

Environmental Appeal Board

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APPEAL NO. 98-HEA-18

In the matter of an appeal under section 8 of the Health Act, R.S.B.C. 1996, c.179.

BETWEEN:	Brian Bray Larry Rappel Rudolph Maarsman John Biel *Ron Pittman		APPELLANTS
AND:	Environmental Health Off	ficer	RESPONDENT
AND:	R.W. McDermid, Coba Su	nbow Holdings	PERMIT HOLDER
BEFORE:	A Panel of the Environmental Appeal Board Don Cummings, Chair		
DATE OF HEARING:	November 17, 1998		
PLACE OF HEARING:	Kamloops, B.C.		
APPEARING:	For the Appellants:		
	Brian Bray Larry Rappel Rudolph Maarsman John Biel	Brian Bray Marilyn McCaul Rudolph Maars John Biel	ley man
	For the Respondent:	Dan Ferguson	
	For the Permit Holder:	Dick McDermid	1

APPEAL

Five appeals were filed against the August 6, 1998, decision of Mr. Joe Rowlett, Environmental Health Officer with the South Central Health Unit (the "EHO"), to issue Sewage Disposal Permit #98-833 for construction of a package treatment plant system for a bare land strata development on Lot D, Plan 18349, Except Plan 23566, FR. N.W. ¼, Section 15, TP. 23, Rge. 9, W. 6 M., K.D.Y.D. Strata Plan K48, Anglemont, British Columbia. The appeals were heard together.

The Environmental Appeal Board has the authority to hear these appeals under section 11 of the *Environment Management Act* and section 8(4) of the *Health Act*.

^{*} Mr. Pittman passed away after filing his Notice of Appeal but before the appeal hearing.

The Environmental Appeal Board, or a panel of it, after hearing all the evidence, may decide to vary, rescind or confirm the decision of the EHO.

BACKGROUND

The property, irregular in shape (approximating the shape of a boot) and approximately 1.2 hectares (2.8 acres) in size, is located in Anglemont, north of Shuswap Lake. At its closest point (the toe of the "boot"), the property is approximately 110 metres from the north shore of the lake and approximately 30 metres above the surface of the lake. The salient features of the property are as follows:

<u>Topography</u>: The property has an average slope of 21 percent, sloping down from north to south, towards Shuswap Lake.

<u>Squilax-Anglemont Road</u>: The Squilax-Anglemont Road, the main access road to the north shore of Shuswap Lake, connects Anglemont to the Trans Canada Highway. In the general area of the property, the road runs east/west1, alongside and parallel to the shore of Shuswap Lake.

<u>Access to Property from the North</u>: The northern boundary fronts Golden Spur Trail (a subdivision road). The major access to the property takes off from Golden Spur Trail near the northeast corner. This access road runs south for a short portion of its length, and then turns 90 degrees and runs west on the property.

<u>Access to the Property from the South</u>: Access to a portion of the property in the southeast corner (the toe of the "boot") is from Ranch Road. Ranch Road is a culde-sac, approximately 300 metres long.

Southwest of the property, Ranch Road takes off from the Squilax-Anglemont Road, runs north for a short portion of its length, and then turns 90 degrees and runs east – parallel to Squilax-Anglemont Road, ending at the property (the toe of the "boot").

<u>Walt's Road</u>: Wedged between Ranch Road to the south, and the subject property to the north and east, is Cedar Terrace Cottages – a small housing development. Access to several of the units is by means of a road (Easement Plan A9053), designated for the purposes of this appeal, as Walt's Road. Walt's Road takes off from the end of the cul-de-sac and traverses the toe of the "boot" from the southeast corner towards the northwest.

<u>Anglemont Community Domestic Water Supply</u>: On the south side of the intersection of Ranch Road and the Squilax-Anglemont Road, above the high water mark of Shuswap Lake, the community of Anglemont has constructed a domestic water pump house to serve the community of several hundred residents. The pump house is scheduled to come on-line in 1999.

¹ Compass directions used to describe the property are not precise; but serve only to define the general direction.

In 1975, the property was divided into 20 lots ("Strata K48").

All parties agree that Strata K48 is a difficult site on which to construct a sewage disposal system. Various photographs and a videotape2 presented as exhibits at the hearing of this appeal confirm that drainage problems exist on Strata K48. Residential development in the area, particularly uphill, may have exacerbated the problem.

There were at least two prior attempts to obtain sewage disposal permits for different locations on the property before the subject permit was issued in 1998.

On November 30, 1995, R.D. Lewis, P.Eng., of R.D. Lewis & Associates Ltd., applied for a permit to construct a sewage disposal system on the west side of the property. Wyenberg Survey & Construction Services excavated a number of test pits and performed percolation tests on the property. Mr. Lewis testified that he withdrew the application after he discovered the property was much wetter than he had been led to believe.

On September 10, 1997, R.W. McDermid applied for a permit to construct a sewage disposal system on Lot 15. On September 23, 1997, the EHO rejected the application. With respect to the suitability of Strata K48 to accept sewage, the EHO wrote,

From our observations and information gathered from the previous application, be advised that much of the area appears to be unsuitable for onsite sewage disposal systems. Further, due to the presence of an elevated water table, water flowing through the property, presence of bedrock, potential for ground water contamination and alteration of topography we are not prepared to issue a permit without a proper hydrogeological/geotechnical study.

