B U R U N D I

A L T E R N A T I V E E N E R G Y: P E A T II

(695-0103)

F O R M A T I V E

E V A L U A T I O N

December 1982

BURUNDI - ALTERNATIVE ENERGY: PEAT II (695-0103)

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BURUNDI - ALTERNATIVE ENERGY: PEAT II (695-0103)
FORMATIVE EVALUATION

I. INTRODUCTION

A. Summary Focus of the Project

AID's support to the Government of Burundi's (GRB's) National Office for Peat (ONATOUR) was initiated on a pilot basis in August 1978. Under the Africa Regional Accelerated Impact Program's Alternative Energy: Peat I Project, $490,000 was provided to assist ONATOUR in developing Burundi's peat reserves for non-industrial, thermal energy requirements. At that time, the beneficiaries of this new source of fuel were identified as the rural majority who were to be encouraged to substitute peat for wood in cooking and heating for the rural household. Following two years of experience under this activity, it was concluded that, given the inefficiencies of the wood-to-charcoal conversion process (7 kilos of wood are required to produce 1 kilo of charcoal), priority attention should be redirected towards consumers of charcoal, who are primarily urban householders. Although peat production on a number of highland bog sites was proceeding, a number of technical questions surfaced which required additional study and experimentation. Equally important, as ONATOUR began its producer-wholesaler operation, it also experienced growing pains which could be treated with a longer term commitment of AID time and resources.

The follow-on project, Alternative Energy: Peat II, was authorized in August 1980. As stated in the Project Paper (PP), the project is directed towards the goal of maximizing Burundi's limited energy resources by developing an underutilized resource--peat. The project has two purposes: (1) to conserve Burundi's forest reserves by increasing the availability and acceptability of peat as an alternative energy source; and (b) to strengthen the institutional capacity of ONATOUR, the implementing agency, which is presently a parastatal organization under the jurisdiction of the GRB Ministry of Public Works, Energy and Mines. To achieve the first project purpose, ONATOUR is focusing its attention on encouraging the substitution of peat for charcoal. Pending creation of an effective demand from urban household consumers, ONATOUR is also enlisting artisanal/commercial (brickmakers, lime kilns, bakeries), institutional (GRB army, missions, schools, hospitals), and industrial (tea factories and potentially the cotton factory) clients. These consumer groups, however, primarily use wood rather than charcoal for fuel/heat requirements and are therefore of secondary, long-term importance to conserve Burundi's forest reserves.

The project is being implemented in two stages over five years. At the end of the first stage, in November 1981, a preliminary project review and technical evaluation concluded that ONATOUR had made satisfactory progress in implementing a new operational philosophy based on the principles of private enterprise; the GRB was making timely financial contributions to cover

ONATOUR's operating losses; and much had been learned in initial experiments with peat macerating technology. With project implementation proceeding encouragingly, a second evaluation was scheduled for November 1982.

B. Purposes of this Evaluation

As jointly agreed with the GRB-ONATOUR and the AID Affairs Office/Burundi (AAO/B), and as stated in a revised Amplified Project Description (PIL 14, submitted to the GRB for countersignature on November 20, 1982), the purpose of this evaluation is to "evaluate progress against anticipated results and, as necessary, identify and recommend changes in the program management and project design." In addition, the evaluation will focus on:

(1) progress in the choice of peat production technology and the results of the Nyamuswaga feasibility study;
(2) ONATOUR's marketing strategy to change consumer preference from charcoal to peat;
(3) ONATOUR's performance as an implementing institution; and
(4) the extent and timing of the GRB's support to the project.

It should be noted that the PP indicated that the formative evaluation should focus most importantly on progress in changing consumer preference from charcoal to peat, i.e., (2) above. Given the experimental and innovative nature of the project, however, equal consideration is also given in this evaluation to the technical and institutional components of the project.

C. Evaluation Team Membership

In the spirit of collaboration and constructive criticism, AAO/Burundi and ONATOUR agreed to joint representation on the evaluation team. As partners in implementing the peat production component of the project, Bord na Mona (BNM) (Irish Peat Development Authority) and the Government of Ireland were also invited to participate. The team members, and the timing of their participation, included:

ONATOUR

Mr. Leonce Sinzinkayo, Deputy Director of Production and Marketing (November 15-December 3)
Mr. Sixte Harushamagara, Chief, Technical Service (November 15-December 3)
Mr. Ian Pattinson, Marketing Advisor and Chief of Party of the AID contract team (November 15-December 3)

Government of Ireland (GRI)

Mr. Val Martin, Production Consultant, Bord na Mona (November 15-November 29)
Mr. Michael Hoey, First Secretary (Bilateral Aid), Development Cooperation Division, Department of Foreign Affairs (November 23-November 26)

AID

Ms. Dianne Blane, Project Officer, REDSO/ESA (Team Leader) (November 16-December 3)
Ms. Judy Bryson, Economist (Contract) (November 15-November 29)
Mr. F. Denis Light, Engineer, REDSO/ESA (November 16-November 23 and November 30-December 3)
Mr. Michael Sullivan, Assistant General Development Officer, AID Affairs Office/Burundi (AAO/B) (November 15-December 3)

The evaluation team wishes most sincerely to thank Mr. Daniel Kinigi, Director of ONATOUR, and his staff, both in Bujumbura and on the bog sites, for spending so many hours and sharing so willingly their first-hand knowledge and expertise with the team. AAO/B is also thanked for its staff support for this effort and is especially complimented on its model project files.

D. Methodology of the Evaluation

The evaluation team has examined the project from various perspectives:

--institutional
--financial
--economic (peat marketing program, price policy, etc.)
--technical
--sociological/socio-economic (impact on beneficiaries)
--environmental

Attention has also been given to project implementation management with specific reference to the AAO/B and to the expatriate advisors and technicians assigned to ONATOUR and financed by AID through the project.

The above analyses on which the recommendations are based have been supported by extensive personal and group interviews and interaction, on-site inspections of the productive bog sites (Ijenda, Kisozi and Matana) and the Grand Marais and Nyamuswaga bog region, and a literature review (technical reports). ONATOUR and AID files, records and reports have also been studied.

II. SUMMARY CONCLUSIONS AND RECOMMENDATIONS

A. Summary Conclusions

1. Relevance: Progress toward Achieving the Project Purposes

(a) To conserve Burundi's forest reserves by increasing the availability and acceptability of peat as an alternative energy source.

The availability of peat as an alternative energy source has been significantly increased within the past two years. ONATOUR's sales record is impressive: 3,534 tons in 1980 and 6,435 in 1981. A realistic, and even conservative, estimate of current year and future year sales is: 6,000 tons in 1982; 10,800 tons in 1983; 20,100 tons in 1984; and, 25,000 tons in 1985. The acceptability of peat is also reflected in terms of sales. On the other hand, as discussed in the Introduction above, the project's target beneficiary--the urban domestic consumer of charcoal--is still only vaguely familiar with the product and to date cannot buy peat in the retail market. ONATOUR launched a limited domestic marketing campaign in 1982, but one of the strongest recommendations in this evaluation focuses on the necessity to gain real momentum in the next two years. To create a market demand for ONATOUR's increasing supply of peat, a suitable stove must be designed and be made commercially available; the quality of peat sold in the market must be comparable to the quality of charcoal; and a retail price structure must assure that peat is a more economic fuel than charcoal.

(b) To strengthen the institutional capacity of ONATOUR to carry out present and planned peat production and marketing operations on an efficient basis and without need for significant future financial or technical support.

Since its establishment in 1977, ONATOUR has made great progress in developing as a viable institution. The organization is well staffed with qualified professionals in each of the four services: administration, finance, production and marketing. The question of whether or not ONATOUR will require "significant" future financial or technical support will be evaluated more appropriately in June-July 1984, by which time ONATOUR will have another full year of production experience, judgments can be made about expanding production to new bog sites and a marketing campaign will have indicated potential and actual consumer interest.

2. Effectiveness: Progress to Date in Achieving the EOPS

(a) Net drawdown of Burundi's forest reserves will have been significantly slowed.

To date, after only two years of implementation, the project has had little effect on slowing the drawdown of Burundi's forest reserves. ONATOUR's clients have substituted peat for wood so that 1981 and 1982 peat sales represented the wood equivalent of clean-cutting only 422 hectares and cropping only 2,340 hectares of trees. If ONATOUR's 1982 marketing plan is implemented without revision, peat usage will represent the equivalent of clean-cutting 2,501 hectares or cropping 12,018 hectares of trees by the end of the project. While this is not a negligible impact, the evaluation team recommends a revised sales target which can only be achieved if ONATOUR launches an aggressive domestic marketing campaign. If accepted by ONATOUR, the revised sales target would result in peat usage representing the equivalent of clean-cutting 4,733 hectares or cropping 22,734 hectares of trees by the end of the project. This target, although lower than predicted in the PP, would still represent a significant contribution to saving Burundi's forest reserves. Reforestation programs will result in the planting of 20,000 hectares of trees by 1984. By saving 5,000 (4,733 rounded) hectares, the revised target would represent a 25% increase on the reforestation efforts.

(b) ONATOUR will strengthen its internal operations, have a trained staff and will cover its operating costs.

As summarized above, ONATOUR's operations (administration, finance, production and marketing) are directed by a young and reasonably motivated professional staff. It is further estimated that ONATOUR will realize a net profit on operations in 1983 and a cumulative net profit in 1984. In August 1980, when the project was designed, it was estimated that ONATOUR would not realize a cumulative net profit until 1988.

(c) Annual peat production will increase to 47,500 tons by 1986.

This PP target should be amended to 40,375 tons, which represents predicted peat production without other organic fuel additives (coffee hulls, rice husks, etc.). It is nevertheless too optimistic. On the basis of the 1981 and, to a greater extent, the 1982 peat harvesting season, a more realistic target is 30,000 tons. This also represents a realistic maximum level of production for ONATOUR. Production constraints include the peat harvesting technology, manpower requirements, logistics, quality of the product and the necessity not to outpace consumer demand.

(d) Sixty percent of Bujumbura's urban domestic market will be using peat by the end of the project (September 1985).

An increase in the use of peat to replace charcoal is essential if the project is to contribute to Burundi's reforestation efforts. ONATOUR's current sales target for domestic consumers in Bujumbura represents, however, less than 3% of the potential domestic market for peat in 1985. Accordingly, ONATOUR's marketing strategy must be strengthened and refocused on the

domestic consumer if the project is to succeed in development terms. A recommended revised target of 10-15% of Bujumbura's domestic market by 1985 is a significant shortfall from the original 60% target, but it is more realistic in light of delays to date in developing and implementing a marketing strategy (including design of a suitable peat stove).

B. Evaluation Recommendations

The evaluation team recommends that ONATOUR and AAO/B undertake the following operational and corrective actions which, given the complexity of the project, have been grouped in four categories: institutional development, the peat marketing program, technical aspects and project management. The rationale and analyses on which the recommendations are based are then discussed in detail in the following sections of the evaluation report.

Institutional Development

1. ONATOUR should continue efforts to establish a cost-accounting system (including double-entry bookkeeping) so that both upper- and middle-level management are aware of the cost implications of management decisions. In this regard:

(a) AAO/B and ONATOUR, including the contract financial advisor, should analyze and discuss in detail the implications of the Coopers and Lybrand audit report of ONATOUR's 1979-81 accounts (received November 30, 1982); and

(b) a Bord na Mona consultant in accounting systems should be provided in early 1983 for up to one month to assist the financial advisor and ONATOUR staff to: establish a cost-accounting system specific to peat production and marketing; refine follow-up training requirements at Bord na Mona or elsewhere; and discuss and plan a tailored training program for the ONATOUR Deputy Director of Administration and Finance.

2. ONATOUR should improve the efficiency of storing and controlling the peat inventory. With regard to inventory storage, analyses should be undertaken to determine (a) the most cost-efficient division of storage between the bog sites and ONATOUR headquarters and (b) the cost of improved storage versus the cost of product loss in peat ricks. With regard to inventory control, planned procurement and use of 4-5 truck weighing scales (up to 25T capacity) should be undertaken immediately.

3. With ONATOUR, a REDSO/ESA engineer should monitor headquarters and bog-site storage requirements on a continuing basis. Increasing the present hangar storage capacity at the three bogs may be a good investment to reduce losses. See Recommendation No. 2 above.

4. ONATOUR should continue to analyze administrative overhead costs to identify potential cost savings and efficiencies.

5. ONATOUR's role in coordinating its program with those of other agencies should be strengthened. A suggestion would be ONATOUR's sponsorship of a biannual roundtable conference to discuss its own and other agencies' and donors' current and proposed activities and research programs on peat and other alternative energy fuels.

6. The evolution of ONATOUR from a parastatal organization to a private enterprise should continue to be encouraged and supported by AAO/B. Endorsing AAO/B's own planning, it would be helpful for a short-term private enterprise specialist to discuss the implications of this evolution wth the GRB-ONATOUR in 1983, by which time it is estimated that ONATOUR will realize a net profit on operations. Two weeks should be adequate for this assignment, although follow-up consultation(s) may be advisable.

7. Summary of recommended technical services:

(a) Under the Bord na Mona contract, the priority recruitment of one project (civil) engineer (two years), one water drainage engineer (two years), and three surveyors (one year each). See Recommendation No. 1 under Technical Aspects.

(b) Under AID contract, a consumer marketing specialist for two years. See Recommendation No. 1 under Peat Marketing Program.

(c) Short-term services in portable/fixed stove design/engineering (at least 6 months), sociology (periodic over one year), and boiler conversion (2-3 months). See Recommendation No. 2 under Peat Marketing Program.

(d) Short-term services in transport economics (one month). See Recommendation No. 6 under Peat Marketing Program.

(e) Under the Bord na Mona contract, short-term services in accounting systems (one month). See Recommendation No. 1 above.

(f) Short-term services in peat (and other waste product) carbonization. See Recommendation No. 11 under Technical Aspects.

(g) Short-term services in private enterprise development (2 weeks to one month with follow-up if appropriate). See Recommendation No. 6 above.

(h) Short-term services in environmental management to study the reclamation of bog sites after peat exploitation/production (initially for 2 months and then with periodic follow-up). See Recommendation No. 4 under Technical Aspects.

8. Summary of additional peat machinery requirements for the 1983 harvesting season:

(a) At least two sets of tracks for the Deutz and Landini tractors.

(b) Three Landini tractors (two for Kisozi-Matana and one spare)

(c) Three Difco-type cutting attachments (two for Matana and one spare).

(d) Two trailers (three if the present trailer under loan from the Basic Food Crops project must be returned).

(e) Parts to modify the present Difco attachments.

(f) Necessary spare and replacement parts for the present machinery inventory and new procurement.

(g) For each bog-site workshop, mechanical tools and equipment to maintain and overhaul the peat machinery. See Recommendation No. 2 under Technical Aspects.

9. Summary of construction requirements through the end of the project:

(a) In the new ONATOUR headquarters: substitution of the laboratory for a storeroom. The storeroom should be relocated at the ONATOUR headquarters yard.

