OXIDATION REDUCTION FOR RAILROAD INDUSTRIAL WASTEWATER

Railroad Environmental Conference
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ARCADIS CP

GOLDEN, BRITISH COLUMBIA

ARCADIS CP

PROBLEM – HIGH BOD EFFLUENT TO SENSITIVE WATERWAY

ARCADIS CP

BACKGROUND

EXISTING SYSTEM

- Existing WWTP constructed for runoff from drip pans and coal car maintenance
  - EQ tank
  - OWS
  - Peroxide injection
- 5-Day BOD limit 20mg/L
- BOD spikes occurred routinely
- Investigations revealed elevated levels of BOD caused by toilet chemicals and food waste disposal
- Peroxide injection system would decrease elevations of BOD but was still ineffective
- Arcadis retained to examine potential options do resolve BOD issue

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EXISTING IWW TREATMENT SYSTEM

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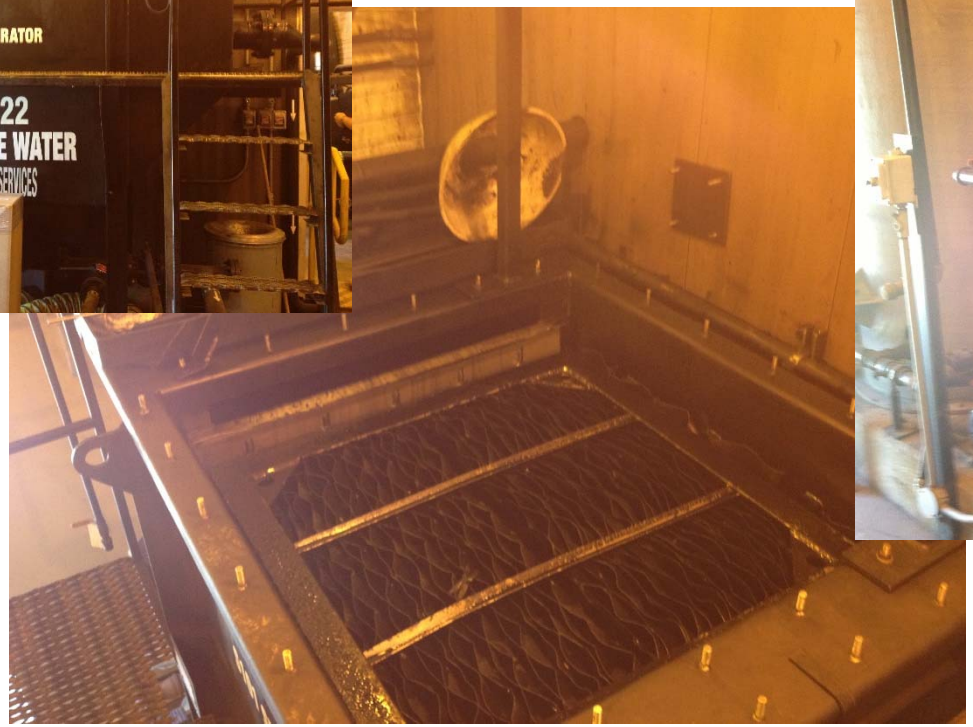
EXISTING IWW TREATMENT SYSTEM



ARCADIS CP

BACKGROUND

NEW ISSUE

- Environmental Risk was notified a new Locomotive shop would be constructed – construction would begin immediately
- The existing WWTP was not designed to treat washwater
- BOD issue would increase with the addition of locomotive washwater
- Local municipality rejected request to connect WWTP to municipal treatment system
- Arcadis scope was changed to design a new WWTP that would meet CP's BOD challenges