On December 17, 1997, Mr. Lewis, of R.D. Lewis & Associates, submitted a new application to construct a sewage disposal system on behalf of the property owner, R.W. McDermid, Coba Sunbow Holdings (the "Permit Holder"). This application resulted in the permit now under appeal. The proposed system will serve five, two-bedroom condominium units planned for Lots 7, 8, 10, 14, and 15, located near the northeastern corner of Strata K48. The estimated daily sewage flow from these units is shown on the application as 5,680 litres per day.

The system to service these units is a Can West Tank – Whitewater, Model DF 150 FF package treatment plant, with a capacity of 5.7 cubic metres per day. The field dose volume is 1.136 cubic metres per cycle, under pressure, utilizing a siphon. Effluent from the system will discharge to a disposal field located downhill from the condominiums, towards the toe of the "boot." A reserve field is to be located adjacent to the disposal field. Attached to the application was R.D. Lewis Associates Ltd. drawing 9760-001 titled "Sewage Disposal Units 7, 8, 10, 14, 15."

² Taken by the EHO during visits to Strata K48 on September 18 and December 2, 1997, and October 27, 1998.

After receipt of the subject application, the EHO wrote to Mr. Lewis advising that he could not make "an appropriate assessment of the property until this study [a hydrogeological/geotechnical study of the site] has been completed."

On April 9, 1998, the EHO received a geotechnical report on Strata K48 from Kala Groundwater Consulting Ltd. ("Kala"), dated April 4, 1998. The EHO sought and obtained the assistance of Lorne Fish, P.Eng., a Public Health Engineer with the Ministry of Health, to review this report. Mr. Fish's review, in the form of a handwritten memorandum was submitted as evidence. It reads in part:

The report states that a more accurate assessment of soils can be made with further investigation (and) testing. Also, Kala has used other information for assessment but will not be responsible for this information.

It appears soil and surface water conditions for this site are critical – I would suggest a more detailed investigation is needed.

After receiving Mr. Fish's comments, a site meeting was held with the EHO and Mr. Ferguson, both with the Thompson Health Region ("THR"), and representatives from the Permit Holder and Kala. At the site meeting, the THR representatives raised concerns about the suitability of the proposed field areas. Following the meeting, Kala withdrew its report and agreed that further site investigation was required to address groundwater depth and flow, surface water diversion, depth of soil, percolation rate, breakout points, potential for groundwater contamination and protection of Shuswap Lake.

The EHO testified that further site inspections were performed with the above-noted parties present, to observe percolation test holes and observation holes in the proposed field locations.

On June 24, 1998, Kala submitted a second report titled "Wastewater Impact Study" (the "Wastewater Report"). This report was heavily relied upon by the EHO and the Permit Holder in this appeal. The Panel notes that the report is signed but not sealed as required by the *Engineers and Geoscientists Act*.

On July 9, 1998, the EHO met with Mr. Lewis, on behalf of the Permit Holder, and Mr. Blackett, of Kala, and advised them that the THR would not issue a permit because of the following:

- 1. Kala proposed the use of an interceptor drain above the field locations to direct possible groundwater flow around the field locations but no plan of the proposed location and design of drains was provided;
- 2. concern regarding the high seasonal groundwater tables; and
- 3. concern for potential breakout in Walt's Road ditch and Ranch Road below the proposed field location.

On July 20, 1998, Gary Meyers, of Kala, wrote to the Permit Holder as a follow-up to the July 9 meeting. Mr. Meyers is not a Professional Engineer registered with the

Association of Professional Engineers and Geoscientists of British Columbia, but is registered as an Engineer-in-Training.

Mr. Meyers, in his July 20 letter, set out the requirements for location, layout, and depth of ground water diversion trenches, and provided a diagram of a typical French drain section. He stated that with installation of the trenches, groundwater would not likely reach previous levels and the potential for high water "daylighting" (breaking out) in the areas of concern "is negligible".

The Panel was advised that Mr. Fish, the professional engineer who reviewed the earlier report for the Ministry, retired and it appears that an independent technical review of the Wastewater Report and the July 20, 1998 letter was not performed.

On July 27, 1998, R.D. Lewis & Associates Ltd. submitted revised drawing 9760-001 and drawing 9760-002 (both dated July 24, 1998) to the EHO. These drawings incorporate a ground water interception system as set out by Kala. Mr. Lewis told the Panel that drawing 002 shows the correct location of the disposal field and reserve field area, but transposes the labels.

On August 5, 1998, the EHO met with Mr. Lewis and requested two revisions to the drawings:

- 1. Provide a four-metre separation between the lowest trench of the disposal field and Walt's Road.
- 2. Relocate the lowest trench near Walt's Road to the top of the disposal field.

On August 6, 1998, the EHO issued the permit and included various conditions which are summarized below:

- 1. Install the sewage disposal system as shown in the R.D. Lewis & Associates engineered drawings 9760-001 and 9760-002.
- 2. Locate the sewage disposal fields a minimum of four metres from the edge of roadway.
- 3. The use of low-flow fixtures is recommended within the strata development.
- 4. Provide a maintenance contract for the package treatment plant. A certified technician approved by the Ministry of Health must carry out the service work. A copy of the contract is required before Authorization to Operate is granted.
- 5. Protect the reserve and disposal fields from heavy equipment and use to prevent soils from becoming compacted.
- 6. Post a notice on the site and in a local newspaper as required by the *Sewage Disposal Regulation*.
- 7. All separation distances set out in the *Sewage Disposal Regulation* apply.
- 8. Provide a Letter of Certification from the engineer.

