

## US Sugar, Clewiston, Florida



### Sugar Refining and Harvest Overview

**by Steven Chapman:**

I worked in Clewiston Florida in 1998 on the construction of US Sugar's new Sugar Refinery. The new refinery was constructed next to the grinding mill that ground 600+ cars of sugar cane per day during the harvest season. The Raw sugar (not a food grade product) was still being shipped in 40' boxcars using sheets of plywood in the doorways.

The first food grade sugar shipped from the refinery in the late fall of 1998 was in covered hoppers to Hershey's I believe. The refinery has a two stall enclosed bay for loading hoppers, bagging machines, Palletizers, Shrink Wrappers, and adjoining warehouse. There is a rail siding on the south side of the warehouse with approximately 6 loading doors.

The US Sugar grinding mill at Clewiston and their second, somewhat smaller mill (don't remember location) both receive harvested sugar cane by rail. US Sugar's railroad has 120 miles of track, 1000 sugar cane cars, and 14 locomotives. I believe steam was used into the late 60's or early 70's.

The cane is ground and then the sugar liquor is boiled under a vacuum to remove the water and then re-crystalized into raw sugar which is light brown in color. The two byproducts produced are molasses and bagasse which is the remaining cane stalk after the center core of sugar has been removed by grinding and heating. The reason cane fields are burnt before harvest is to solidify the liquid sap in the cane to minimize loss during cutting and transport.

The molasses is stored in tanks, similar to fuel oil tanks, and shipped to market in tank cars. The bagasse is dried, chopped, and used to fuel the mill's steam boilers.

The rail cars the sugar is hauled in have sloped ends similar to hopper cars but one side is hinged at the top and the cars are tilted and side dumped at the mill. The car sides are wire mesh on a steel framework. I believe the cars are 36' long.

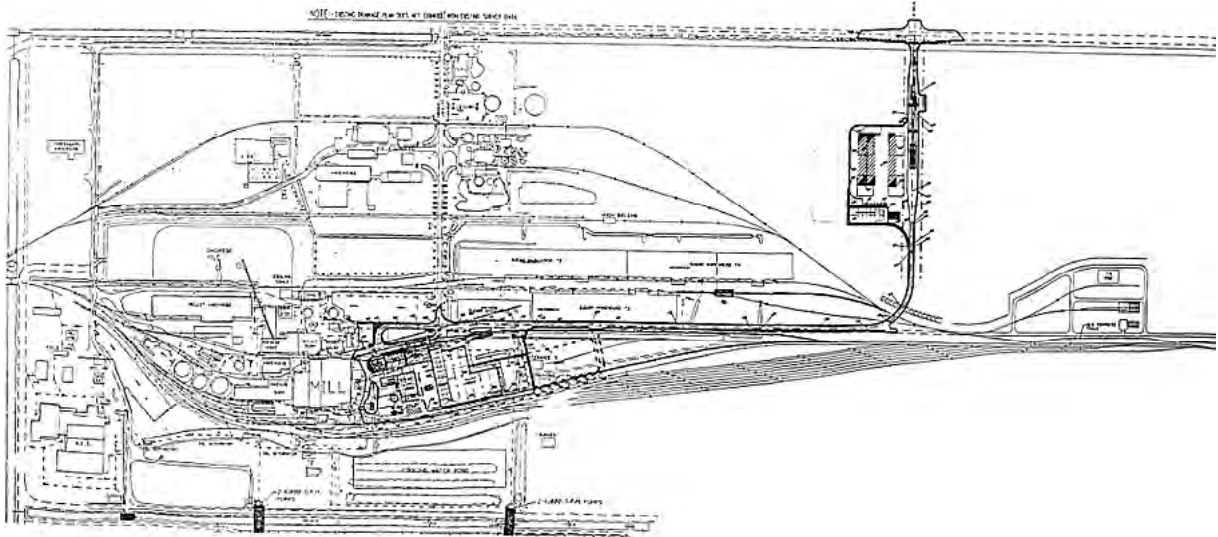
There are conveyor belt loaders scattered throughout the cane fields. Rail traffic flows to and from the cane fields at night.

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The refinery would be interesting to model especially if you did not have an adjacent grinding mill so the raw sugar would have to be shipped in by rail with refined sugar going out by rail and truck.

In the 2001-2002 harvest (179 days) US Sugar harvested 6,800,000 tons of cane resulting in production of 800,000 tons of raw sugar and 35,000,000 gallons of molasses.

The refinery produces 500,000 tons of refined sugar per year with approximately 90% of it shipping out by rail car (8 - 180 ton cars per day).



Use [USsugar] as a search term in the Image Collection to view Steven's other photos and drawings.

# US Sugar Clewiston -- 2001-2002 Season Sugar Production Rates

PEAK	2001-2002 SEASON	CLEWISTON
	179 LENGTH OF SEASON	60%
	6,800,000 TONS OF CANE HARVESTED	4,080,000
50,000	37,989 TONS PER DAY - CANE	22,793
	40 TONS PER RAILCAR	40
1,300	950 RAILCARS PER DAY	570
	40 RAILCARS PER HOUR	24
	800,000 TONS OF SUGAR PRODUCED	480,000
	4,469 TONS PER DAY - SUGAR	2,682
	35,000,000 GALLONS OF MOLASSES PRODUCED	21,000,000
	195,531 GALLONS PER DAY	117,318
	PERCENT OF STORAGE	50%
	# OF TANKS	3
	GALLONS PER TANK	3,500,000
	CU FT PER TANK	466,667
	DIAMETER OF TANK	120
	HEIGHT OF TANK	41
	REFINERY PRODUCTION ESTIMATE	
	TONS PER YEAR	540,000
	DAYS PER YEAR	345
	TONS PER DAY	1,565
	TONS PER HOUR	65
	PERCENT SHIP BY HOPPER CAR	89%
	180 TON CAPACITY HOPPER CARS PER DAY	8
	HRS/CAR @ LOADING RATE OF 35 TONS/HR	5
	5 LB BAGGING MACHINE @ 20 BAGS PER MIN	
	TONS PER HOURS	3.00
	SMALL PACKAGE BAGGER	
	TONS PER HOURS	1.50
	100 LB BAGGING @ 50 BAGS/HR	
	TONS PER HOURS	2.50
	TONS PER HOUR PACKAGED	7.00