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PROGRESS REPORT NO. 1

FEASIBILITY STUDY
ANDERSON RANCH PROJECT
YAVAPAI COUNTY, ARIZONA

For

MINERALS EXPLORATION COMPANY, INC.

October 1977



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1.0 SUMMARY

Minerals Exploration Company, Inc., awarded Morrison-Knudsen Company, Inc., a contract for the Anderson Project Feasibility Study on September 9, 1977. The Scope of Work for this project is presented in Section 2.0.

The initial kick-off meeting to review the scope and design criteria was held in Tucson on September 19-20, and a progress review meeting was held in Boise on October 17-18, 1977.

As of October 28, the engineering was approximately 50 percent complete. Three invoices, totaling \$38,905.06, covering the recorded charges through October 14, 1977, have been submitted to MEC for payment. This includes about 34 percent of the \$108,000 labor costs estimated for the completion of the Feasibility Study.

At present, all indications are that the Feasibility Study will be completed on schedule by December 31, 1977.



2.0 SCOPE OF WORK

The initial Scope of Work was as follows:

Morrison-Knudsen Company, Inc., proposes to provide Minerals Exploration Company, Inc. (hereafter referred to as "Owner"), with all engineering services required to complete a feasibility study for Owner's use in planning the development of its uranium deposit in Yavapai County, Arizona. The study will develop capital and operating cost estimates accurate to within ± 15 to 20 percent of actual costs for facilities to mine and process 2,000 dry tons of uranium ore per day. Standard open pit mining methods will be used and a conventional acid leach, CCD, solvent extraction process will recover U_3O_8 from the ore in the form of a yellowcake concentrate. Morrison-Knudsen understands that the average ore grade will be approximately 0.07 percent U_3O_8 , and the presently estimated mine life is 17 years at the specified design rate. Morrison-Knudsen's study will be based on data and criteria provided by Owner and its consultants.

A. Engineering Services - Mine

Morrison-Knudsen's mining engineering services will include a review and evaluation of data and criteria provided by Owner for incorporation into the study to verify Owner's estimates of mine capital and operating costs. This data will then be compiled and subjected to analysis to determine project economic feasibility. This study assumes positive results of individual study review.



If, in fact, Morrison-Knudsen's review indicates the need for further data development, such further effort would either be recommended for completion by Owner's personnel or offered as engineering services by Morrison-Knudsen.

Data Provided by Owner

1. Ore Reserve Estimate - by Digitgraph Computer Systems
2. Equilibrium Study - by Chapman, Wood & Griswold
3. Geotechnical Study - by Dames & Moore
4. Geological Report - by Owner
5. Hydrological Report - by Water Development Corporation
6. Topographic Maps (5-foot contour) - by Cooper Aerial
7. Mill and Tailings Siting - by Sergent, Hauskins & Beckwith
8. Overall Pit Design - by Owner
9. Production Schedule - by Owner
10. Equipment Selection - by Owner
11. Manpower Requirements - by Owner
12. Capital and Operating Cost Estimates - by Owner
13. Access Road Routing - by Owner
14. Primary Power & Cost to Property - by Owner
15. Potable & Process Water Source - by Water Development Corp.

Morrison-Knudsen will make an independent review based on the above documents to evaluate Owner's mine plan and capital and operating mine cost estimates. This will include review of:



1. Volumetric determinations of yearly overburden and ore materials.
2. Layout of the operating pits, waste dump areas, ore stockpiles and haulage routes.
3. Ore zone development, including production methods, blending requirements, if needed, and definition of dilution factors.
4. Equipment requirements.
5. Manpower requirements.
6. Mine support facility requirements.
7. Mine development schedules.

Capital and operating cost data developed within this feasibility determination will be utilized as input to the financial analysis procedures described in the appropriate section to follow:

B. Engineering Services - Mill

Morrison-Knudsen's feasibility study for Owner's acid leach mill will be based on the basic process and flowsheet provided by Owner's metallurgical consultant, A.H. Ross and Associates of Toronto, Canada. Ross will provide amenability test supervision, a process flowsheet and design criteria. Ross will also review Morrison-Knudsen's equipment specifications, drawings and other mill-related documents.

Morrison-Knudsen will incorporate data from the previously listed reports and studies provided by the Owner to develop a conceptual mill design for the feasibility study.



