

# WATER MANAGEMENT

## Performance Overview

- 88 percent of water used in 2011 was from recycled sources
- No reportable spills to local water bodies
- Water treatment research continues; coke byproduct filters tailings water and removes naphthenic acids
- University research chair established to explore additional methods of cleaning tailings water

## Our Commitment

Water is essential to Syncrude's operation and plays a key role in our production processes. We recognize that water is a limited resource that must be managed carefully. Our commitment is to take prudent steps to manage and conserve the water we use and to protect the health of regional water bodies, including groundwater.

Syncrude's water management practices are based on the objectives of minimizing the withdrawal of fresh water from the Athabasca River, maximizing reuse of process-affected water, and responsibly managing its storage.

## Using Water Wisely

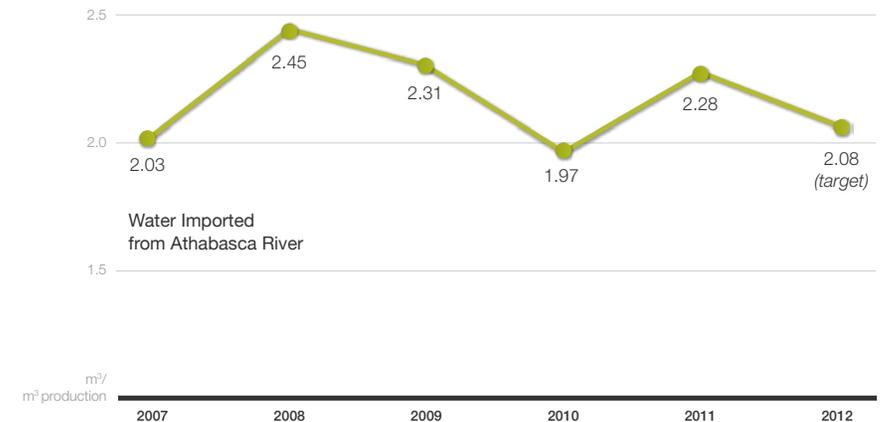
The Athabasca River is our main source of fresh water. It provides about 15 percent of our total water needs. Water imported from this river is used to cool process water, generate steam and as potable water. The remaining 85 percent of water used is recycled from our settling basins, also known as tailings ponds, and used in bitumen extraction processes. In 2011, 88 percent of the water used was recycled from these sources.

Our water license, granted to Syncrude in the 1970s, permits us to withdraw 61.7 million cubic metres of fresh water annually. In 33 years of operation, we have always operated well within these limits. Currently, we withdraw about 0.2 percent of the river's average annual flow. At the river's lowest flow – during the winter – our withdrawal is about 0.5 percent.

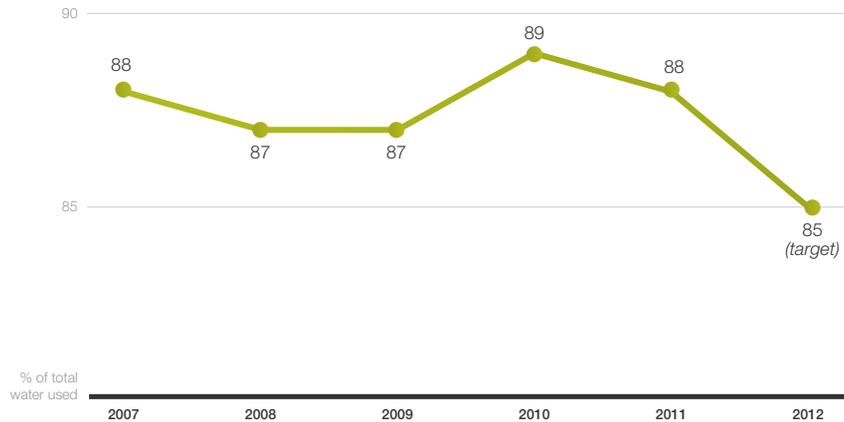
We are committed to water conservation and have historically demonstrated continuous improvements. In fact, we have reduced the water intensity of our processes by about 60 percent from levels in the early 1980s. Today, we require about two cubic metres of fresh water to produce a cubic metre of crude oil.

Syncrude has been in operation for over three decades. Throughout those years, many considerable gains were made in water conservation. Now, work is underway to define a water strategy going forward. This will examine how we can continue to make improvements in our processes over the short-term while engaging our research department towards developing new technologies that will further minimize our import of fresh water in the future.

