

# **Value Engineering Study**

## **Alternative Electric Room Design**

**July 31 – August 1, 2003**

### **Executive Summary**

In an ongoing effort to find more productive methods and more efficient approaches to electrical installation, the Value Engineering Team identified electric rooms as an area with high potential for significant improvement. The team met for two days to use value engineering methods to explore and analyze different ways of providing the essential functions of an electric room. The team chose to study a recently constructed ethanol plant in order to determine possible savings for future ethanol construction.

The team identified three related issues for more detailed study.

- The first issue relates to where the electrical room is constructed and where major components are installed. Traditionally, electric rooms are built as an integral part of the processing plant. An alternative to this approach is to use a pre-fabricated electric room that could be built off-site and placed in the processing plant later in the construction process. The potential for using a prefabricated electrical room that must be moved to the site makes the size and weight of components more critical.
- This need to reduce size and weight drove the investigation to issues of motor starter standards.
- Another option that was considered was to treat the entire electric room as an enclosure eliminating the need for separate enclosures for control hardware and motor starters.

### **Advantages/Disadvantages of off-site assembly of electrical rooms:**

- + Installation of components can begin earlier in the project schedule.
- + More complete testing of control systems is possible prior to on site check out.
- + Shop work avoids construction site hazards and risks associated with other contractors.
- + Productivity should be improved by working in a controlled environment.
- + Per diem and other on-site labor expenses should be reduced.
- Lack of information may prevent early completion.

### **NEMA vs IEC type motor starters:**

The biggest advantage that IEC style motor starters have over traditional NEMA starters in MCC buckets is reduced space requirements. Much has been written in other publications about the differences between these two standards for motor starters. It is beyond the scope of this study to assess all of the debate about these two standards. For this study we assumed that motors 60 h.p. and less can be reliably controlled by IEC style starters. Clients may also have strong preferences for certain motor starter standards.

### **Advantages/Disadvantages of electric rooms as enclosures:**

- + Reduced need for all types of enclosures – less weight, less space required.
- + Fewer panel entries to be made with conduit
- + Improved air flow and better cooling
- + Improved flexibility for routing wires

- Major change in how electric rooms are treated by plant personnel
- Container must meet appropriate specifications for area classification

### **Cost Comparison**

The cost comparison evaluates the initial costs of a standard electric room versus a prefab electric room. We have included the assumptions that are listed above in designing the prefab room, such as eliminating control panel enclosures and using IEC style motor starters.

On a typical ethanol project, Interstates could realize up to 10% savings in the initial electrical costs associated with the electrical room.

Keep in mind – this only compares the initial costs of construction. This does not include the savings realized through shortening the schedule and manpower peak shaving. Also, the overall savings to the project will be even larger, given that the general or structural contractor no longer has to provide space or manpower to construct an electric room.

### **Recommendations:**

The Value Engineering team's recommendation is that Interstates begin pursuing the option of pre-fab electric rooms on the majority of our projects, depending on the factors listed on the previous page. For some projects and some customers, pre-fab may not make sense. But, the VE team believes an overwhelming percentage of our customers will be very interested in the benefits of a pre-fab structure.

If you are interested in this study and wish to know more detail about it, please call Jaron Vande Hoef at 1-877-722-1664, ext 103.