

APPENDIX "A"

EMR/CMHC NORTHERN INITIATIVES
CONTRACT AUGUST 1988

9 August 1988

Ann Mackenzie
Director, Residential Energy Management
Energy Mines and Resources
580 Booth Street
Ottawa, Ontario
K1A 0E4

Re: R-2000 Home Program Technology Project
Northwest Territories Housing Corporation
Technical Support

Dear Ms. Mackenzie:

In 1987, CMHC and EMR established a joint venture for the purpose of providing technical support to agencies involved in residential construction in northern Canada. The project involved a cost sharing agreement between CMHC and EMR to establish a contract person to assist in various activities in the north. In January of 1988, a contract person was hired to work out of the CMHC office under the direction of Mr. R.L. Duncan. The duration of the contract was until December 30, 1988. The following activities are currently in place as a result of that contract:

- a) The establishment of a secretariat for the North Group, a housing advisory committee made up of representatives from CMHC, EMR, CHBA, NWTHC and YHC all interested in housing technology as it applies to the north.
- b) The identification and documentation of technical issues and concerns related to the adoption of residential technologies suitable for the north including those related to R-2000.
- c) Field demonstration of the System 2000 and Heatslave oil fired boiler systems. Both systems represent technological advances in oil heating and address key hurdles experienced by the R-2000 program in regards to regions dominated with oil heating.

- d) Field testing and demonstration of various ventilation strategies currently being adopted in the north.
- e) Monitoring of wood moisture content in pre and post retrofit building envelopes in the north.
- f) Monitoring of air quality in northern housing.
- g) An RFP document for private sector development of integrated heating and ventilation systems.

The attached work statement represents an amendment to the contract between CMHC and EMR established on December 29, 1988.

In the original contract, sufficient funding was made available to maintain a contract person until December 30, 1988. Several contracts are currently in place in the north as a result of this contract. In addition, EMR/R-2000 has requested the assistance of this contract person to develop standard analysis techniques to evaluate the energy performance of houses monitored according to Level B protocol.

It has been determined by CMHC and EMR that there is a need to extend the contract staff person to March 31, 1989 so he can continue to manage several key projects underway in the north as well as assist in analysis of Level B monitoring of several R-2000 homes currently being monitored over the 1988/89 heating season. EMR agrees to provide an additional \$20,000 to the contract to cover the salary and travel costs for contract staff position for the period from December 31, 1988 to March 31, 1989. In addition, some minor changes in the original contract were necessary. The attached Work Statement represents a revised contract between CMHC and EMR. A summary of the amendments to the original Work Statement are outlined below:

- 1) In the original agreement, a contract staff person was to be allocated to work out of the NWTHC or EMR Regional office in Yellowknife up to March 31, 1987. Resources were not available to allow this position to be filled. As a result, all of the responsibilities of that position were shifted to the contract person working out of the CMHC Ottawa office. The contract staff person assumes those responsibilities for the duration of the contract.
- 2) Mr. Tom Hamlin of EMR/R-2000 has recently suggested to CMHC that this contract person assist in the analysis of data that is being collected as part of Level B monitoring projects underway by the R-2000 program. Two major heating/ventilation demonstration projects in the north also fall under this category.
- 3) The EMR contribution has been increased by \$20,000 to \$150,000 to cover salary and travel costs allocated to the contract staff person for the period from January 1, 1989 to March 31, 1989.

I trust that CMHC's committment to this project is satisfactory to yourselves and that EMR will execute this agreement and process a Financial Encumbrance for the contract extension at the appropriate time.

Yours truly,

Lorne Finley
Director
Project Implementation Division

APPROVED:

E.A. Flichel
Senior Vice-President
Policy, Research and Programs

APPROVED:

Ann Mackenzie
Director
Residential Energy Management
Energy Mines and Resources

Attached: Work Statement - R-2000 Home Technology Program

WORK STATEMENT - R-2000 HOME PROGRAM TECHNOLOGY PROJECT

TITLE: NORTHWEST TERRITORIES HOUSING CORPORATION (NWT HC)
TECHNICAL SUPPORT

DATE SUBMITTED: 29 December 1987
Amended 2 August 1988

LEAD AGENCY: Canada Mortgage and Housing Corporation

PROJECT LEADER: Rob L. Duncan, P. Eng.

SUBCONTRACTOR: Northwest Territories Housing Corporation and other private sector contractors as required.