## Water Use Intensity



## Process Water Recycled



## Releases to the Environment

Alberta Environment prohibits the release of any water that does not meet quality regulations. Syncrude does not discharge process-affected water, waste water or any industrial run-off into local water bodies. The only discharges to the Athabasca River are treated sanitary sewage similar to that discharged by municipalities, diverted clean surface (muskeg) water and basal water from the Aurora Mine via Stanley Creek, and clean surface water from a gravel pit.

During the reporting period, there were no spills to local water bodies. However, there were four occurrences in 2011 when water discharges from Aurora did not meet government quality standards; three related to elevated Total Suspended Solids and one of elevated Biochemical Oxygen Demand. We reported these incidents to regulators. The water was natural and did not contain any process constituents. It was similar to water quality during spring run-off or periods of heavy rain.

## Advances in Tailings Water Treatment

We recognize that, by not releasing water, we are creating an increasing storage challenge that is not acceptable to our stakeholders. As well, from a reclamation perspective, it is necessary to build a final landscape with a hydrology that connects seamlessly to the surrounding environment. Towards this, we have conducted research on tailings water treatment using coke, a byproduct of our process. The treatment is similar to using a home water filter. The coke, which is almost pure carbon, acts as a filter that captures contaminants and, most importantly, naphthenic acids. Bench-scale research shows the treated water is able to support aquatic life. We are running a pilot-scale plant in 2012 which will answer further technical questions and provide the design requirements for possible commercial-scale implementation.



*A research project has shown that tailings water can be treated with coke, a byproduct of our process which is almost pure carbon. The treatment is similar to using a home water filter. Pictured here, tailings water before (left) and after (right) coke filtration.*

Furthermore, Syncrude announced funding in 2011 towards a [new research chair](#) at the University of Alberta that will explore additional methods of tailings water treatment. Led by Dr. Mohamed Gamal El-Din, the five-year funding will help identify, evaluate and develop new management solutions. Approximately one dozen graduate students, as well as two postdoctoral fellows, will be working on projects through this chair.

## Our Support for a World-Class Regional Water Monitoring System

Alberta Environment monitors the Athabasca River and its tributaries at 11 sites in the region. In addition, the [Regional Aquatics Monitoring Program \(RAMP\)](#) does extensive monitoring of climate and hydrology, water quality, benthic invertebrate communities, sediment quality, fish populations and fish health, and lakes sensitive to acidity in the Lower Athabasca region. RAMP's 2010 and 2011 technical reports are available [on-line](#).

According to regulators, monitoring stations downstream of oil sands operations do not detect any industrial impacts when compared to historical readings of naturally occurring compounds. Because the river cuts through the oil sands deposit, bitumen is often exposed along the banks and then seeps into the water.

In 2010, the [Royal Society of Canada](#) commissioned an Expert Panel of Canadian Scientists to review and assess evidence relating to several perceived environmental impacts of the oil sands, including regional water supply. According to their assessment, current evidence does not suggest a threat to the viability of the regional aquatic ecosystem. However, stakeholders remain concerned about downstream impacts.

To address ongoing concerns, a government-sponsored contaminant load study is currently underway that is examining how air particulates, land disturbance and drainage may affect water quality. Also, in early 2012, the Alberta and Canadian governments announced a [joint implementation plan](#) for integrated environmental monitoring in the oil sands region. The plan builds on monitoring already in place and outlines a phased, adaptive implementation approach to monitoring over the next three years. Through the Canadian Association of Petroleum Producers, we are providing our input on this new system and support a credible, transparent and science-based approach that can guide us effectively on responsible water management in the future.

## Water Use

	Unit	2007	2008	2009	2010	2011
Imported from Athabasca River	million m <sup>3</sup>	36.0	41.2	37.5	34.1	38.5
Imported from Athabasca River	m <sup>3</sup> /m <sup>3</sup> production	2.03	2.45	2.31	1.97	2.28
Water returned to the Athabasca River – treated sanitary	thousand m <sup>3</sup>	261	233	270	320	321
Water returned to the Athabasca River – other (Aurora diversion)	thousands m <sup>3</sup>	1.9	2.5	4.9	10.5	7.9
Process water recycled	millions m <sup>3</sup>	256	268	258	278	270
Process water recycled	% of total water used	88	87	87	89	88
Water discharge quality exceedances (treated sanitary)	# of incidents	1	0	0	0	0
Water discharge quality exceedances (industrial process)	# of incidents	0	0	0	0	0
Reportable spills to natural water bodies	m <sup>3</sup>	0	0	0	0	0

## Water Perspective

In 2010, the oil sands industry represented about seven percent of the total provincial allocations for fresh water.