(b) Improvements to the ONATOUR headquarters yard: (1) erection of an additional hangar/shed with a storage capacity of 300 tons; (2) placement of a concrete foundation on either the total yard area or, minimally, on the open, uncovered area; and (3) construction of a mechanical workshop with an inspection pit and greasing facilities to service ONATOUR's vehicle fleet.

(c) Up-country housing: (1) two houses at Kisozi; (2) one house at Matana; and (3) two or three houses at Nyamuswaga, with location and construction timing to be determined based on the anticipated schedule of peat production. Note: Housing rental at all sites must be provided until the new housing is ready for occupancy.

(d) Offices at the bog sites: (1) one office at Ijenda; (2) one office at Matana; and (3) one office at Nyamuswaga, with location and timing of construction to be determined based on the anticipated schedule of peat production. Note: The offices should be of a simple, five-room module type with an overhang for the project vehicle.

(e) At the Kisozi bog site: installation of an underground gas/diesel fuel tank and gravity-fed pump with lock.

10. Summary of recommended vehicle procurement:

(a) An additional 10T tipper truck to replace, when deadlined, the 7T truck provided in 1979 under the Peat I project.

(b) Three additional pick-ups (one for each bog manager) to replace, when deadlined, the vehicles provided under the Peat I project. See Recommendations Nos. 7 and 8 under Peat Marketing Program.

ONATOUR does not concur with this summary recommendation for vehicle procurement, requesting instead an additional two 10T trucks in 1983. Note: AAO/B should assure that the two 10T trucks now in the procurement process are both tippers. The determination of when (at what point) vehicles are deadlined should be made by the COP/Project Manager based on the advice of the BNM technicians.

Peat Marketing Program

1. A consumer marketing specialist should be recruited for the project contract team. Responsibility over a two-year period would be to design and implement an aggressive marketing strategy/campaign aimed primarily at the urban domestic consumer of charcoal. A position description has been prepared.

2. The following short-term consultant services should be procured to assist the consumer marketing specialist in designing and launching a vigorous marketing campaign:

(a) a stove designer with experience in portable and fixed stoves and in using peat fuel. Length of assignment: at least 6 months by March-April 1983. ONATOUR requests the services on a long-term basis (one year minimum);

(b) a sociologist with experience in Burundi and, if possible, fluency in Kirundi. It is suggested that a Burundian, perhaps from the university and preferably a woman, be recruited. Length of assignment: periodic over one year (especially possible if Burundian); and

(c) an engineer to advise on fixed stove modifications and boiler conversions for artisanal, industrial and institutional use of peat. Length of assignment: 2-3 months. ONATOUR should prepare for this consultation in advance by canvassing potential clients and

8. AAO/B should approve the procurement of replacement pick-ups for the three bog managers at Ijenda, Kisozi and Matana. The pick-ups should be used to promote peat sales in the rural areas near the bog sites as well as for continuing to transport materials and equipment between the bog sites.

9. ONATOUR should study the potential cost advantages of utilizing a tractor with trailer (6T capacity) for transporting peat to the Ijenda and Tora tea factories, especially during the off-season. (During the production season, the tractor and trailer should be used for transporting peat at the bog site in order to minimize excessive handling.) ONATOUR concurs with this recommendation only with the understanding that tractors, if used to transport peat off-season, will be replaced when deadlined.

Technical Aspects

1. Bord na Mona should recruit and nominate candidates for the project (civil) engineer (1), water/drainage engineer (1), and surveyor (3) positions by not later than January 1983. Their placement is requisite to initiate the survey and hydraulic analysis in 1983 and the hydraulic and structural design (including drainage work) in 1984 in the Nyamuswaga bog region.

2. Following are the recommended 1983 peat production machinery requirements:

(a) Ijenda: 1 SAM (on dry area following hand-stripping) and 1 Difco with tracked tractor.

(b) Kisozi: 2 SAMS and 1 Difco with tracked tractor.
Note: The Lilliput machine should be properly stored. Unused spare parts should be painted and also properly stored. If appropriate, the machine could be used for rolling at Kisozi.

(c) Matana: 2 Difcos with tracked tractors.
See Recommendation No. 8 under Institutional Development for a summary of recommended procurement.

3. A pilot peat production effort ("test") at Nyamuswaga should be undertaken concurrently with the proposed survey work of the entire bog region. Initial testing and production at 5-6 sites should be started in May-September 1983. The tests should demonstrate to the GRB and farmers in the region that peat production is not environmentally destructive. The experience can be evaluated in the June-July 1984 evaluation, which will result in recommendations on additional requirements for production equipment, transport, access roads, housing and office construction, marketing, etc. Additional inputs may then be provided before the end of the project. Note: AAO/B should write to ONATOUR requesting written confirmation that testing and

collecting detailed information on plant production/capacity, present fuel consumption and costs of operation, appliance in use, etc. Bord na Mona should be requested to provide this specialist.

3. With the assistance of the consumer marketing specialist and the short-term consultants recommended above (No. 2), ONATOUR's marketing staff should undertake systematic data collection and analysis as the basis for, and continuing to support, an aggressive marketing strategy. The use of a questionnaire and female interviewers is suggested. Specific information and analyses are urgently required on:

(a) the energy needs and usage patterns of the different categories of consumer (domestic, artisanal, commercial and industrial, in that order of priority);

(b) the performance of fixed and portable peat stoves in the household; and

(c) the wholesale and retail marketing system for charcoal.

4. ONATOUR should institute a multiple pricing structure within the context of a vigorous, multifaceted marketing strategy. For example, the price of peat to industrial, institutional and artisanal/commercial clients should subsidize the lowest possible price to potential domestic consumers. Furthermore, the pricing policy must be examined carefully to insure that peat for the urban domestic consumer is priced at a level which will permit market penetration through an economically rational retail structure.

5. To have an impact on the domestic market, ONATOUR should strengthen its outreach effort by enlisting the active support of Burundian opinion leaders, educationalists, extension workers (in the foyers sociaux, for example), etc.

6. Following the design of an acceptable peat stove, ONATOUR's marketing staff should identify and train interested stovesmiths in its production. The stovesmiths should then assume responsibility for meeting the market demand as soon as feasible.

7. A decision on expanding ONATOUR's truck fleet beyond its 1983 capacity (either one 7T and three 10T trucks or four 10T trucks) should be deferred until late 1983. At that time, a short-term transport economist should study the current situation and the experience over the past year. Analyses of the OTRABU and private transport business (present and projected capacity and charges) and ONATOUR's running costs (maintenance, fuel costs, etc.) should be included, most importantly, in the terms of reference. ONATOUR does not agree with this recommendation, believing instead that its internal transport analyses conclude that the ONATOUR truck fleet requires six 10T trucks in 1983.

production at Nyamuswaga can be started in May-September 1983. ONATOUR has given oral confirmation to the evaluation team.

4. Short-term services in environmental management should be provided to study the reclamation/rehabilitation of bog sites for agricultural production after peat exploitation. Length of assignment: at least 2 months initially in early 1983, with periodic follow-up.

5. Pilot peat production should be undertaken at the Kitanga A and B bog sites as a supplement to (and/or as a safeguard against possible restrictions on) large-scale peat exploitation at Nyamuswaga.

6. In general, peat production should continue to be as labor-intensive as possible to the extent permitted by the market value of peat.

7. Procurement of four truck weighing scales (at least one with 25T capacity) should be completed as soon as possible. They should be installed at each bog site (3) and at the ONATOUR headquarters yard (1). A fifth scale (25T capacity) should be procured when peat production commences at Nyamuswaga (and/or at Buyongwe). See Recommendation No. 2 under Institutional Development.

8. Arrangements should be made quickly to procure new parts to modify Difco attachments so that they can be tested during the short dry season in January 1983. See Recommendation No. 8 under Institutional Development.

9. Peat ricks should be narrower and higher to improve water-proofing with the straw/reed covering.

10. The Deutz and Landini tractor rear wheels should be replaced with tracks for improved mobility on the bog. See Recommendation No. 8 under Institutional Development.

11. The feasibility of carbonizing peat (with and without additives) should continue to be investigated with particular reference to future large-scale exploitation of the Nyamuswaga bog region. Assuming consumer acceptability, on-site carbonization and transport to urban markets may be more cost-effective than transport of raw peat to urban markets. The feasibility of adding peat dust to coffee hulls and rick husks should be included in the investigation.

12. AAO/B and ONATOUR should consider the procurement of a portable gasifier within the context of continued experimentation with peat-burning appliances. The gasifier model should be medium-sized.

13. AAO/B and ONATOUR should consider favorably the procurement of a manual or mechanical conveyor belt loader for the ONATOUR headquarters yard to

facilitate loading operations and potentially reduce manpower employment requirements (especially if there is a further increase in the minimum wage). Depending on its performance, procurement of additional conveyor belt loaders for use on the bog sites should also be considered.

14. An ONATOUR staff team, including at least one fitter, should visit the peat and papyrus experimental projects in Rwanda. A regular exchange of information, by periodic visits or correspondence, should then be initiated.

15. As requested by ONATOUR, AAO/B should arrange for the agronomist(s) under the Basic Food Crops project and the REDSO/ESA regional agricultural officer to investigate, on a limited basis, the potential use of peat as a fertilizer medium. ONATOUR-AAO/B should also request Bord na Mona to provide information on this subject.

Project Management

1. Another formative evaluation should be scheduled between now and the final (end-of-project) evaluation in September 1985. The period June-July 1984 is recommended. This next evaluation should prove helpful to ONATOUR and AAO/B in making final decisions before the end of the project concerning the status and future of peat production at Nyamuswaga (and/or Buyongwe and Kitanga A and B); ONATOUR's additional transport requirements, if any; final equipment procurement; additional participant training requirements; progress in the domestic marketing campaign; and guidance for a possible follow-on phase, if appropriate. The evaluation will require 3-4 weeks. Membership on the team will be jointly determined by ONATOUR and AAO/B.

2. As proposed in the revised Amplified Project Description (PIL 14), all contract position descriptions should be reexamined and revised as necessary to reflect accurately the jobs being done by each team member. This exercise should vent the frustrations of those team members who now believe that their effectiveness is less than maximum and that their work is not professionally satisfying. Responsibility would then rest with AAO/B and the COP/Project Manager to assure that the contract team members are performing their jobs efficiently and effectively within the ONATOUR organization and within the terms of their position descriptions.

3. Periodic project management meetings should be initiated immediately. Different management groupings should include: AAO/B and the contract team; ONATOUR and the contract team; the contract team members among themselves; and AAO/B, ONATOUR and the contract team. This should significantly improve morale, particularly among the contract team members, and strengthen relationships between the contract team, ONATOUR and AAO/B for joint problem-solving, implementation planning and constructive group criticism.

4. The approval/concurrence/clearance process of project documentation within AAO/B should be minimized and/or streamlined. To the extent that the present process also involves recourse to REDSO/ESA, AAO/B should discuss with REDSO/ESA how procedures may best be revised to minimize delays. It may be possible, for example, to minimize the issuance of PILs, which require REDSO/ESA approval, and rely more on official correspondence.

5. Between AAO/B and REDSO/ESA, an attempt should be made to accelerate the procurement process for equipment and spare parts.

6. The COP/Project Manager should be given more authority to make local purchases without recourse to AAO/B's prior approval. The case of procuring replacement tires was cited as an example.

7. AAO/B should enforce the provisions of the revised Amplified Project Description (PIL 14) which relate to the relationships of the contract financial advisor and administrative advisor to the ONATOUR Deputy Director for Administration and Finance, i.e., the financial advisor "will work directly with" and the administrative advisor "will work closely with" the Deputy Director for Administration and Finance. Although physical proximity may not be possible until ONATOUR is in its new office building, contact should be maintained on a very frequent basis.

8. The contract administrative advisor should not be responsible for preparing AID documentation (cables, PIO/Cs, PILs, etc.). This responsibility appropriately rests with the AAO/B project manager. The administrative advisor should support more substantively ONATOUR's expanding, internal administrative workload.

9. AAO/B and ONATOUR should both explore a broadened relationship with Bord na Mona on, for example, the potential production/marketing of different kinds of peat (dust, milled, pelletized for fertilizer, etc.), financial management training for ONATOUR staff, etc.

10. AAO/B must resolve outstanding questions concerning support to AID contract technicians, including the Bord na Mona members. A particularly frustrating issue is the importation of consumables after six months at post. The evaluation team strongly supports a decision in favor of the advisors. Note: During his TDY as a member of the evaluation team, in a meeting with the Minister, Mr. Hoey reportedly negotiated this point favorably for the Bord na Mona fitters. If possible, ONATOUR is requested to include the AID contract team members (present and future) within the scope of the negotiated resolution.

11. The contract financial advisor should continue to strengthen his French language capability.

12. AAO/B should send copies of the Quarterly Progress Reports and the Semi-Annual Financial Reports to Bord na Mona and the First Secretary (Bilateral Aid), Development Cooperation Division, GRI Department of Foreign Affairs (present encumbent, Mr. Michael Hoey). A set of the reports to date should also be sent to both organizations.

13. To assure its maximum usefulness to both ONATOUR and AAO/B, this evaluation report should be translated into French.

III. SUMMARY OF PROJECT INPUTS: PROPOSED AND REVISED

The first year of project implementation, basically CY 1981, represented a shake-down period for both ONATOUR and AID. ONATOUR recruited Burundians for the professional mid- and upper-level management positions, an AID and Bord na Mona recruited counterpart advisors and technicians for peat production. During the second year of project implementation, CY 1982, with the placement of advisors at ONATOUR headquarters and technicians at the bog sites, and with the arrival of peat macerating machines and tractors from Ireland, ONATOUR's efforts in peat production and marketing commenced in earnest.

Two important developments within the past two years have required major shifts and realignments within the PP budget. The first concerns production planning over the next 5-10 years. At the time of the PP design (June-July 1980), a DANIDA survey of Burundi's peat reserves was underway but not completed. The most educated assumption was that peat production would b expanded from the three bogs currently being worked (Ijenda, Kisozi and Matana) to six bogs (adding Kitanga A, Kitanga B and Nyacijima). On the basi of analyses in the DANIDA prospection report (August 1981), however, it has been decided that large-scale production on the latter three bogs is not as feasible as initially assumed. All three bogs have a high ash content (25-31%), and the Nyacijima bog is under fairly intensive cultivation. On th other hand, the DANIDA survey did identify immense peat resources in the Nymuswaga bog. With a relatively low ash content (17%), recoverable deposits are estimated to total more than 4 million metric tons. Development of the Nymuswaga bog, prior to production, will require, however, large-scale drainage engineering and construction.

The second unforeseen requirement for AID project funds is housing construction for contract technical personnel at or near the bog sites. As originally planned, the GRB was responsible for renting suitable up-country accommodations. This is not feasible over the long term, however, and the GRB-ONATOUR have argued convincingly of the necessity to construct housing.

To accommodate these additional requirements, over the past several months ONATOUR and AAO/B revised the total project budget. Savings can be realized with a more modest and realistic staffing pattern at the bog sites. A revised Amplified Project Description (Annex I of the Project Agreement) an

revised project budget were forwarded to the GRB for countersignature on November 20, 1982. The following table compares funding requirements for project components as estimated in the PP and as revised after two years of project implementation.

