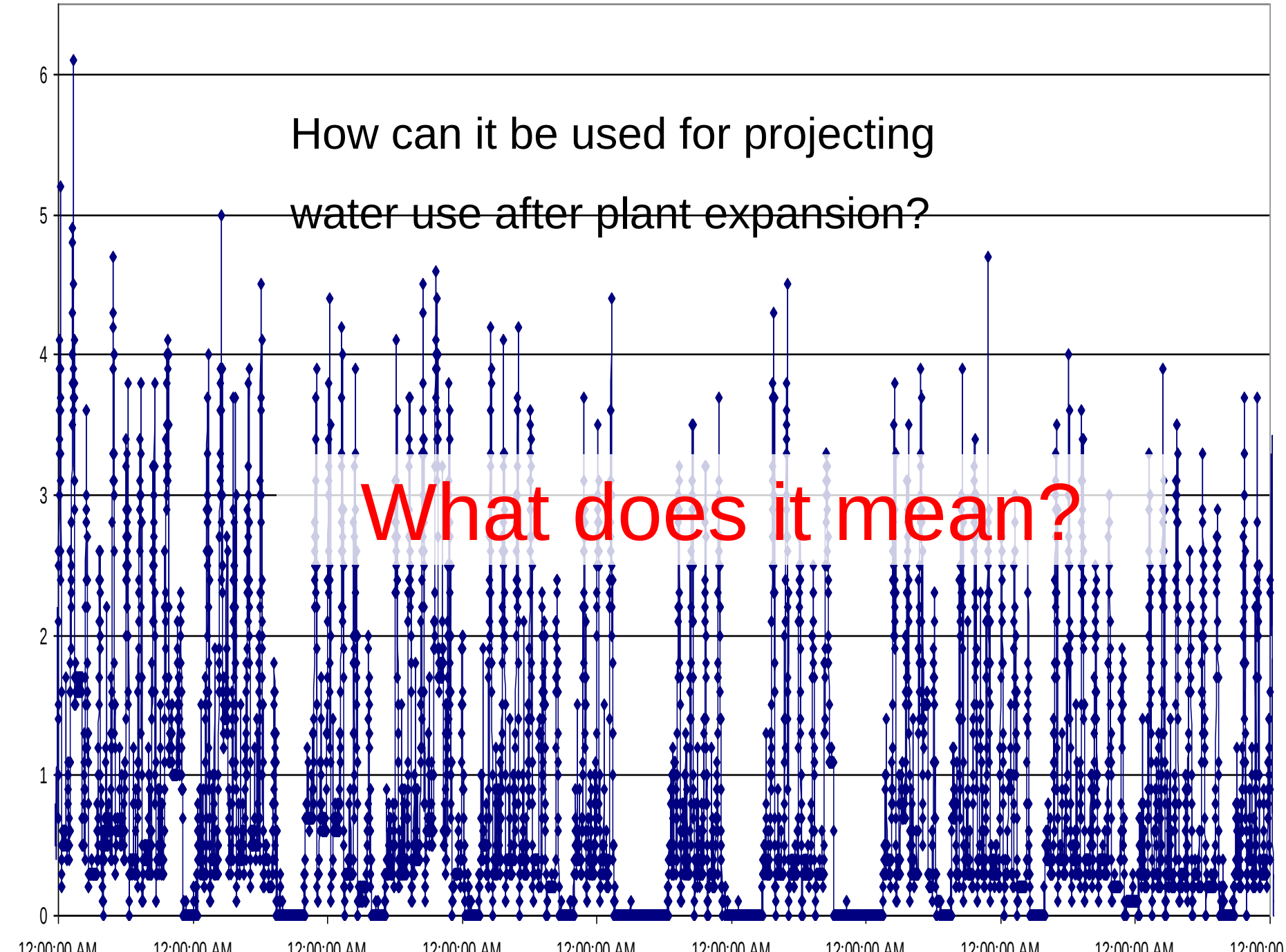
Project Summary

Client is a Food Processor located in the Lower Mainland

Engaged us during $8 million plant expansion

Plant has dedicated flow meters

- Flow readings every 15 minutes
- 287 flow data points per day
- 105,000 data points per year