The permit was appealed to the Board by five local residents. Mr. Bray is the president of the company that owns Cedar Terrace Cottages – the cottages located below, or to the south of Strata Plan K48. He was representing the interests of the members of the Cedar Terrace Cottages in the appeal.

The Appellants maintain that all of Strata K48 should have been studied, not just the eastern portion of the property. They argue that the permit should be varied to require that this be done. Further, the Appellants expressed concerns that the estimated daily sewage flows shown on the application were not realistic, the water conditions on the site were not adequately considered, and the system, as designed, will not adequately protect their properties and the domestic water supply for Anglemont. Issues of mounding and effluent breakout, maintenance and liability for the system, and protection of the reserve field were also discussed during the hearing.

The EHO and the Permit Holder oppose the appeal. They argue that the EHO properly issued the permit after extensive scrutiny of the site and in accordance with the *Health Act*, the *Sewage Disposal Regulation* and relevant policies. The EHO submits that it was only after ensuring that each of the THR's concerns were addressed by Kala that the permit was issued.

It should be noted that, at the time of the hearing of this appeal, the site had undergone significant change. The lots have been cleared of trees and roads have been constructed. Further, the Permit Holder has substantially constructed condominiums on Lots 14 and 15 and begun construction on Lot 10.

ISSUES

The issues raised in this appeal are as follows:

- 1. Whether estimated daily sewage flows used in the permit application are realistic and accurate.
- 2. Whether all of Strata K48 should have been studied rather than just the eastern portion and the five condominium units that relate to the permit.
- 3. Whether the site conditions are adequate to support a sewage disposal system.
- 4. Whether the EHO properly assessed the possibility of effluent breakout and mounding.
- 5. Whether the responsibility for monitoring, maintenance of the system and liability for future problems have been adequately addressed.
- 6. Whether the fields are properly protected from hazards.

DISCUSSION AND ANALYSIS

1. Whether estimated daily sewage flows used in the permit application are realistic and accurate.

A number of the Appellants contend that the estimated sewage disposal flow of 5,680 litres per day (1,262.2 gallons) is too low. Assuming two or more people in each building unit, they argue that the estimate should be 2,600 or more gallons/day (200 gallons/person x 10 or more people in five building units). The Appellant Biel also questioned whether the figures used in the application, a mixture of imperial and metric units, were accurate.

The EHO testified that metric units govern, and imperial units are used only for convenience. Further, he stated that the calculations of projected flow are taken from Appendix 1 to Schedule 2 of the *Regulation*, are based on year round use, and are correct.

For five, two-bedroom units, the estimated minimum daily sewage flow set out in Appendix 1 is 5 x 1,136 litres per day, which equals 5,680 litres per day – the same number shown in the permit application. The capacity of the package treatment plant is shown as 5.7 m^3 /day, which is just a rounding off of the estimated daily sewage flow.

The Panel finds that the figures used in the permit application are realistic, accurate, and satisfy the requirements set out in the *Regulation*.

2. Whether all of Strata K48 should have been studied rather than just the eastern portion and the five condominium units that relate to the permit.

The Appellants contend that the five eastern lots cannot be viewed in isolation. They point out that Strata Plan K48 shows 20 lots. Many of the Appellants submit that there have been large amounts of water coming off the property leading to road washout and flooded basements. Although the subject permit only relates to five units on one end of the property, they submit that more houses are planned.

Further, the Appellants note that there are already environmental problems in the area. According to a 1996 report by Golder Associates, done for the Columbia Shuswap Regional District:

The subject area [Anglemont] is probably reaching (or may have reached) its carrying capacity for septic disposal to ground. This conclusion can only be determined absolutely by installation and observation of monitoring wells with some hydrogeological assessment.

The Appellants maintain that the entire 2.8 acre parcel should be studied to ensure that the waste from the development will not adversely impact their properties and the lake.

The Permit Holder says that Golder report is not specific to the five cottages in question. The EHO agrees. In his Statement of Points, the EHO states that the Golder report was done at the urging of the North Okanagan Health Region, THR and the Ministry of Environment, Lands and Parks as a result of pollution concerns on the foreshore of the lake. He states that permit applications are reviewed on an individual, site specific basis and often do not look at the combined health and environmental impacts in a geographic region.

The EHO told the Panel that the subject application was examined on its own merit and that the Permit Holder has every right to apply for a permit to serve only five lots. The EHO testified that there is nothing in the *Regulation* to permit him to reject the application because an owner is developing only a portion of a property.

The Panel agrees with the EHO that he acted properly in accepting the application and assessing it on its own merits.

3. Whether the site conditions are adequate to support a sewage disposal system.

For an in-ground sewage disposal system to operate effectively, an adequate amount of permeable, unsaturated soil above ground water and bedrock is required. As the Permit Holder applied for a conventional package treatment plant system, the requirements set out in Schedule 3 of the *Sewage Disposal Regulation* apply. Section 11 of Schedule 3 provides as follows:

11. A conventional absorption field shall not be located in an area where an impervious layer of soil or bedrock, or the ground water table are less than 1.2 m [4 ft.] below the ground before it has been artificially disturbed by placement of fill, excavation or otherwise.

Kala conducted two sets of testing in and around the field areas. The results of both these tests are contained in its June 24 Wastewater Report.

The first set of tests was performed on March 2, 1998. Two test pits were excavated: Test Pit #16 was excavated at the south end of the disposal field and Test Pit #17 was excavated at the south end of the reserve field. Bedrock was reached at a depth of 2.1 m and 1.7 m respectively. No ground water was intercepted in either pit.

