2019 Case Study

COMPASS MINERALS

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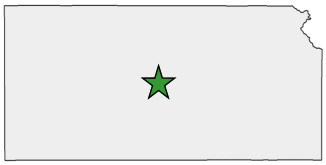

Company Background
Compass Minerals is a publicly traded company (CMP on NYSE) with a 2018 revenue of 1.5 billion dollars. Products produced by Compass Minerals include food-grade salt, water-conditioning products, various de-icing products and plant nutrients. With a robust corporate responsibility policy and yearly sustainability reports, Compass Minerals continues to be a leader in environmental stewardship for the natural resource industry. The Lyons evaporation plant utilizes mechanical evaporation to separate salt from highly concentrated brine. The plant produces around 1,000 tons of salt per day to meet product demands. Products produced at the Lyons facility include food-grade salt both bagged and bulk, salt and mineral products for livestock, water-conditioning products, and bulk -treated and untreated salt for industry users.

Project Background
Compass Minerals is in the midst of remediating two historical chloride plumes and currently sends approximately 524 million gallons of water to Class 1 disposal wells. Recognizing the need to conserve water and preserve pore space in the Arbuckle formation, Compass is pursuing opportunities to divert water from Class 1 disposal. Compass Minerals is also looking to reduce freshwater intensity on site by reducing wastewater wherever possible. The driving routes of employees and overall pumping rate were investigated to look for fuel, electricity and greenhouse gas reductions.

Incentives To change
Due to decreasing Arbuckle space and increased seismicity, KDHE has released a set of objectives to reduce volume of waste going to Class 1 wells. Non-hazardous waste is the target for volume reduction. Any new permit or renewal of a Class 1 disposal well must be accompanied with a volume-reduction plan or study. Before the next Class 1 re-permit application is due, Compass Minerals will need to have a volume-minimization program/study in place. In addition to disposal minimization, Compass Minerals is looking to reduce both freshwater intensity at all sites by 5% and greenhouse gas emissions by 7% by 2020.

Projects Reviewed for P2 potential.
Drinking fountain installation
Two continuous-flow drinking fountains currently exist in the plant. They run at a combined 3.5 GPM for a yearly water use of more than 1.84 million gallons. They are in inconvenient locations and rarely used by workers. The intern identified two locations for traditional hi-low water fountains that will reduce water usage by 1.7 million gallons per year and reduce 4.1 $MTCO_2e$. In addition to environmental considerations, the new fountains will save at least $4,600 per year in water cost.

Daily well route adjustment
Brinefield employees perform daily rounds to check remediation wells not essential for salt production. It takes nearly 30 minutes a day to drive to wells F and G to gather total and current flow rates. If these checks were to be reduced to once a week, it could save $5,827 including fuel and company time. State remediation wells 3, 4 and 5 are also checked daily and if reduced to weekly could lead to an additional $507 in fuel savings. Between the two projects, 2.2 $MTCO_2e$ could be avoided. Safety of the employees would also increase with less time behind the wheel.

Class 1 volume reduction

When evaluating diversion options, less energy -intensive options were preferred to limit the environmental impact of saving the water, but those options are limited. Process use, golf course use and wetland creation/restoration are a few of the options that could require no treatment. Extensive site selection, piping needs and equipment evaluation would need to occur to implement any of these. Several treatment options were reviewed by the intern and most vendors recommended a reverse osmosis setup. Emerging technologies were reviewed for future consideration as well. Water treatment could make the water suitable for NPDES discharge, possible irrigation use and increased plant use opportunities, but treating the water can be quite energy intensive resulting in increased greenhouse gas production rather than reduction. The water is a valuable resource in the area, both treated and untreated, with land values being $1,000-$2,000 higher per acre in the region when irrigated.

Decreasing pumping rates

The vacuum building, along with several geothermal AC units throughout the plant, utilizes Hollinger well water, but not all equipment requires this high-quality water to run. Higher chloride water could be used for cooling water, make-up water and dust-collection equipment. Water utilized by the geothermal heat pumps could also be reused. If the Hollinger wells were pumped at their recommended rate and remediation water was used instead, 197.8 $MTCO_2e$ could be avoided along with electricity savings of $11,626 per year. More research is needed to determine which remediation water source could supply the water to help scale back Hollinger water use. Several viable sources are available but significant piping changes would need to occur to redirect remediation water, condensate water and/or geothermal heat pump water for process water. The amount of water used by plant processes would not change but where it comes from could lower overall pumping by Compass Minerals. Not related to plant use, remediation pumping rates could be adjusted with options such as deep aquifer screening, or pump, treat and reinject.

Summary of 2019 P2 intern recommendations for *COMPASS MINERALS*

Project	Annual estimated environmental impact	Estimated cost savings ($/year)	Status
Drinking Fountains	1,700,000 gallons 4 $MTCO_2e$	$4,600	Equipment Ordered
Route Changes	2 $MTCO_2e$	$6,362	Recommended
Class 1 volume reduction	524 million gallons	NA	More Research Needed
Pumping Rate Decrease	197 $MTCO_2e$	$11,626	More Research Needed
Total[1,2]	1,700,000 gallons 6 $MTCO_2e$	$10,962	

[1]Does not include projects “not recommended” or with “more research needed”
[2]EPA P2 GHG Calculator with Cost, Apr. 7, 2016