

RECORD OF REVISIONS

For

TECHNICAL PEER REVIEW OF
DRAFT COMPREHENSIVE DRINKING WATER
SOURCE TO TAP ASSESSMENT GUIDELINE

Jennifer Maxwell

March 7, 2005

GENERAL COMMENTS

Peer Review	STAT Direction			Revision Comments
Reviewers' comments & suggestions	Accept	Reject	Defer	
OVERALL				
<p><u>General Comments</u></p> <p>I think that the draft is a good start. A well thought out guide that incorporates the ideas discussed at the workshop would be a very useful tool for both the water suppliers and the drinking water officers.</p> <p>The bottom line is, I do agree it is time to take drinking water more seriously and I am glad that this process reflects that seriousness.</p> <p>We likely cannot get the document full-proof the first time. Amendments will need to be made after it is used for a period. I suggest that workshops be scheduled in about a year's time to get feedback on how it has been working.</p> <p>One reviewer stated that he likes the document in its present form in that it defines the kind of work to be done and provides some boundaries on the assessment.</p>	✓			
<ul style="list-style-type: none"> • It was pointed out that obtaining results was the key and a means of measuring this was important. • Needs to be more outcomes based (e.g., focus on Step 8, recommendations) • With each step there should be clearly stated at the outset what the expected outcome is for the step. 	✓			Clearly identifying assessment components on the first page of each module achieves this. Actual results will be seen when the water supplier implements a risk management plan to address concerns identified through the assessment process.
<p><i>It was suggested to do a step-by-step case study in order for the document to become as useful a document as it can possibly be.</i></p>			✓	<i>The pilots can provide examples for case studies.</i>
<p>A comprehensive understanding of sustainability is not reflected in this document, does not</p>	✓			The concept of sustainability is an integral component of

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seem to be an underlying philosophy.				the assessment end point and this has been expressed more clearly in the revised draft.
The assessment should be conveyed as a tool that is for their benefit so that they can understand and operate their system more effectively (since they must pay for it).	✓			Agree. Discussed in Introduction.
Introduce the concept of barrier strength and reliability earlier should clarify for later risk characterization modules.	✓			Agree. Presented in Introduction and discussed in each module.
It is evident that there are many players responsible. This could be better spelled out in the document.	✓			Agree. Diagram to illustrate? Pilots?
<u>Updating mechanism for guideline</u> <ul style="list-style-type: none"> • Include an updating mechanism in the Guideline to keep it current • Q3. To keep the document current, how often should updates be done? At least one reviewer suggested that there must be an updating mechanism included in the report. Is the document dated already? Is it oriented toward the future? How does the document compare on an international level? 			✓	Updating mechanism for guideline to be determined at a later date.
<u>Updating assessment on regular basis</u> Is there a recommendation/requirement for reviewing and updating the assessment on a regular basis? Who is responsible for doing this?	✓			Requirements for updating assessments will be determined by the DWO. This is spelled out in the introduction of the revised draft.
<u>Need to identify clear endpoint of document:</u> Could end after risk ID (e.g., move Step 8 to Asses. Response Plan phase) Should it be replaced with a section dealing with recommendations? I like the idea of ending the document at Step 7 keeping the focus on identifying the hazards and assessing the risk (i.e. the assessment). Step 8 may be better served in an Assessment Response Plan guidance document along with examples of measures to address specific threats or risks.		✓		Guideline will include Module 8 as it identifies the necessary actions to address drinking water hazards. If an assessment response plan is done following the assessment it will be the plan developed by the water supplier to say how he will implement the necessary measures for drinking water protection, taking into account the hazard characterization and risk management strategy in the assessment report, as well as other factors unique to the water supplier. Rationale for Module 8 and difference between Module 8 and Assessment Response Plan is clarified through Figure 8-1.

