

You've Developed a New Process - Now What?

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The conceptual design for the process has been completed. The pilot testing was a success. The equipment, raw materials, catalysts, adhesives and/or solvents have been selected. Now it's time to answer some important questions and address the environmental and OSHA issues associated with making your new full scale process a reality.

At what point will consultants be brought in to ensure a strong integrated design team? What will that team need to address? What are the related environmental and OSHA issues associated with your process? When and how should those issues be addressed?

In terms of timing, that depends. In most cases however, effective teams are integrated quickly to avoid costly mistakes and major schedule delays. Listed below are some of the key issues your team will want to consider.

1. What are the environmental and OSHA requirements for raw material and waste storage?

- Are the materials subject to special handling procedures or protocols (to protect employee and/or community health and safety, bulk or non-bulk)?
- What emergencies can occur and what equipment, training is needed to handle?
- Is permitting required (air, water, land, waste profiles)?
- How much of the material will I store at any given time and will that amount of certain listed materials require that I develop a Risk Management Plan (RMP) or implement a Process Safety Program (PSM), SPCC, SWPPP, Contingency Plan, LDAR?
- How can these materials be safely handled to meet OSHA requirements - physically/ergonomically handling the materials and from a worker-exposure perspective?

2. What codes/design standards apply to the materials involved?

- Do National Fire Protection Association (NFPA) stan-

dards apply to my process and the raw materials involved

- a. Are Flammable liquids, flammable solids or oxidizers, pyrophoric involved?
- b. Will storage of flammable liquids (solvents/adhesives) be inside a building or outside?
- c. What type of design considerations do I have to build into my project in order to comply with NFPA standards?
 - Are there any special ventilation standards associated with material handling, usage, and storage (i.e., OSHA 29 CFR 1910.107(b)(5)(i) requires that spray painting operations be designed, installed and maintained such that the average air velocity over the open face of the booth - or booth cross section during spraying operations - shall be not less than 100 linear feet per minute)
 - What type of handling consideration and storage will I need to consider (secondary containment, etc)?
 - Will I be required to provide any add-on emissions controls for this process or equipment?
 - What type of storage will I have (i.e., bulk tanks or containers such as tote bins, or drums)?
 - What is the appropriate MOC (Material of Construction) for the storage vessels, piping and process vessels?
 - Will emergency relief for storage or process vessels be needed and if so what is the proper design?
 - Will the storage operations be enclosed in a building, open, or under roof?
 - What type of facility/process access or facility security will there need to be?
 - How close will it be to the main production facility, the nearest neighbor, etc.?
 - How will I receive the raw materials - tanker truck, rail, or in non bulk containers?
 - How will I off load the materials from the in coming transport and convey them to the storage area?
 - Are there special environmental and personnel safety design considerations in the off-loading system and equipment that must be included in the design?
 - How will I convey the materials from storage to the production area?

3. What raw materials, solvents, catalyst, binding agents, etc., will meet the process/production needs?

- If two or more raw materials or solvents meet production standards and objectives, which of these would be most preferable from an environmental and OSHA perspective and why?
- Are there quality control procedures for raw materials and finished products,
- Are the impacts of impurities or contamination known?
- Are there reactions that could take place because of inadvertent mixing of raw materials?

4. Once the design for the process has been completed, what will I need to do regarding waste such as air emissions, wastewater, storm water, hazardous waste and non-hazardous waste?

- Once the design information is available, you will need to calculate potential air emissions. Then make a decision based upon the emission rate and/or process type as to whether a construction and/or operating permit is required.
 - Will there be wastewater from this operation, and if so, how will it be managed?
 - a. Will it go to an existing onsite wastewater treatment plant?
 - b. Is it discharged indirectly through the city POTW, and if so, what does this add in terms of volume and contaminants of concern to my wastewater and do I notify the agency and the operator of the POTW or obtain a permit modification based upon that information?
 - In terms of storm water, is the entire process under roof or exposed to storm water run off? If so, what notifications or permit applications do I need?
 - a. If it is not under roof, what impact does this have on my facility's storm water?
 - What hazardous waste materials will be generated from my process?
 - a. In what quantities?
 - b. Will I need to notify regulatory agency?
 - c. Will I need an EPA identification number?
 - d. How do I store/handle the waste appropriately? What do the regulations require? What is the safest way to store it?
 - Where can the waste be handled and what is the cost?

5. How many drums of liquid are allowed per regulatory requirements?

- It depends on what the composition of the liquid would be - is it a raw material or a waste?

6. What do I need to do to comply with the building codes associated with the design of an electrical system?

- The area or city building code requirements
- Will permits be required (city, county, state)?
- Has to meet NFPA standards
- Has to meet OSHA standards
- What type of information do I need to supply to the insurance company to ensure adequate coverage?

7. What OSHA requirements will I need to follow to address ventilation issues?

- This goes back to when the process is designed. You have to look at the storage room and what sort of ventilation issues will be present. What is required by OSHA?

8. How should I manage and dispose of empty drums or tote bins and those filled with waste?

- If the waste is hazardous, how do I handle it?
- If non-hazardous, how do I handle it?

9. At what point will the PHA (Process Hazard Analysis) be completed for proper evaluation of the design, process conditions and adequate safety interlocks or safety layers of protection.

10. At what point will the Management of Change be implemented to make sure that all changes to the design or process variables/conditions are addressed properly?

As you can see, one step depends upon the other and they are all interwoven with the entire design process. It is important to weave environmental, health & safety and other design criteria into the front-end technical engineering design. By taking the time to ask the right questions, you and your consultant can avoid major issues on the back end. It is important to have all the right questions asked up front to prevent delays in the construction or startup of the process that can cause cost overruns. Acquiring the services of qualified and experienced consultant(s) can greatly minimize costly mistakes that result in schedule deviations and budget overruns and bring much value to the project team to help address all of these issues that facility personnel may not deal with routinely.

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