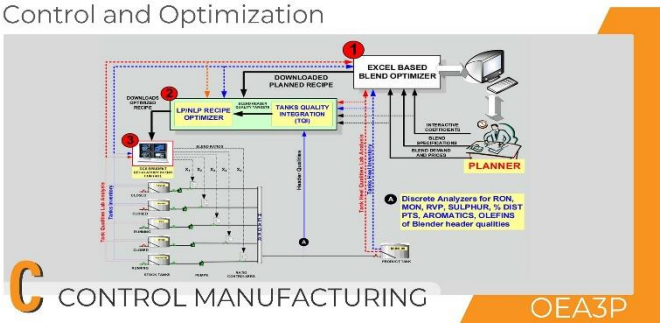
# Advanced Online Blend

Control and Optimization

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| **Topic ID** | **OEA3T** |
| **Title** | **Advanced Online Blend Control and Optimization** |
| **Category** | **C-Control Manufacturing** |
| **eLearning Level** | **Basic** |

## Introduction

Typically, the blend control and optimization architecture are composed of three layers: offline optimizer, online control, optimization, a regulatory blend control, or RBC. The first two layers are resident in the workstations, whereas the last one is in the distributed control systems (DCS).

**This topic will discuss the significance and applicability of all three layers individually in the scheme of the blending control system.**

### Mandatory Layer - Offline Blend Optimizer

The first step in the blending control system is to plan and optimize a recipe using an offline Excel-based or sophisticated higher language-based optimizer. This step uses information that may be outdated and not as current as expected. Nevertheless, it is a starting point to produce a feasible initial blend recipe. The recipe so planned can be perfect if the input data is current and the blend models and optimization algorithm are robust. Unfortunately, it is not the case for blending systems in most refineries.

### Two-Layer vs. Three-Layer Blend Architecture

The recipe planned by the planner or blend engineer gets executed in DCS and controlled by the Regulatory Blend Control. Therefore, the recipe so executed can be considered optimized. However, this may not be the case if the process conditions are different from offline optimization and violate quality giveaway. Therefore, an additional layer between the offline optimizer and RBC is added To avoid such a situation. It is called online blend control and optimization. This latter optimizes the blend recipe as the process changes in real-time.

### Limitation of Online Blend Control and Optimization Layer

The blend models and optimization algorithms used in offline and online optimizers are not identical and will cause serious discrepancies in the final blend recipe and economics.

This layer may be redundant if the offline optimizer generates recipes based on the latest qualities of component tanks and non-linear blend models with the latest refinery-specific blend parameters.

To have consistency in optimizers and blend models, use the same vendor to implement optimization and integrated online/offline blends control.

Online analyzers concerning integrated multi-analysis should be installed using slow/fast loop sampling. They can also use multiplexers. These online analyzers may use near-infrared analysis (NIR) for qualities of the stock tank and for the header.

The analyzer sampling point should be strategically located at the stock tank's inlet. In addition, there should be continuous use of an online analyzer.

### Summary

Three-tier architecture can meet a refiner's present and future needs in the context of optimization systems and blend control. Earlier constraints have been addressed by updating technology.

## Options for eLearning This Topic

| Mode of eLearning | Available? |
|---|---|
| Free Course | No |
| Refresher Course | No |
| Pick N Choose (Custom Curriculum) | Yes |
| Advanced Level Course | Yes |
| Structured MCOR Curriculum | Yes |