

# SAGD Development Optimization

## Problem

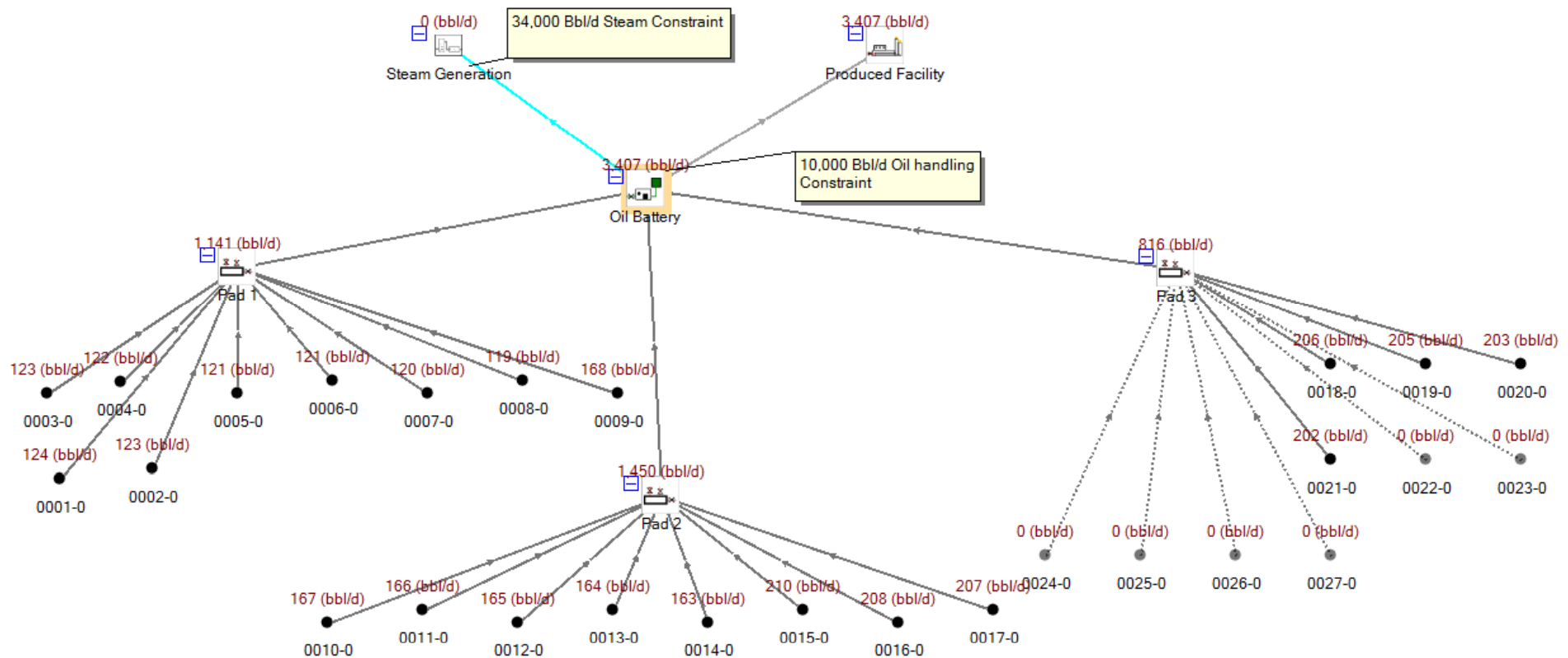
- Development planning for Steam Assisted Gravity Drainage (SAGD) development

## Challenges

- Constrained production on oil handling and steam production.
- Wells must be shifted in time in order to fit within these constraints.

