DESIGN OF A DATA PROCESSING SYSTEM
FOR URANIUM IN SITU MINING PLANTS

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DATA PROCESSING SYSTEM

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1.0 INTRODUCTION

1.1 PROBLEM DEFINITION

The purpose of this project is to design and implement a data processing system for uranium in situ mines for continuous use with the capability of producing progress reports on each project.

Uranium Resources, Inc. operates a number of uranium solution mines as part of joint venture projects. The responsibility of maintaining accurate records and reporting each project's progress has fallen to URI and demands a reliable and predictable system to do so. The programs and files initially set up to perform these record-keeping functions were not designed for long-term use. The re-design of the original system was necessary to allow for continuous use by many projects and to overcome other major limitations, as noted in the System Survey.

1.2 A DESCRIPTION OF URANIUM IN SITU MINING

This very general and very brief description of uranium in situ operations is included for those unfamiliar with the operations of URI. More technical explanations of in situ mining are available but are not necessary in explaining the data processing steps.

Uranium occurring in low-grade ores can often be recovered economically and with little surface damage through solution mining. This "in situ" mining process involves penetration of the ore body, permeation by a leaching solution, and the recovery of a mineralized solution.

Injection and extraction wells are drilled throughout an ore field. Through the injection wells certain chemicals are introduced into the formation which release the uranium into a solution. Extraction wells pump this enriched solution to a plant on the surface for eventual recovery of an oxide of uranium called yellowcake.
The measurements of the injected and extracted flows as well as their chemical composition are necessary for the efficient and economic operation of the plant because they are used in determining uranium recovery and techniques of operation. Data regarding a certain well, or a field in general, should be readily available for interpretation.

This data processing system for uranium in situ mining projects offers some consistency in data recovery and manipulation. Rather than having a separate set of programs for each project, this system takes a general look at all projects. It is, in effect, a package that can be applied to any project that Uranium Resources, Inc. chooses to undertake.

1.3 GENERAL APPROACH

The system design resulting from this project is based on the original data processing system of Uranium Resources, Inc. Basic drawbacks of the initial design necessitated changes in the data processing functions and file structures, as documented in the System Survey. The final file structures are explained in the File Layouts. Various aspects of AlphaBasic used to create the files and source documents are examined in the Explanation of AlphaBasic. Implementation and Evaluation indicate some of the problems encountered during development as well as some of the advantages and disadvantages of the newly designed system. The Appendix includes the program listings and any output generated by those programs.