ConocoPhillips

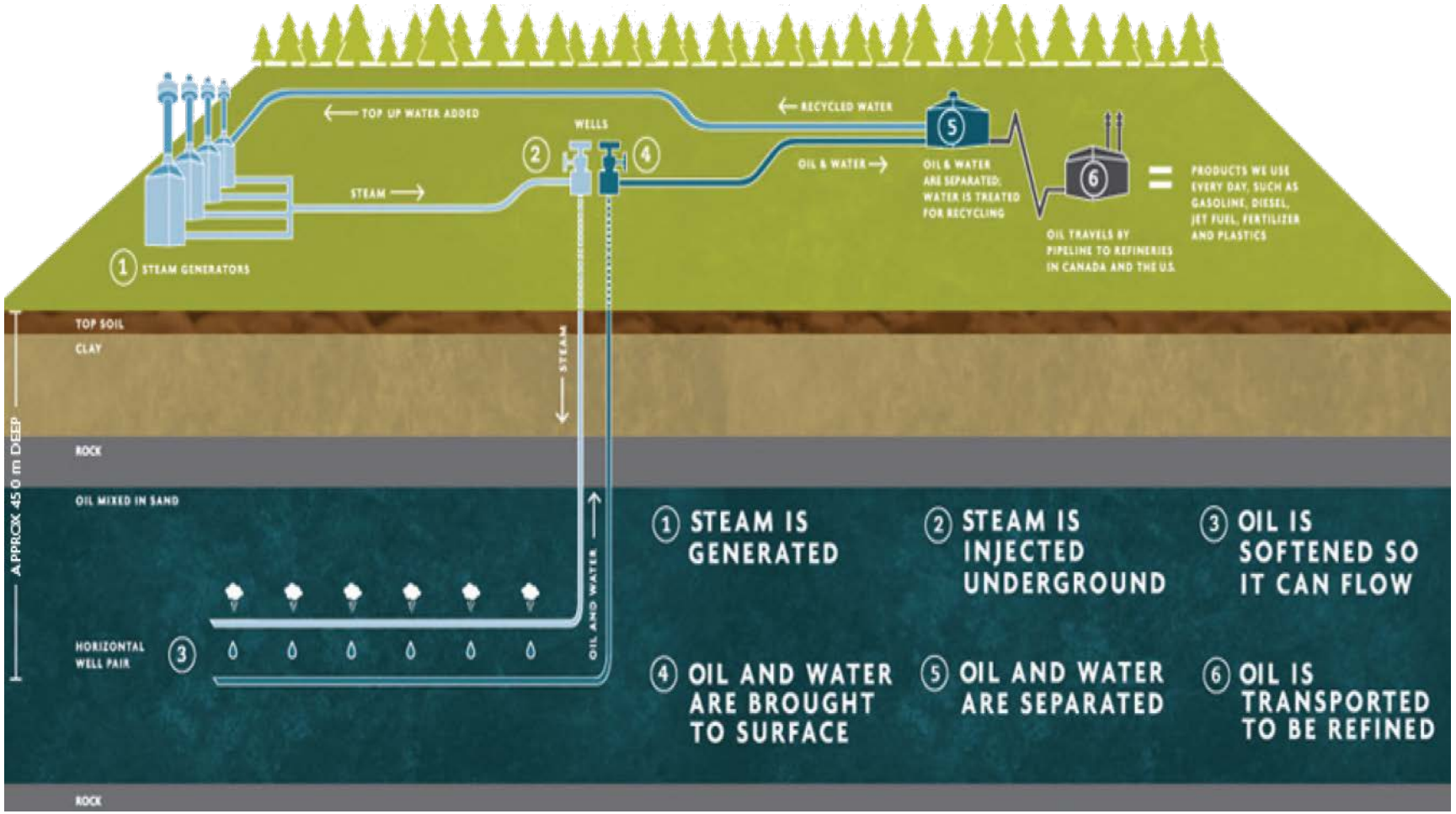
SAGD Water Lifecycle

Mike Scribner, Manager of Technology and Optimization, ConocoPhillips Canada

Agenda

- Oil Sands Overview
- How SAGD works
- The water process
- Improving our water use efficiency
- Questions

SAGD Process



Source: Cenovus

Taking Action : Water

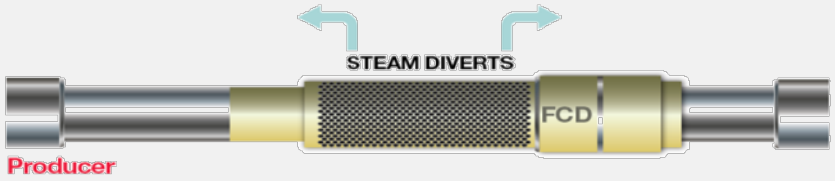
- Optimizing Recycling
  - Towards 90%
  - Plant efficiency
  - S2 Evaporators
- Even lower quality water
  - Desalination module at S2
  - Moving to optimize saline water
- Technology lowering SOR
  - Novel Well Architecture
  - GT-OTSG
  - eSAGD