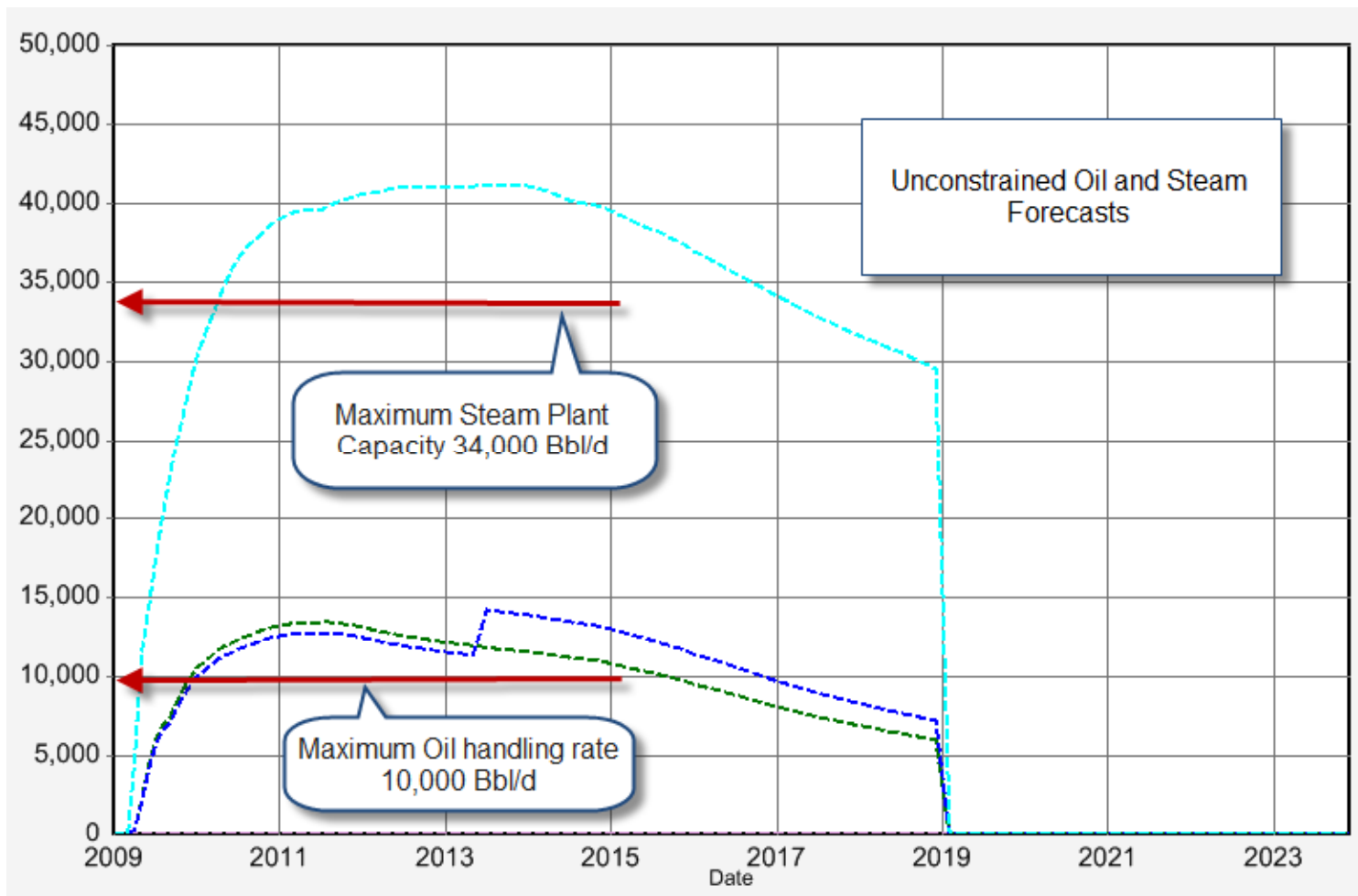
# Flow Diagram – SAGD Development Planning

- A flow schematic is easily created in WellSpring to represent the field wells and facilities