The Panel notes that Mr. Wyenberg carried out the March 2, 1998 program under the direction, but not supervision, of Kala. He testified that he is a surveyor. He is not registered with the Corporation of Land Surveyors of the Province of British Columbia, nor is he a Professional Engineer or Professional Geoscientist specializing in the field of hydrogeological/geotechnical engineering.

A second set of tests was conducted on May 11, 1998, after the Ministry had expressed continuing concerns about the suitability of both fields. Of the eight test pits excavated at this time, three were dug within the area of the fields. Test Pits #18 and #19 were excavated at or near the northeast and northwest corners of the disposal field; Test Pit #21 was excavated near the north end of the reserve field3. Bedrock was encountered at 1.6 m, 1.1 m and 1.3 m respectively. No groundwater was intercepted in any of these test pits but some mottling was seen at a depth between 0.75 and 1.6 m from the ground surface in Test Pit #18, at the top of the disposal field.

From the results of these test pits, as well as those excavated above and below the fields, it appears that the depth to bedrock increases to the west and south – towards the bottom of the property and Ranch Road, below the fields.

In the Wastewater Report, Kala describes the soil profile in the area of the disposal field and reserve field area as:

- a thin veneer of loamy topsoil (0.15 to 0.3 m), generally overlying
- a layer of silty sand (0.3 to 0.9 m thick), which in turn overlies
- a layer of silty sand or gravel (0.6 to 1.35 m thick), which in turn overlies bedrock.

It also notes that a lean clay layer was intercepted between 0.15 and 0.75 m. below the surface in Test Pit #18.

From the results of the March 2 and May 11 testing, it appears that both fields generally have more than 1.2 m of soil above bedrock, although the one test pit on the northeast corner of the disposal field (#19) shows slightly less. However, the existence of a layer of "lean clay" found in Test Pit #18 between 0.15 m and 0.75 m below the surface causes the Panel some concern. The R.D. Lewis & Associates Ltd. drawing 9760-001 shows a typical absorption trench depth of 0.6 m which would be in the clay layer. When this clay layer was found, the Panel is of the view that this should have led to additional testing in the rest of the field. Despite the history of concerns regarding groundwater and the soils in the area, there are few test pits within the area of the fields. Further, the differing layers or types of soils in the vicinity of the fields raises concerns with respect to mounding and effluent breakout which will be discussed further below.

Section 11 of Schedule 3 also requires 1.2 m of soil above the ground water table. According to section 2(b) and (c) of Schedule 1, the ground water table shall be determined as follows:

2. ..

(b) Where the ground water table is not affected by infiltration from a body of surface water as described in paragraph (a), the ground water table shall be the average of the 2 *maximum recorded seasonal ground water tables* in

³ There are references to Test Pit #20 being within the reserve field but according to the engineered drawings, and page 6 of the Wastewater Report, it is actually located outside of the field, above lot 10).

the 24 month period immediately prior to the date of application. The records considered for this calculation shall be those acceptable to the medical health officer or public health inspector.

(c) In situations where

(i) no records are available, or

(ii) there is a probability of flooding or a high water table

the medical health officer or public health inspector may determine the ground water table.

[emphasis added]

There is no dispute that the groundwater table fluctuates seasonally. According to Kala, "it would be expected that groundwater quantities would be higher during the freshet than during deficit periods of the year" (p. 4, Wastewater Report).

Although Kala states that its March 2 tests were performed during freshet, the Panel prefers the evidence of the EHO that freshet conditions in the Shuswap area normally occur in May and June. This is supported by the March 2, 1998 soil log which shows an air temperature of zero degrees Celsius. Therefore, only the test results obtained in May 1998 (Test Pits #18, #19, #21) would more likely reflect a period of high seasonal water table.

Although no water was found in the test pits in May, the Appellants contend that the testing was conducted during an abnormally dry year. They argue that the long term residents have observed high ground water levels and provided photographs of the test pits dug in 1995, which contained water throughout the year. The Panel notes that these test pits were located on the west side of the property, which is acknowledged to be much wetter than the east side where the fields are now proposed.

The Appellants also argue that the water problems on the property worsened when the land was cleared of trees and other vegetation. Consequently, they argue, the test results and the Wastewater Report do not reflect normal conditions.

The EHO agreed that 1998 was an extremely dry year, but did not express any concern that the study does not represent normal site conditions. He did not require an additional year of testing in spite of the THR's historical concerns about water on the property (as set out in the "Background" section of this decision), and the presence of mottling in Test Pit #18 between 0.75 and 1.6 m (apparently above the 1.2 m mark).

In its Wastewater Report, Kala notes that mottling is a "general indication of groundwater flow through this layer, but it is not known whether the groundwater flow was recent". The Panel accepts this statement. However, the Panel notes that Mr. Meyers, in his July 20th letter, indicates that mottling was between approximately 1.3 and 1.6 m below the surface. He states that

Bedrock was encountered at 1.6 metres below the existing grade. ...Mottling occurred in the lower third of this [silty sand] layer [directly above bedrock] which would indicate a groundwater flow of approximately 0.3 m. Depth to groundwater would then be 1.3 m or 0.5 m below the invert of the septic field drainage tile, which is greater than the 1.2 m required by the Health Act.

Thus, there is inconsistency on the part of Kala regarding the location of the mottling. The Wastewater Report indicates that it begins at a depth of 0.75 metres below the surface – less than the 1.2 metres required by the *Regulation*, but Mr. Meyers suggests that it is deeper.

