CHEESE PLANT DESIGN, OR WHAT SHOULD I THINK ABOUT BEFORE SPENDING ALL THAT MONEY

Jim McFadden
Morrisville State College
Dairy incubator
There is no one perfect plant design

- You have to design the plant for your operation
- Every design is made up of trade-offs
  - Money
  - Space
  - Time
- Best if you can work at a plant first
Start with great milk

• Milk at best when leaving animal, goes downhill from there
• Milk the animal clean
• Store it clean and cold
• You want the cheese to have your culture, not what is in barn
Raw / Pasteurized

• Raw – cash flow, has to age, have to make everyday, don’t know how it tastes

• Pasteurized – fresh cheese, sell right away, cash flow, flavors can be added
Big enough

• Can’t build too big, but can spend too much
• Leave room for expansion
• Most build too small
Utilities

- Water, clean, potable, volume, does it dry up
- Will you need chilled water
- Septic, systems don’t like a lot of milk waste
  - Needs to be large enough to handle
  - Located so no contamination
- Has to handle waste, soap, sanitizer
Utilities

- Electrical, right voltage and phase
- Much commercial equipment is 3 phase
- Watch how they charge you
  - Residential / Agricultural
  - Commercial
  - Demand
Utilities

- Heating source for building heat, hot water, steam
- Boiler fuel
  - Electric, Natural gas, Fuel oil, Propane, Wood
- Steam
- Clean
- Culinary
- Watch your boiler chemicals – are they food grade
- Hot water
  - Will need enough
  - Fast recovery or large storage tank
Size equipment to output

• Leave room for expansion, but you must fill at least half
• Too small and you are doing many batches
• Too big and will not properly work, inefficient
• Best full, but will work between half and 2 third
New or Used equipment

- New is great, everything matches but expensive
- Probably installed
- Warranty
- Watch for a salesperson that will sell you too much
Used equipment

- Be careful buying used, sight unseen
- Not always like the picture
- Flash on the camera will hide imperfections
- Buckling, pinholes, valves, all parts
- Usually no warranty
- Ask for provision to send it back if won’t pass inspection
- Pay shipping to get it here
- Usually have to pay before you get it
- You probably have to pay to send back
- Make sure it will work with your utilities
- May have to take what is available
Regulatory help

- Local inspector may have knowledge of equipment model
- NY Ag & Mkts has equipment specialist
- 3A marking
- National standard
- Not needed to be legal
- Just because it has it doesn’t mean it meets regulations
Separate building for plant

- 50 feet separation is standard
- Site where contaminants won’t interfere
  - Barnyard
  - Manure pit
  - Leach /septic fields
  - Dusty road
Building

- Solid
- Secure
- Parking lot
  - Especially if you are going to have sales at plant
Plant design

• Layout on paper to scale, including equipment
• Make a person to scale and see how much room to move around
• Layout where the drains and hoses will be
• Easier to move equipment with a pencil
Plant design

- Show the design to other people
- Regulatory
- Codes officer in local area
- Others in industry
- Are you right or left handed
- Think about how you will work and how product flows
Plant design

- Make sure you leave room all the way around equipment
- Look to have room for expansion
- Storage for small tools, you will want shelving close
  - Knives, Moulds, Paddles, Screens, Rake, Scoops, Pails
- Where will you use water, you want hoses
  - Use a dairy hose (food grade) not a garden hose
- Where will your drains be, slope floor to help you
- Don’t put equipment on top of drains
- Have enough so you are not chasing across the plant
Other areas to think about

• Bathroom
• When it is time to go, it is time to go
• Will always happen when you are about to do next step
• Make sure it won’t contaminate plant
• Ventilated, but not into plant
• Sink individual towels
• Usually have to go through 2 doors
• Doors will be self closing
Other areas to think about

• Office
• Nice to be separate room so it won’t get wet
• Desk and file cabinets, records will be your best friend
• Inspector will like to have a space not in your way
• Copy of the regulations
• Computer, telephone
Other areas to think about

• Lab
  • Need to do antibiotic testing
  • Some may do more tests
  • Storage for scales, PH meters, other equipment
• Nice to be away from plant
• Could be with office
Other areas to think about

- Storage rooms
- Dry for paper products
- Chemicals
- Food related – cultures, flavors
- Refrigerated / Frozen / Dry
- Packaging supplies
- Spare parts, spare equipment
Other areas to think about

- Aging room
- Large enough to rotate stock
- Shelving to find individual batches
- Has to hold temperature and humidity
Other areas to think about

- Sales area
- Will you sell from plant
- How much do you want people to see
- What don’t you want them to see
- Coolers
- Shelving
- Sales counter
Other areas to think about

• Changing room
• Keep plant clothes and boots separate
• Have a separation between work and home or barn
• Mostly for contamination
Other areas to think about

• Entrance / Reception area
• If no sales area, where will you meet with people
• Don’t want them in your plant
• Good impression
Other areas to think about

• Break room
• Will you have employees
• Can’t be eating in plant
Plant interiors

• Walls / Ceilings – washable, cleanable, smooth, impervious
• No bare wood!
• Paint will work, keep it in good condition
• Tile, nice expensive
• FRP – fiberglass reinforced plastic, nice
Plant interiors

• Lighting
  • Enough, make it bright
• Sealed or at least covered
• Natural or Artificial
• Windows
• Not operating (can’t open)
Plant interiors

• Floors – washable cleanable, smooth, impervious
• Dairy tile with acid resistant grout, expensive
• Epoxy, nice
• Cement/concrete, keep it in good shape
• Acid will pit it easily
Plant interiors

• Heating / Cooling / Ventilation
• Make your plant comfortable
• Constant temperature and humidity makes good cheese
• Watch for drafts, will carry contaminants
Equipment

- Pasteurizer – unless you are going raw
- Batch - smaller, less expensive, lower temperature, many used
  - Steam heated
  - Electric heated
- HTST – continuous, larger, more expensive, auto controls
Equipment

• Cheese vat
• Size to your production, don’t get too big or small
• Manual or mechanical cutting and agitation
• Make sure you have room all the way around
Equipment

• Draining tables
• Get them close to vat
• Move them out of the way
• Can they go right into cooler
Equipment

- Wash vat
- Some thing that has wash water very easy to use
- Clean equipment is happy equipment and good cheese
Equipment

• Raw milk receiving room
• Separate room
• Able to get truck in
• Ability to wash truck
• Sink individual towels
Equipment

- Raw milk storage
- How many days will you make
- How many days do you need to store
Equipment

- Packaging, cutting, wrapping, labeling
- Equipment to wrap or package
- Tables
- Shelves
- Boxes
Equipment

• Cooler
• Big enough for stock
• Shelving so that you can find product
• Keep product off floor
• Good lighting
• Constant temperature
Equipment

• Other equipment depending on product
• Brine tank
• Salting table
• Chilled water tank
• Stretching machine (Pasta Filita)
• Press
Put pride in your plant

- People will notice
- Will make it easy to put pride in your product
- Remember it has your name on it
• Questions?

• Thank you for your time!