Morrison-Knudsen's engineering services for the mill and related facilities will include:

1. A review and evaluation of data supplied by Owner and its consultants.
2. Recommendations for changes or modifications, if any, to the flowsheet and/or design criteria provided by Owner and/or its consultants.
3. Development of preliminary general arrangements, elevations, one-line electrical, tailings disposal system, and auxiliary facilities. It is anticipated that 15 drawings, plus sketches, will be developed.
4. Development of a pulp and water balance.
5. Preparation of a major equipment item list complete with sizes, prices, horsepower requirements and pertinent delivery information.
6. Preparation of performance specifications for all major equipment.
7. Preparation of a preliminary general construction specification.
8. Development of capital and operating cost estimates accurate to within \pm 15 to 20 percent of actual costs.
9. Development of a milestone schedule for detailed design and construction.
10. Preparation of an estimate of the number of drawings and man-hours required for detailed engineering.
11. Development of a construction manpower schedule.



The above scope for the mill and auxiliaries will also include engineering and design for the following:

1. Communications System - Comparing microwave versus telephone.
2. Power distribution for the mine and mill.
3. Water distribution, sewage disposal and heating.
4. A mill laboratory, administration building and central repair and maintenance facilities.
5. Radiation monitoring of the plant facilities.

The drawings produced will be of sufficient quality and completeness to be used in the detailed engineering phase, if the same criteria are used.

To date, there have been no changes in this scope.



3.0 COSTS

The invoices for engineering services billed to MEC by M-K are summarized below.

<u>Invoice No.</u>	<u>Date</u>	<u>Period</u>	<u>Amount</u>
E-90606	9/30/77	9/03 - 9/16	\$ 4,255.54
E-100651	10/17/77	9/17 - 9/30	17,363.28
E-100671	10/24/77	10/1 - 10/14	<u>17,286.24</u>
TOTAL INVOICED			\$38,905.06

The total labor charges invoiced amount to \$37,246.92, or approximately 34 percent of the \$108,000 budgeted for completion of this study.



4.0 ENGINEERING PROGRESS

Design is 50 percent complete versus 50 percent scheduled.

4.1 Metallurgical

4.1.1 A report on Semiautogenous Grinding versus Conventional Grinding (A.H. Ross flowsheets) was submitted on 10/12/77.

4.1.2 A report on Acid Plant Studies was submitted on 10/3/77.

4.1.3 A flowsheet based on A.H. Ross criteria was developed.

4.1.4 A Pulp and Water Balance was completed.

4.1.5 A Preliminary Equipment List was compiled.

4.1.6 Pricing was obtained on 75 percent of the major equipment items.

4.1.7 A Preliminary Operating Cost Estimate was completed.

4.2 Design Drawing Status

<u>Dwg. No.</u>	<u>Title</u>	<u>Percent Complete</u>
21-53-0-001	Flowsheet - Ore Receiving Crushing, Grinding, Leaching & CCD	90%
21-53-0-002	Flowsheet - Solvent Extraction, Stripping, YC Precipitation and Packaging	90%
21-53-0-003	Mill Area Site Plan	60%
21-53-0-004	Area Plot Plan	0%



<u>Dwg. No.</u>	<u>Title</u>	<u>Percent Complete</u>
21-53-0-005	Ore Receiving & Crushing General Arrangement Plan & Elevation	70%
21-53-0-006	Fine Ore Storage & Mill Feed General Arrangement Plan & Elevation	40%
21-53-0-007	Mill Building General Arrangement Plans	20%
21-53-0-008	Mill Building General Arrangement Elevations	20%
21-53-0-009	CCD Thickeners General Arrangement Plan & Elevation	60%
21-53-0-010	Solvent Extraction General Arrangement Plan & Elevation	60%
21-52-0-011	Administration Building General Arrangement Plan & Elevation	20%
21-53-0-012	Shop, Warehouse & Change House General Arrangement Plan & Elevation	10%
21-53-0-013	Tailings Disposal & Water Reclamation Plan	0%
21-53-0-014	Water, Sewage & Heating One-Line Diagram	0%
21-54-0-015	Electrical One-Line Diagram	0%

4.3 Mining

The mine engineering work is approximately 45 percent complete.

4.3.1 Studies Review

An evaluation and review of the ore reserves, equilibrium, geotechnical, geological and hydrological reports are in progress.



4.3.2 Mine Plan Review

Review of overall pit design, production scheduling, equipment and manpower requirements have been completed. The results will be evaluated in early November.

It has been decided to re-evaluate the haul cycles in the second and fifth year of operation to determine the truck requirements.



5.0 GENERAL COMMENTS

- 5.1 Contact has been established with Tom Bailey of Woodward-Clyde in San Francisco to obtain meteorological data.
- 5.2 Contact has been established with Bill Webb of Dames and Moore in Phoenix to coordinate tailings-related design.
- 5.3 Preliminary cost estimates were made for the pumps and pipeline from the Palmerita Ranch.
- 5.4 John Marshall of MEC's Wyoming operation visited Boise on October 26 to discuss environmental permit requirements.