Where do we go from here?

We are not going to be permitted to continue operating Pete's Lake water system in the way that it has been operated up to now. We need to make some decisions on which improvements and approaches to try to follow through on, or whether to discontinue providing water from Pete's Lake.

Hopefully, you have read and digested the previous 10 short "chapters" that provide basic information about the need for water treatment in general, the specific circumstances regarding Pete's Lake water system, legislated duties and responsibilities regarding provision of safe water and some options for how to treat water to make it safe.

Following the circulation of this final chapter, a survey will be distributed to all members to help crystallize understanding of the diverse needs and interests of all members. We will then hold a "town-hall" style information and discussion meeting to gather additional viewpoints and ideas and answer questions that may have arisen. We hope for strong participation in the survey as soon as is practical, so that we can provide preliminary results at this meeting. The survey will remain open for response until sometime after the meeting so that, if they wish, members can update their responses following the meeting.

The basic options that <u>may</u> be available to us are outlined below. These are called "basic" options because within each category there are multiple solutions. Once we establish the <u>type</u> of change(s) that we want to make, we can deal with specific options and costs. None of the options will be without cost for everyone. Some options may share the cost evenly, some may share cost according to use, some may have little cost for some and very high cost for others.

There are four major concepts for us to decide between:

1. **No water distribution from Pete's Lake.** (Options A, B)
2. **No treatment and not used for potable or "other" domestic uses** (Options C, D)
3. **Treated at Point of Entry or possibly Point of Use** (Option E)
4. **Treated in a centralized plant near the lake, with chlorine residual for distribution.** (Options F, G)

Definitions for the purposes of this chapter:

- **Potable uses:** drinking, food preparation, washing of fruits and vegetables that may not be cooked before eating, washing dishes, brushing teeth, cleaning wounds
- **"Other" domestic uses:** household uses such as washing clothes, showering/bathing, flushing toilets, general cleaning
- **All domestic uses:** Potable uses plus "other" domestic uses. [Does *not* include uses such as watering garden and other uses outside of the dwelling unit.]

Options A and B provide two ways for people to separate themselves from PLWUS if they no longer want to take water from the system. Disbanding the society does not mean going "back" to some other arrangement for distributing water from Pete's Lake. Any distribution system will still fall under the jurisdiction of Island Health.

Basic Option A. <u>Disband the society.</u>

We can disband the society. No one gets water from Pete's Lake unless they apply individually for water rights and individually run their own piping. <u>Requires no negotiation with IH.</u>

- Cons:
  - No more water from Pete's Lake for any purpose.
  - Water License and Operating Permit will be cancelled.
  - Society may be required to remove waterworks from lake.
  - Everyone has to go it alone. Everyone will have to supply their own water for all purposes.
  - ***Individuals can apply for water license from lake and put in private (one house) piping, but if people band together to share pipes (2 or more connections) or one person supplies water to any other property, or if any property is rented, those people will again be subject to IH requirements.***
  - Because PLWUS was designated as a non-member-funded society at the AGM last year due to accessing government grants, assets of PLWUS, or proceeds from sale of such assets, would need to be distributed to another (non-member-funded) society, community service cooperative, registered charity or charitable purpose trust.
- Pros:
  - No more PLWUS. No meetings. No fees.
  - If everyone goes it alone, no Island Health (IH) involvement.
- Costs:
  - PLWUS: Possible costs to disband and to remove lake outlet and manifolds.
  - Individuals: Full costs for everyone to provide alternate water source for all purposes.

Basic Option B. Individuals <u>leave PLWUS and go it alone.</u>

Members always have the right to leave the society, disconnect from the Pete's Lake supply and make their own way. <u>Requires no negotiation with IH</u> for those who choose to leave PLWUS.

- Cons:
  - Need to find your own source for all water.
  - Fewer members to provide "convincing power" to Island Health.
  - Fewer members to provide energy, time and guidance to continued operation of PLWUS.
  - Fewer members to share costs.
- Pros:
  - For those who choose to leave: Individual freedom of action. Freedom from PLWUS hassles.
  - Remaining PLWUS members can continue to take Pete's Lake water.
  - PLWUS can continue to seek solutions to permitting issues.
- Costs:
  - PLWUS: Fewer members to share costs if central system chosen.
  - Individuals: Full cost for those that leave to provide other water source for all purposes.

Options C and D outline two situations in which water can still be accessed from Pete's lake with no treatment. One requires users to provide water for all domestic uses from a completely separate supply and the other requires users to provide only their own potable water, allowing them to use Pete's Lake water for other domestic purposes such as washing clothes and showering.

Basic Option C. Small System #1: Seek a Raw Water distribution permit.

Pete's Lake water may not be connected to any buildings in which there is a kitchen or bathroom. All water to those buildings must be from a separate supply. This should be relatively easy to negotiate with IH but will provide irrigation and fire protection water only. No domestic use. Water system will still be under IH, but potable standards will not apply.