($000)

Component	PP Financial Plan (August 1980)	Revised Project Budget (November 1982)
Technical Services	$4,602	$2,269
Equipment & Vehicles	1,754	2,083
Demonstration/Publicity	100	171
Participant Training	110	118
Construction	260	1,085
Other Costs	352	1,080
Nyamuswaga Development	---	340
Contingency & Inflation	822	854
TOTAL	$8,000	$8,000

Assuming the timely and effective delivery of the above AID-financed inputs, the project was designed to achieve four specific outputs with regard to ONATOUR's institutional development and actual peat production:

Institutional Development

1. Trained ONATOUR staff
2. Improved ONATOUR management capability

Technical Aspects

3. Resolution of technical questions
4. Development of commercial bogs

Progress to date in achieving these project outputs is discussed in detail below.

IV. INSTITUTIONAL DEVELOPMENT

A. Project Inputs

1. AID Contribution

(a) Technical Services

In designing the project, AID and ONATOUR estimated requirements for specialized skills, both long-term and short-term, to strengthen ONATOUR's headquarters staff, to increase peat production on the bog sites and to create a growing demand for the new product as a substitution for wood and charcoal. Specifically, the services of a marketing specialist for four years, a financial specialist for four years, a general engineer for two years, 4 bog-site supervisors and 2 mechanics were requested. For technical problem-solving, short-term services in engineering, consumer marketing, social analysis and stove design and construction were provided for in the project budget.

Under two-year personal services contracts (PSCs), AID recruited a marketing advisor and a financial advisor. The marketing advisor entered on duty February 1, 1981, essentially continuing the services which he had provided to ONATOUR under the Peat I project. As the first member of the contract team, the marketing advisor was also designated as the Chief-of-Party/Project Manager. After an inordinate delay, the financial advisor was recruited and entered on duty May 1, 1982.

To direct peat production on the bog sites, a somewhat unusual contractual arrangement was negotiated between Bord na Mona, the GRB and AID. Under a four-year host country contract, let on August 21, 1981 for $360,560, Bord na Mona will provide the services of Irish engineers and fitters (master mechanics). Bord na Mona continues the base salaries of the technicians and provides home office backstopping. AID, with project funds, finances a fixed monthly rate for each employee, which is roughly equivalent to the cost-of-living and hardship allowances paid to AID contract personnel. AID also meets administrative expenses, such as freight allowances, provisions for medical evacuation and supplemental French language training. (Bord na Mona finances the first six months of language training for each employee.) The PP indicated a requirement for four bog site supervisors (3 in 1981; 4 in 1982; 3 in 1984), and two mechanics (1 for four years and 1 for three years). On the other hand, the GRB-Bord na Mona contract specifies that Bord na Mona will provide one water/drainage engineer for two years; four bog-site supervisors/foremen; two mechanics; one industrial engineer for one year; and, six months of consultant services. To date, the two BNM fitters have arrived (both on March 24, 1982) and have supervised the 1982 peat harvesting season (May/September). One BNM bog supervisor entered on duty September 30, 1981; he resigned, however, on June 28, 1982.

To relieve the Project Manager of time-consuming responsibilities for personnel backstopping and logistic support, AAO/B approved the recruitment of a full-time administrative advisor for the contract team, including the Bord na Mona members. The advisor entered on duty March 27, 1982 under the terms of a one-year personal services contract.

One of the tasks of the evaluation team has been to re-examine the requirements for both long- and short-term technical services in the light of recruitment delays, actual peat production experience, proposed development of the Nyamuswaga bog and ONATOUR's own headquarters and bog-site management capabilities. Recommended requirements are summarized below.

Skill	Proposed in PP	Recommended 11/82	Source AID		BNM
Marketing Advisor	1	1 (on-board)	X		
Financial Advisor	1	1 (on-board)	X		
Administrative Advisor	-	1 (on-board)	X		
General Engineer	1	-	X	or	X
Project (Civil) Engineer	-	1			X
Bog-Site Supervisors	4	-			X
Fitters	2	2 (on-board)			X
Water/drainage Engineer	-	1			X
Surveyors for Nyamuswaga Bog Development	-	3			X

A BNM civil engineer will be required for two years to supervise and plan peat production at the three on-going sites and "test" production at the Nyamuswaga and Kitanga A and B bogs. ONATOUR will also assume production responsibility at the Buyongwe bog in 1984. A BNM water/drainage engineer will also be required to supervise the survey, survey analysis and hydraulic engineering in advance of production at the Nyamuswaga bog. Three BNM surveyors for one year each will actually conduct the survey of the Nyamuswaga bog with support from ONATOUR and the Ministry of Agriculture/Rural Engineering.

An evaluation of the incumbent marketing advisor's proposed marketin strategy is presented in Section VI, Peat Marketing Program, below. It is th considered judgment of the non-ONATOUR members of the evaluation team that inadequate progress has been made in the last two years in stimulating an urban domestic demand for peat. A more aggressive marketing strategy must be designed and implemented without further delay if the project is to realize a impact within the next three years. Given budgetary constraints, it is appropriate to recruit a replacement for the incumbent who has practical, field experience in consumer marketing with a firm or organization in developing countries. It must be noted, however, that the ONATOUR Director does not accept this recommendation, expressing instead his satisfaction with the incumbent marketing advisor's performance to date and confidence in his capability to undertake an effective marketing strategy over the next two years.

Establishment of a more rigorous financial management system is an absolute prerequisite for ONATOUR's long-term viability, especially if the organization evolves into a private enterprise. Evaluation recommendations t guide ONATOUR and the financial advisor in strengthening ONATOUR's financial management are presented and discussed below in Section V., Financial Analysis. Although the advisor has recommended improvements in ONATOUR's accounting system, few if any have been implemented. This may be attributed to limited access to senior ONATOUR management and/or to a lack of support from the Project Manager. An audit of ONATOUR's 1979-81 accounts, performed by Coopers and Lybrand (Kinshasa) in October 1982, highlights ONATOUR's lack of financial management during those years. An audit of the 1982 accounts, t be performed within 90 days after the close of the financial year (December 31, 1982), should indicate a marked improvement as a measure of the financial advisor's on-the-job effectiveness.

In handling personnel-related matters and logistic support for all contract team members, the incumbent administrative advisor is efficient and effective. It was observed by the evaluation team, however, that the advisor has also been charged by AAO/B with drafting (if not also finalizing) AID documentation to support the project. This documentation includes implementation cables, PIO/Ts, PIO/Cs, PIO/Ps, Project Implementation Letters etc. Preparation of AID documentation is more appropriately the responsibility of the AAO/B staff. With work-time saved, the administrative advisor could more substantively support ONATOUR's expanding, internal administrative workload. One possibility would be to assist ONATOUR in preparing for the Nyamuswaga bog development. Assistance would be useful in providing coordinative, administrative and logistic support to both the "test" exploitation and arrangements for the pre-production survey, survey analysis, hydraulic engineering and construction.

(b) Participant Training

The project was designed with an emphasis on on-the-job training for the majority of ONATOUR's counterpart staff. To supplement this, however, the project budget including up to 24 months of short-term U.S. and third country training in technical fields related to peat production and in administration and finance. These training requirements remain valid and are generally reflected in ONATOUR's 1983 Training Plan. To date, the ONATOUR Director and Chief of the Technical Service have visited Bord na Mona, and the Chief of the Marketing Service will complete a one-year USDA course in agribusiness management in January 1983. The 1983 training proposal to conduct an in-country mechanics training program in collaboration with the Technical and Vocational School (Ecole Technique Scientifique) in Bujumbura is particularly appropriate. The course would be conducted during the off-season (November-April) by the BNM fitters at the Kisozi bog. Following the 1983 harvesting season, ONATOUR mechanics would then be better prepared to attend a three-month training module within the Bord na Mona mechanic apprenticeship program. An orientation tour for the ONATOUR Director to visit and establish contacts with the peat industry in the U.S. is also valid. It should be possible for other donors, however, to finance similar orientation tours for the Director in Europe (Finland, Germany, etc.).

(c) Construction at ONATOUR Headquarters

Construction requirements proposed in the PP were limited to a new headquarters office building. This building was designed and then redesigned and resited from the present office-warehouse in the industrial area to a new location in central Bujumbura. The PP cost estimate of $175,349 plus a 15% annual inflation rate was too low, anticipating a more modest facility than the one finally approved. In November 1982, the contract was awarded for $480,176, which reflects a minimum daily wage increase from FBu 80 to FBu 140 in Bujumbura and a 13% tax rate payable by the GRB. The AID contribution to the cost of construction will therefore be $417,753. A recommended change in the present layout is the substitution of the laboratory to test peat samples for a storeroom. The storeroom can be relocated in the old offices at the ONATOUR yard.

At the ONATOUR headquarters yard (the office-warehouse in the industrial area), up to 1,500 tons of peat can be stored under an open-sided concrete-floored hangar. The peat is trucked from the bog sites, unloaded, stacked and stored in the hangar pending reloading and delivery to the client-consumer. With a loss of space/capacity to accommodate a truck, the hangar normally stores about 1,000 tons of peat. Open ground space is also used to store up to 300 tons of peat under plastic sheeting. During the rainy seasons, the yard area becomes so muddy that logistics are seriously hampered.

The following recommendations should improve general operational efficiency at the yard:

(1) erection of an additional hangar with a storage capacity of 300 tons;
(2) after draining, placement of a concrete foundation on either the total yard area or, minimally, on the open, uncovered area;
(3) procurement of a manual or mechanical conveyor belt loader;
(4) installation of a truck weighing scale (25T capacity) to replace the two 100K bag scales presently in use; and
(5) construction of a mechanical workshop with an inspection pit and greasing facilities to service ONATOUR's vehicle fleet.

(d) Other Costs

Project funding requirements have more than doubled since the PP design, increasing from $453,000* to a revised total of $1,080,000. In the PP, other costs included rental housing for the contract team, rental of temporary office quarters for ONATOUR during construction of the new building and vehicle POL costs (for the peat macerating machinery through December 31, 1982 and for the 9 project-financed pick-ups through the life of the project). The revised project budget includes these three cost items plus $45,000 to construct and equip bog-site machinery workshops; $250,000 for vehicle maintenance and support; and $165,000 for administrative support. The PP estimate for POL costs has increased from $101,000 to $262,000. The evaluation team has not second-guessed the legitimacy of these cost items. ONATOUR should note, though, that the cost of operating the peat machinery and the vehicle fleet averages about $100,000 per year and will become a major component of ONATOUR's administrative overhead budget after September 1985. This would argue for streamlining ONATOUR's vehicle (trucks, pick-ups and sedans) fleet.

2. GRB Contribution

The revised Amplified Project Description does not include a recalculation of the GRB contribution to the project, which is most importantly an equity contribution to recapitalize ONATOUR's operating shortfall for 1980-84. The PP table for ONATOUR's "Projected Profit and Loss Statement" (PP, Annex E, Exhibit 1) indicates a cumulative net loss by 1984 of $1,011,000. A recalculation, now based on actual operating deficit figures for 1980 ($28,000) and 1981 ($336,460) and estimated for 1982-84, indicates an estimated, rounded cumulative net loss by 1984 of $520,000. See Table 1, Section V., Financial Analysis, below. ONATOUR's improved profit loss position can be attributed primarily to the substantial increase in the wholesale price of peat: from FBu 2,490 per ton in 1980 to FBu 9,000 per ton

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*The PP Financial Plan includes $352,000 for "rental/other." This figure does not include, however, $101,000 budgeted for POL. In the description of project inputs (PP, p. 21), the total for "Other Costs" is $453,000.

as of January 1, 1982. The other PP component of the GRB contribution was the cost of purchasing land for the new ONATOUR office building, estimated at $78,000.

Following two years of project implementation, the GRB-ONATOUR have agreed to provide additional in-kind contributions: access to radio broadcasting to promote the use of peat and moving costs to the new building. The GRB's investment budget for ONATOUR, $67,000 in 1980 and $171,367 in 1981, is also an important component.

On balance, it appears that the GRB's decreased contribution to ONATOUR's operating shortfall is offset by an increase in its investment in ONATOUR and in-kind support. AAO/B is probably accurate in judging the total GRB contribution to remain at least $1,089,000 as originally estimated in the PP. Whether or not the estimate is accurate is of secondary importance to the fact that the GRB has demonstrated its commitment to ONATOUR's present and future financial and administrative viability.

3. Government of Ireland (GRI) Contribution

The GRI contribution to the project includes the base salaries of the BNM technicians plus technical and administrative backstopping. In addition, the GRI has offered scholarships to regional technical colleges in Ireland. Three Burundians are presently in training, and three more will begin their studies in 1983. It is expected that the participants will join the ONATOUR staff upon their return. A verbal pledge of supplemental support estimated at $1.2 million (included in the PP's Summary Financial Plan) remains to be defined.

B. ONATOUR Staffing

The evaluation team is very favorably impressed with the caliber of ONATOUR's upper- and mid-level management staff. The PP discusses ONATOUR's recruitment of 8 service and branch chiefs. To date, 10 have been recruited and now supervise subordinate staff in the Administrative Service, Technical Service, Commercial Service, Financial Service, Production Branch, Prospection and Laboratories Branch, Sales Branch, Accounts Branch and Payments Branch. Upper-level management includes the Director, Deputy Director of Production and Marketing and Deputy Director of Administration and Finance, all of whom appear well qualified to direct the organization. As of November 1982, only the Research Office (Bureau d'Etudes) is non-operational.

ONATOUR presently has 57 permanent staff members including three bog managers, three deputy bog managers and four mechanics (3 at the bog sites and 1 at the ONATOUR headquarters yard). Policy direction is provided by the Administrative Council whose 10 members are drawn from the GRB and the private sector. The Council generally meets every three months. Operational direction is provided by the ONATOUR Management Committee composed of the

Director, the two Deputy Directors and the Project Manager. This Committee meets on the first and third Monday of each month in principle; in practice, it meets irregularly, supposedly because this core management staff is in daily contact.

The 1981 evaluation report highlighted a continuing problem: the centralization of decison-making at the Director and Deputy Director levels. As ONATOUR's mid-level management gains operational experience, it becomes increasingly important to initiate the process of delegating authority. Primary responsibility for encouraging this management concept rests with the Project Manager, particularly given his participation on the Management Committee. His efforts should also be supported by AAO/B.

ONATOUR's employment practices appear commendable. Upper-level management appointments are made by the Minister of Public Works, Energy and Mines. Mid-level and subordinate/non-professional staff are employed on the basis of training and previous working experience. A merit promotion system has also been established. A performance report for each employee is completed by his/her supervisor at the end of the calendar year. With a favorable evaluation, an employee may receive a pay increase from 1-5% of the base salary. In addition, ONATOUR offers periodic step increases on the basis of seniority in the organization. ONATOUR is also prepared to offer an incentive/bonus scheme to retain and attract capable employees. The scheme will not be implemented, however, until ONATOUR realizes a profit on its operations, which is now predicted for as early as 1983 or 1984.