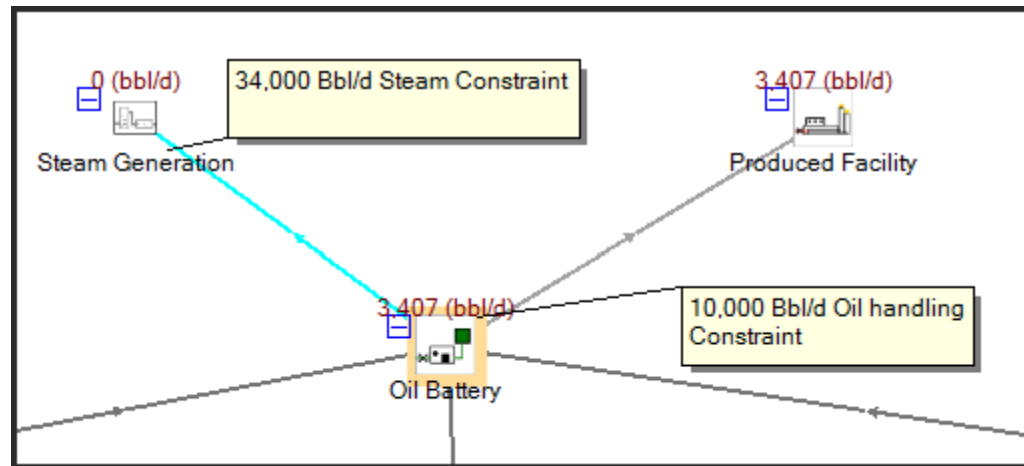


# Unconstrained Run

Actual production potential is higher than the facilities can handle, so not all wells can be brought on at the same time. Which wells should we defer, and by how much?



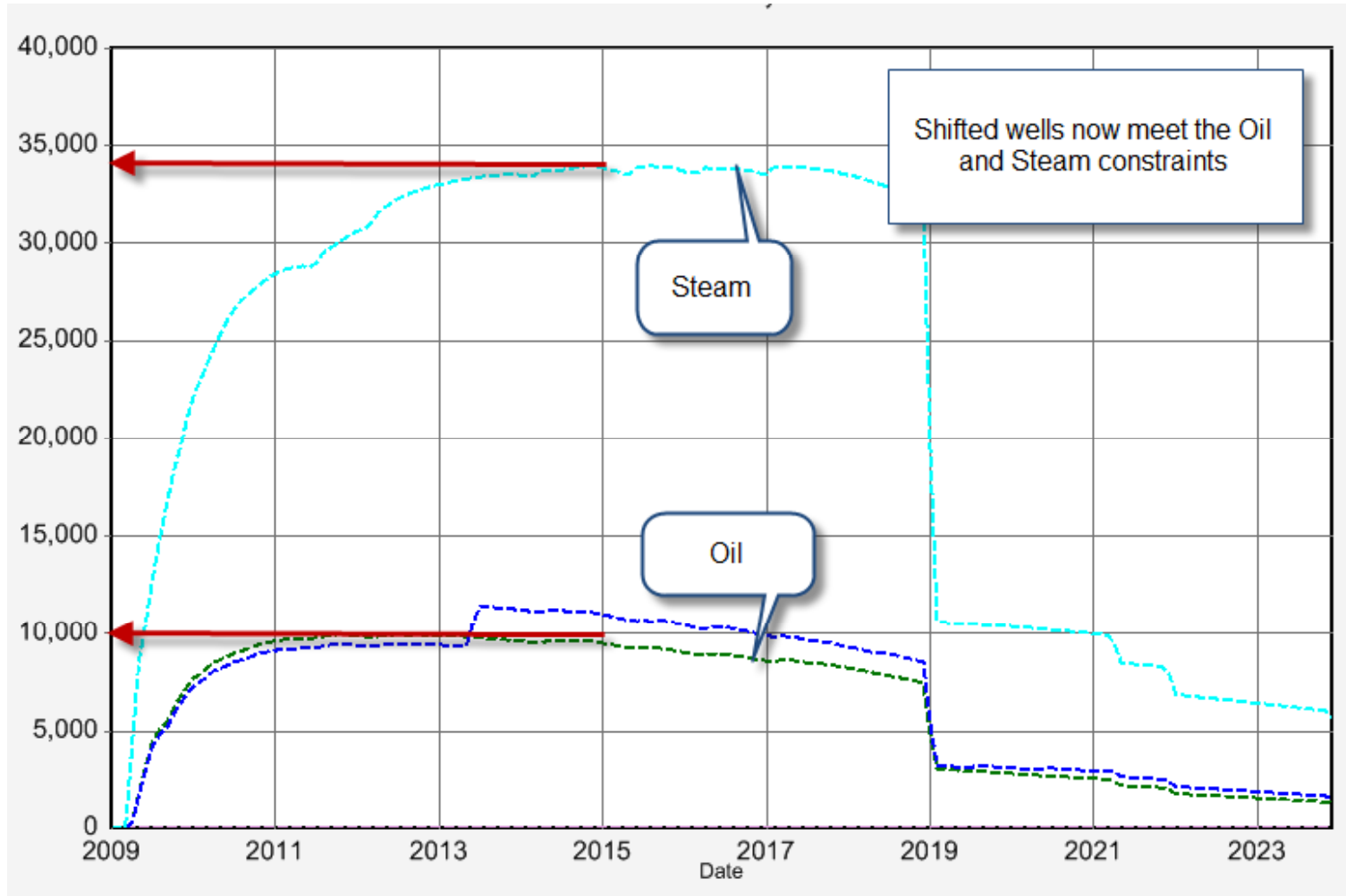
## Individual constraints can be added at each of the facility nodes