How can it be used for projecting
water use after plant expansion?
What does it mean?
6
5
4
3
2
1
0
12:00:00 AM
12:00:00 AM
12:00:00 AM
12:00:00 AM
12:00:00 AM
12:00:00 AM
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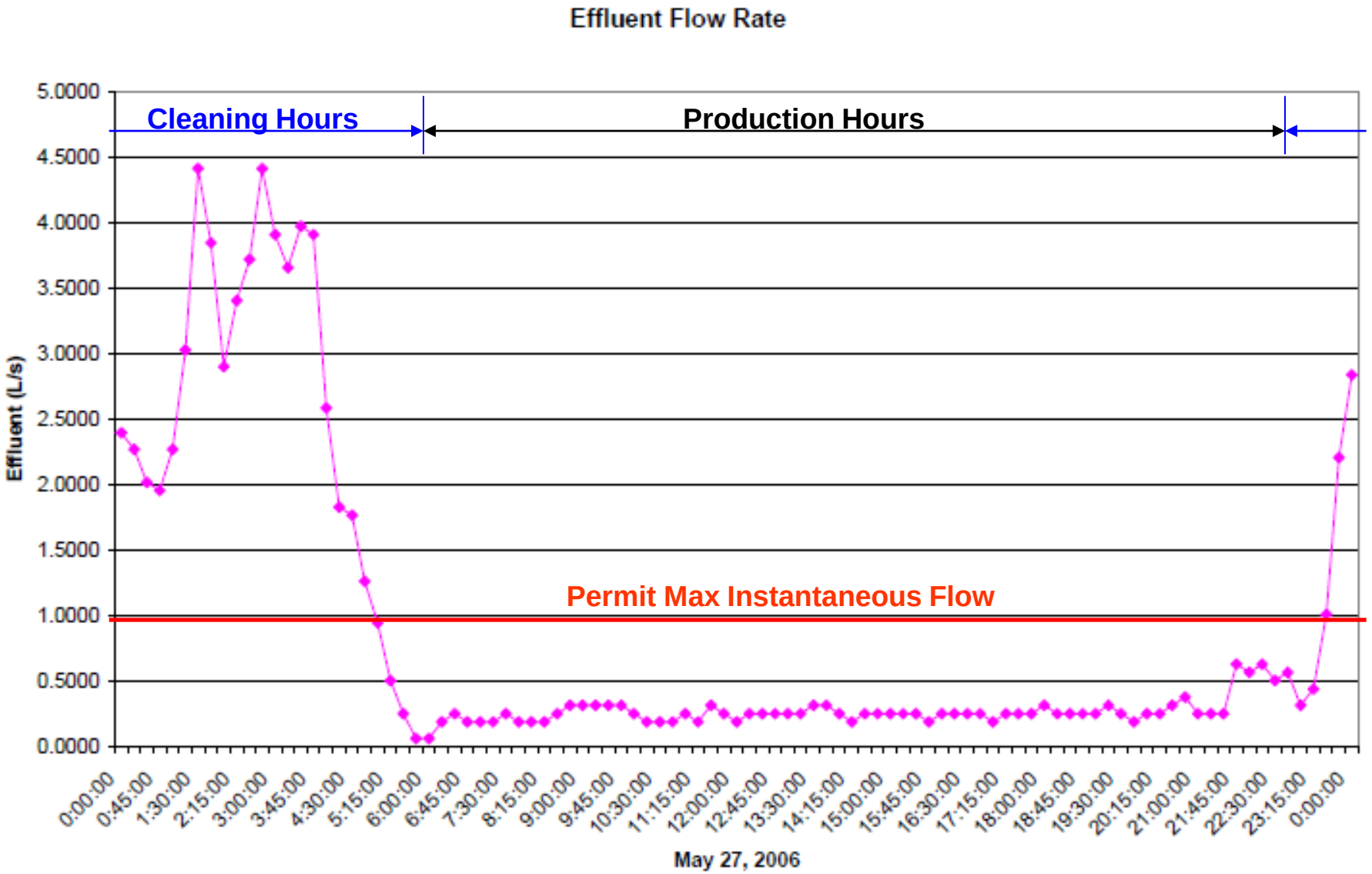
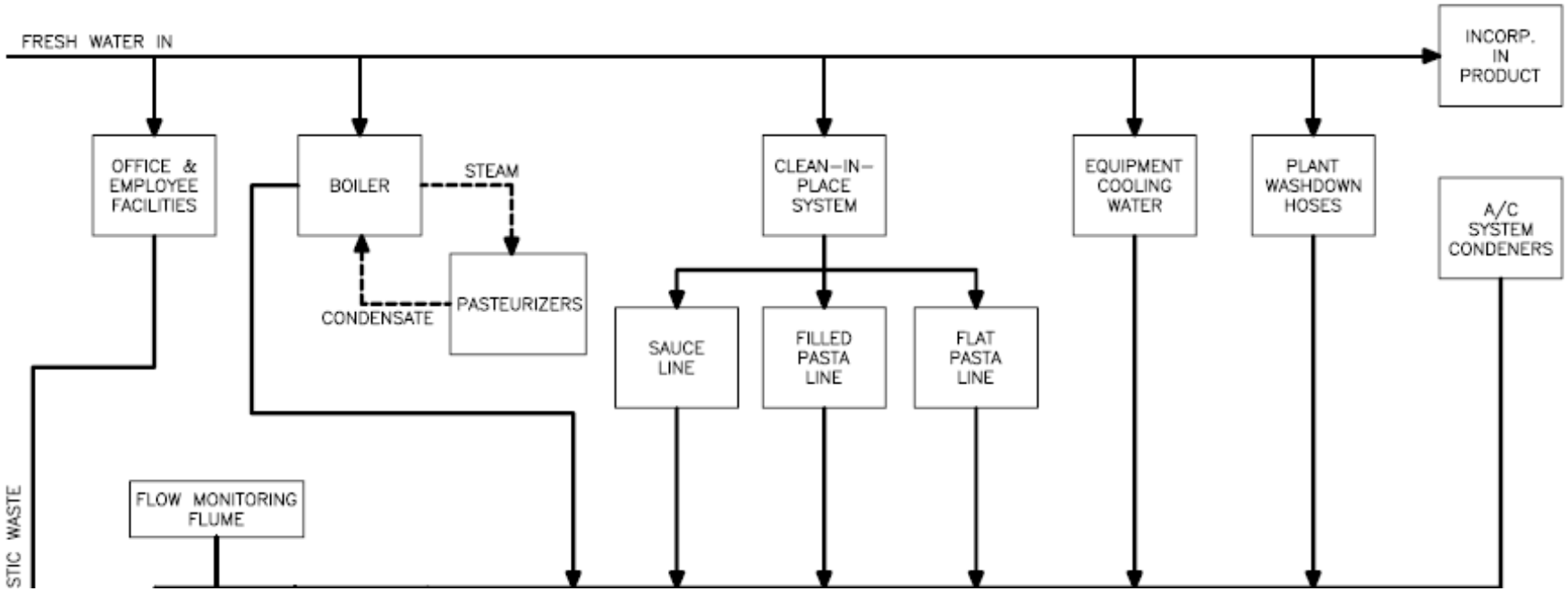
Typical Daily Effluent Flow with Original Permit Levels