At the hearing, Mr. Meyers stated that the mottling found in Test Pit #18 is not a problem as it is unknown when it occurred and, in any event, the groundwater trenches and surface water interceptors specified in the approved plans will be sufficient to lower the groundwater level to ensure the required 1.2 m of natural soil. In his July 20 letter, Mr. Meyers states: "With installation of the GDT [groundwater diversion trench], the groundwater table is not likely to reach previous levels indicated by mottling".

When questioned whether he was satisfied that there is no continuous groundwater, the EHO replied that "he had read Kala's statements and believed them." The EHO relied heavily on the report and the July 20 letter when making his decision to issue the permit.

The Panel has a number of concerns in relation to the testing done to date. Only one set of tests in the field areas was performed during freshet, and the tests were performed in a dry year. The EHO knew that 1998 was a dry year, that drainage on the site was a predominant issue, and that there was evidence of clay in the soil.

The Panel also notes that under the heading "Closure" in its report, Kala states that "Due to changes within subsurface conditions not encountered within the scope of this report, Kala cannot warranty or guarantee subsurface groundwater or effluent flowpaths" (p. 15). Although Mr. Meyers explained to the Panel that this simply means that the results are valid only in the areas tested, combined with the Panel's other concerns, it has little confidence in Kala's conclusions.

Given the serious concerns about water on the site, proper testing and analysis of the conditions in the area of the fields is critical. The Panel notes that section 3.2 of chapter 3 of the Ministry's "Policy – On-Site Sewage Disposal", states that where reports are provided by a hydrogeologist, the EHO should consider whether the report "has been evaluated by a Public Health Engineer". While Kala's first report (April 9, 1998) did undergo such a review, and was subsequently withdrawn, the EHO did not refer the Wastewater Report, which is a very technical report, to a Ministry engineer for a similar evaluation.

While the interceptor drains may help to reduce ground water levels, the Panel is of the view that the EHO should have submitted the Wastewater Report for an evaluation by a Ministry engineer to ensure that there were sufficient representative samples taken in and around the field areas to determine the groundwater table, to fully appraise the conditions on this marginal site and properly assess the proposed system. The importance of this evaluation becomes more apparent given the Panel's concerns in relation to breakout and mounding which are discussed below.

4. Whether the EHO properly assessed the possibility of effluent breakout and mounding.

In his Statement of Points, the Appellant Rappel notes that there is always a brownish-yellow water oozing out of the banks along the north side of Ranch Road (even in summer), and a brownish-yellow water flowing under the Squilax-Anglemont Road and dispersing onto the beach and into the lake, less than 100 m from the domestic water intake (the pump house). All of the Appellants are concerned that, given the site conditions, untreated effluent will mix with this underground flow and contaminate the lake and the domestic water supply.

In his Statement of Points, the EHO states that many of the Appellants' concerns are justified. He testified at the hearing that there are "serious issues with the southeast area where fields are proposed" which the THR took steps to ensure were addressed. The EHO acknowledges the seepage (oozing) on the north side of Ranch Road and near the lake. In his Statement of Points, the EHO states that concerns about escape of effluent to the roadside ditch led to changes in the drawings and the requirement for a minimum 4.0 m separation from the lowest trench to the road. In addition, the EHO states that Kala was required to complete expensive soil testing and modeling to ensure breakout and contamination of the lake does not occur.

In its Wastewater Report, Kala states that the ambient groundwater flow is to the south, eventually discharging into Shuswap Lake approximately 140 m from the field. Kala claims that the "system boundary" for the two fields – that point where the natural environment assimilates sewage to a practical extent, is the ditch on the north side of the lower access road (Walt's Road). It concludes that "attenuation will occur and effluent breakout to the south near the road will not occur" (p. 11).

Regarding the potential for breakout, Mr. Meyers stated in his July 20 letter that the potential of high water daylighting in the Test Pit (#23) below the fields, close to Walt's and Ranch Roads, "is negligible". In that Test Pit, water was intercepted at approximately 2.0 m below the ground surface and no mottling was observed above the gravel layer containing the observed groundwater flow. According to Mr. Meyers, this indicates that the groundwater remains at or below the level of this gravel layer.

Mr. Meyers testified that, while there may be seepage at the Ranch Road ditch, the ditch is 35 m from the field area and the effluent will be renovated long before reaching it. He testified that, based on Kala's modeling, pathogens will be renovated within 6 feet (2 m) of horizontal flow. The modeling also indicated that it would take the effluent plume six months to one year to flow from the field to the lake, and it would take 162 days to fill phosphorous points that could be loaded. If one takes into account plant uptake, the modeling suggests that it would take 49 years to fill spots based on a 45 degree effluent flow spread.

The EHO accepted Kala's findings and concluded that there would not be breakout or contamination of the domestic water source. However, he notes that if breakout does occur, he can issue an order.

Although Kala predicts that breakout of effluent will not occur at the system boundaries, the Panel is concerned by some of the qualifying statements in the Wastewater Report, including the following:

- 1. "Based on the limited soils and groundwater investigation undertaken by Kala in and about the freshet of 1998, Kala is confident that downgradient impacts will be minimal, if all recommendations of this report are adhered to." (p. 14).
- "Kala can not warranty or guarantee that breakout will not occur." (p. 15).

The statement that Kala cannot warrant or guarantee that breakout will not occur was explained at the hearing by Mr. Meyers. He said that Kala could only say that breakout will not occur under "normal conditions", based on annual climatic data. He stated that the system was not designed to deal with "Acts of God" or abnormalities such as a 1 in 200 year flood event.