NEW IWW TREATMENT SYSTEM

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SLUDGE
SLUDGE

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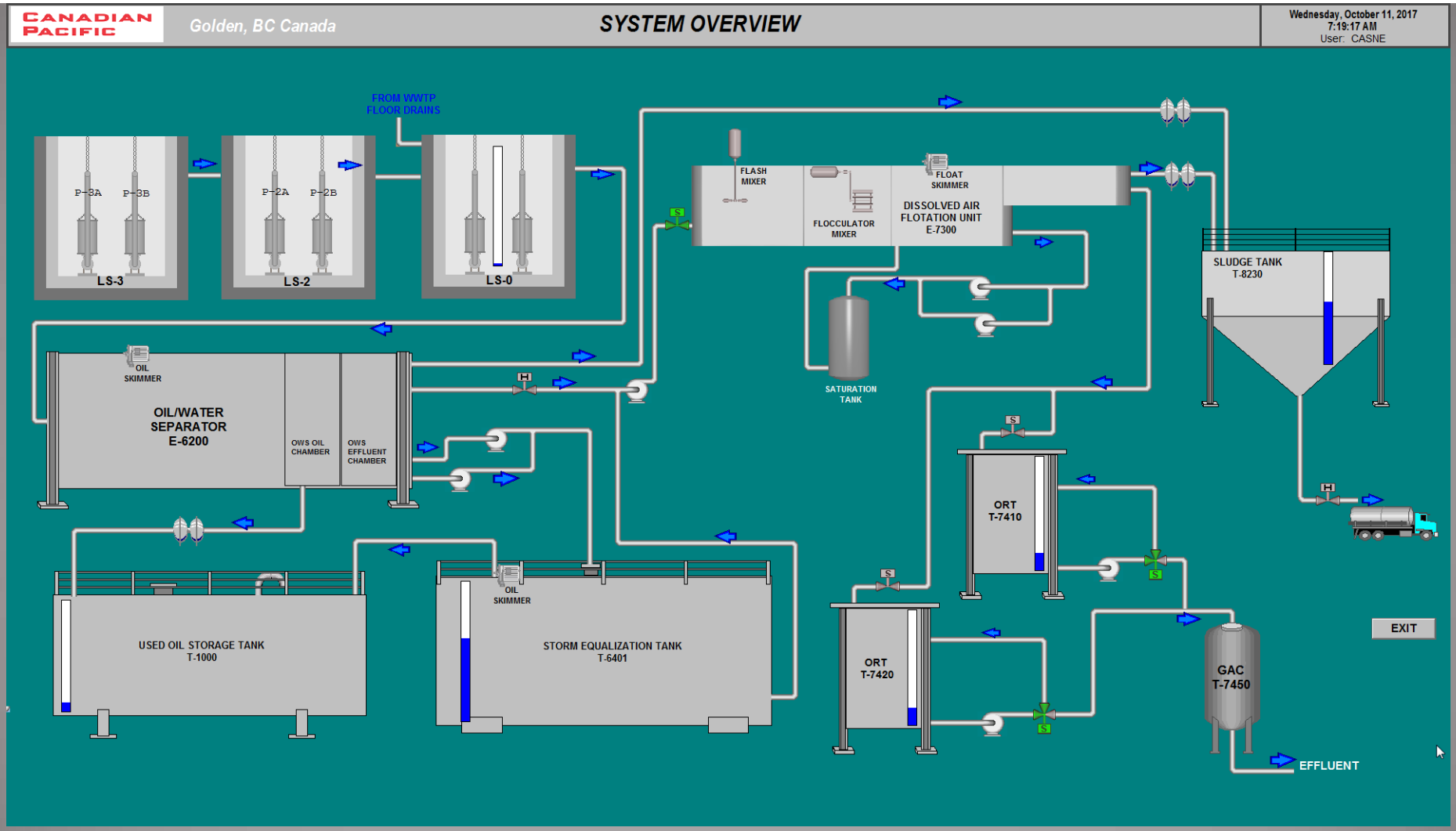
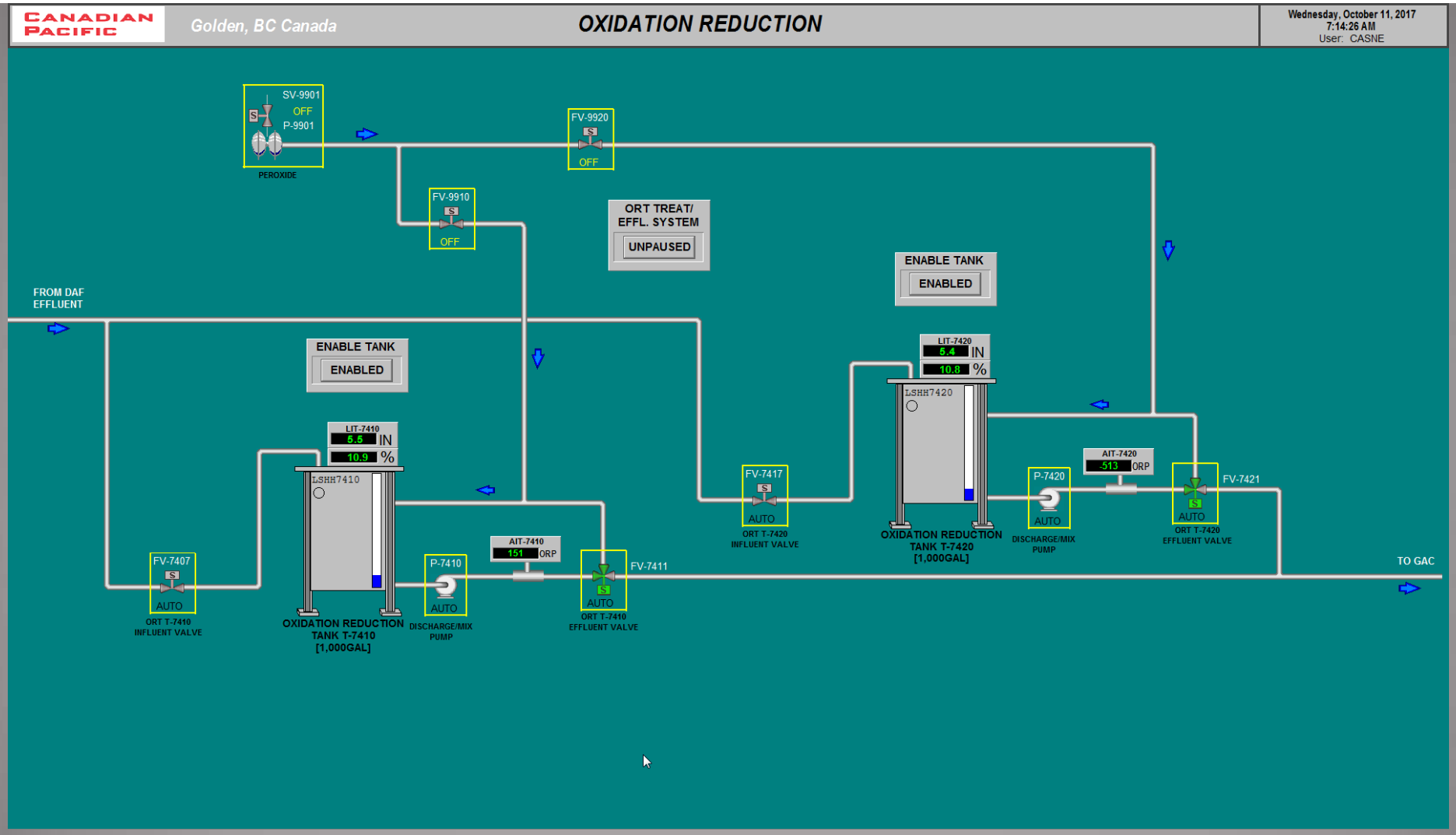

