Scope of Outside Battery Limit Facilities

The OSBL Facilities for you design are likely to include at least the following:

Water

Raw water treating	(Make up for BFW + process water + cooling tower) x 1.1 Clarification and/or silica removal may be required if city water is not the raw water source.
	Boiler feed water (BFW comprises all steam demand – non-recovered condensate or process steam) x 1.1. Demineralization required
De-Aerator	All water going to steam generators

Electric Power

Incoming power switch yard	Total electric power load
Motor control centers.	All electric motors in facility. One or more for process And one or more for OSBL
Un-interruptable Power	Sufficient for all instrument and shut down systems and emergency lighting (say 5 kW minimum)
Emergency Generator	Say 50 kW minimum

Air System (Instrument Air and Yard Air)

Typically air is available to the consumer at 90 psig. Suggest minimum 300 scfm

Compressor(s)	usually two at 100%; one motor and one turbine drive
Air Dryer	usually one sized for 100% + spare
Air Receiver	5 minutes of capacity going from 90 to 60 psig.

Fuel Gas

Incoming gas metering station

Fuel gas supply drum	(5 minutes of capacity going from 60 psig to 45 psig with main supply source not flowing)

Fuel gas collection drum if process makes useable fuel gas

Scope of Outside Battery Limit Facilities

Fire Fighting Facilities

Central Fire Pumps	200-psig discharge pressure minimum. 1 motor, 1 turbine and 1 diesel minimum)
Central Fire Water Tank	Eight hours at maximum capacity of one fire pump
Ring Mains	Size for 1500 gpm flow or 8 inch diameter minimum
Hydrants and monitors	Sufficient to attack the fire from at least two locations

Breathing Apparatus

Fire Truck (Should have some sort of fire fighting truck. May need full size engine)

Foam inventory

Fire Station

Aqueous Effluent Treating Plant

This is very much a function of the plant and the types of aqueous effluents.

As a minimum, require a collection tank, and aerated bio-digester followed by polishing tank or pond and land farm for sludge disposal. If you can hook up to the municipal sanitary sewer, so much the better, if not then you need a separate sanitary waste treating plant. .

Flare System

Flare line (s)
Flare Drum (s)
Flare Stack (s) (minimum height 150 feet)
Flare drum pump out pumps

Roads, Bridges, Fences, Parking Lots

Should be around 1 – 2 % of total installed cost dependent upon plant size

Raw Material Receipt and Product Shipping

Rail siding
Truck loading bays
Pipeline Connection
Warehouse

Scope of Outside Battery Limit Facilities

Maintenance Equipment

Cranes
Trucks
Other Vehicles
Welding Machines
Other Special Equipment
Hand Tools

Buildings

Central Control Building
Product Loading System Control Building
Dispatcher's Office
Gate House
First Aid
Fire House
Admin Building
Maintenance Machine Shop
Spare Parts Store House

These services can be combined in one or more buildings depending upon plant size

Spare Parts

Commissioning and Start Up	1% of all equipment and materials
	Percent of equipment capital cost
Insurance Spares	Fired Heaters @ 10% Heat Exchangers @ 4 % Pumps and Compressors @15% Columns, Vessels, Reactors @ 1% Fire and Safety Equipment @ 14% Instruments @ 10% Electrical @ 13%
Invested Spares	25% of major critical un-spared equipment such as compressors and high pressure pumps

Scope of Outside Battery Limit Facilities

Storage Tanks

The sizing of storage tanks is a function of the amount of material that is likely to flow in or out of them in a given time period.

Feedstock.

If a storage tank is expected to receive one lot of feedstock equivalent to 20 rail cars of 25,000 gallons capacity per car, then the tank must be able to receive at least 500,000 gallons of material. Since it would make no sense to run the tank totally empty or totally full, tanks are specified for a "working capacity. This "working capacity" is then multiplied by say 120% to give the actual size of the tank. So for 500,000 gallons of working capacity we would specify a 600,000-gallon tank for this service.

Continuing this example, the plant would have at least two 600,000-gallon tanks in the feed system. One tank would be receiving feedstock, and the other would be providing feedstock to the process. If the feedstock delivery method is somewhat erratic, or it more or less tank cars might make up a shipment, then there may be need for further tankage.

For added flexibility you might also choose to have three 400,000-gallon tanks rather than two 600,000-gallon tanks.

All incoming feedstock is usually tested for quality assurance purposes, either by random samples or by testing a tank of received product.

If your feedstock is being delivered by pipeline then it is common to run to a tank and then into the process. You would most likely fill the tank one-day, test it the next and release it for processing on the third. This suggests that you should have three tanks each with say 120% of one day's capacity.

Product

Product storage is a function of testing policy and shipment size.

It is industry practice to run a full lab test on a tank before it is released for shipment. Typically samples are taken from the top, middle and bottom of the tank and are tested both individually and as a composite sample. That means that the tank must have no flow in or out from the time the samples are taken. Any product produced in that period must go to another tank(s).

There must be enough tankage for supplying the maximum sized product shipment, plus testing a full tank, plus rundown capacity for product.