However, Kala presents a dichotomy when it makes unconditional statements such as "attenuation will occur and effluent breakout to the south near the road (Walt's Road) will not occur" while at the same time admitting the findings are based on "limited soils and groundwater investigation." The Panel recognizes that earth science, in general, is an interpretive science whereby conclusions are drawn from a reasonable number of samples and tests. The question facing the Panel is whether the soils=investigation is sufficient and whether the public's health will be protected. This Panel faces the same question in relation to the potential for effluent surfacing due to the effects of mounding.

Kala assessed the potential for mounding and determined that a steady state condition could be maintained for the design load of 5.7 m³ per day assuming a:

- downward gradient of 0.05 m/m
- minimum depth of 0.7 m of soil
- minimum "hydraulic conductivity" of 1x10⁻⁴ m/s.

Kala claims that the downward gradient is actually steeper at 0.21 metres/metre and this "will act to limit mounding below the disposal field and limit the rise of groundwater levels down gradient of the disposal field."

However, on page 12 of the Wastewater Report, Kala states: "If a hydraulic gradient (sic)4 of 1×10^{-4} m/s over a depth of 0.7 metres can not be achieved, or

⁴ Hydraulic gradient in Darcy's Law, which is used to determine the flow of water in soils, is the ratio between the hydraulic head and length. Being a ratio, it is dimensionless – a pure number. The

the permeability of soils at depth are found to restrict the flow path to shallow depths, then effluent will likely surface." The Panel finds the coefficient of permeability used in this statement is inconsistent with the coefficient used in Appendix B of the Wastewater Report. In the calculation, Kala used a much lower coefficient of permeability of 0.003 ft/day (10⁻⁷ cm/sec) to determine the time it would take for an increase of 2.0 metres of groundwater rise.

The Panel is of the opinion that the study of the site and the modeling must instill confidence that the absorption field will function as intended. That is, it will

- 1. Accept the effluent.
- 2. Treat it through a combination of biological, chemical, and physical processes.
- 3. Dispose of the treated effluent to ground or surface water.

To instill this confidence, the key criterion, in the opinion of the Panel, is an appropriate value for the coefficient of permeability (or hydraulic conductivity). Kala, when calculating soil residency time (p. 9), and natural discharge capacity (p. 10) have used a value of 10⁻⁴ metres per second (or 10⁻² centimetres per second) for the coefficient of permeability. This value is typically more appropriate for soils in the range of sand and fine sand (see Terzaghi, Karl and Peck, Ralph B. (1967): *Soil Mechanics in Engineering Practice*. New York, John Wiley and Sons, Inc., 2nd. ed.; Sowers, George B. and Sowers, George F. (1970): *Introductory Soil Mechanics and Foundations*. Toronto, Collier-MacMillan Canada, Ltd., 3rd ed.).

However, the soil profiles shown in figures 8, 9, and 11 of the Wastewater Report show a predominance of silty sand with lean clays near the northern boundary of the disposal field and towards the toe of the property. For silty sand and dirty sand, one would expect a value in the range of 10^{-3} cm/sec to 10^{-5} cm/sec (10^{-5} m/sec to 10^{-7} m/sec) to be used. One would expect an even lower value to be used for silts and clay.

The Panel notes that Kala dedicates an appreciable portion of the Wastewater Report (one issue section) to natural discharge capacity. Using a coefficient of permeability of 10⁻⁴ m/sec, Kala concludes the natural discharge capacity of the disposal and reserve fields to be 22.86 m³/day. This is *greater* than the proposed daily effluent loading of 5.7 m³/day. Kala argues that consequently, the ground in the location of the fields actually takes away, or has the capacity to take away, three times the amount of water going into the ground from the system.

However, the Panel notes that if the coefficient of permeability for silty sand is used $(10^{-3} \text{ cm/sec} (10^{-5} \text{ m/sec}))$, which may be more appropriate, then the natural discharge capacity is reduced to 2.286 m³/day – *less* than the proposed loading. By virtue of dedicating an entire section of the Wastewater Report to this issue,

coefficient of permeability expresses the ease with which water passes through soil and is usually reported with the dimensions of centimetres per second. Kala has chosen to report it as metres per second.

Kala obviously deemed it important and further supportive of its claim that the proposed fields will accept and treat effluent without posing a hazard to the public health.

However, Kala never explains why it assumed a permeability of 10⁻⁴ metres/second. It does not provide the rationale used to select the figure – whether it is a direct or an indirect determination. Then, having used this figure, Kala cautions the reader that if the figure is incorrect, which the Panel believes may be the case, "then effluent will likely surface." Given the Panels concerns with the coefficient of permeability used by Kala for these soils, the Panel has little confidence that breakout and mounding will not be a problem.

The Panel also notes the soil is anisotropic. Kala presents no information or analysis of the impact of anisotrophy and whether it will or will not have an impact on effluent breakout.

The EHO does not profess to have expertise in the fields of soil science or geotechnical engineering. As noted above, he obtained and relied upon the inhouse expertise of Mr. Fish, P.Eng, to review the technical merits of Kala's first report. However, no independent review of the Wastewater Report was performed by a professional engineer or professional geoscientist working with, or for, the Ministry. Without this independent review, the Panel is of the opinion that the EHO was unable to appreciate the significance of some of the statements made by Kala. In turn, he issued a permit that may not protect the public health as he envisioned.