Surmont 2 Evaporator

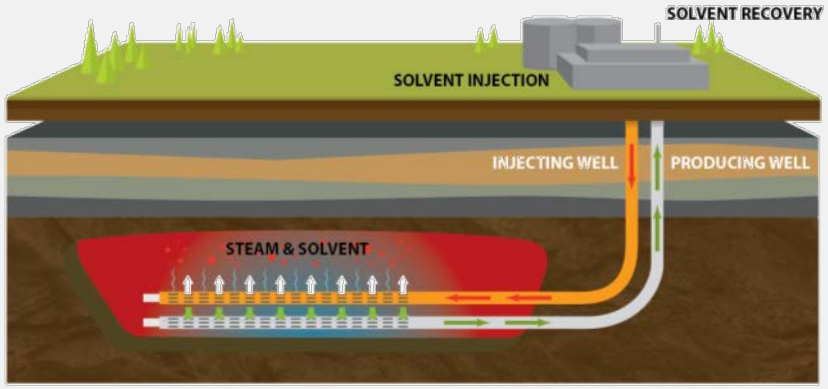
Reducing SOR

- Operating Efficiency
  - High reliability reduces SOR
- Improved Steam Quality at Surmont
  - Efficiency of our treatment process has led to higher steam quality at our Surmont operation
- Flow Control Devices (FCDs)
  - Lower SORs
- Technology
  - GT-OTSG
  - eSAGD
  - Novel Well Architecture

Flow Control Devices



Enhanced Steam Assisted Gravity Drainage



Water Usage: The Big Picture

Surmont 1 Daily Approved Maximum Diversion Limit
4,450 m^3

Actual Daily Usage
24%

Water Usage: The Big Picture

Surmont uses

to make

In 2013 Surmont produced almost

10 MM bbl

of BITUMEN

An 18-hole golf course with an area of 407 acres uses **six times** as much water in a year as Surmont.

What can you do with **10MM bbl** of bitumen?

One year of production at Surmont equals

62 BILLION YEARS

of iPhone charges!

What can you do with **10MM bbl** of bitumen?

