Handling Fluid Fertilizers

- Selecting the Right Equipment Components
Considerations

- Systematic approach
- Compatible components
- Short term vs. long term
- Plan ahead for future expansion
Considerations

- Systemic approach
- **Compatible components**
- Short term vs. long term
- Plan ahead for future expansion
Considerations

- Systemic approach
- Compatible components
- **Short term vs. long term**
- Plan ahead for future expansion
Considerations

- Systemic approach
- Compatible components
- Short term vs. long term
- Plan ahead for future expansion
Overview

- Evaluation of the project
- Define the requirements
- Define what you have to work with
- Match the components
Overview

- Evaluation of the project
- **Define the requirements**
- Define what you have to work with
- Match the components
Overview

- Evaluation of the project
- Define the requirements
- Define what you have to work with
- Match the components
Overview

- Evaluation of the project
- Define the requirements
- Define what you have to work with
- Match the components
Evaluation of the project

- What do I want and where do I want to go
- New or Existing Site
- Environmental issues
- Budgetary concerns
Evaluation of the project

- What do I want and where do I want to go
- **New or Existing Site**
- Environmental issues
- Budgetary concerns
New Site
Existing Site
Evaluation of the project

- What do I want and where do I want to go
- New or Existing Site
- Environmental issues
- Budgetary concerns
Evaluation of the project

- What do I want and where do I want to go
- New or Existing Site
- Environmental issues
- Budgetary concerns
Define the requirements

- Throughput
- Products
- Manpower
Design with Direction

- Develop a plan
- Work from a flow diagram
- Allow a realistic time frame
Design with Direction

- Develop a plan
- **Work from a flow diagram**
  - Simple Flow Diagram
  - Cad designed diagram
- Allow a realistic time frame
Design with Direction

- Develop a plan
- Work from a flow diagram
  - Simple Flow Diagram
  - Cad designed diagram
- Allow a realistic time frame
Design with Direction

- Develop a plan
- Work from a flow diagram
  - Simple Flow Diagram
  - Cad designed diagram
- Allow a realistic time frame
Design with Direction

- Develop a plan
- Work from a flow diagram.
- Allow a realistic time frame
Match the components

- Storage Tanks
- Pumps
- Measurement
- Piping
- Inload
- Loadout
Common Themes

- Material of construction
- Product mix
- System capacity
- Quality control
- Labor
Storage Requirements

- Amount of Product Through-Put
- Products
- Seasonal storage
- Secondary Containment
Tanks

- Size
- Shape
- Material
- Fittings
- Foundation
Pumps and Plumbing

- System Capacity
  - Load size
  - Time
  - Plan for growth
Plumbing

- Size
  - Suction vs. Discharge
  - 2” to 150 gpm
  - 3” to 300 gpm
  - 4” to 450 gpm
  - 6” to 800 gpm
  - Oversize long runs
Plumbing Selection Criteria

- Flow characteristics
- Corrosion resistance
- Strength
- Cost of Installation
- Flexibility for changes
- Weld or thread?
Plumbing Materials

- Hose
- PVC
- Mild steel
- Stainless steel
- Poly
- Combinations
System using hose and prefabricated stainless steel fittings.
Pump Selection

- Type
  - Self-priming centrifugal
  - Straight centrifugal
  - Positive displacement

- Capacity (not size)
- Material
- Seals Or Packed Box
Pump Performance

- Design
- Impeller
  - Size
  - Shape
- Speed
Pump Curve

- Flow rate vs. head
- Horsepower
- NPSH
- Efficiency
Measurement

- Scales
- Meters
  - Flow rate
  - Accuracy
    - Quality control
    - Custody transfer
Types of Meters

- Positive Displacement
- Turbine/Squirrel cage
- Electromagnetic
- Coriolis Mass Flow
Positive Displacement

- Liquid moves into a measuring chamber and the number of “Units” are counted
- Volumetric
- Accuracy of some affected more than others by changes in product and flow.
- Lots of moving parts.
Turbine Meters

- Volumetric
- Liquid moving through meter causes rotor to turn in proportion to flow rate
- Straight pipe requirements
- Changes in flow rate and viscosity can have large effect on accuracy
- Some moving parts
“Mag” Meters

- Volumetric.
- Measures velocity of liquid through a tube of known area.
- Liquid must be electrically conductive.
- Highly accurate across large range of flow rates and viscosities.
- Less straight pipe needed.
- No moving parts to wear out.
Mass Flow Meters

- Measures mass or weight.
- Accurate to .05% of flow rate.
- Doesn’t care what liquid it’s measuring.
- High turndown ratio.
- Only moving parts are oscillating tubes.
Calibrate!

- All meters can lose calibration over time.
- Mechanical types more susceptible to wear.
  - Flow rate.
  - Compatibility.
- If calibrating volumetric meters by weight, know the true density of the product.
Controlling the Flow

- Valves
- Manifolds
- Control systems
Valve Selection

- Style
- Construction
- Operation
Types of Valves

- Ball valves
- Butterfly valves
- Gate valves
- Check valves
Manifolds

- Suction manifolds
- Injection manifolds
Control Systems

- Manual
- Actuated valves
- Presets
- Automation
Control Systems

- Manual
- Actuated valves
- Presets
- Automation
Control Systems

- Manual
- Actuated valves
- Presets
- Automation
Control Systems

- Manual
- Actuated valves
- Presets
- Automation
Dry Tower Automation
Unattended Loadout Panels

- Multiple remote sites from one office
- Custody transfer with approved devices
- Custom bills of lading
- Field identification
- Detailed transaction reporting
- Secure remote site management
- Communication
  - Modem, direct cable, internet, wireless
For more information contact:
Murray Equipment, Inc.
2515 Charleston Place
Fort Wayne, IN 46808
(800) 348 - 4753
Or visit our web site at:
http://www.murrayequipment.com