

VERMONT ENVIRONMENTAL BOARD
10 V.S.A., Chapter 151

RE: Killington 43 Corporation Findings of Fact, Conclusions
A. Jay Kenlan, Esq. of Law and Order
Abell & Kenlan Application #1R0522-4-EB
P.O. Box 578
Rutland, VT 05701

This decision pertains to an appeal filed with the Environmental Board ("the Board") on January 30, 1986, by the Killington 43 Corporation from the January 3, 1986 decision of the District #1 Environmental Commission ("the Commission") denying Land Use Permit Amendment Application #1R0522-4. The latter application sought approval to install electrically heated saunas in 144 housing units for which the Commission had previously issued conceptual approval.

The parties agreed to the following procedures with regard to this appeal:

- 1) The prefiling of all technical testimony pursuant to Board Rule 17(D);
- 2) The conduct of the public hearing by way of Administrative Hearing Officer pursuant to Board Rule 41 and 3 V.S.A. § 811;
- 3) Waiver of the 40 day requirement of 10 V.S.A. § 6085(b).

Prefiled testimony was filed by the Applicant and the Public Service Department on March 12 and March 13, respectively.

The Board's Chairman convened the public hearing in this matter as administrative hearing officer on April 28, 1986, with the following participating as parties:

Applicant Killington 43 Associates by A. Jay Kenlan, Esq.
State of Vermont, Department of Public Service ("PSD") by
Gordon Gebauer, Esq.

The hearing was recessed on April 28, pending the issuance of a Proposed Decision, and a review of the record and deliberation by the full Board. On April 29, 1986, the hearing officer issued a request that PSD confirm **the Applicant's** determination with regard to the availability of gas-fired sauna heating equipment. A response to that request was filed May 16, 1986, by the Applicant and on May 21, by the PSD. A Proposed Decision was issued on May 28, 1986. At the request of the Applicant, the hearing officer held the record open, and additional information was admitted into the record by

stipulation of the parties. The Applicant filed objections to the proposed decision on July 31, which were corrected on August 4, and the Board held a public hearing to allow oral argument on August 4. This matter is now ready for decision. The following findings of fact and conclusions of law are based exclusively upon the record developed at the hearings before the hearing officer and the full Board.

I. ISSUES IN THE APPEAL

Condition #5 of Land Use Permit #1R0522-3 included a requirement that approved units "shall rely upon gas fired systems for the provision of heat and hot water needs including saunas and jacuzzis." The Applicant's pending request to use electric heaters in saunas raises issues with respect to Criteria 9(F) (Energy Conservation) and 9(J) (Public Utility Services) of 10 V.S.A. § 6086(a).

II. FINDINGS OF FACT

1. Land Use Permit #1R0522 was issued on June 25, 1984, approving the construction and use of two model housing units to be used in relation to the pre-sale of 27 units to be constructed in the future as Phase I of "The Woods at Killington" ("The Woods") condominium project. The Woods project is located on a 100 acre tract adjacent to the Killington Access Road in the Town of Sherburne, Vermont. Condition #5 of this permit stated, in part:

"These [model] units shall rely upon gas fired systems for the provision of heat and hot water needs including saunas and jacuzzis."

2. Amended Land Use Permit #1R0522-3 was issued on August 19, 1985, "**conceptually**" approving the multi-phased "The Woods" recreational resort project consisting of 144 housing units/1/; a "Village Center," including a restaurant and commercial space; cross-country and horse trail system; and supporting water, sewer and road systems. This amended permit also authorized "site and foundation" construction on 13 of 32 Phase I housing units.

/1/ The Woods project was conceptually approved for 144 units. The Applicant's testimony in this case, however, assumed a total of 147 units, which is the basis of the information provided in this proceeding. The actual figures should be adjusted accordingly. However, the differences between 144 and 147 units do not materially alter the findings and conclusions made herein.

