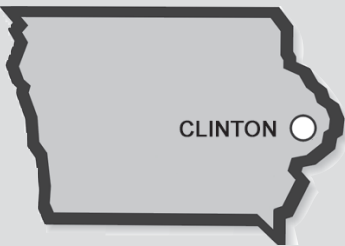


Archer Daniels Midland



Archer Daniels Midland Company (ADM), founded in 1902 and incorporated in 1923, is one of the global leaders in agricultural processing. ADM processes crops into food ingredients, animal feed ingredients, renewable fuels and naturally derived alternatives to industrial chemicals. Headquartered in Decatur, Illinois, ADM has facilities in 40 states and in over 60 different countries worldwide. ADM-Clinton is a corn processing facility, manufacturing products such as corn oil, fuel alcohol and starch.

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Project Background

The main project is located at a cogeneration plant under construction in Clinton, Iowa. Several old boilers in the corn plant have been used over several decades to produce steam and electricity for part of the plant. Recently, ADM determined that it is more economical and environmentally friendly to build a cogeneration plant to provide enough steam and electricity for the entire plant. Thus, a suitable biocide for the new cooling tower is desired. Additionally, ADM is also looking for a better way to handle wastewater sludge.

Incentives to Change

The new cooling tower will require a biocide for the treatment of recirculation water. Selecting a suitable biocide will reduce water consumption, lower chemical use and increase the reliability of the cooling system. With respect to the amount of chemicals required, it is important to have sufficient containment area to protect against a chemical spill.

ADM-Clinton also spends thousands of dollars a month to dry and landfill sludge from the wastewater treatment plant. It would be beneficial to find a more environmentally friendly and economical approach to handle the sludge.

Results

Biocide selection for cooling tower

It is recommended that the facility use a combination of hypochlorite (bleach) and bromide as the biocide for the new cooling tower recirculation water treatment. Even though the bleach and bromide mix has a higher unit cost than the more commonly used chlorine gas

disinfection system, less biocide is required (50 percent reduction at startup) due to the high pH in the makeup water.

In addition, the concentration cycle can be increased, which will correspondingly lower water consumption, lower treated water discharge and lower the use of other chemicals, such as anti-scaling and corrosion inhibitors into the cooling tower. As a result, lower operation and treatment cost of the cooling tower will result.

Moreover, conventional chlorine gas treatment is classified as highly toxic by OSHA and EPA; thus, a Risk Management Program (RMP) and Process Safety Management (PSM) program would have to be developed and updated every time a process or equipment modification occurred. The bleach and bromide biocide will not require these plans and can reduce the health risk of the operators as well as the surrounding community.

Wet Sludge recycling

It is recommended that the facility practice wet sludge recycling. Currently, the main purpose of the onsite wastewater treatment plant is to treat the process waste water from the corn plant, causing 24,000 pounds per month of 1 percent moisture dry sludge to be generated and landfilled.

However, the drying process sometimes is unnecessary for sludge recycling. By skipping the sludge dryer or even the belt press filter, a large amount of natural gas, electricity, hauling and disposal costs can be reduced, although the shipment weight and volume of sludge will increase due to the higher moisture contents.



Air Pollutants Diverted in Tons

	Total for all sectors
SO2	1.40
CO	2.56
NOX	1.50
VOC	3.17
LEAD	0.0
PM	0.140

Green House Gases Diverted in Tons (CO2 Equivalent)

	Total for all sectors
CO2	4,277
CH4	807
N2O	330
CFCS	6.27

Project	Annual Cost Savings	Environmental Results	Status
BIOCIDE SELECTION	\$16,000	Reduce 48 million gallons of water consumption and discharge. Reduce 5,700 gallons of chemical dosage. Lower risk of producing THM (carcinogenic matter).	Recommended
WET SLUDGE RECYCLING	\$517,000	Reduce 542,000 Therms annually of natural gas use.	Recommended

