

UOP LLC

25 E. Algonquin Rd.
Des Plaines, IL 60017-5017
Tel: 847.391.2000
Fax: 847.391.2253
www.uop.com

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Refinadora Costarricense de Petróleo S.A.
Apartado 4351
San José, Costa Rica

Subject: Observations to the Revised Refinery Configuration (Case 10 – Phase II)
RECOPE S.A. - Moín Refinery Expansion Project, Limón, Costa Rica

Dear Sirs:

We were recently allowed an opportunity to review the findings of WorleyParsons regarding the Moín Refinery Expansion & Modernization Project technical configuration contained in their "L.P. Enhanced Validation for FSR (Feasibility Study Review) Case Ten – Phase II" report. WorleyParsons performed a deep evaluation of all characteristics the project. Their report contains a description of the modifications that were made to the estimated refinery configuration to improve its robustness and to address issues that had been identified previously, including those issues identified by Honeywell UOP in our report "UOP Feasibility Study Review for RECOPE S.A. Refinery Expansion Project" issued in May 2011. In our review of the WorleyParsons report, Honeywell again enlisted specialists from our Refinery Configuration and Process Profitability engineering group.

In order to properly address and review all the issues found during previous work on the project, it is clear that WorleyParsons performed a rigorous modeling of both the existing process units of the Moín refinery and those new process units considered in the project. Our review of the report did not reveal any flaws in the modeling that was performed and we believe there are now no serious issues with the configuration; the configuration should be considered highly reliable. As was concluded previously, the Delayed Coking – Hydrocracking process based configuration case is the optimal selection, however with the additional study from WorleyParsons, we are now also confident that there is a thoroughly consistent technical basis for unit selection and design that will lead to units that are correctly sized and designed. Estimates of refinery margin and capital expense made based on the revised configuration are now expected to also be much more reliable.

There were five outstanding issues that Honeywell UOP had identified in our updated report dated May 27, 2011. Each of these issues was fully addressed by WorleyParsons and have been resolved. Our observations on the final resolution of each issue are as follows:

1. Coker yields. As with other process units, the coker yields were updated from licensor information. This was a key modeling priority for WorleyParsons. From that

modeling, they found no problems with product qualities and quantities.

2. Hydrogen consumption in hydroprocessing units: WorleyParsons performed an extensible review of the issue, now using reasonable values for hydrogen consumption that are very much in line with Honeywell UOP's earlier recommendations based on our experience.
3. Reformer product property prediction: WorleyParsons' reformer product properties are aligned to Honeywell UOP's expectations. They examined all possible feeds to isomerization and reforming units, and generated results for product properties similar to Honeywell UOP's. This is corroborated in WorleyParson's comment regarding a dual operational mode for the reforming unit as a solution to allow successful production of both Premium and Regular Unleaded gasolines meeting product specifications.
4. Gasoline blending: The issue with addition of MMT is not longer a problem in the project. WorleyParson's proposition of relaxing of the existing aromatic content specification from 35 vol-% to 40 vol-% in order to more easily produce gasoline is consistent with the conclusions reached by Honeywell UOP. In addition, WorleyParsons mentioned use of isomerate of higher RONC (88-90 or even higher) that would also help to further mitigate this issue.
5. Naphtha splitting: As it was originally recommended by Honeywell UOP, WorleyParsons established the same cut points for the split naphtha: 85 °C End Point for the light naphtha going to the isomerization unit and approximately 200 °C End Point for the heavy naphtha going to reforming unit, thus avoiding benzene precursors and lowering the aromatic content on the reformate.

Based on our review, Honeywell UOP believes that the project now presented is very feasible. We generally are in agreement with WorleyParsons in all aspects of the process work that they developed. The finished products from the project can be produced to meet specifications following the recommendations presented by WorleyParsons.

If you have any questions or concerns about our review presented here, please contact me. We would be pleased to discuss with RECOPE in greater detail in a follow-up meeting that may be arranged at your earliest convenience.

Best Regards,



Honeywell UOP

Eric J. Hammel
UOP LLC - Process Technology & Equipment