

BEFORE THE
POSTAL RATE COMMISSION
WASHINGTON, D.C. 20268-0001

EVOLUTIONARY NETWORK DEVELOPMENT
SERVICE CHANGES, 2006

Docket No. N2006-1

RESPONSE OF UNITED STATES POSTAL SERVICE WITNESS SHAH
TO OFFICE OF THE CONSUMER ADVOCATE INTERROGATORY
(OCA/USPS-T1-21(d))

The United States Postal Service hereby submits the response of witness Pranab Shah to the following interrogatory of the Office of the Consumer Advocate, filed on April 5, 2006: OCA/USPS-T1-21(d).

The interrogatory is stated verbatim and followed by the response.

Respectfully submitted,

UNITED STATES POSTAL SERVICE

By its attorneys:

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**RESPONSE OF UNITED STATES POSTAL SERVICE WITNESS SHAH
TO INTERROGATORY OF THE OFFICE OF THE CONSUMER ADVOCATE**

OCA/USPS-T1-21. At pages 9-10 of your testimony, you briefly describe the optimization models used in the Evolutionary Network Development (END) process which continues as an evolutionary process the Network Integration and Alignment program as discussed in OCA/USPS-T1-5. Please provide a complete mathematical description for each type of optimization model, including the following items:

- a. Specify and briefly define each constant or variable used in the model, using mathematical notation as necessary (e.g., V_{ijk} might be the volume of class i mail originating in area j and destined for area k). For each variable (or set of similar variables), specify: a) whether it is used as an input variable, a decision variable, or an output variable; b) whether the variable is discrete or continuous; and c) what range of values the variable can take.
- b. Specify the objective function to be optimized by the model, in equation format (using the variables and constants defined above).
- c. Specify the constraints used in the model, as equations and/or inequalities (using the variables and constants defined above).
- d. Specify the mathematical method used to find the optimal solution (e.g., linear programming, integer programming) and provide a reference for that method in the technical literature.

RESPONSE:

(a-c) Objections filed.

(d) The method employed is mixed integer programming. For more about this method, please consult: Laurence Wolsey and George Nemhauser, *Integer and Combinatorial Optimization*, Wiley-Interscience, 1st edition (November 15, 1999) ISBN: 0471359432.