TOTAL COST: EMR - \$150,000
CMHC - \$75,000
CMHC will manage the one full time contract staff assigned to this project.

DURATION: January 1, 1988 to March 31, 1989

ABSTRACT: This project involves six parts:

- a) the establishment of secretariat services for the EMR/CMHC/NWTHC housing advisory committee - Northern & Remote Technology in Housing (NORTH),
- b) the identification and documentation of technical issues and concerns related to the adoption of residential technologies suitable for the North including those related to the R-2000 Home Program,
- c) the testing and field implementation of several heating appliances and alternate distribution strategies that would appear to be more appropriate than the systems presently in use,
- d) the field monitoring of several existing ventilation systems and the development and field testing of an integrated low cost and lower power ventilation system appropriate for the north, and
- e) to develop standard analysis techniques for evaluating the performance of houses monitored according to Level B protocol.
- f) To assist in the management of CMHC initiatives in the area of integrated residential heating and ventilation system

1. OBJECTIVES

To identify, investigate, document, and coordinate northern residential technology issues and activities to improve energy conservation and the quality of NWT housing through the North advisory committee.

To develop and manage (R, D&D) projects related to increased energy conservation and improved quality of NWT housing.

To assist in the adoption of R-2000 performance standards and related technologies by NWT Housing Corporation.

To test and demonstrate CSA approved state of the art energy efficient oil heating technologies and monitor several low cost ventilation strategies for application in northern and remote housing.

Encourage a standard method of monitoring and evaluating the energy performance of houses and their sub-system.

2. RATIONALE

The climate in the NWT is considerably colder and remains colder for longer periods than in Southern Canada and, hence, technologies designed for and which work well in Southern Canada may not perform in the North. Verified data on the performance of various building components is required to establish appropriate standards and technologies suitable for NWT housing. Designers and contractors will then be able to select construction methods and products that are suitable for this region on the basis of an objective scientific assessment rather than subjective opinions.

3. STATEMENT OF WORK

The work will be coordinated through CMHC offices in Ottawa through a CMHC Northern Project officer. The following activities have been identified as responsibilities of this position.

- Secretariat and administration work for the housing technology advisory committee (NORTH) which is a working group of EMR, NWTHC and CMHC and other parties interested in northern technologies and is primarily concerned with technology development and transfer in the Northwest Territories. This committee also provides input into CMHCs' Housing Research Committee.
- Liaison with all NORTH members.
- Identification and ranking of research requirements.
- Preparation of status reports on findings from field testing and demonstration projects.
- Assistance to facilitate the adoption of energy conservation strategies and other housing technologies in line with the EMR R-2000 program objectives.
- Initiation and management of R, D&D projects identified by North committee members.

- Preparation of summary reports on R, D&D projects.
- Investigation of innovative housing technologies suitable for northern conditions.
- Preparation and implementation of the fundamental equations that describe the energy balance of the various R2000 demonstration houses and their sub-systems to enable on-line analysis during data collection.
- Preliminary analysis and presentation of Level B monitoring data for those houses currently being monitored for EMR as well as those being monitored in the north under the CMHC/EMR Northern Initiative joint venture.

CMHC will allocate one CMHC staff year to comply with government staffing requirements.

- b) The technical assessment work, which will be done by external consultants, is to develop a field investigation and reporting strategy to document concerns and problems. The following activities have been identified:
- The design and development of a strategy for investigation and reporting on issues and problems identified in the field by various agencies.
 - The development of a field procedures and documentation manual and provision of training required for implementation of the data gathering.
 - The supply of field measurement equipment and recording instruments required to implement the recording and analysis of data by NWT, CMHC and EMR.
- c) Two oil fired appliances have been identified as having a potential application in the north. It is proposed to ensure that these appliances are CSA approved, lab and field tested and demonstrated in Arctic conditions.
- d) Several passive and mechanical ventilation systems have been installed by CMHC and NWT-HC which require testing and refinement. It is also necessary to integrate or isolate the ventilation air from combustion air to produce a complete and efficient solution to the ventilation problem. Several appliances are available that can meet these requirements. It is proposed to carry out a complete technical and cost assessment of various ventilation strategies and mechanical devices and produce recommendations regarding the best solutions.