3. The amended permit included the following Condition #5:

The heated structures approved herein shall be constructed with insulation with an R-Value of at least R-19 in the exterior walls, at least R-38 in the roof or cap and at least R-10 around the foundations. These units shall rely upon gas fired systems for the provision of heat and hot water needs including saunas and jacuzzis. The electric saunas and jacuzzis already installed in model units 1A and 1B shall be detached from electrical supply and not used unless subsequently approved by the District Commission through a permit amendment. If the amendment request is unsuccessful, the electric heating elements for these units shall be removed and replaced with gas fired heating elements. All saunas and jacuzzis to be installed in the approved units 1C-H, 1J and 2A-D shall be gas fired in accordance with the original findings of the Commission.

No appeal was filed with regard to Condition #5 or any other aspect of the amended permit.

4. On October 17, 1985, the Applicant filed Land Use Permit Amendment #1R0522-4 seeking approval for the installation of electrically heated saunas in lieu of the gas fired saunas previously approved. The Applicant investigated the availability of gas fired sauna heaters and found that a 40,000 BTU heater was the smallest commercially available unit. A heater of this size is too large for the 4' x 6' x 7' and 4' x 5' x 7' sauna rooms designed for the condominium project. The Applicant has indicated that the sauna room should be enlarged to 6' x 7' x 7' if a 40,000 BTU heater were to be installed. Such an enlargement would substantially increase the construction and replacement cost of the sauna facility. Electric heating units are, however, available which are properly sized for the intended sauna rooms. The PSD concurs that a 40,000 BTU heater is too large, and that there is no smaller gas unit currently on the market.
5. Central Vermont Public Service Corporation ("CVPSC"), the utility serving the Sherburne area, has notified the Applicant that it has the ability to serve the electricity demands of the project (Exhibit #3), including the saunas (Exhibit #4). CVPSC estimates that the saunas will contribute an additional "diversified demand" of between 200 and 400 KW in addition to the estimated 700 KW necessary to serve other electrically supported functions of the project. No empirical data is available to estimate the "diversified demand" of sauna use.

6. The Applicant's engineer has submitted a document (Exhibit #2) which contains three reports on the energy impacts of the electric saunas. The first report (October Report) was dated October 10, 1985 and revised on March 3, 1986. The second report (November Report) was dated November 26, 1985 and revised on March 6, 1986. The third report (July Report) was dated July 1, 1986, and assumed that the gas-fired sauna room was enlarged to 6' x 7' x 7' in order to accommodate the 40,000 BTU gas heaters.
7. At the August 4 hearing, the Applicant stated that if the electric saunas are approved by the Board, the total number of saunas which would be installed at The Woods project would be reduced from 147 to 99. The sauna heaters would be 4.5 KW heaters, instead of 6.0 KW heaters originally proposed. In addition, the Applicant would substitute gas ranges for electric ranges in all units which have not yet been built, which would allow the electric service to those units to be reduced from 200 amp to 100 amp service. At the present time, 18 units of the 144 units approved for the project have been built.
8. Each electric sauna would use 4.5 KW when operating. The Applicant has calculated the estimated electricity use for the sauna installation based on the following assumptions:
 - a) that each sauna would be used twice each week on average;
 - b) that The woods units would have an 80% occupancy rate in the months of December through March; a 50% **occupancy** rate in April, May, September, October and November; and a 30% occupancy rate in June, July and August;
 - c) that each sauna use would involve a one-hour warm-up, and a 15 minute use by the occupant, with a maximum temperature of 180 degrees. The heater would be shut off automatically through a timer.
9. Based on these assumptions, the estimated annual energy consumed by each electrically-heated sauna will be 361 KWH, or 35,740 KWH for the 99 units. This total annual electrical use is low in comparison to electric space heating. **The** Applicant estimates that electric heat would require more than 2,000,000 KWH for this project. Gas equipment will be installed to heat The Woods units.