CANADIAN PACIFIC
Golden, BC Canada
SYSTEM OVERVIEW
Wednesday, October 11, 2017
7:19:17 AM
User: CASNE
FROM WWTP
FLOOR DRAINS
P-3A
P-3B
LS-3
P-2A
P-2B
LS-2
LS-0
FLASH MIXER
FLOCCULATOR MIXER
FLOAT SKIMMER
DISSOLVED AIR FLOTATION UNIT E-7300
SATURATION TANK
SLUDGE TANK T-8230
OIL SKIMMER
OIL/WATER SEPARATOR E-6200
OWS OIL CHAMBER
OWS EFFLUENT CHAMBER
ORT T-7410
ORT T-7420
GAC T-7450
USED OIL STORAGE TANK T-1000
OIL SKIMMER
STORM EQUALIZATION TANK T-6401
EXIT
EFFLUENT

OXIDATION REDUCTION SYSTEMS


CANADIAN PACIFIC
Golden, BC Canada
OXIDATION REDUCTION
Wednesday, October 11, 2017
7:14:26 AM
User: CASNE
SV-9901
OFF
P-9901
PEROXIDE
FV-9920
OFF
FV-9910
OFF
ORT TREAT/ EFFL. SYSTEM
UNPAUSED
ENABLE TANK
ENABLED
FROM DAF EFFLUENT
ENABLE TANK
ENABLED
LIT-7420
5.4
10.8
IN
%
LSHH7420
LIT-7410
5.5
10.9
IN
%
LSHH7410
FV-7417
AUTO
ORT T-7420 INFLUENT VALVE
OXIDATION REDUCTION TANK T-7420 [1,000GAL]
P-7420
AUTO
DISCHARGE/MIX PUMP
AIT-7420
-513
ORP
FV-7421
AUTO
ORT T-7420 EFFLUENT VALVE
FV-7407
AUTO
ORT T-7410 INFLUENT VALVE
OXIDATION REDUCTION TANK T-7410 [1,000GAL]
P-7410
AUTO
DISCHARGE/MIX PUMP
AIT-7410
151
ORP
FV-7411
AUTO
ORT T-7410 EFFLUENT VALVE
TO GAC
ARCADIS
CP