ONATOUR, Ministry officials and AAO/B have jointly recognized the need to define more clearly the advisory and/or operational roles and responsibilities within the ONATOUR bureaucracy. The revised Amplified Project Description states that project-funded headquarters and field technicians "function primarily as advisors and trainers of Burundi counterparts," although they may also perform specific, short-term operational tasks at the request of the Director. It is also agreed that subsequent PILs will present position descriptions for each advisor and technician. According to AAO/B, these revised position descriptions have been drafted. It is the recommendation of the evaluation team, however, that each position description be again reexamined and revised as necessary to reflect accurately the job being done by each team member. It is hoped that this exercise will vent the frustrations of those team members who now believe that their effectiveness is less than maximum and that their work is not professionally satisfying. It should be noted that this recommendation in no way implies a lack of easy and friendly working relationships between the team members and the ONATOUR staff. It reflects, rather, the uncertainty which any new employee feels in joining a young and expanding bureaucracy.

The evaluation team also recommends that periodic project management meetings be initiated immediately. Different management groupings should include: ONATOUR and the contract team; AAO/B and the contract team; the

contract team members among themselves; and ONATOUR, AAO/B and the contract team members. This should significantly improve morale, particularly among the contract team members, and strengthen relationships between ONATOUR, the contract team members and AAO/B for joint problem-solving, implementation planning and contructive group criticism. An example of the present uncertainty about lines of communication was cited by the Deputy Director for Production and Marketing. Now technical questions concerning peat production are referred directly by the BMI technicians to the Project Manager. The Project Manager then assumes responsibility for answering the question or solving the technical problem, without recourse to the Deputy Director, who only learns of the situation in question "after the fact." Obviously the Deputy Director is responsible for production decision-making, and technical questions should be referred either directly to him or simultaneously to him and the Project Manager.

C. ONATOUR's Relationships with GRB Offices/Agencies and Other Donors

ONATOUR seems to enjoy a strong working relationship with the Ministry of Public Works, Energy and Mines. The Director reports to the Minister through the Director-General of Geology and Mines. Both officials follow ONATOUR's operations with great interest, and this is evidenced in concrete terms by the GRB's annual operating and investment subventions.

ONATOUR is a member of the Commission for Agricultural Bog Development (Commission des Marais). Other members include the Ministry of Agriculture's directors for Rural Engineering (Genie Rurale), Agricultural Planning, Agronomy, ISABU (the agricultural research service) and the up-country Regional Development Office. The Commission's mandate is an important one: to determine for what purposes and under what conditions Burundi's rich river valleys and peat bogs will be used. In specific terms, the Commission determines whether or not a peat bog should be exploited for peat and/or should be used for agricultural production. The Commission must approve any large-scale peat exploitation in the Nyamuswaga bog region, and a favorable decision will be crucial for ONATOUR's long-term viability. This is discussed in greater detail in Section VII, Technical Aspects, below. The Commission meets on an ad hoc basis. ONATOUR's future will depend in large part on establishing a constructive working relationship with the other members of the Commission.

It is also in ONATOUR's self-interest to maintain close contacts with the other GRB parastatals, particularly those managing the coffee (OCIBU), tea (OTB), cotton (COTIBU) and transport (OTRABU) industries. OTB has converted two of its three tea factories to peat fuel, and COTIBU is also interested in converting to peat. ONATOUR has periodically contracted with OTRABU to truck peat from the bog sites to Bujumbura. Coordination is also essential to the extent that donors are supporting the parastatals. For example, FED assistance to strengthen Burundi's tea industry resulted in complementary assistance to develop the Kizozi bog, substituting peat for wood as factory

fuel. In addition to FED, the World Bank, UNIDO, Finland and Ireland are either directly involved in peat production (Finland and Ireland), are interested in using peat fuel (UNIDO) or interested in the environmental impact of peat production in the bog regions (World Bank). Other donors and potential Burundian commercial and institutional clients would no doubt also profit from contact with ONATOUR. To promote greater coordination and communication, it is suggested that ONATOUR sponsor a biannual roundtable conference to present and discuss its own and other agencies' and donors' current and proposed activities and research programs on peat and other alternative energy fuels. To be successful, the conference should be tightly structured and based on a presentation of ONATOUR's own workplan for the current and coming years.

D. Progress toward Project Outputs

The project is designed to have two outputs which relate directly to ONATOUR's institutional development: (1) trained ONATOUR staff and (2) improved ONATOUR management capability. As discussed above, a full complement of staff appointments has been made, and each contract team member is working on a day-to-day basis with at least one counterpart. On-the-job training in peat production engineering, peat analysis in the laboratory and surveying, however, cannot begin until the Bord Na Mona engineers and surveyors are in place. Assuming their recruitment by late January and arrival by April-May 1983, the balance of technical training can be provided before the end of the project in September 1985.

ONATOUR's management capability is being strengthened by the support of the contract team and short-term consultants. It is commendable that ONATOUR has preferred to use the contract team members in an advisory rather than operational capacity. If it can strengthen financial management and marketing, ONATOUR's future is promising indeed. ONATOUR's management capability will really be tested if the organization evolves from a GRB parastatal to a private enterprise. The Director has stated that discussing the implications of this evolution may be premature until ONATOUR realizes a profit on operations. The subject is complex, however, necessitating major decisions among various options, and discussions to clarify the issues should be started as quickly as possible. Even if ONATOUR does not realize a profit on operations in 1983 (as now estimated), the GRB-ONATOUR should proceed to study the options and technicalities of establishing a corporate structure. AAO/B has requested the short-term services of a private enterprise specialist who should be available on a periodic basis to assist ONATOUR in making the transition.

V. FINANCIAL ANALYSIS

A. Summary

A review of ONATOUR and project financial records and operations indicates that ONATOUR can show a profit on operations in 1983 and achieve a net profit, after reserving for depreciation, in both 1984 and 1985. A summary of the analysis on which this conclusion is based is contained in Table 1: Potential Profit and Loss Account, 1981-1985. Profits will be possible, despite delays in project start-up and the impossibility of achieving the production targets established in the PP, due to the steep price increase which ONATOUR has implemented. The 1982 bog price is 30% higher than the 1990 price projected in the PP. This policy carries the risk, however, that market development may be hindered by excessive prices. Pricing policy is crucial to ONATOUR's future as a viable commercial entity and is considered in detail in Section VI. below. This potentially healthy financial state is also dependent upon a number of factors which will have to be carefully managed by ONATOUR, most importantly the financial management of costs and accounts receivable, which would be facilitated by establishment of an efficient cost accounting system.

B. Improvements in Financial Management

1. Unit Cost Analyses - Production, Transporation and Administration

ONATOUR is undertaking a unit cost analysis of production and is collecting information on peat transport costs. The unit cost exercise is highly useful for management decision-making on the most cost-effective equipment purchases and for providing a clearer picture of expected production costs for budgeting/pricing decisions. It is also a tool to identify areas of potential cost savings.

(a) Production Cost Analysis

To date, the exercise indicates that ONATOUR is achieving a production cost per ton, before amortization of equipment, of FBu 290 on the SAM and FBu 264 on the Difco (which operates the most effectively). After amortization, the production cost per ton is FBu 450 on the SAM and FBu 513 on the Difco. It is noted that this latter figure differs from the figure in the financial advisor's memo of November 16, 1982. This is because the Difcos should be amortized over four production seasons and the SAMs over seven production seasons. The preliminary ONATOUR amortization schedule assumed that Difcos could be used for 48 months and SAMs for 84 months, hence 12 production seasons for Difcos and 21 production seasons for the SAMs. The tractors used with the Difcos will last for seven years, and it is fair to amortize them only for the months which they are working on production. This was done for the figures above. However, if the tractors are not used for other tasks in the off-season, their total amortization costs will be a

TABLE 1

POTENTIAL PROFIT AND LOSS ACCOUNT - ONATOUR - 1981 - 1985 (FBu 000)

(Assuming Nyamuswaga and/or Katanga Brought Into Production In 1984)

	1981 (Actual)	1982 (Estimated)	1983 (Projected)	1984 (Projected)	1985 (Projected)
Production - MT	6,460	10,570	15,000	21,000	30,000
Revenue Sales 1/					
on Bog 2/	-	-	12,500	23,375	25,800
Institutional/Industrial - Bujumbura 3/	35,890	53,100	60,750	83,125	105,500
Domestic/Artisanal 4/	870	900	7,750	39,050	65,975
Production Costs	(13,200)	(8,375)	(14,230)	(21,900)	(34,400)
Transportation Costs	(19,375)	(17,350)	(24,900)	(58,550)	(88,620)
Gross Margin	4,185	28,275	41,870	65,100	74,255
Administrative Costs	(30,175)	(33,825)	(35,000)	(37,600)	(39,900)
Net Profit (Loss) from Operations	(25,990)	(5,550)	6,870	27,500	34,355
Less Depreciation	(4,320)	(9,425)	(15,750)	(17,350)	(22,290)
Net Profit (Loss)	(30,310)	(14,975)	(8,880)	10,150	12,065
Cumulative Net Profit (Loss)	(30,130)	(45,285)	(54,165)	(44,015)	(31,950)

1/ For volume of sales see Table 2.
2/ Based on sales price to tea factory of FBu 5/kilo 1983; FBu 5.5/kilo 1984 and FBu 6/kilo 1985.
3/ Based on sales price of FBu 9/kilo in 1982/83; FBu 9.5/kilo 1984 and Fbu 10/kilo 1985.
4/ Based on sales price of FBu 5/kilo in 1983; FBu 5.5/kilo 1984 and FBu 6.5/kilo 1985.

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TABLE 2

Estimated Sales 1983 - 1985

By Category of Consumer

(MT)

	1983	1984	1985
On Bogs			
Industrial	2,300	4,000	4,000
Missions, etc.	200	250	300
Sub-Total	2,500	4,250	4,300
Bujumbura			
Institutional	6,600	6,600	6,600
Industrial	150	2,150	3,950
Domestic	1,500	7,000	10,000
Artisanal	50	100	150
Sub-Total	8,300	15,850	20,700
TOTAL	10,800	20,100	25,000

TABLE 3

Estimated Sales/Production Balance 1983-1985

	1983	1984	1985
B.F. stock January	6,930	9,630	8,430
Production	15,000	21,000	30,000
Wastage (ten percent)	(1,500)	(2,100)	(3,000)
Total Stock	20,430	28,530	35,430
Sales	10,800	20,100	25,000
C.F. Stock December	9,630	8,430	10,430

production charge, thus further increasing the production costs of using the Difco to FBu 617 per ton. This factor should receive the attention of ONATOUR management, and consideration should be given to using the tractors for other tasks in the non-production season, such as transporting peat to the tea factories.

The above unit cost figures indicate that peat production with the SAMs is the most economical. The SAM operating costs are primarily labor, whereas the Difco operating costs are more heavily weighted to fuel. It is, however, the consensus of technical opinion that the Difco is a better machine for the GRB-ONATOUR program because of the environmental factors (no need for deep drainage, etc.), flexibility in usage and speed of production. With a higher rate of production, labor concentrates on handling peat rather than on the arduous task of producing peat with the SAMs. However, both types of equipment will continue to be used, and their performance will be evaluated on a continuing basis. Although it may not result in selection of the cheapest method of production, the production cost analysis is providing useful information for decision-making and for future budgeting purposes.

(b) Transportation Cost Analysis

ONATOUR is presently collecting data on transportation costs for an analysis of this aspect of operations. This is extremely important because transportation is a growing component of the total costs of peat production and will have to be carefully monitored. Figures are available on the ton/kilometer charge of private transporters, who have been moving approximately 90% of the peat from the bogs to Bujumbura. Preliminary figures are also available from ONATOUR for the limited amounts of peat currently transported by its own trucks. Preliminary analysis indicates that ONATOUR's ton/kilometer operating costs have been essentially equal to the charges by private transporters. However, the cost to ONATOUR of using its own transport is actually higher when vehicle depreciation is considered. ONATOUR's management, however, argues that the private transporters' charges of only FBu 11 per ton/kilometer will not continue and that a charge closer to the official rate of FBu 22 per ton/kilometer is likely to be reinstituted in 1983. ONATOUR also contends that its own capacity to transport peat is required to meet client demand during periods when private transport is difficult and costly to procure, e.g., during the coffee season.

ONATOUR will have three project-financed 10T Mercedes trucks for most of 1983. One was used by ONATOUR in 1982; the other two will be purchased early in 1983. In addition, ONATOUR has one 7T truck, purchased under the Peat 1 project in 1979, which will be fully rehabilitated in December 1982. These trucks will provide ONATOUR with the capacity to move 80% (conservatively) of the peat which is expected to be sold in Bujumbura in 1983. Accordingly, the 1982 situation, when private transporters moved most of the peat, will be reversed in 1983.

It is recommended that procurement of additional large transport vehicles be delayed until the 1983 experience is evaluated. In late 1983, a transport economist should compare the experience with ONATOUR's own transport versus that with private transporters. The overall transportation situation in Burundi should also be assessed to determine likely trends in private transport charges. On the basis of the economist's analysis, ONATOUR and AAO/B should then decide whether or not any more trucks should be purchased under the project either to replace vehicles or to expand transport capacity.

(c) Administration Costs and Efficiency

An analysis of the cost components of overhead should also be undertaken to determine what efficiencies can be achieved. As production increases, administrative overhead becomes less important in terms of cost per ton produced. However, this favorable situation could be affected if handling costs also increase with production. There now appears to be considerable excess labor capacity, and it should be possible for the same workforce to handle a much larger volume of peat if efficiencies are identified, i.e., if there is a reduction in the number of times peat is bagged and moved. This should also reduce peat wastage.

The efficiency of the system of controlling and storing the peat inventory should also be improved. Peat is now stored on the bogs, largely in straw-covered ricks, and is transported to Bujumbura as required. This method of storage may be leading to deteriorations and loss of production through water damage. Consideration should be given to (1) the most cost-efficient division of storage between the bog sites and ONATOUR headquarters in terms of efficient product movement and delivery to markets and (2) the cost of improvided storage versus the cost of product loss in peat ricks.

Inventory control is extremely difficult because there is no means of weighing the product as it leaves the bogs. A truckload is weighed after it arrives in Bujumbura, and this weight is used to adjust bog inventories. However, this is not an adequate control system since losses may incur enroute. Also, the truck scales do not belong to ONATOUR, and there are frequent delays in the weighing. If trucks are loaded in the ONATOUR headquarters yard, small scales are used, which is time-consuming and leads to additional product handling. For a more efficient inventory control system, it is recommended that truck weighing scales be provided at the three bog sites and at the ONATOUR headquarters yard.

(d) General Recommendation

It is recommended that the contract financial advisor continue to work with ONATOUR staff to carry out the costing analyses discussed above. ONATOUR's financial staff, as well as the production and marketing service staff, should continue to be involved because it is important that individuals in operational roles are aware of the cost implications of management

decisions. All analyses could be undertaken more efficiently with a cost accounting bookkeeping system at ONATOUR.

2. Establishment of an Improved Accounting System

The PP financial analysis indicated that ONATOUR must establish a cost accounting system to meet the needs of a peat-harvesting/mining enterprise. However, to date, this action has not been taken. ONATOUR does not have a double-entry bookkeeping system. Purchase ledgers and cash books are essentially diaries and inventories. Expenditure records provide no means of analyzing production costs, transportation costs, etc. As a result, the unit cost exercises discussed above require considerable research and time to identify expenditures, and no accounting information is readily available for management decision-making. This information could be provided without difficulty with a cost accounting system.