Power about

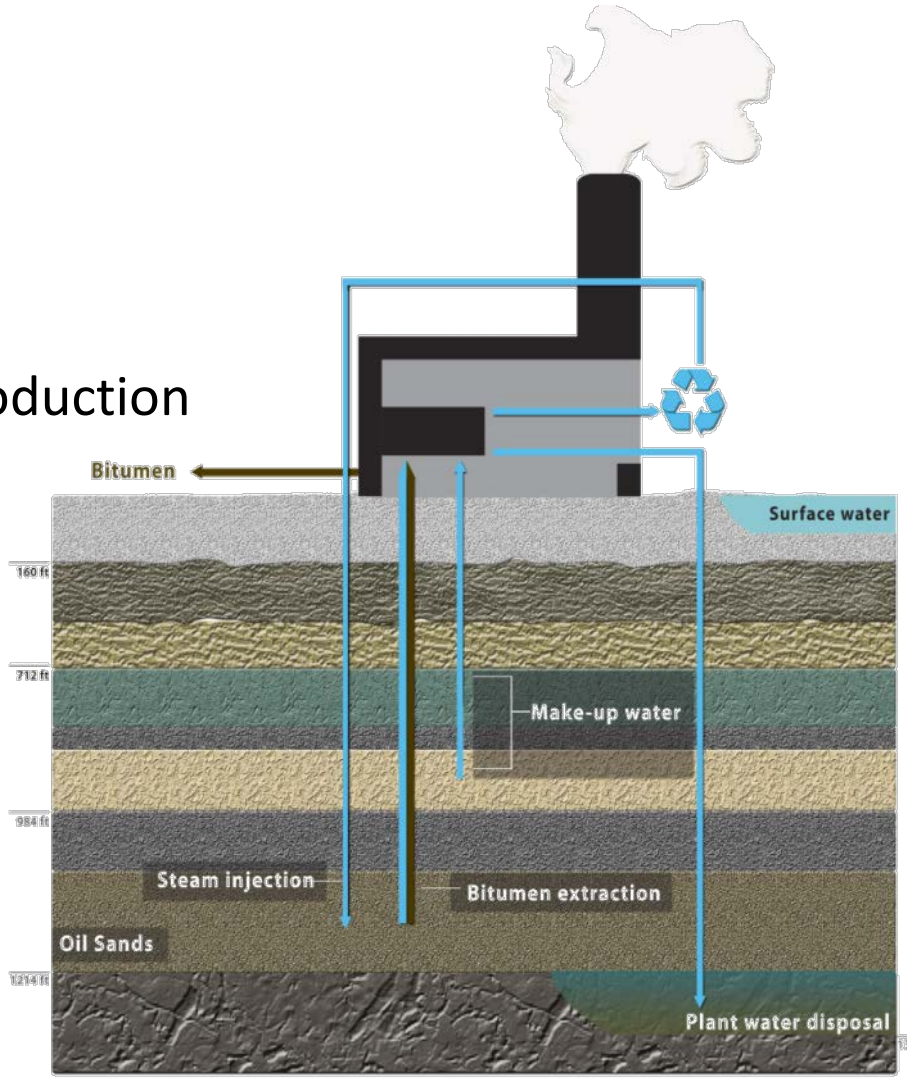
100,000

CANADIAN HOMES

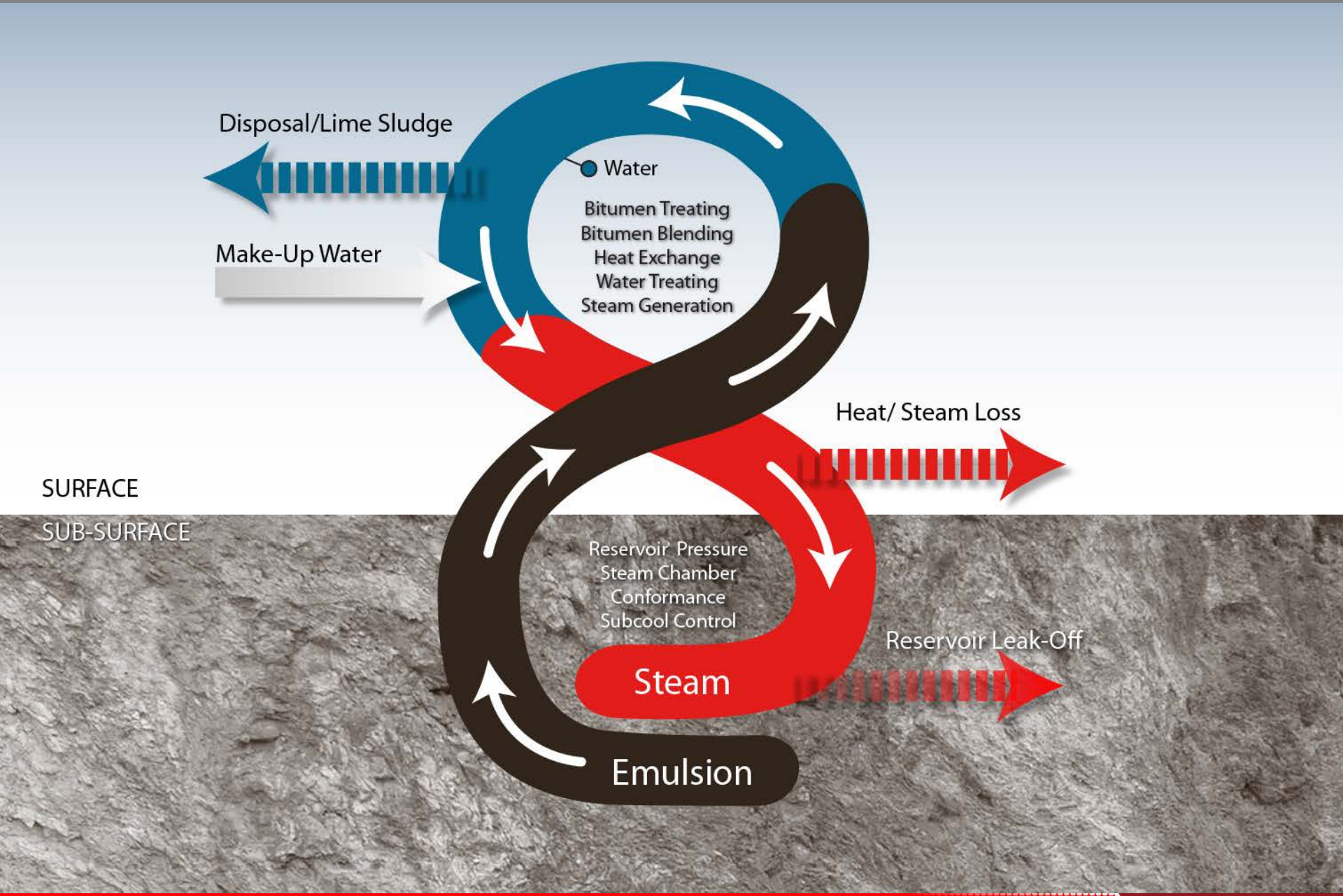
for a year!

Facts : Water for Surmont

- ZERO surface water use, discharge
  - Low quality ground water
- 87% recycle rate (2013 average)
- Heavily regulated
- In situ water use will grow with production
  - 0.25 bbl make-up water / bbl bitumen



Water Disposal




GHG/Air
Environmental Risks
Biodiversity
ENVIRONMENT
Land
Water
Waste


ConocoPhillips
Canada