- Cons:
  - ***All buildings that contain a kitchen and/or bathroom must be permanently disconnected from Pete's Lake water distribution system.***
  - **No water from the system may be used for any domestic purposes**
  - May still have IH requirements especially regarding inspection to ensure that buildings remain disconnected.
- Pros:
  - PLWUS does not have to treat water.
  - Untreated water available for frost protection of lines, irrigation and fire protection.
- Costs:
  - PLWUS: No additional costs beyond current operation and maintenance, except to ensure that water is not used for any domestic uses (even if treated).
  - Individuals: Full costs to provide alternate water source for all domestic purposes.

Basic Option D. Small System #2: Separate Potable Water Supplied by Individuals

Pete's Lake water may be permitted to enter the house, but it must not be connected to kitchen or bathroom sinks. A separate potable water source must be provided to supply kitchen and bathroom sinks with safe drinking water. This will be unlikely to negotiate with IH because it is much more difficult to monitor.

- Cons:
  - Everyone must figure out and maintain ***their own potable water system*** (eg well, rainwater catchment or water transported from elsewhere***) that does not involve treatment of Pete's Lake water.***
  - Will still have IH requirements, especially regarding inspection to ensure that no potable use is being made of Pete's Lake water and that suitable potable water is being supplied.
- Pros:
  - Untreated or partially treated water for "other" domestic purposes may be distributed (with some restrictions) to buildings that contain kitchen and/or bathroom.
  - PLWUS does not have to treat water.
  - Untreated water available for frost protection of lines, irrigation, fire protection and "other" domestic uses.
- Costs:
  - PLWUS: No additional costs beyond current operation and maintenance, except to ensure that water is not used for any potable uses (even if treated).
  - Individuals: Costs to provide potable water from a separate source.

Option E would allow domestic and potable use of Pete's Lake water without central treatment. Water could be supplied untreated to homes provided that approved treatment systems are installed in every home. This would be what is called Point of Entry (POE) or Point of Use (POU) treatment. Non-potable water is piped into every house.
Case 1: POE devices treat all the water entering the property/house or building to make it potable.
Case 2: POU devices treat water only at specific points where potable water is required (e.g., single outlets or faucets such as a kitchen and bathroom sink).

Typically, these devices use filters and either ultraviolet (UV) radiation or reverse-osmosis (RO). See the POE/POU Update regarding a new very low-power UV system that uses LEDs. Additionally, IH can put restrictions about what kind of equipment to use, maintenance, testing, reporting, etc. It would be PLWUS's responsibility to make sure all units are properly installed and maintained. To facilitate this, legal rights for PLWUS to access the equipment will be required.

Basic Option E. **Small System #3: Point of Entry (POE) or Point of Use (POU) treatment**
Pete's Lake water would be permitted to enter the house, but it must not be connected to kitchen or bathroom sinks unless treated by POE or POU devices. It should be possible to negotiate with IH, but POE would be more readily accepted than POU would be.

- Cons:
  - Systems will have to be inspected and monitored by PLWUS.
  - Systems may have to all be the same. (We would try to avoid this.)
  - Systems may have to be owned and maintained by PLWUS.
  - Depending on type of system chosen, there may be power requirements.
  - May require considerable effort to get IH approval.
- Pros:
  - Pete's Lake water can be provided to all users for all uses.
  - Untreated or partially treated water for "other" domestic purposes may be distributed (with some restrictions) to buildings that contain kitchen and/or bathroom.
  - PLWUS does not have to treat water.
  - Untreated water available for frost protection of lines, irrigation, fire protection and "other" domestic uses.
- Costs:
  - PLWUS: No additional system costs beyond current operation and maintenance. Additional operating costs to ensure that all water used for any potable purposes is adequately treated using the installed POE/POU systems.
  - Individuals: Initial cost of POE/POU units, installation and maintenance. This might be direct costs or may be costs paid through PLWUS assessments.

Options F and G relate to the many different options for centralized "at source" treatment. This would include treating all (single distribution system) or only some (dual distribution) of the Pete's Lake water that is delivered by our system. If a dual system were used, all subscribers would need to take both treated and untreated water.

We could buy a prepackaged plant, have a plant designed and built for us or possibly build part of the system ourselves. The plant would include pretreatment through chemical coagulation and flocculation followed by rapid sand or membrane filtration and treatment by chlorine, UV or slow sand filtration. Alternatively, these options could also include well water if we could find a good groundwater source. If it is a clean source, pretreatment may be eliminated, but then two treatment steps would be required. In any case, low dose residual chlorination would be required for distribution. Additionally, water storage tank(s) would be required and most likely some pumps and therefore also a generator to supply power.

The difference between options F and G are only in who would provide upfront capital, design, build, operate and administer a central treatment plant. The following list of Cons and Pros relates to either option. Cons and Pros that relate only to the particular option are listed on next page.