Further, the Panel notes that the quality of the effluent after treatment, and before its release to the disposal field, is unknown. The *Regulation* does not establish limits for biochemical oxygen demand, total suspended solids, and coliform count. Mr. Lewis, responding to a question, could not state how effective the proposed treatment will be other than that he expected reductions in the order of 95% for both biochemical oxygen demand and total suspended solids. Kala's Wastewater Report suggests that the 5 day biochemical oxygen demand for the effluent "will likely be" in the order of 45 mg/L and the total suspended solids "may be" 60 mg/L at the absorption field distribution box (p. 2). It is unclear where these estimates come from and whether they are accurate estimates.

Given the marginal nature of the site, the very technical nature of the Wastewater Report and the July 20 letter, and the Panel's concerns, the Panel finds that these documents should be subjected to an independent review.

In his submissions, Appellant Biel suggests that to minimize the possibility of effluent breakout, the two proposed fields should be located near the northeastern corner of the property. However, Mr. Lewis, of R.D. Lewis & Associates, disagrees. He told the Panel that the system, as designed, works under gravity. A siphon is used to dose the field under approximately one p.s.i. of pressure. This, he contends, is much preferable to a system using a pump. The Panel agrees.

5. Whether the responsibility for monitoring, maintenance of the system and liability for problems has been addressed.

In their Statements of Points, some of the Appellants expressed a concern that the system would not be properly maintained. Some of the Appellants also questioned who would be responsible if effluent breakout occurs. The Appellant Biel suggests that monitoring wells be installed to monitor effluent.

The EHO states that an operating and maintenance agreement must be in place before he grants final authorization to use the system pursuant to section 4(1) of the *Regulation*. He also stated that the Strata will be responsible for the long term operation and maintenance of the system. Regarding future liability should a breakout occur, the EHO states that while there are no performance standards in the *Regulation*, there is a requirement that sewage not reach the surface of land or create a health hazard. If the THR receives a complaint and investigation confirms that sewage is reaching land, an order would be issued to remedy the situation.

Mr. Lewis testified that for the first two years, there is a service agreement between the Permit Holder and the company representative who will inspect the system on a prescribed schedule as required by Condition No. 4 of the permit.

While the permit requires that a maintenance contract be in place for the package treatment plant, and there are enforcement tools available to the EHO should problems develop in the future, the Panel agrees with the Appellant Biel that, given the severity of the conditions on the site, the permit should require the Permit Holder to develop a monitoring program to test for effluent breakout and mounding. This is supported by Kala's recommendation that "regular visual monitoring of downgradient slopes should be ensured" (p. 15, Wastewater Report). In its closing, the Permit Holder stated that Mr. Biel's idea of monitoring is a good idea and it has no objections to doing so.

Finally, the Appellants were concerned about possible flooding of their properties. They maintained that intercepted ground water, collected by ditches running alongside Walt's Road and Ranch Road, will flood the basements of those living below Strata K48. The Appellant Biel testified he lives along the lower reach of Ranch Road and is concerned that he will get seepage into his basement from increased flow running in the ditch.

In its Statement of Points, the Permit Holder pointed out that the owner will obtain the required insurance under the *Condominium Act*.

The EHO argued that the issue is beyond the jurisdiction of the Ministry of Health and, therefore, the Board. While increased surface flow will undoubtedly result from installation of the interceptor drain, a necessary component of the disposal and reserve area fields, the Panel agrees that it is not an issue that falls within the jurisdiction of the Ministry of Health or this Panel.

6. Whether the fields are properly protected from hazards.

There was some evidence presented at the hearing which indicated that the integrity of the reserve field may be threatened.

The reserve field area lies between Walt's Road to the south and Lot 10 to the north. Both the EHO and Mr. Meyers testified that equipment had crossed over the reserve field area. A culvert in the ditch running alongside Walt's Road allows access to the reserve field and to Lot 10. The EHO told the Panel that he wanted the culvert removed to prevent damage to the reserve field area and that such direction "could be a condition for use." The Permit Holder contends that the culvert is necessary to provide access to Lot 10.

Another threat to the integrity of the fields is a proposed road to cut diagonally across Strata K48 from the northwest, connecting the access road to Golden Spur Trail to Walt's Road. This road may adversely affect the disposal field.

The Panel is concerned about maintaining the integrity of both disposal fields given the resistance shown by the Permit Holder to remove the culvert in the Walt's Road ditch. Further, the Panel notes that the Permit Holder has generally shown disregard for direction. The representative for the EHO wrote, in his Statement of Points,

Mr. Rowlett requested that the applicant discontinue disturbing the natural ground surface until the sewage disposal issue was addressed. In fact, the original disposal field area (now reserve area) was being parked and driven on during construction of Unit 10.

Condition No. 5 to the permit simply directs the Permit Holder to protect the reserve and disposal field. In light of the concerns identified above, the Panel finds that the permit should specify what kind of protection is intended for the fields and should stipulate a date when such protection is to be installed. The Panel recommends that fencing, bollards, or some other means of protection be constructed to protect the disposal field and reserve field area from vehicular traffic and construction equipment and should be in place permanently.

DECISION

In making its decision, the Panel of the Environmental Appeal Board has carefully considered all relevant documents and all evidence and arguments made during the hearing, whether or not they have been specifically reiterated here.