A travel budget will be allocated to this contract for the period from 1 January 1989 to 31 March 1989 to enable the contract person to perform a minimum of the following:

- a) Attend the Energy Efficient builders Association (EEBA) conference in Winnipeg, March 2-4, 1989.
- b) Attend the NoRTH committee meeting to be held in Winnipeg, tentatively, March 5-8, 1989.
- c) Travel to Edmonton to meet contractor involved with development of pilot project.
- d) Travel to Toronto to meet with contractors involved in R2000 monitoring.
- e) Travel to Edmonton to meet contractor involved in R2000 monitoring.

EMR agrees to loan the following equipment to CMHC for the purpose of allowing the contract person to conduct his job functions.

- a) One Sanyo MBS 16 Plus Computer complete with a 5 $\frac{1}{4}$ floppy drive and a 3 $\frac{1}{2}$ floppy drive, Packard Bell Monitor, Rainbow Modem.
- b) One Sciometrics 16 channel Electronic Measuring System complete with power supply.
- c) One Nova CO2 analyzer.

4. REPORT RELATIONSHIPS

The project manager for the work is CMHC permanent employee, R.L. Duncan, P. Eng., who will report to EMR regarding the work. The CMHC project officer will work out of CMHC offices in Ottawa under the direction of Mr. Duncan.

External consultants will be awarded work on the basis of a competitive process to individuals or firms best qualified to carry out the work outlined herein.

Mr. Tom Hamlin will be responsible for providing input and direction on the Level B analysis work. The contract person will work out of the CMHC office in Ottawa under the direction of Mr. Duncan.

5. DELIVERABLES

- Record of North meetings and recommendations.
- Development of a priority list of research initiatives.

- Status reports on findings from field testing and demonstration projects.
- Report on support provided to facilitate the adoption of new construction technologies, including energy efficiency (R-2000), by NWT Housing Corporation.
- Compendium of Northern building problems and scientific solutions.
- Summary report of R, D&D projects undertaken in the North.
- Documentation of the field investigation analysis and reporting system, field procedures manual.
- Report on field investigations of concerns and problems in NWT housing.
- Two energy efficient and CSA approved oil fired heating appliances tested and demonstrated for northern and remote Canadian housing.
- Assessment of integrated low power ventilation strategies appropriate for northern and remote Canadian housing.
- Report outlining the equations implemented for the Level B analysis of the R2000 monitoring program.
- Development of an appropriate format to facilitate EMR/R2000 personnel to analyze data collected under the Level B R2000 monitoring program.

6. COST

Estimated costs are as follows:

- a) Contract staff
CMHC project officer - \$50,000
- b) Field Investigations and Reporting - \$50,000
- c) Testing and Demonstration of
Oil field heating appliances - \$60,000
- d) Monitoring of ventilation systems - \$45,000
- e) Assistance in Level B analysis - \$20,000
plus travel allowance

Total \$225,000

Cost sharing - CMHC and EMR agree to cost share the projects described herein on the following basis:

EMR contribution	\$150,000
CMHC contribution	<u>\$ 75,000</u>
Total project cost	\$225,000

EMR agrees to provide the amount of \$150,000 distributed as follows:

- An FE of \$ 90,000 87/88 fiscal year upon signature to March 31/88
- Upon review and acceptance of interim report #1, an FE of \$40,000 88/89 fiscal year to March 31/89
- An FE of \$ 20,000 88/89 fiscal year on December 31, 1988

The cash flow projection and project schedule is as follows:

	Projected Cashflow	EMR F/E
Start up - F/E Execution 87/88 Fiscal Year		\$ 90,000
Interim report #1 31 March 88	- \$ 90,000	
FE Execution 88/89 Fiscal Year		\$ 40,000
Interim report #2 1 July 88	- \$ 30,000	
Interim report #3 1 October 88	- \$ 45,000	
FE Execution 88/89 on Fiscal Year 31 December 88		\$ 20,000
Interim report #4 31 March 89	- \$ 60,000	
Final report 31 April 89		
Total	<u>\$225,000</u>	<u>\$150,000</u>

Contractual commitments on the part of CMHC which extend beyond the fiscal year ending 31 March 1988 will be made conditional upon the funding for the fiscal year ending 31 March 1989 from EMR being approved and made available.

Each interim report shall include a forecast of expenditures for the remainder of the fiscal year. EMR must be informed by January 15 of this fiscal year and October of next fiscal year whether there will be any lapsing funds in order that these maybe reallocated to other projects.

CMHC may request an increase in the expenditure and EMR cash flow upon submission of a revised cash flow projection by CMHC.

This work statement and financial breakdown may be amended by written mutual agreement of both CMHC and EMR.