- Cons:
  - Chlorinated system – concerns regarding consumption of water containing residual chlorine and trihalomethanes
  - Requires additional land base for processing plant. This may be difficult and/or expensive to get as Magic Mountain may not be willing. A lot of decisions to make about what, where, when, how.
  - Cost of required certified operator.
  - Power requirements for prefiltration system and pumping to storage tanks, also possibly for re-pressuring the distribution system if treatment plant is significantly lower elevation than the lake.
  - Storage and transport of chlorine source (chlorine gas or hypochlorite).
  - All water for irrigation, fire protection and "other" domestic uses must be treated or a twinned system for domestic and non-domestic uses must be developed.
  - Twinned system requires entirely new distribution system, rights of way, Ministry of Highways approval and DFO approvals for underwater lines. Approval for underwater lines unlikely.

- Pros:
  - Chlorinated system – high microbiological safety when functioning correctly.
  - "State of the Art" / "Gold Standard" well proven system, run by certified operator.
  - Users should not have to do any water treatment on site unless they choose to.
  - Certain to get IH approval eventually.

Basic Option F. **<u>At Source Treatment #1:</u>**
System built and maintained by PLWUS (residual chlorine for distribution)

- Cons (see above plus):
  - A lot of administrative work up front.
  - A lot of ongoing administrative work and increased responsibility regarding reporting, supervision of employees and more complicated and critical systems than what is currently in place.
  - Increased liability as users can reasonably believe that delivered water is safe to drink without further treatment or concern. Under or overdosing of chlorine residual could create either microbiological or chemical (chlorine) safety hazard and failure in pretreatment process could result in high levels of trihalomethanes.
  - All capital funds must be raised before/during construction.
  - PLWUS is not eligible for current infrastructure grants.
  - Cost must be divided amongst users and paid "up front" unless PLWUS can somehow borrow funds.
- Pros (see above plus):
  - Some control over system choices
  - Some control over costs (especially negotiating with local contractors)
  - Some control over fees and rules.
- Costs:
  - Additional costs for twinned system if chosen.

Basic Option G **<u>At Source Treatment #2:</u>**
System built and maintained by qRD (residual chlorine for distribution)

- Cons (see above plus):
  - Loss of control over system choices.
  - Loss of control over costs (almost certainly a lot more expensive than doing it ourselves)
  - Loss of control over fees and rules.
  - Unlikely that qRD would accept liability for a dual distribution system, therefore all water for frost protection, irrigation, fire protection and "other" domestic uses will be treated.
  - <u>qRD may not be willing</u> to provide a water service.
- Pros (see above plus):
  - Some of cost may be offset by infrastructure grants. Best case almost 75% of costs could be covered.
  - Cost is unlikely to be charged "up front" but rather would be paid by higher usage charges over a long time period.
  - No more PLWUS. No meetings. No membership fees.
  - No PLWUS responsibility or liability for operation, maintenance or safety of system.
- Costs:
  - Total cost to build comparable system would be greater than if PLWUS built the system, but some of cost may be offset by infrastructure grants.
  - Likely that treatment plant would be considerably larger than what we might choose for Option F (no dual system).

Where do we go from here?

The list above is a skeleton of the available options. Each of options C through G has much more to it than what is presented here, but this list fairly represents the initial decision that we must make as a society:

Once we decide which direction or directions we wish to pursue, then we can look more closely at the specific options available, whether or not or how we can get approval, what up front and ongoing costs would be involved, what kind of timeline we can accomplish the change(s) in, how much we want to do with volunteer energy vs how much we contract out, what kind of management structure we would need to develop, etc.

Some information regarding options and costs is available in the MSR and HyGeo consultants' reports. Unfortunately, some of the information, particularly with regard to POE/POU systems is misleading. Although possibly accurate for the systems as described, many other much lower cost options are available. Costs for rainwater catchment have also been challenged by a local contractor. Costs for central treatment plants and POE are "class D" estimates (± 50%) plus 30% contingency. They are based on a roughly estimated water requirement of 40,000 L/day (8,800 imp. gallons/day), whereas our water license provides for 50,000 imp. gallons/day (230,000 L/day). The systems as designed would have to be bypassed, requiring boiled water advisory, during the coldest part of winter and in the event of firefighting water demand. Following such events the system would have to be super-chlorinated, flushed and tested extensively before the water would be considered safe to use again without boiling.

Because of the shortcomings of current cost estimates, it is wiser to consider only "ballpark" figures. Unfortunately, all approaches will have some cost involved. There will be both capital costs and maintenance costs for all situations. Costs for finding or setting up your own water source, for all or some of your needs, may vary widely depending on characteristics of siting, needs and "who you know". Costs for POE or POU systems may be greater or less depending on individual needs, how much plumbing or electrical might need adjusting, what system is chosen, how much monitoring is required, whether monitoring is done by a single hired person or a group of volunteers. Cost for a central system will depend on what volume of water will be treated, what kind of system is chosen, and who builds and operates it (qRD or PLWUS).

Deciding where we go from here represents a new beginning, not an endpoint.

Hopefully, this information series has helped you to understand many aspects of the complicated and difficult situation that we currently face as users of Pete's Lake water.

In an effort to help crystallize the interests, needs and water uses of all members, please, after you have read this series, keep it available for reference and complete the survey at the link that will soon arrive in your mailbox.