On the evidence presented, the Panel has found that a number of the Appellants' concerns in relation to the permit are well founded. The Panel has identified certain important issues which may affect the credibility of the study and the conclusions reached in the Wastewater Report and Mr. Meyers July 20 letter, which were relied upon by the EHO when issuing the permit. This causes the Panel to question whether the ultimate use of this system will contravene the *Health Act* and/or the *Sewage Disposal Regulation* (i.e., it may not adequately protect the public health). However, the EHO does not have sufficient expertise to determine whether the conclusions are fatally flawed, and the Panel does not have sufficient evidence before it to make this determination. If the conclusions are fatally flawed, the permit should be rescinded and further study completed. However, if they are not, the permit should stand.

In light of the above, it is premature and ill advised to unconditionally confirm or rescind the subject permit. However, the Panel is prepared to give conditional approval to the permit, subject to the following conditions and permit amendments:

- 1. In accordance with the *Engineers and Geoscientists Act*, the Wastewater Report must be sealed by Mr. Topp, P.Geo., of Kala. The Panel understands that the EHO has a copy of the Wastewater Report on file. If Mr. Rowlett does not have a copy on file, Mr. Topp is to supply Mr. Rowlett with a copy of the report. The report shall not be edited, corrected, amended, modified or changed in any way from that originally submitted and referred to during the course of this appeal.
- 2. The July 20, 1998, letter by Mr. Meyers must also be sealed. As Mr. Meyers is not registered as a Professional Engineer in the Province of British Columbia, the July 20, 1998 letter must be sealed, signed, and dated by Mr. Topp if it was prepared and delivered under his direct supervision. If the letter was not prepared under his direct supervision, Mr. Topp will issue a new letter sealed, signed, and dated. If he disagrees with statements made in the letter, he shall make any necessary corrections and highlight them for the benefit of the reader.
- 3. The EHO shall have both the June 24, 1998, Wastewater Report and July 20, 1998 letter (as may be amended by Mr. Topp), reviewed by a professional engineer or geoscientist working for, or with, the Ministry of Health or the THR. This person should be qualified and trained in soil identification, hydrogeological and biochemical principles and must be provided with a copy of this decision so that he or she is aware of the Panel's concerns.
- 4. After reviewing the Wastewater Report, the letter, and this decision, the professional shall, as a minimum, state
 - Whether the two proposed disposal fields will accept effluent at the rate shown on the permit.
 - Whether effluent will surface or breakout before renovation thereby creating a threat to public health and/or objectionable odors.
 - Whether additional testing of ground water levels is warranted.
- 5. The review is to be provided to the EHO for his consideration. If the EHO is satisfied that the review supports the conclusion that the system will protect the public health, the permit is confirmed, provided that the following amendments are made to the permit, as well as any other amendments the EHO may add as a result of the review:

<u>Condition No. 1</u>: This condition requires the system to be installed in accordance with the R.D. Lewis & Associates Ltd. engineered drawings 9760-001 and 9760-002. As these drawings have incorrectly labeled the field areas, the Panel orders that these drawings be revised to correctly label the disposal field and reserve field areas. Further, setback distances from Ranch Road and Walt's Road shall be added to

the drawings. These revised drawings are to be signed, sealed, and dated.

<u>Condition No. 5</u>: This condition shall be amended to specify the kind of protection required for the reserve and disposal fields to protect those fields from vehicular traffic and construction equipment (e.g. fencing, bollards, or some other means of protection satisfactory to the EHO); to stipulate a date when such protection must be installed; and to require such protection to be permanent.

<u>Condition No. 8</u>: The permit should be more precise in stating who is to certify what. Therefore, this condition shall be amended to read

A Letter of Certification is to be provided by the Project Engineer, Mr. Lewis, P.Eng., or in the event Mr. Lewis is unable to do so, by a Professional Engineer registered in the Province of British Columbia, preferably in his employ. The Letter of Certification is to be signed, sealed, and dated.

<u>Condition No. 9</u>: The Permit Holder must develop a monitoring program to test for effluent breakout and mounding as recommended by Kala on p. 15 of its Wastewater Report.

The expiry date of the permit is one year from the date of this decision.

COSTS

The Permit Holder raised the issue of costs. He suggests that he has exercised due diligence in hiring competent professionals. The fact that the EHO issued the Permit should instill confidence that the sewage disposal system will work. He suggests that one can enter a public building feeling confident it will not collapse because of sound engineering. He contends the same holds true for his sewage disposal system.

The Permit Holder claims he could have sold two cabins by now if the appeal had not been launched. He claims the appeal is unnecessary and has cost him money.

The Appellants claim the development may affect their future domestic water supply and have "just cause" to challenge the permit. Further, under a "democratic system" they have every right to appeal to the Environmental Appeal Board.

The Respondent, in his Statement of Points writes

We are pleased to acknowledge that the residents of Anglemont are concerned with neighbouring development including potential health impacts, breakout of sewage effluent, pollution control, and ultimately the protection of Shuswap Lake which will soon be their source of drinking water. Many of their (the Appellants) statements are accurate and concerns justified.

The Environmental Appeal Board, under section 11(14.2)(a) of the *Environment Management Act*, has the power to order costs in an appeal. This section

authorizes the Board to require a party to pay all or part of the costs of another party in connection with the appeal. A party seeking costs under this section may make a submission to the Panel hearing the appeal with respect to an award of costs at the conclusion of the hearing.

The Board has not adopted a policy that follows the civil court practice of "loser pays the winner's costs." The Board's policy is to award costs in special circumstances.

The Panel, after hearing the appeal, has found that many of the Appellants concerns were justified. The Panel finds that the Appellants did not act improperly in appealing the decision of the EHO. Consequently, the Panel rejects the Permit Holder's request for costs.

Don Cummings, Panel Chair Environmental Appeal Board

March 15, 1999