ONATOUR's accounting requirements are somewhat specialized because of the production/marketing characteristics of peat. Bord na Mona has considerable experience with these accounting problems and has established a simple, effective system. BNM's experience, particularly dating from its establishment in 1946, would be helpful in establishing an improved accounting system for ONATOUR. It is therefore recommended that a BNM consultant in accounting systems work with the financial advisor and ONATOUR financial staff to establish a cost accounting system. The consultancy should be scheduled in early 1983 so the specialist may also assist in orienting ONATOUR finance personnel prior to their undertaking third country training programs, at Bord na Mona or elsewhere, which are under consideration for 1983. The consultant should also work with ONATOUR in identifying financial/accounting training needs and most relevant programs. In this regard, it would be useful to discuss and plan a tailored training program at BNM for the ONATOUR Deputy Director of Administration and Finance.

C. Issues Relating to ONATOUR's Financial Viability and Achievement of a Project Internal Rate of Return

1. Development of Nyamuswaga and/or Kitanga Bogs

ONATOUR's management structure and overhead have been based on anticipated production of 40,375 tons of peat and sales of 47,500 tons of peat with 15% organic additives (coffee hulls, etc.) by 1986. It is the technical consensus that the three highland bogs currently being exploited (Ijenda, Kisozi and Mitano) cannot produce much more than a total of 15,000 tons per annum. Although more tonnage could theoretically be produced, it would be difficult to move the peat from the bogs before the rainy season(s). Also, a higher production level would lead to earlier exhaustion of peat from these bogs. If production from other sources is not increased by 1984, sales in that year would not exceed 15,000 tons and would then decrease by 1986 to 13,500 tons (production minus wastage). Although ONATOUR could still become

commercially viable by servicing clients who can afford to pay a higher price for peat, the project's IRR would be greatly reduced when factoring in both the AID and GRB investment costs. In terms of benefits, the number of consumers would also be greatly reduced, and the project would make only a minor contribution to preserving Burundi's forests.

Accordingly, it is crucial that ONATOUR exploit other peat resources. Preliminary testing of production on the Nyamuswaga bog should begin in 1983, and supplemental technical expertise should be provided as necessary to assist ONATOUR in preparing a "test" workplan which is environmentally sound and which considers the interests of the agriculturalists who will ultimately farm the bog lands. This assistance should lay the groundwork for the Commission des Marais' approval of large-scale peat production at Nyamuswaga. In addition, it is recommended that test production also be undertaken on the Kitanga A and B bogs in 1983. Although development of these bogs has been deferred because there is indication of the peat's high ash content, different results are possible in the context of actual production. Experimental production and further sample analyses should proceed. If the quality of the peat is acceptable, harvesting of these bogs would be cost-effective because of their proximity to the Ijenda, Kiwozi and Matana bogs. Bog management would be much easier than for the northern bog(s).

2. Carbonization of Peat

Recognizing that converting peat to charcoal at the bog sites would save on transportation costs and that charcoal would be readily acceptable to the domestic market, peat carbonization experiments have been undertaken. The results are contradictory. A test kiln in Bujumbura produced very poor results and indicated that carbonization leads to too great a loss of energy to be efficient. However, experimentation with a continuous process kiln in Kenya produced very favorable results. The subject should be studied further, particularly in the context of production on the northern bogs. Transportation of raw peat to urban markets would probably cost more than the conversion process. The cost of transportation is also an energy cost and should be considered in evaluating the energy loss in peat carbonization. Assuming, however, that peat charcoal will be more expensive to buy than raw peat, the lower-income domestic consumer will continue to be dependent on the successful design of a peat-burning stove. See Section VI. below.

VI. PEAT MARKETING PROGRAM

A. Background

Development of a consistent market for peat is critical to ONATOUR's financial viability. When the project was designed in 1980, the GRB army was

the principal market for ONATOUR's production. It was recognized that this source of income was necessary to ONATOUR in its formative stage. However, the army cannot absorb expanded production, and it is also undesirable from an economic and social perspective that it remain the principal consumer.

Analyses prepared by the PP design team indicated that primary attention should be focused on the urban domestic market. This category of consumer uses wood energy in its most wasteful form, i.e., charcoal, for cooking. In addition, these consumers need a cheaper source of energy since price increases for charcoal are placing a severe financial strain on many families, especially the poor. The artisanal sector was also identified as a peat consumer for small-scale production of products such as bricks, roofing tiles, lime and cement. Potential institutional and industrial consumers were accorded less priority because they primarily use fuel in the form of wood. This is a much more efficient usage of wood energy than the usage pattern in the urban domestic market.

Significant resources have been provided in the project budget to assist in the market development effort. Most important are the services of a marketing specialist for four years, supplemented by short-term services in consumer marketing, sociology and stove design. Funds ($100,000) were also provided for the production of 1,000 demonstration stoves, at an estimated cost of $20 each, and for demonstration/publicity campaigns.

B. Current Status of ONATOUR's Sales and Marketing Campaign

1. Sales

There has been little change in the composition of ONATOUR's sales since 1980. Sales to domestic and artisanal customers represented only 2% of ONATOUR's total sales in 1982 (January-October); institutions purchased 3%; and the army purchased the remaining 95%. This pattern will shift as the tea factories at Tora and Ijenda, having installed boilers especially designed to use peat, are projected to purchase 2,300 tons of peat in 1983. The Ijenda tea factory, however, is still under construction, and the Tora tea factory has just begun test firings. If the construction schedule slips, actual 1983 sales will be lower. On the other hand, if the tea factories go into operation on schedule, and if sales to up-country army camps increase as projected, ONATOUR's sales to these clients in 1983 are estimated at 8,820 tons, with approximately 75% for the army and 25% for the tea factories. Since the FED was originally involved in peat production at Kisozi as a means of obtaining fuel for the two tea factories it was rehabilitating, this shift represents a very little new market development.

2. ONATOUR's Market Information and Planning

ONATOUR has not yet collected systematic information on the potential customers for peat. "The Market for Peat in Burundi" (issued in October 1982)

provides little precise data on the potential size of various markets for peat. A summary of information on the various types of consumers follows.

(a) Urban Domestic Consumers

The report reviews the urban domestic market and concludes that potential will be limited by the availability of a suitable stove. It is suggested that 65 stoves (imbabura) (currently designed but requiring further modification) be produced by project-trained stovesmiths. Potential market demand is based on the amount of peat which would be burned in these stoves. Given other limiting factors (not specified), the probable market for peat is then reduced to 10% of this potential market. No consideration is given to possible differences in usage patterns to be expected of consumers with varying income levels, etc.

The report contains a comparative analysis of cooking costs with charcoal and peat, which indicates substantial savings with peat fuel. However, calculations are based on the retail price of charcoal (there is a 100% mark-up between wholesale and retail prices) and the wholesale price of peat which ONATOUR sells by the bag. If the wholesale price of charcoal (FBu 23/kilo) is compared with the wholesale price of a kilo of peat, the cost of an average daily consumption of charcoal (1.4 kilos) is FBu 32 as compared to FBu 28 for peat (3.0 kilos). The close correspondence indicates that pricing policy must be examined carefully to insure that peat is priced at a level which will permit market penetration through an economically rational retail structure.

The report suggests the following domestic marketing approach:

--Further modification of the peat imbabura, based upon technical inputs from a stove designer and a sociologist who would collect information on stove performance in the household;

--Training of stovesmiths;

--Continuation of the test marketing program. For the past several months ONATOUR has been manufacturing and offering the peat imbaburas free to customers who purchase a bag of peat. This offer has been publicized through newspaper articles, demonstrations in the market, etc. Following the initial peat purchase, ONATOUR delivers subsequent bags of peat to the door on demand. It is suggested that this promotional program continue indefinitely until market awareness is sufficient for sales to be self-sustaining.

--Promotion through newspaper articles, market demonstrations, radio programs, etc. will be continued. In addition, information on peat and the imbaburas will be circulated to GRB ministries and departments.

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--Marketing. It is proposed that ONATOUR sell peat by the sack or by the kilo, but only to present customers, in small market depots. This seeks to avoid the possibility that individuals who do not have a peat imbabura will attempt to burn it in a charcoal imbabura and be dissatisfied with the results.

Although the marketing approach outlined above has certain useful features, it is unlikely to achieve results commensurate with the required costs and resources. For example, by October 1982 ONATOUR had distributed 188 stoves, of which 102 were distributed in July-September. Considering only these 102 customers (assuming that the balance of 86 are too recent to have a purchase record), it is noted that 56-57% bought peat only when they received the imbabura, and 27-28% have bought peat only twice. The campaign is, therefore, having very little impact in developing sustained usage, and ONATOUR does not have the personnel to provide the extensive retail marketing coverage required to follow up in this area. The only systematic data collection on customers is the number of times they purchase peat. This situation should be corrected as the basis for an improved marketing campaign. A suggested approach is discussed in Section C. below.

(b) Institutional Consumers

The potential market for peat from institutions has not been systematically surveyed. Although 112 church missions, 12 prisons, 57 secondary and technical schools, and 14 hospitals represent a potential market, little data on their fuel usage has been collected to date. Survey data on institutions in Bujumbura, Gitega and Bururi is not specific, i.e., on the numbers and types of stoves or other appliances, fuel consumption, source and cost of fuel, etc. Again, systematic data collection must be the basis for market plans/campaigns, and little progress has been made to date.

(c) Artisanal Consumers

Artisanal demand is discussed in ONATOUR's report only in relation to bakeries, briquetteries and lime kilns, and information is largely anecdotal. With regard to bakeries, it is claimed that little can be done until a stove engineer can design modifications to existing ovens. However, to maximize his services, information on the number of bakers, types of ovens, fuel consumption, fuel costs and those bakers seriously interested in oven conversions should be prepared. Little information on briquetteries is available, although ONATOUR now has several customers. It is indicated that these clients will go out of business when the new Briquetterie Industrielle opens in 1983, and that this factory represents the likely market for peat. It is assumed that up-country brick-makers will continue to use wood. However, if the experience of artisanal brick-makers in Bujumbura has been positive, information on how they are employing peat should be disseminated up-country to brick- and tile-makers, particularly in the Ngozi region, near

Nyamuswaga, which is a major production area for these products. Information on lime kilns and porcelain cement production indicates that peat can be used but is similar in cost to wood. No demand for peat from these artisanal entities is identified.

(d) Industrial Consumers

Information on this client group is more extensive, although only two tea factories, the Briquetterie Industrielle, COTEBU (the cotton textile mill) and the Laiterie Akirimata are identified as potential customers. Information is not provided either on the size of the industrial sector in Burundi or on other possible customers. Second only to the army, the Briquetterie Industrielle will probably be the most important single consumer of peat by 1985, accounting for an estimated 14% of ONATOUR's expected sales in 1984 and 24% in 1985. Accordingly, if there are delays in factory construction, changes in brick production capacity, etc., ONATOUR's industrial sales could fall below the estimated total of 6,150 tons in 1984 and 7,950 tons in 1985. Added to any slippage of demand by the tea factories, it is apparent that ONATOUR may have difficulty in insuring for itself even a severely restricted market for peat in 1984. Clearly, a serious effort must be made to redress the situation and to establish a data base for a coherent marketing strategy.

C. Recommendations for an Improved Marketing Program

The evaluation team identified four essential components for a sound marketing campaign:

(1) Specific information on the energy requirements and usage patterns of the different categories of consumers. Each should be thoroughly surveyed and data filed and updated on a card index. Survey information and social studies of the domestic consumer market, supplemented by data from ONATOUR's experience, should be the analytical basis for estimating consumption patterns of different types of domestic consumers (e.g., by income level). This will enable ONATOUR both to set realistic targets for potential sales and to develop sales/publicity campaigns tailored to the needs of various customers.

(2) Solutions to the technical problems associated with peat usage. This component involves further modifications to the peat *lubebara*, and the technical input of a stove engineer will be required. In addition, the services of an engineer specializing in institutional stove modifications and boiler conversions should be provided. Both engineers should be contracted for short-term services.

(3) Development of a retail marketing structure for the urban domestic market. ONATOUR has neither the staff nor management capability to develop a retail marketing structure for peat, and it would not be economically rational for ONATOUR to develop one. To do so, ONATOUR would

have to enter into direct competition with the charcoal merchants, increasing their hostility to the new fuel and ensuring their efforts to emphasize its negative features. ONATOUR would also have to charge a sufficiently high price for peat to cover its marketing costs. Because the charcoal merchants have a 100% profit margin between their wholesale and retail prices, they have considerable flexibility for price reductions to undercut peat sales. Instead, ONATOUR should involve charcoal vendors in the quartiers, introducing a pricing structure which will (a) attract them into selling peat and (b) result in a final consumer price low enough for market penetration. In essence, ONATOUR has a double sales task: to develop a market among consumers and to convince retailers of the value of handling peat. ONATOUR must collect considerable data on the vendors and the economics of their operation to develop a correct approach.

(4) Involvement of opinion leaders, educators and extension personnel. ONATOUR should enlist the support of individuals and organizations to develop public awareness of the benefits and correct use of peat. As a first step, these leaders should be thoroughly briefed on the economic and social importance of substituting peat for charcoal to assist in preserving Burundi's forests and environment. Both public awareness of the need to conserve wood supplies and the identification of peat usage with progressive citizenship would assist ONATOUR's marketing and further assure achievement of the project's purposes and goal. ONATOUR should identify contacts and present group educational/promotional seminars. Involvement of extension in the foyers sociaux, for example, would greatly increase the effectiveness and outreach of ONATOUR's marketing development.

Given ONATOUR's present peat inventory and a production capacity in excess of market demand, it is urgent to initiate these components as soon as possible. It is therefore also recommended that a consumer marketing specialist be contracted for a period of two years to work with ONATOUR's Chief of the Marketing Service and his staff in designing and implementing a comprehensive marketing campaign. The campaign should focus, however, on developing an urban domestic market for peat. This advisor should be assisted by a short-term sociologist and portable/fixed stove engineers.

The following draft position description may be helpful to AAO/B and ONATOUR in recruiting the specialist.

Position: Consumer Marketing Advisor

Duty Station: Bujumbura, Burundi

Duration: Minimum 2 years.

Qualifications: Preference will be given to candidates with university degrees in economics, finance, marketing or related subject areas. Candidates without degree-level professional

qualifications may be considered if they have proven experience in managerial positions with marketing firms or similar organizations.

Experience: Practical, field experience with firms or organizations in developing countries is the single most important criterion to be considered in selecting candidates. A minimum of five years of such experience is highly desirable. Prior managerial experience is equally desirable.

Language: Conversational and written competence in French is essential. Ability to communicate in local languages or dialects, e.g., Kiswahili or Kirundu, would be a valuable asset.

Duties: The specialist will be responsible to the AAO/Burundi and will work as a senior-level advisor to both the ONATOUR Director and Deputy Director for Production and Marketing. He/she will work particularly closely with ONATOUR's marketing and promotional staff.