10. From the standpoint of capital cost, the electric saunas are clearly more economical. Assuming the sauna rooms were the same size, the capital cost would be \$3,435 per electrically heated sauna versus \$4,500 per gas-heated sauna. If the room were enlarged to accommodate a 40,000 BTU gas heater, the capital cost would be \$8,090 per sauna. Gas-heated saunas are also clearly more expensive than electrically heated saunas on a "life-cycle" cost comparison as well. (October Report, page 2; July Report, page 11)
11. In terms of total energy consumption, including the production, transportation or transmission, and end use, the gas units are more efficient. The production and transportation efficiency of propane gas is 81.2%. According to the manufacturer, the gas sauna heaters are 77% efficient, giving the units an overall efficiency rating (production through use) of 62.5%. By contrast, the electric sauna heaters are estimated to have only a 29.1% overall efficiency rating. While the heaters themselves are 97% efficient, the total efficiency of electric energy from production of source fuel through generation to site delivery averages only 30%, given Vermont's mix of fuel sources to generate electricity (nuclear, coal, gas, wood, hydro, etc.). (October Report, pages 3-4; November Report, page 1; testimony)
12. The Applicant estimates that energy consumption per use of each electric sauna stove would be 20,445 BTUs. Since electric saunas have only a 29.1% overall efficiency rating (production through use), each use would have a total energy consumption of 70,292 BTUs. In contrast, the estimated energy consumption per use of each gas heater is 22,280 BTUs. With an overall efficiency rating of 62.5%, the total energy required for each use is only 35,648 BTUs, or approximately 50% of that required by the electric heaters. (October Report, pages 6-8)
13. The woods project will be served from the Sherburne substation of CVPSC. That substation is approaching its capacity. Based upon ability-to-serve commitments issued by the utility, the substation will reach its capacity in 1986-1987. CVPSC has investigated a variety of potential new transmission corridors and is now engaged in a public hearing process preparatory to submitting a 30 V.S.A. § 248 application to the Public Service Board.
14. The CVPSC generating 'peak now occurs in the 8:00 a.m. to 10:00 a.m. period. The Sherburne substation experienced peak power usage between 9:00 p.m. and 10:00 p.m. during the winter of 1984-85, and experienced elevated loads from 6:00 p.m. to 10:00 p.m. These substation demands correspond to the times when saunas will receive their predominant use: 5:00 p.m. to 10:00 p.m.

15. New distribution and transmission facilities are required for the Sherburne area's future electricity needs, independent of The Woods project. Whether or not electric saunas are installed, new transmission facilities are required. The Woods project, standing alone, is unlikely to have an impact on the timing or capacity of these new facilities.
16. CVPSC discourages the use of electric space heating because of negative impact on the utility's generation system: area space heating demand falls coincidentally in time with **CVPSC's** highest generating peak of the year. However, CVPSC considers saunas to have less of an impact on generating systems because their use is more diverse and not necessarily concurrent with peak electric demand periods. Exhibit #5.
17. Based on the assumptions stated in paragraph 6 above, the Applicant has estimated that there would be a yearly average of 0.16 uses per day per unit for The Woods project as a whole. Since each sauna would use 4.5 KW of electricity when operating, the total "connected demand" for the 99 saunas would be six times 99 units, or 445.5 **KW** for the project. The average "diversified demand" would be only 16% of the connected demand on a yearly basis, or 71 KW. The Applicant concludes, and the Board agrees, that based on those assumptions, each electric sauna will contribute approximately .7 KW of diversified demand on a yearly average. (October Report, page 4)

III. CONCLUSIONS OF LAW

Criterion 9(F) of 10 V.S.A. Section 6086(a) requires the Board to find that:

"the planning and design of the ... development reflect the principles of energy conservation and incorporate the best available technology for efficient use or recovery of energy."

In Re: Piper Ridge Associates, Appeal #2W0112-3-EB, issued April 12, 1984, this Board evaluated a proposal to employ electric space heating against the requirements of both Criteria 9(F) and 9(J) of 10 V.S.A. Section 6086(a). With regard to Criterion 9(F), we indicated that the burden is upon the Applicant to demonstrate that it has investigated other available technology and to establish why the selected equipment is the best from an energy efficiency perspective.

The Applicant in this case has investigated alternative electric and gas fired equipment. It has determined, and we concur, that the only available gas fired equipment is oversized for the use to which the Applicant intends to put the equipment. The electric unit selected is the only sauna heater commercially available which is properly sized for the sauna rooms which the Applicant has designed.