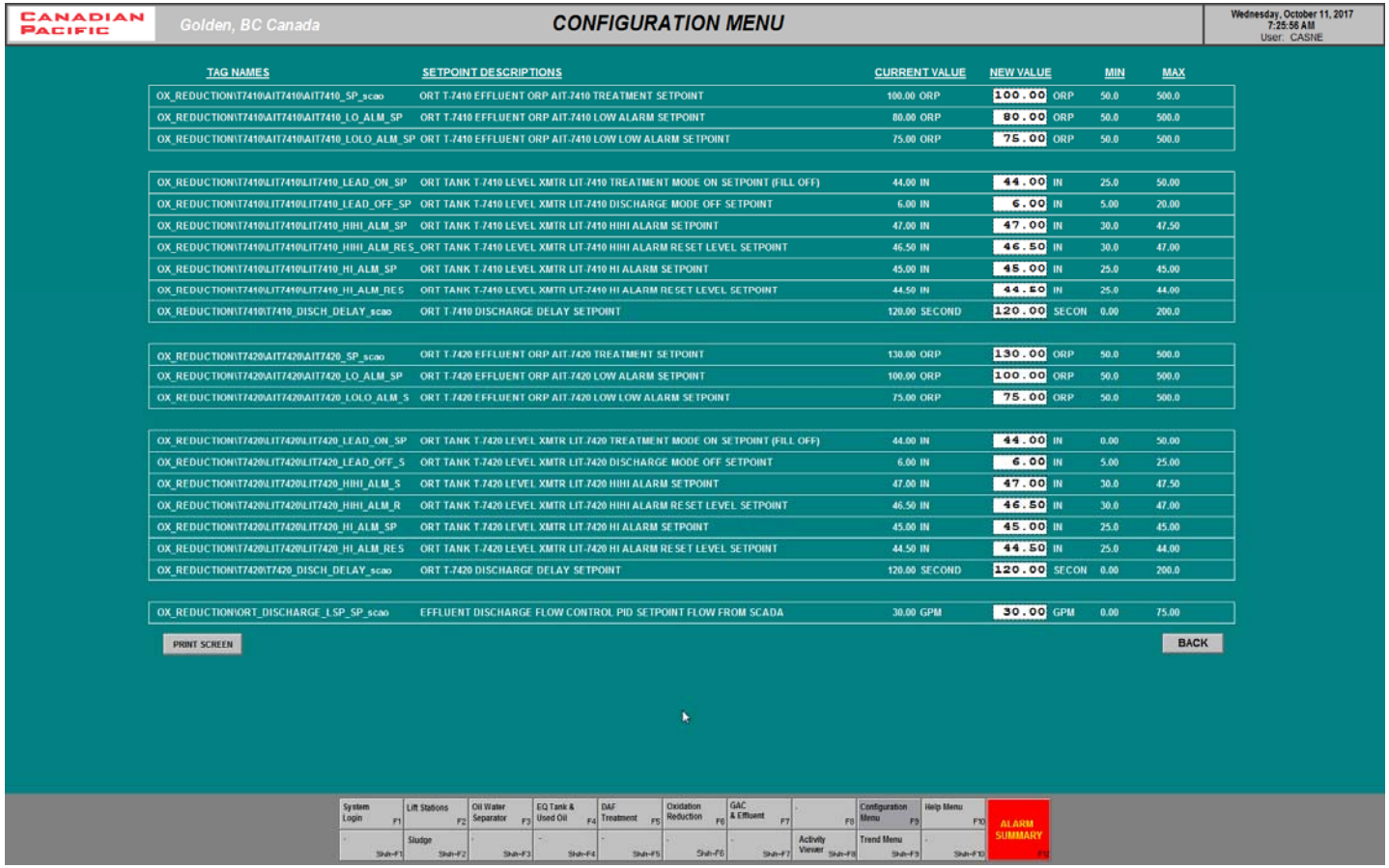
ARCADIS CP


REGAL
REGAL TANKS LTD.

JAR TESTING

- What is the right dose?
- What does 20ppm BOD look like?