Duties will include:

--Assist ONATOUR in analyzing actual and potential markets for peat in Burundi as a basis for developing a strategy on appropriate marketing initiatives for each category and/or sub-category of consumer, i.e., urban domestic, commercial/artisanal, institutional and industrial. The strategy should include specific marketing targets, as well as a timetable for achieving them, and an organizational work plan detailing necessary resources to undertake marketing plans and activities. Special emphasis must be given to developing a strategy for the urban domestic market. In collaboration with ONATOUR staff, the expert will develop and update the analysis regularly for Ministry and AID review.

--Develop and implement promotional campaigns to introduce peat and peat stoves to urban domestic markets, including programs to demonstrate and test consumer reaction to peat and peat stoves. This should include a plan for utilizing project resources set aside for such activities (stove design, radio promotion, demonstration materials, social research, surveys, etc.) for Ministry and AID review.

--Train ONATOUR staff in the practical aspects of both production and marketing, including linkage of production levels with marketing targets, stock control, transport economics, market analysis, pricing analysis, unit cost analysis, development of marketing strategies, etc. The emphasis must be on on-the-job training in these skills so that, after two years, ONATOUR's marketing staff will be able to carry out all future marketing functions with little or no expatriate assistance.

D. Design and Implementation of a Domestic Market Campaign

1. Revision of the Present Market Promotion Program

ONATOUR's ongoing market promotion program is having a limited impact on peat usage, and specific data on household experiences using peat and the peat stove are not being collected. Project funds for stove manufacture should not be exhausted on a prototype which will later be refined and/or replaced after inputs from the stove engineer. The cost of producing the present stove - FBu 700 - is too high, in any case. A stovesmith's production rate is yielding a weekly salary of about FBu 4,000 which exceeds the salary of many types of supervisory personnel. Therefore, no more than 250 stoves should be produced under the current program. The ONATOUR staff should then concentrate on placing those stoves in households, adequately servicing the users with peat and collecting data on user experience.

In early 1983, the proposed consumer marketing advisor, the ONATOUR Chief of the Marketing Service and the short-term sociologist should design and undertake a survey, using a questionnaire, to collect data on fuel usage patterns, costs incurred, etc. The sociologist, preferably a Burundian and a woman, should assist in phrasing questions and in orienting/supervising the interviewers. The employment of female interviewers is recommended to gain the confidence of the women using the stoves.

Technical information on stove performance should also be collected. Data on how quickly the interior metal firebox wears out, the relative costs/efficiency of either using a ceramic liner or replacing the metal box, etc. will assist the stove engineer in recommending and testing modifications. The stove engineer should arrive by March-April 1983 for a period of at least six months to refine a peat stove design and to plan and implement a training program for stovesmiths. The consultant should study the labor requirements to produce a stove and then develop a wage scale which is comparable to a stovesmith's normal income. This is essential to produce stoves in line with normal market costs.

2. Initiation of a Marketing Campaign in a Single Quartier

A strengthened market promotion program should begin initially in a single quartier. Stoves should be placed in a significant percentage of households, e.g., 400 stoves would cover approximately 10% of the households in Kamenge. As discussed above, the support of opinion leaders and extension workers in the quartier should be enlisted to assist ONATOUR staff in the promotion effort, including training consumers to use the peat stoves. The present promotional terms of reference are appropriate to continue: a free peat stove with the initial purchase of peat.

Before the promotion campaign begins, ONATOUR should attempt to involve the charcoal vendors in the quartier in retailing peat. Consumers will probably use both peat and charcoal for different cooking purposes: peat is preferable to charcoal and wood for cooking beans quickly and without constant tending of the fire; however, charcoal can be doused and relighted as needed for preparing other dishes. This advantage/disadvantage should be explained to the charcoal vendors, as well as the fact that peat sales should make up for reduced charcoal sales. ONATOUR should provide cooperating vendors with 30 days credit and offer to publicize the availability of peat from them in contacts with consumers. It is essential that ONATOUR develop a price policy which will permit these vendors to make sufficient profit on handling peat while permitting a sufficiently low price to the consumer. It is suggested that ONATOUR consider selling peat to the vendors at a price of FBu five francs per kilo, which would permit them to make a normal mark-up while maintaining the consumer price of FBu nine francs per kilo. ONATOUR should charge the retail price for the initial bag of peat so consumers will not be encouraged to buy directly from ONATOUR.

Market development efforts in the quartier should be carefully monitored and used to refine plans for eventual expansion into other areas of the city. Stovesmiths in the quartier should be surveyed to identify those who are interested in training to make the peat imbabura. The stovesmiths should then assume responsibility for meeting the market demand as soon as feasible.

E. Financial Implications of the Proposed Sales Target

The revenue/sales estimates in Table 1 and the estimated sales targets in Table 2 (Section V., Financial Analysis) are based on ONATOUR's reaching approximately 3% of the urban domestic market in 1983, 10% in 1984 and between 10-15% in 1985. The price structure can be refined when data are available on the costs/benefits of peat usage; it is essential, however, that the final consumer price be as low as possible during the project period. If ONATOUR is to make a net profit by the end of the project, prices to institutional/industrial consumers will have to be higher than the prices to the charcoal vendors for the period of the project. Although the price to institutional/industrial consumers could be held at FBu nine francs per kilo while the price is gradually increased for the domestic market, ONATOUR's net profit would be considerably reduced. ONATOUR should advise institutional/industrial consumers who question the price structure that it is GRB policy to subsidize the price to domestic consumers in the interest of market development and social considerations.

VII. TECHNICAL ASPECTS

A. Project Inputs

1. AID Contribution

(a) Equipment and Vehicles

Equipment and vehicle requirements to support peat production have been refined considerably since the project was designed two years ago. Proposed procurement in the PP included 45 peat macerating machines, 9 pick-ups for ONATOUR and contract team mobility between headquarters and the bog sites, one 10T truck and one Portavan. In addition, tools and equipment for the bog-site labor forces and machinery maintenance, plus office and laboratory equipment and residential furnishings have been project-financed.

Given ONATOUR's and AID's lack of familiarity with peat macerating machinery (harvesting under Peat 1 was primarily manual), it was determined to procure initially only one type of machine, three semi-automatic macerators (SAMs). Bord na Mona subsequently identified a second type of machine, a Difco Turf Cutter, of which two were procured. The SAM and Difco machines both extract a layer of peat which is then mixed and ground (macerated) and finally extruded in either cut blocks on a conveyor belt (SAM) or a cylindrical "sausage" (Difco). The turf is manually stacked to dry on the bog, then carried off for temporary storage until it is delivered by truck to the ONATOUR headquarters yard for sales in Bujumbura. The SAM is pulled manually along the bog on moveable rails; the Difco is tractor-drawn. The three SAMs were delivered in August 1981 and the two Difcos and tractors in July 1982. Experimental harvesting began in September 1981 with the SAMs. Harvesting with all machines began in May-September 1982. In light of production constraints (equipment maintenance, the labor-intensive nature of the stacking, bagging and transporting operation, lack of the full complement of BNM engineers and climatic conditions) and delays in market development, it has now been decided that supplemental equipment procurement for the 1983 production season should be limited to three additional tractors and Difco attachments. Two sets will be used at Matana and one will be kept as a spare. Additional procurement requirements through the end of the project are expected to be limited.

Of the nine PP-budgeted pick-ups, six have been procured and are being used by the contract team (5) and the ONATOUR marketing staff (1). The balance of three will be procured when the BNM project/civil engineer, drainage/water engineer and surveyors arrive. Three pick-ups were procured under the Peat I project to provide mobility to the Burundian bog managers at Ijenda, Kisozi and Matana. Given a general "life expectancy" of four years, the vehicles will probably be deadlined in 1983. The evaluation team supports ONATOUR's request to procure replacements with project funds. It is further recommended, however, that the pick-ups be used to promote peat sales in the

rural areas near the bog sites as well as for continuing to transport materials and equipment between the bog sites.

The PP-budgeted 10T truck had been scheduled for procurement in 1983. Given increased production during 1981-82 and difficulties in contracting private transporters during the coffee production season (which coincides with the peat harvesting season), AID agreed to accelerate procurement of a 1981 model Mercedes tipper truck to 1982. This truck, plus a 7T Volvo truck provided under the Peat I project, constitutes ONATOUR's present haulage fleet. In order to avoid future transport constraints, AAO/B has also approved procurement of two additional 10T tippers in 1983; delivery is expected in May-June 1983. ONATOUR also argues that private transporters' charges will continue to escalate and that dependability on them will become increasingly problematical as peat production increases to compete with coffee evacuations from up-country. ONATOUR's transport analysis concludes that it will be more economical to have an in-house transport capability than to contract with private transporters. Based on this analysis, ONATOUR has requested the procurement of two additional trucks in 1983, which would increase the truck fleet from four to six. The evaluation team discussed this issue with ONATOUR at length and agrees that the 7T Volvo truck should be replaced, when deadlined, with a new 10T tipper. The team further recommends, however, that a decision on expanding ONATOUR's truck fleet beyond its approved 1983 capacity (either one 7T and three 10T trucks or four 10T trucks) should be deferred until late 1983. At that time, a short-term transport economist should study the current situation and the experience over the past two years. The economist's terms of reference should include analyses of the OTRABU (GRB parastatal) and private transport business (present and projected capacity and charges) and ONATOUR's running costs (maintenance, fuel costs, salaries, etc.). Determinations of when (at what point) ONATOUR's trucks and pick-ups are deadlined should be made by the COP/Project Manager based on the advice of the BNM fitters. It should be noted that the non-ONATOUR members of the evaluation team do not discount ONATOUR's transport analysis, but rather understand that the transport situation is in a period of flux. For example, fuel prices will probably increase over the next year; on the other hand, private transporters may also increase their fleets to keep pace with demand and, to remain competitive, may negotiate reasonable charges.

Finally, procurement of a Portavan to provide temporary accommodations at the bog sites has been cancelled. A portion of those funds will be used instead to procure an official vehicle for the ONATOUR Director.

(b) Up-Country Construction

As discussed in the Summary of Project Inputs (Section III. above), an unforeseen requirement for project funds is housing construction for contract technical personnel who are/will not be posted in Bujumbura. As originally planned, the GRB was responsible for renting suitable up-country accommodations. Although a suitable house has been rented near Kisozi (on the

grounds of the Tora tea factory) for one BNM fitter, the other is lodged in an isolated area not particularly convenient to either Matana or Ijenda. Up-country rental housing, when available, also requires considerable renovation (installation of electricity and running water, for example) before it is suitable for expatriate personnel. Under these circumstances, and recognizing the investment value to ONATOUR as well as the necessity to house the full complement of BNM technicians, the evaluation team recommends the following construction prior to the end of the project:

(1) Up-country housing: two houses at Kisozi; one house at Matana; and two or three houses at Nyamuswaga (location and timing to be based on the anticipated schedule of peat production). Housing rentals for all personnel will, of course, be required until new housing is ready for occupancy. ONATOUR has negotiated the purchase of plots at Kisozi and Matana. A REDSO/ESA engineer should backstop the housing designs/plans and the actual construction.

(2) Offices at the bog sites: one office at Ijenda; one office at Matana; and one office at Nyamuswaga (location and timing to be based on the anticipated schedule of peat production). The offices, including a cistern for a toilet and wash basin, should be of a simple, five-room module type with an overhang for the project vehicle. They will be used for record-keeping and storage of the spare parts inventory.

(3) At the Kisozi bog site: installation of an underground gas/diesel fuel tank and gravity-fed pump with lock. Centrally located between Ijenda and Matana, the pump will service the tractors and project vehicles. Fuel is now transported and stored in drums which has proven to be both dangerous and inconvenient.

(c) Nyamuswaga Development

As also initially discussed in the Summary of Project Inputs (Section III. above), ONATOUR preliminarily identified six bogs which it planned to bring into production during the life of the project. Three are now in production, and, if additional laboratory testing of peat samples is favorable, Kitanga A and Kitanga B may also be brought into production. The mid-1981 DANIDA survey of Burundi's peat reserves identified the largest deposits, however, in the Nyamuswaga region in the north, bordering on the Grand Marais. With a relatively low ash content (17%), recoverable deposits in Nyamuswaga are estimated to exceed 4 million metric tons. In light of this favorable analysis, ONATOUR is in the process of amending its production planning and has requested project support to begin exploitation at Nyamuswaga. In his report "Nyamuswaga Valley Drainage Scheme, Interim Report" (October 1982), Thomas Bree, a water engineer with the Irish Electricity Supply Board, cautions that:

> The large storage capacity of the bog and the extensive contributing area upstream has an important effect on river flows and water levels in the bog and in the entire river reach down to the confluence with the Ruvuma (river). Drainage works cannot be undertaken in the bog without first obtaining reliable estimates of river flows and a detailed topographic survey to identify the storage volume and the existing channel capacities. Without such information, piece-meal drainage works could seriously upset the hydrological balance of the catchment. Overland flooding would increase downstream, and flows and watertable levels would be reduced in the dry season. (p. 8)

Mr. Bree recommends realistically planning for large-scale production within the parameters of the following timetable:

- survey and analysis: one year
- hydraulic and structural design: five months
- construction of drainage/hydraulic works: one year
- full-scale production

The recruitment and arrival of the Bord na Mona project/civil engineer, water/drainage engineer and three surveyors are critical to ONATOUR's undertaking any actions at Nyamuswaga. According to the BNM member of the evaluation team, the positions will be advertised in December-January 1983, and the technicians could be in place by May-June 1983. The project engineer will be based at Tora, which is basically equidistant from the three producing bogs and the Kitanga bogs. His primary responsibilities will be production planning, including Nyamuswaga development, and general supervision of production operations at all bog sites. The water/drainage engineer and the surveyors will be stationed at Nyamuswaga and, with CRB support, will undertake the full-scale survey.

Since it is estimated that two and half years of survey, design and construction will be required before large-scale production at Nyamuswaga can begin, the evaluation team recommends that a pilot production effort ("test") be undertaken concurrently. ONATOUR concurs with this recommendation. As now discuss 1, five or six sites, varying in size up to 16 hectares, would be selected on the basis of non-interference with agricultural production, minimum drainage requirements and proximity to roads. Initial testing and production would be started in May-September 1983. The purposes of undertaking a pilot production effort are:

(1) to demonstrate to farmers in the bog region that peat production is not environmentally destructive;

(2) to test and compare further the performance of the S/M and Difco machinery;

(3) to test the quality (chemical, friability, etc.) of the Nyamuswaga peat; and

(4) to strengthen ONATOUR's request for the Commission des Marais's approval of large-scale peat production at Nyamuswaga.

With regard to (2) above, Mr. Bree noted in his report that:

> The use of the Difco machine for peat extraction is particularly suited to the subsequent land reclamation works for cultivation. It constitutes a multiple pass system where the bog surface is gradually and evenly lowered over a large area. The drainage ditches are lowered also each year, and the final drainage depth of 100 cm. would provide good drainage conditions for subsequent cultivation. This is evident from the areas cultivated at present in Nyamuswaga. (p. 9)

On the other hand, the Difco machine does not work well in bog areas with submerged and semi-submerged timber, papyrus and other heavy vegetation, which was observed at Nyamuswaga.