Production Limit	<input type="button" value="Add Constraint"/>	Oil	Steam		
	Date	Max Rate	Max Rate	Max Rate	Delete
	Jan 2009	10,000.0	34,000.0	0.0	+X

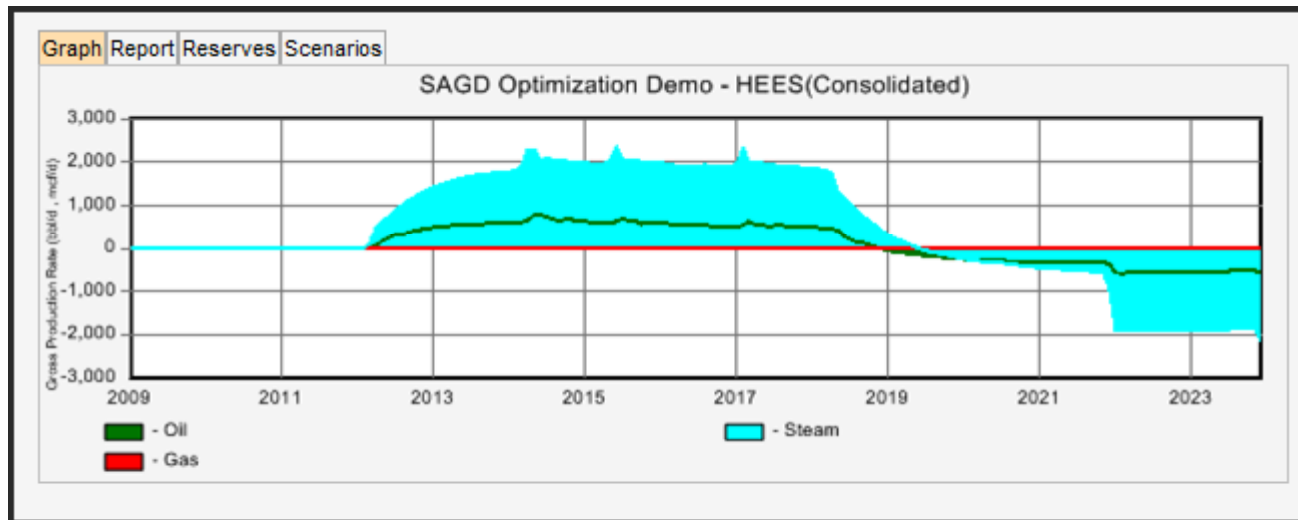
WellSpring then re-calculates the model, shifting individual wells in time in order to meet the constraints

After the optimization, the field is producing within the facility constraints



## This model can then be used to compare Steam Oil Rates (SOR) sensitivities

- We can create a second scenario with an SOR of 3.2 (32,000 Bbl/d steam) and then compare the production and economics with the original SOR 3.4 case.
- The plot below shows the SOR 3.2 case subtracted from the SOR 3.4 case. Steam requirements are accelerated, as is oil production.



## Economics

- With the respective capital and operating costs entered for these scenarios, an incremental comparison of the economics can be calculated to evaluate the alternatives.