TUNING THE SYSTEM



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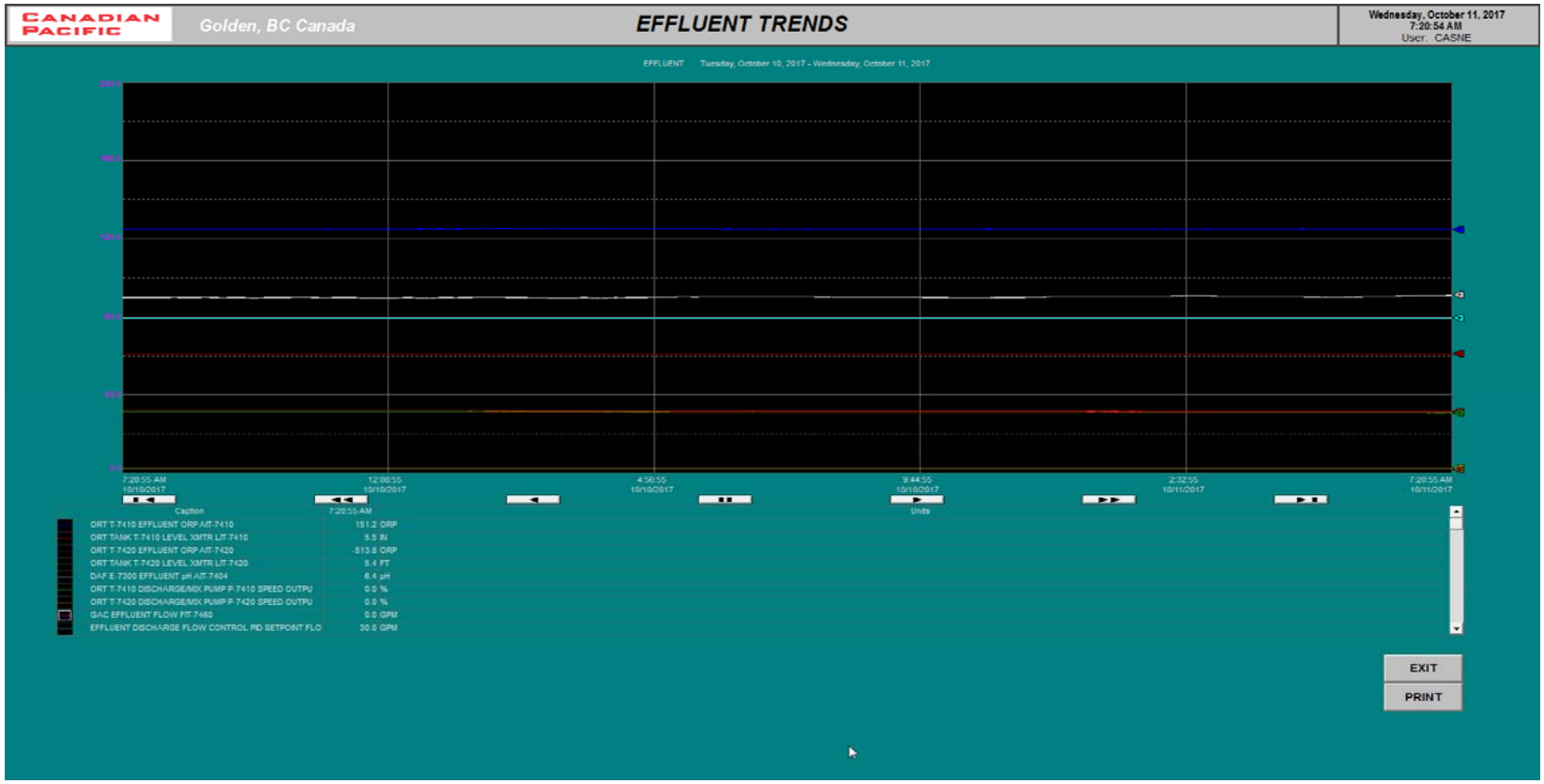
OXIDATION REDUCTION POTENTIAL INDICATORS

HYDROGEN PEROXIDE INJECTION SYSTEM

EFFLUENT

WHAT'S HAPPENING…



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OXIDATION REDUCTION

LESSONS LEARNED

- There is no direct correlation between oxidation reduction potential and 5-Day BOD
- 5-Day BOD results are not available for 5 days
- COD and BOD can be correlated and COD results can be obtained same day
- Toilet chemical and other inputs can drastically upset BOD
- Must be careful overdosing hydrogen peroxide or other treatment chemicals

PRESERVING A RESOURCE


2201
2201
ARCADIS
CP