B. Progress toward Project Outputs

The project is designed to have two outputs which relate directly to the technical aspects of peat production: (1) resolution of technical questions and (2) development of commercial bogs. Technical questions relating to household and institutional/industrial use of peat remain outstanding. The efforts of the contract Project Manager to initiate the design and subsequent modifications of a peat briquetting are commendable, although further progress will depend (for the third time) on short-term consultant services in fixed and portable stove design. The most recent VITA consultant, Mr. Tim Wood, worked effectively, and it is suggested that AAO/B determine whether or not he may be available to return on any short-term basis to supplement a stove designer who should work on a full-time basis for at least six months. ONATOUR and AAO/E may wish to contact the following two individuals for nominations of competent stove specialists:

> Eric Bruner
> Project Officer - UNICEF
> Appropriate Technology Project
> Ciega

Armando Filipinni
Project Officer - UNICEF
Binayo Appropriate Technology Project
Ministry of Basic Education
Addis Ababa

It is also recommended that a short-term specialist in boiler conversion be provided under the project to advise institutions and industrial operations on the requirements to modify fuel usage from wood to charcoal.

Practical experience on the bogs has led to resolution of many technical questions on production methodology/technology. As discussed above, the comparative advantages and disadvantages of both the SAI and Difco machines argue for using both under a bog's varying conditions. For example, it is suggested that a particularly dry section in the Ijenda bog, which was not harvested in 1982, be hand-stripped and then harvested with a SAI. In the wetter sections of the bog, the Difco attachment should be used. The tractor, however, should be outfitted with rear wheel tracks to increase its mobility. Use of the Lilliput machine (FED-financed) on the Kisozi bog was not successful due to the high percentage of a straw-type fiber in the peat. The Difco machine performs especially well on the Matana bog due in large part to the high quality of the peat. Manual peat harvesting should be phased out in 1983. In summary, considerable progress in resolving technical questions has been made in the past two years, and the evaluation team is optimistic that most, if not all, will be resolved by the end of the project.

ONATOUR has also made considerable progress in only two years in developing peat production on a commercial basis. Although the original PP production targets have proven to be much too high, the revised targets, summarized below, nevertheless indicate achievement of this project output:

Actual	
1981	6,460 MT
Estimated	
1982	10,570 MT
1983	15,000 MT
1984	21,000 MT
1985	30,000 MT

VIII. SOCIO-ECONOMIC ASPECTS - BENEFICIARY IMPACT

There are three target groups who can benefit from an increase in the availability and acceptability of peat: the users/clients, the labor force working on the bogs sites and the artisanal manufacturers of peat stoves.

A. Users/Clients

The evaluation team visited a number of clients who are now using peat in the peat imbebura. ONATOUR's marketing staff did not randomly select households which were visited, so it is not surprising that the basic response to informal interviewing was positive. Since ONATOUR has only initiated its market promotion program in Bujumbura within the past several months, the 160 clients now using peat are those who have volunteered and would therefore generally represent a group receptive to innovative technology. This cannot be the case when ONATOUR undertakes its extension effort to reach 10-15% of the urban population, or about 20,000 clients, by 1985.

In general, the peat stove has not been substituted for the charcoal stove. Since most households include about 10-20 members, women cook with 4-6 stoves for each meal. Most are now using only one peat stove, and the peat fire seems particularly suited to cooking beans because it requires little or no tending (relighting, replenishment, etc.), provides even heat and lasts for 1-1 1/2 hours. Grilled meats and stews are better prepared over charcoal. Some women were not familiar with ONATOUR's basic instructions for using the peat stove (for example, filling the space between the outer frame and the combustion chamber with peat ashes to retain heat) or preparing the fire (for example, opening the bottom panels to create the maximum draft). Design problems with the peat stove include oxidation of the inner combustion chamber and breakage of the inner clay liner. Some women have also complained that their cooking pots have oxidized and/or the bottoms are "burned" by the peat smoke. One client noted to the team that food prepared on the peat stove also acquires an odd taste.

B. Bog-Site Labor Force

In the PP it is estimated that about 2,400 workers will be employed on the bogs by 1985, of which 675 would be full-time, contract employees of ONATOUR. In the 1982 production season, about 800 workers were hired on the three bogs to manually harvest the peat (at Ijenda), operate the SAMS, stack the turf for drying, carry the dried turf to storage areas next to the bogs, stack the turf under cover, and carry the turf from the storage areas for loading on trucks. Of the total work-force of 800, ONATOUR employs about 250 on a year-round basis to continue loading trucks and generally maintain the bog sites in the off-season. Laborers are paid the daily minimum wage of FBu 90. Assuming a six-day work-week during the five-month harvesting season, each earns a minimum of about FBu 10,800. This represents a considerable injection of disposable income in the rural areas, and it would be interesting to study whether or not there has been a quantifiable improvement in the quality of life of the labor force. It is doubtful if production increases will result in employment increases since ONATOUR's management will necessarily stress efficiencies in performance. Laborers will be hired if the Nyamuswaga and Kitanga bogs are brought into production, but maximum employment may level off at about 1,500 (350 full-time) by 1985.

C. Artisanal Stove Manufacturers

ONATOUR now employs five stovesmiths to manufacture the peat imbaburas at the ONATOUR headquarters yard. The stovesmiths are paid FBu 700 per unit, and each can manufacture 1+ per day. As discussed in Section VI., Peat Marketing Program, market development efforts by quartier should include the identification and training of interested stovesmiths. Following their training, the stovesmiths should then assume responsibility for meeting the market demand for peat imbaburas as soon as feasible. Pending at least the initial implementation of a more aggressive domestic marketing strategy/plan, it is premature to judge whether or not the PP's target of 4-5 workshops in operation and approximately 50 stovesmiths manufacturing peat imbaburas by 1985 is realistic.

IX. ENVIRONMENTAL ASPECTS

An Environmental Assessment (EA) was conducted in May-July 1980 within the context of the project design. Included (though not attached to) in the PP as an annex, the statement is made that the assessment's "findings have been incorporated in the Project Paper and into ONATOUR's operating guidelines for peat extraction at all bogs." The EA contained 19 recommendations (see Annex B, Exhibit 1): 4 relating to monitoring water, peat and nutrients; 5 relating to peat harvesting; 6 relating to post-production bog reclamation; and 4 relating to general issues. In February 1982, the REDSO/ESA Environmental Officer and Agricultural Officer visited ONATOUR and the Nyamuswaga bog region and presented an additional 7 recommendations in the Gaudet-Nissly/Bliss memorandum of February 23, "Pre-Assessment of the Developmental Potential of Nyamuswaga Swamp" (Annex B, Exhibit 2). Many of the environmental concerns addressed in these recommendations are related to drainage and reclamation. Environmental concerns related to drainage operations are also addressed in Thomas Bree's report (see Section VII. above). With the assignment of the Bord na Mona water/drainage engineer, these concerns can be approached.

The evaluation team recommends the short-term assignment of an environmental management specialist to study the reclamation/rehabilitation of bog sites for agricultural production after peat exploitation. Working with ONATOUR's engineering staff in the Production Service, the specialist should focus on:

(a) a review of ONATOUR's progress to date in following the EA recommendations, especially to insure that guidelines are in fact incorporated into ONATOUR's operational work/production plan;
(b) prepare an implementation plan for bog reclamation;
(c) recommend corrective measures for the Ijenda bog; and
(d) recommend protective measures for the "test" production sites at Nyamuswaga.

The environmentalist should work with ONATOUR for at least two months in early 1983 and return as necessary for periodic follow-up. ONATOUR and AAO/B have also suggested that the agronomist working with the AID Basic Food Crops project might participate in preparing the reclamation implementation plan. It is possible that the required services can be procured, at no cost to the project, through an AID/W S&T centrally-funded program.

X. AID PROJECT MANAGEMENT

Although thinly staffed, AAO/B has monitored the project closely since its inception, under Peat 1, in 1978. Project management responsibility rests with the General Development Officer, who is supported by an Assistant General Development Officer and an International Development Intern (IDI). Given the size of the AAO/B's project portfolio, however, each officer monitors the project on a part-time basis. Frequent visits are made to the bog sites, and the AAO, Program Officer and project management staff enjoy a solid working relationship with the ONATOUR Director and his staff. The ONATOUR staff, however, has expressed its frustration and dismay at the time required to process implementation actions through the AAO bureaucracy. This is partially explained by the operational relationship between AAO/B and REDSO/ESA, and it is recommended that an effort be made to minimize and/or streamline the approval/concurrence/clearance process of project documentation. A specific suggestion is made to minimize the issuance of PILs, which require REDSO/ESA approval, and rely more on official correspondence.

A close working relationship between the AAO/B Project Manager and the contract Project Manager is, and will be, of utmost importance in assuring that the remaining three years of the project will lead to achievement of the project purposes. An adversary relationship must be avoided at all costs because it threatens not only the implementation of the project in general, but also the morale and perceptions of ONATOUR and the contract team.

The most important recommendation concerns the scheduling of another formative evaluation of the project between now and the final evaluation in September 1985. June-July 1984 is suggested because ONATOUR will have completed a third production season and a strengthened marketing strategy and campaign should be in full swing. This evaluation should also prove helpful to ONATOUR and AAO/B in making final decisions before the end of the project concerning:

(a) the status and future of peat production at Nyamuswaga (and/or the Kitanga and Buyongwe bogs);
(b) ONATOUR's additional transport requirements, if any;
(c) final equipment procurement;
(d) additional participant training requirements;
(e) progress in the domestic marketing campaign; and
(f) guidance for a possible follow-on phase, if appropriate.

Given the importance of this evaluation, at least 3-4 weeks will be required. Membership on the team will be jointly agreed upon by ONATOUR and AAO/B, but should include an evaluation specialist/project officer, an economist/financial analyst, an engineer, a sociologist, a peat production specialist and an environmentalist. The number of persons on the team should be restricted to the above specialities, though necessarily draw heavily on ONATOUR and AAO/B staff for support.

November 1981 Evaluation Recommendations and Actions Taken as of November 31, 1982

1. Recommendation: Two Herbst Difco Turf Cutters and tractors should be procured for use during the 1982 harvest season.

Action Taken: Two Difco attachments and two tractors (one Deutz and one Landini) were procured and went into operation in July-August 1982.

2. Recommendation: A system should be established to analyze spare parts requirements and ordering and stocking procedures.

Action Taken: Under a short-term local contract, an inventory/stocking system is now being established. With this system, spare parts can be controlled and ordered in advance of actual requirements.

3. Recommendation: A consultant should study the organization of field workers, including the disposition of tasks, and then recommend a workplan to ONATOUR. The study should be undertaken during the 1982 harvesting season.

Action Taken: During his August 1982 TDY, Mr. Maurice Keane (Bord na Mona) observed labor organization on the bogs and included several general recommendations in his trip report. Based on his suggestions, the BNM Fitters have started to draft a workplan. It is expected that the BNM Project Engineer will finalize a workplan shortly after his arrival and/or during the 1983 harvesting season.

4. Recommendation: Consideration should be given to installing permanent or portable truck scales at each bog site and at headquarters.

Action Taken: Procurement of 4-5 truck weighing scales is now in process. The REDSO/EA Supply Management Officer is identifying U.S. manufacturers; the contract Project Manager has gotten information from a German manufacturer.

5. Recommendation: A study of peat briquetting (particularly as it may apply to the Nyamuswaga bog) should be undertaken in 1982.

Action Taken: Peat briquetting was considered within the context of the Kananura-Kelvin feasibility study on the carbonization of coffee hulls and rice husks. In this 1982 evaluation report it is recommended that the feasibility of carbonizing peat, with or without additives, should continue to be investigated.

6. Recommendation: An analysis of the potential peat market should be undertaken to update the May 1980 Pattinson study, "The Development of Peat Marketing in Burundi".

Action Taken: The contract Marketing Specialist, Ian Pattinson, prepared an updated study in October 1982, "The Market for Peat in Burundi".

7. Recommendation: Annual audits should be performed within 90 days after the end of ONATOUR's fiscal year.

Action Taken: Coopers and Lybrand (Kinshasa) studied ONATOUR's 1979-81 financial records in October 1982. Their report, received on November 20, 1982, will be analyzed and discussed jointly by AAO/B and ONATOUR. ONATOUR's 1982 financial records will be audited by no later than late March 1983. It is recommended that Coopers and Lybrand also undertake this audit.

8. Recommendation: ONATOUR should be requested to provide AID with a more detailed, monthly report of its financial status.

Action Taken: Since the arrival of the contract Financial Specialist in May 1982, monthly financial reports have been prepared and submitted to AAO/B.

9. Recommendation: At the appropriate time, ONATOUR should consider introducing an incentive/bonus scheme to retain and attract capable employees.

Action Taken: Although AAO/B and ONATOUR have discussed the desirability of such a scheme, ONATOUR has taken no specific action to implement one. ONATOUR is prepared to offer an incentive/bonus scheme when the organization realizes a profit on its operations. (This may occur in 1983 or 1984.)

10. Recommendation: The next evaluation should address the question of merit promotions for ONATOUR staff.

Action Taken: In ONATOUR, at the end of the year, a performance report for each employee is completed by his/her supervisor. With a favorable evaluation, an employee may receive a pay increase ranging from 1-5% of the base salary. In addition, ONATOUR offers periodic step increases on the basis of seniority.

11. Recommendation: AAO/B, ONATOUR and Ministry officials should clarify the role(s) of each member of the contract team.

Action Taken: Action has been initiated but not completed to date. AAO/B has prepared a PIL which presents revised position descriptions. It is recommended in this 1982 evaluation, however, that the proposed position descriptions again be examined for accuracy. This is essential to maximize on-the-job effectiveness and professional satisfaction.

12. Recommendation: A PIL should be issued to advise the GRB that it has satisfied the two Conditions Precedent to Additional Disbursement relating to necessary financial and administrative support to ONATOUR.

Action Taken: PIL 12 was issued on February 10, 1982 advising the GRB of the satisfaction.

13. Recommendation: The 1982 harvesting season should be used as a trial period to test fully the three harvesting machines (Lilliput, SAM and Difco). After the season, a decision should be made on the most appropriate macerating machine, and procurement actions should be undertaken.

Action Taken: The three machines were tested during the 1982 harvesting season. Based on this experience, it is concluded that both the Difco and SAM machines should be used in combination on the bogs. The Lilliput may be used for rolling on the Kisozi bog during the 1983 harvesting season. Procurement of additional tractors and Difco attachments is recommended in this 1982 evaluation report.

14. Recommendation: An assessment of the Nyamuswaga bog should be undertaken as soon as possible.

Action Taken: Following his field trip, Thomas Bree (a water engineer with the Irish Electricity Supply Board) presented preliminary findings in "Nyamuswaga Valley Drainage Scheme, Interim Report (October 1982)".