	Total	Production	Sanitation
Pre-expansion flow rates	**89 m^3/d**	**25 m^3/d**	**64 m^3/d**
	4.5 lps		**4.5 lps (Max)**
Post-expansion Estimates	**136 m^3/d**	**128 m^3/d**	**96 m^3/d**
	12.1 lps		**8.9 lps (Max)**

- A water balance was completed for the plant.
- Flow spikes during sanitation attributed to
  - Draining of multiple kettles
  - Draining of CIP tanks during short period of time

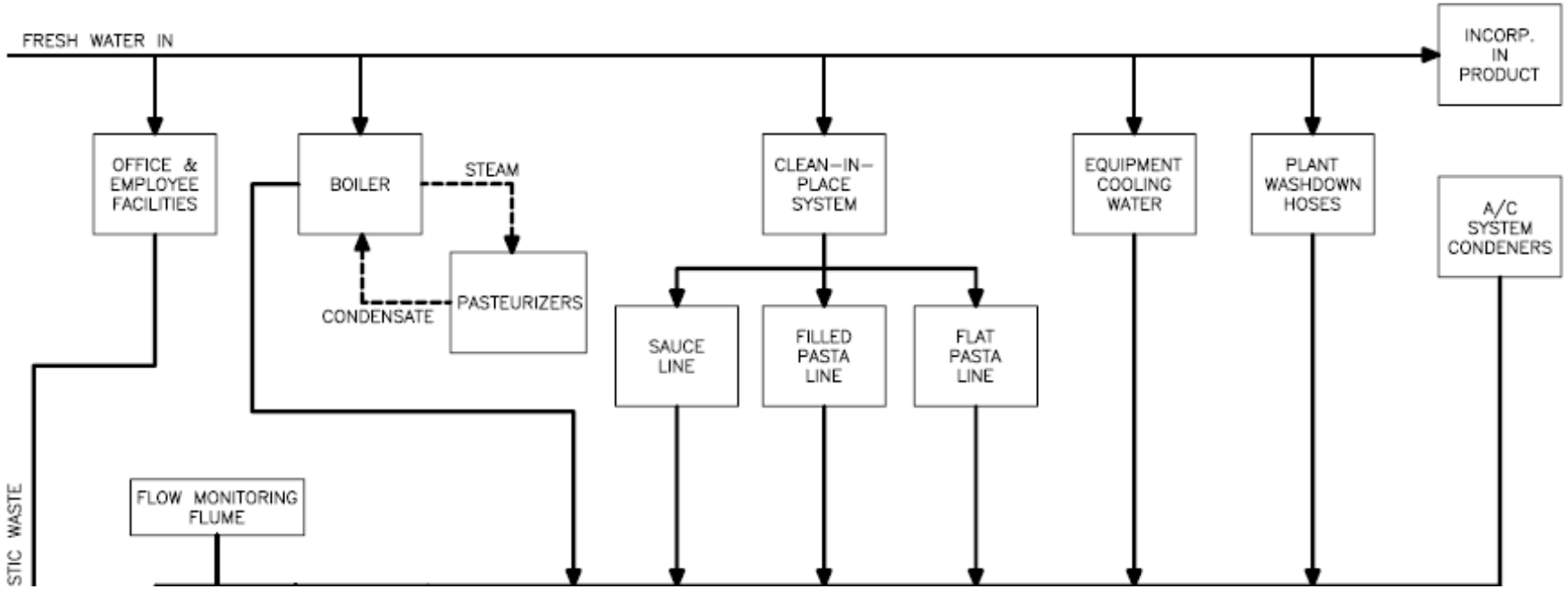
Identified Opportunities

Best practices implemented

- Operator's education/awareness
- Lower volume nozzles for the CIP system
- Ingredients in bags rather than pails
  - => reducing water for cleaning
- Holding tank for kettle discharge
  - => slow bleed back into system
- High pressure hoses

RESULTS

- reduced peak flows & total water consumption



	Total	Production	Total Sanitation
Pre-expansion flow rates	**89 m^3/d**	**25 m^3/d**	**64 m^3/d**
	4.5 lps		**4.5 lps**
Post-expansion Estimates	**224 m^3/d**	**128 m^3/d**	**96 m^3/d**
	12 lps		**8.9 lps (Max)**
Post-expansion Estimates w/ Water Saving Measures and Water Management Practices	**109 m^3/d**	**40 m^3/d**	**69 m^3/d**
	4.5 lps		**4.5 lps (Max)**

ACTING LOCALLY

- Determine Water Footprint
  - own operation and supply-chain
  - batch, continuous, seasonal
  - water balance for all unit processes
- Reduce Water Footprint
  - identify opportunities
  - to reduce consumption and generation
- Plan Water Neutrality
  - Reduce as much as possible internally and externally
  - Offset at local watershed level
- Operate Water Neutral

THANK YOU !!

www.KeystoneEnvironmental.ca

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