On the other hand, even though the gas heater is oversized and therefore relatively inefficient for the particular use, the total energy use required by the gas heaters is only one-half that required for the electric heaters, if the entire cycle of energy production, transportation and end use is considered. Electrical energy is very efficient if only the end use is considered (97% vs. 77% for propane gas), but that does not consider that up to 70% of the energy originally in the fuel source has been lost in the production, generation and transmission of the electricity.

Nor can the issue of energy conservation be looked at in total isolation from the fact that the Sherburne substation is reaching capacity and the fact that finding new sources of electrical energy is becoming increasingly expensive. Criterion 9(J) requires that the Board find that:

(1) electric service will be available to the project when it is completed; (2) an excessive or uneconomic demand will not be placed on the electric utility; and (3) the provision of electric services has been planned on the basis of reasonable population and economic growth projections.

Had this been an original application, the Board might well deny permission to install electrically-heated saunas, especially in light of the evidence that the Sherburne substation will reach capacity in 1987, and that it will be two or three years under the best of circumstances before new transmission facilities come on line. The Board cannot ignore the fact that electrical energy is extremely costly to produce and is becoming more so. It must recognize that electricity is a higher form of energy, particularly well suited to performing certain tasks that other forms of energy cannot. Given the efficiency losses associated with the production and transmission of electricity, it should be conserved to the extent reasonable for those tasks to which it is well suited.

Nor can the Board ignore the fact that the decision in this case **will serve** as a precedent for other condominium projects, built and to be built, in the Killington area or at other recreational resorts. The Board believes that in enacting Criteria 9(F) and 9(J), as well as Criterion 9(K) dealing with impacts on public investments including electric generating and transmission facilities, the General

Assembly wanted the Environmental Board and District Commissions to take a broad view of the problem of energy conservation and the impact which new developments have on the demand for public utility services. Each project which comes through the Act 250 process usually has only a minor impact if looked at individually. Cumulatively, however, the impact may be enormous. In deciding this case, the Board is keeping the cumulative impact firmly in mind. Failure to do so would inevitably result in higher additional costs to all rate-payers, as public utilities are forced to speed up their timetables in the construction of new generating and transmission facilities.

What makes this application different, however, is that the Applicant has agreed to reduce the overall electrical demand at The Woods project from what had previously been approved by the District Commission. Permit #1R0522-3, which originally approved the construction of 144 condominium units at The Woods, allowed the Applicant to install 200 amp electric service in the units in order to accommodate electric kitchen ranges and a variety of other electrical appliances. The Applicant is entitled to build the project as approved. In seeking approval for the electric saunas, the Applicant has voluntarily agreed to substitute gas-fired kitchen ranges for the electric ranges in the 120 units still to be built, and to reduce the electric service to those units from 200 amp to 100 amp service. In addition, the Applicant will reduce the number of units having saunas a maximum of 99 units, and will install 4.5 KW heaters instead of the 6.0 KW heaters originally proposed in the amendment application.

Based upon these changes to the originally approved project, the Board concludes that the electric demand of The Woods project, including the total connected demand as well as the energy demand, will be reduced from what was originally approved. The Board therefore concludes that the application now pending reflects the principles of energy conservation, and incorporates the best available technology for the efficient use of energy. It also concludes that necessary public facilities and services will be available for the project as now proposed, that the project will not place an excessive or uneconomic demand upon those facilities and services, and that the provision for upgrading the public utility facilities and services is based upon a projection of reasonable population increase and economic growth.

The Board will therefore issue a permit allowing the installation of up to 99 electrically heated saunas having a size of 4.5 KW or less per unit. In addition, the Board shall by permit condition require that all condominium units not completed as of the date of this decision have gas-fired kitchen ranges and not more than 100 amp electric service.

V. ORDER

Land Use Permit #1R0522-4-EB is hereby issued in accordance with the findings of fact and conclusions of law herein. Jurisdiction over this matter is returned to the District #1 Environmental Commission.

Dated at Montpelier, Vermont this 20th day of August, 1986.

VERMONT ENVIRONMENTAL BOARD


Darby Bradley, Chairman

Board members participating:

Ferdinand Bongartz
Lawrence H. Bruce, Jr.
Dwight E. Burnham, Sr.
Jan S. Eastman
Samuel Lloyd
Roger N. Miller
Donald B. Sargent