15. Recommendation: A production specialist should be added to the contract team.

Action Taken: ONATOUR argued convincingly for continuing the position of marketing advisor since market expansion was/is a priority concern. Agreement was reached that the recruitment of a production specialist would be deferred pending the recommendations of the Project Engineer's study of the organization of the bog sites. In ONATOUR's judgment, a production expert is not required prior to exploitation of the Nyamuswaga bog. Basically agreeing with ONATOUR, the 1982 evaluation team believes that (a) implementation of an aggressive marketing strategy is top priority, (b) the services of a consumer marketing specialist will be critical to the success of a marketing strategy, and (c) the Project Engineer's responsibilities should include production planning at the three bog sites.

16. Recommendation: Efforts to design a peat-burning imbabura should continue.

Action Taken: In November-December 1981, a VITA stove designer and sociologist worked on a peat stove design. As a follow-up to their study (issued in Spring 1982), in June-July 1982, another VITA stove designer (Tim Wood) worked further on fixed stoves and the test portable stove developed by DUB and the contract Project Manager. Further short-term assistance in stove design is required and recommended in this 1982 evaluation.

17. Recommendation: A store of medical supplies for each bog site should be procured before the 1982 harvesting season.

Action Taken: First aid kits were placed at each bog site in June 1982. An order for a more complete stock of medical supplies was placed in May-June 1982 but has not been received to date. AAO/B is requested to follow-up.

FROM: "ENVIRONMENTAL ASSESSMENT, BURUNDI PEAT II PROJECT"
(May-July 1980)

RECOMMENDATIONS:

A. Monitoring Water, Peat and Nutrients

The project will develop CNATOUR's field capability in laboratory testing. It is therefore intended that CNATOUR establish a small laboratory to maintain quality control of the peat. In addition, a simple program should be set up to achieve the following:

1. Simple staff gauges (or, if possible, V-notch weirs), should be installed in the input and output channels. The channels should also be gauged, so that discharge can be recorded. One gauge reader for each bog should be trained to enter discharge data on a daily basis. Long-term records will provide a basis for improving drainage systems and/or installation of control structures.

2. Water samples should be locally tested for conductivity and pH. Sub-samples should be occasionally sent to the proper Ministry for nitrogen and phosphorus analysis.

3. Peat samples should be taken from all bogs and sent to Bord na Mona or other laboratories such as the Kinsealy Research Centre, Agric. Institute, Dublin. Specifically, the analysis should include: moisture content; pH;conductance; pH in weak natural salt solution; volume weight; water and air capacity; particle size distribution; ash, C, N, P, S, K and Ca content; and cation exchange capacity.

4. Soil moisture should be determined in abandoned areas after peat has been harvested. Several simple field methods are available for this. The water table must then be regulated and maintained so that abandoned areas can be opened to reclamation before they irreversibly dry out.

B. Peat Harvesting

1. If soil moisture on abandoned areas drops significantly so that the water table is liable to drop below 30 cm, damming of drains (i.e. by back-filling) should be carried out to allow flooding. Large abandoned areas should not be allowed to become irreversibley dried out as it will then be subjected to wind erosion and will be very difficult to use for cropping. After peat removal, sluices should be installed downstream to enable the drainage channels to be used as irrigation canals during the dry season. They should be provided with a diversion

canal so that even if the sluices were not opened before the rains, any large or unusual flood will bypass the structure.

2. Peat samples from all bogs should be sent for analysis so that recommendations can be made about the specific agricultural practices to be followed during reclamation.

3. Bog profiles in new areas should be scrutinized to ensure that the ground slope, local terrain and central stream channel are such that they will not induce flooding and slumping once harvesting has begun.

4. After harvesting at least 1.5 meters of peat should be left on the bog surface to allow for agricultural reclamation. This peat layer should have a water table of 0.3-0.5 meters. If it has begun to dry out, i.e., if the water table is too low, the peat must be reworked with green manure, compost, straw, or other soil amendment in order to improve the soil moisture prior to planting.

5. During the actual harvesting of peat the bog managers should be encouraged to install sluices made out of small logs and wooden stakes or even out of peat blocks. This procedure should be carried out especially during rainy seasons or when any unusual flood is obvious.

C. Reclamation of Bogs

1. Reclamation on an experimental basis should be started on a few small areas which have already been abandoned in several of the project bogs.

2. In bog reclamation in Ireland, the surface is often graded prior to reclamation. This allows for a gentle sloping surface which aids natural drainage. It would be advisable to try out several reclamation techniques on a 10 meter square plot in an abandoned bog, such as Kivogero Bog. One technique which should be tested here would be the use of wide, shallow channels cut toward the main channel (river). This would create a floodplain effect to allow slow drainage. Such a technique could be coupled with further grading of the surface between the drains. In addition, eucalyptus saplings could be set out in the area between drains.

3. In each of the project bogs a small test plot should be set aside in a part of the bog which has been harvested. The test plot should be divided into 4 sections and planted with (a) eucalyptus; (b) a local crop such as sweet potatoes; (c) local grasses and/or sedges; and (d) a control section left for natural reclamation. This test plot should be maintained during harvesting operation, and will serve to demonstrate which reclamation technique will be most successful.

4. Forestry and agricultural agencies should be strongly encouraged to participate in reclamation work. The options available in reclamation of the abandoned bogs would be: (a) local farmers should be encouraged to use the land, providing simple drainage controls are left behind after harvesting for use in irrigation; (b) tree planting should be encouraged with the help of local forestry officials; (c) if the bog is left to recover by natural reclamation, it must still be left with a high enough ground water available to allow growth of weeds and, later, a natural succession to the local flora; (d) a fourth option would be to fill all drains, flood the region and introduce fish fingerlings, such as Clarias spp. for fish culture. This would be especially feasible in the smaller bogs.

5. ONATOUR may want to consider reclamation with tree species such as eucalyptus in order to provide supplementary biomass to use in briquetting. This would eventually replace the peat as an energy resource, as the peat is removed.

6. Discussions should be opened with the Government to decide the composition of the authority required for reclamation. The project will include a requirement for initiating such a discussion.

D. Issues to be Resolved

1. Monitoring of the bog water input, discharge and moisture level in the peat must be recorded as often as possible, so that the water relations in each bog can be assessed periodically.

2. Methods for peat extraction should be tried out and applied in different bogs in order to arrive at the most efficient method for future peat removal.

3. Nutrient output from the bogs should be occasionally assayed in order to detect if any significant change occurs in nutrient loads to the receiving rivers.

4. Test plots should be set up in abandoned areas even if small in size, in order to establish a basis for future reclamation work.

UNITED STATES GOVERNMENT

memorandum

DATE: February 23, 1982

REPLY TO ATTN OF: John Caudle and Curt Nissly, REDSO/EA

ANNEX B, Exhibit 2

SUBJECT: Pre-assessment of the Development Potential of Nyamuswaga Swamp

TO: Mr. George Bliss
AAO Burundi

Enclosed please find the pre-assessment which was completed a few days ago. The recommendations which are listed at the end of the pre-assessment were essentially drawn up for long-term guidance of the Mission. The pre-assessment team felt that effective development would not be possible until the post of Drainage Engineer for the over-all project was actually filled. This should be done as quickly as possible. In the meantime, we would suggest the following Interim Action Plan:

1. Recruit a full-time drainage engineer;
2. The September 1981 ISABU report on crop production in bog areas must be obtained from Genie Rural, translated and circulated (L.P.R. Gerard, 1981 Les Marais au Burundi. Etat actuel des connaissances pour leur mise en valeur rationalle propositions d'experimentation)
3. Reclamation as recommended in the Peat II PP must be started soon. A good beginning could be made by insuring eucalyptus seedlings are set out in the non-project bog, Kivogero;
4. Trial plots must be set up in the present Peat II Project bogs (as called for earlier) to test production of local vegetable crops and/or rice. These plots should be set up in areas in each project bog where peat harvesting no longer occurs;
5. Simple staff gauges must be installed in all input and output channels in all of the existing project bogs;
6. CENTUR mentioned that it might be possible to begin immediate trials in Nyamuswaga using the Difco peat extractor. If this pilot project should be started up, it should be accompanied by cultivation trials to see if this method can be used later in combination with agriculture;
7. USAID/CENTUR should have a joint meeting with ISABU, Genie Rural, Canors and/or other agencies to discuss how the integrated development of the Nyamuswaga Swamp will be coordinated.

Our pre-assessment was done under fairly rushed conditions because of the advent of the rainy season. We felt that a more complete assessment is needed and should be done later after some progress has been made on the above seven actions, and after CANTOR has firmly decided on their method of extraction.

cc: H. Blank
P. Bloom
L. Hausman
B. Robinson

1. 1981 figures derived from "Calcul du Prix de Revient de la Tourbe" ONATOUR - September 1982 - Breakdown between Administration and Production costs derived by assuming all on-bog personnel costs for production season are production costs. Sales figure from Quarterly Status Report No. 4.

2. 1982 figures derived from "Exécution Budgétaire - October 1982" - ONATOUR - projecting administration and transportation costs for balance of year. Breakdown between administration and production costs derived from worksheets on the production cost exercise ONATOUR has underway. Again all on-bog personnel costs for production season were taken as a production cost. Not included are fuel and spare parts provided by the Project. ONATOUR amortization figure for 1982 contained in "Calcul du Prix de Revient de la Tourbe" increased to include one ten ton truck plus three pickups and macerating machines and tractors used 1982 production season. Sales revenues derived from projected sales contained in "The Market for Peat in Burundi" - Ian Pattinson - October 1982.

3. 1983 figures are based on "Prévisions Budgétaires 1983" under preparation by ONATOUR finance section. Breakdown between administration and production costs derived by allocating all on-bog personnel costs during the production season to production and adding costs of operating and maintaining macerating machines. Transportation costs have been derived by estimating production amount which will be moved to Bujumbura in 1983 for sale. No provision was made for cost of delivering peat to tea factories as it was assumed ONATOUR would charge for this service thus meeting out the costs. Depreciation figure is based on ONATOUR's basic depreciation figure for 1982 (FBu 4 million) plus depreciation on four delivery trucks, four Difcos, one Deutz Tractor, four Landini tractors, three SAMs and three pickups. Some items may have been overlooked and it is emphasized that the 1982-1985 depreciation figures are estimates which may be somewhat low but contain all the most important cost elements. Sales figures were derived by using sales volume contained in the "Market for Peat" with limited upward adjustment in the domestic sector in light of the vigorous marketing campaign recommended by the evaluation. Revenues derived from sales based on pricing structure contained in the footnotes.

4. 1984 figures based on 1983 figures. Administration costs adjusted upwards by six percent and increased to cover costs of administrative/contract personnel on Nyamuswaga bog in non-production season. Production costs based on cost per ton produced 1983 with upward adjustment by ten percent to cover higher personnel/fuel costs. Transportation costs have been adjusted upwards to compensate for portion of sales which will be coming from Nyamuswaga and inflated by ten percent. Depreciation figure contains basic ONATOUR 1982 schedule plus four trucks, six Difcos, one Deutz tractor, six Landini tractors, three S.M's and three pickups. Sales figures are based on Peat Market Report with Upward Adjustment in Domestic/Artisanal market.

5. 1985 figures based on 1984 Administration estimate inflated by six percent. Production figures based 1984 cost per ton produced inflated by ten percent. Transportation costs account for portions of sales coming from highland bogs and Nyamuswaga and are inflated by ten percent over 1984 costs. Depreciation schedule based 1982 schedule plus four trucks, eight Difcos, one Deutz tractor eight Landini tractors, three SAM's, three pickups and the Office Building. Sales figures in domestic sector adjusted upwards, otherwise follow Market for Peat Report.

Information Appendix

Prepared by: AID/Burundi

Date: 28 July 1983

Project: Alternative Energy: Peat II (695-0103

Country: Burundi

Cost: $8,000,000

I. What constraint is this project attempting to relieve?

Heavy use of wood by all sectors of the Burundi economy for fuel is rapidly depleting the country's forest reserves. The Peat II project is working to relieve pressure on wood supplies and simultaneously increase the amount of energy available to consumers by increasing the production and acceptability of peat as a fuel source.

II. What technology did the project promote to relieve this constraint?

To increase production of peat the project is experimenting with three different kinds of technology: manual, semi-automatic and tractor operated. Manual production has proved to be too slow to keep up with the consumer demand and the quality of peat produced manually is generally poor. The semi-automatic machines work better under some bog conditions and semi-automatic peat is preferred by some consumers. Project experience to date, however, indicates that relatively small tractor-mounted machines which have been developed in Europe within the last two to three years will be the most practical technology for Burundi's production needs.

To increase the utilization of peat the project is working with a number of consultants and local artisans to develop domestic stoves suitable for peat, to convert factory boilers for peat use, and to develop a marketable form of carbonized, pelletized and/or gasified peat.

III. What technology did the project attempt to replace?

None. There was very limited manual production of peat at the beginning of the project but this is essentially a new industry in Burundi.

IV. Why did project planners believe that intended beneficiaries would adopt the proposed technology?

It was expected that the primary beneficiaries of the project would be Bujumbura domestic fuels consumers. It was predicted that the cost of their normal fuel, charcoal, would rise precipitously within a few years and that, therefore, they would quickly change to peat. In fact, the price of charcoal has not risen as predicted and furthermore, domestic consumers resist using peat for a variety of reasons, including smoke, requirement for a special stove and the necessity to adjust cooking habits. On the other hand, institutions and industries were not

considered as customers for peat in the PP but they currently take the bulk of production. While work will continue on developing the domestic market, significant expansion of consumption in the short term is likely to come in the institutional and industrial sectors.

V. What characteristics did the intended beneficiaries exhibit that had relevance to their adopting the proposed technology?

All households in Bujumbura use small portable charcoal burning stoves twice a day to cook their meals. It was assumed that if they were offered an economical alternative fuel they would adopt it.

Concerning peat production technology, the Office National de la Tourbe (ONATOUR) was a new organization searching for an acceptable method of producing peat.

VI. What adoption rate has this project achieved in transferring the proposed technology?

Less than 5 percent of Bujumbura's domestic consumers are using peat for fuel.

VII. Has the project set forces into motion that will induce further exploration of the constraint and improvements to the technical package proposed to overcome it?

The problems of production technology are more or less resolved for now. ONATOUR must continue to be aware of technological developments in this field but for the foreseeable future they have the capacity to produce more peat then the market can take. The emphasis of the project is now on marketing. An advertising campaign has been developed for the local newspaper, consultants and local artisans are working on better stove designs, consultants are working with local industries on boiler design, and studies are being prepared on carbonization and gasification of peat.

VIII. Do private input suppliers have an incentive to examine the constraint addressed by the project and to come up with solutions?

One objective of the project is to assist ONATOUR, now a parastatal organization, to become a private, profit-making firm. A preliminary study to this end has been completed.

Local artisans have been trained in making peat-burning stoves and it is expected that they will continue to produce the stoves as demand increases.

IX. What delivery system did the project employ to transfer technology to intended beneficiaries?

Advertising campaigns have been used and will continue to be used to inform and persuade the people to use peat. Government officials and local opinion leaders have been enlisted to sell peat as an alternative fuel.

X. What training techniques did the project use to develop the delivery system?

The project has used existing media and government network.

XI. What effect did the transferred technology have upon those impacted by it?

Production technology: It has enabled ONATOUR to produce as much peat as it needs in the foreseeable future relatively efficiently.

Consumption technology: The effects are yet to be seen.