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<p><u>Need to identify endpoint of assessment scope</u></p> <ul style="list-style-type: none"> One reviewer posed the question, 'Where is the endpoint of the assessment?' Comments ranged from 'It is clearly the tap', 'Technically, the document is all inclusive, i.e. to the tap', 'This could be better spelled out in the document' to 'I don't think there is consensus in the industry of Health Authorities where the end point should be'. Only 44% answered that they were clear where the endpoint of the assessment was from reading the document. One reviewer suggested that a statement be made to the effect that users have some responsibility for the integrity of the system beyond the property line. Another reviewer adds that private plumbing is problematic. The decision of the end point is to be made by the DWO, perhaps this point could be made clearer in the document. <p>Q39. Where is the tap? There are a variety of situations that require flexibility and are more complex i.e. distribution of water from inside to outside park boundaries, issue of first nations in that they distribute water outside their legal boundary to neighboring communities etc. Assessment of risk would be tricky.</p> <p>40. Does tap mean; pipes, valves, the tap itself and anything else off the water main that feeds to the individual residence? Are there other interpretations?</p> <p>41. What is 'source'?</p>			✓	<p>The ultimate endpoint of the assessment is a safe and sustainable water supply.</p> <p>The DWO will define the scope of the assessment. Pilots will define some parameters.</p>
<p><u>7.2</u> Figure 7.1 better captures the interrelationship of management, governance and funding and the physical assets and human activities required to ensure a safe drinking water supply.</p> <ul style="list-style-type: none"> Perhaps this figure could provide the basis for how the guide is structured. 		✓		<p>Barriers are only one side of the assessment coin. The figure and associated barrier evaluation complements the identification of hazards through a structured and logical process.</p>
AUDIENCE				
<p>1. There needs to be a clearer indication of who the guideline document is written for. The 2 potential reader groups are professional consultants, engaged to do the assessments, and the water suppliers, who will use the document to conduct their own assessments. The present document is not well suited to either. One solution is to have two separate documents. The first, a simplified document for water suppliers and for</p>	✓			<p>The audience for the document was clearly identified on pg. 6 of the CS2TA document under "Who Should Use this Guideline". Reviewers clearly felt that the style of the document did not match this statement. In the revisions, the document was streamlined to be made more</p>

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<p>consultants a more prescriptive, yet flexible document.</p> <p><u>Intended audience unclear</u></p> <p>Q17. How user friendly or inviting is the document for the intended reader/user? Who is the intended user? At least 3 reviewers indicated that it might be better to have the document written with the water supplier in mind rather than the professional consultant. If the intended reader/user is the consultant they have much of the technical information already.</p> <p>If water suppliers are not able to understand the document this will put an increased level of responsibility on the DWO.</p> <p>It is difficult to follow the linkages from one user to the other. What about having a companion document to solve the issue of who the document is written for? i.e. a different document for each user. This would bridge the information for each user. Text boxes could also be used to clarify/highlight information. The use of executive summaries could also be effective.</p> <p>Valerie Cameron explained that an 'Interpretation Guide' is being produced which will play an important role as it fits in between the Screening Tool and the 'CS2TA' Guideline document.</p>				<p>accessible to less technically oriented audiences.</p>
ROLES & RESPONSIBILITIES				
<p>4. Clarify the context of the document and clearly indicate who does what after Steps 1 to 7 are complete. More direction as to who is going to take action once risks are identified in Step 7? Was the goal to develop mitigation strategies, write recommendations or foster awareness of the hazards? Even with the explanation of the Screening Tool and the Assessment Response Plan, different reviewers had various impressions as to their roles and responsibilities. Outlining some realistic scenarios in Step 8 would provide an excellent guideline as to who would be expected to take action once a risk is identified and what that action might involve.</p>	<p>✓</p>			<p>Figure 8-1 helps to clarify who is responsible at each stage of the risk assessment-risk management continuum.</p> <p>Input will be sought from pilots.</p>
<ul style="list-style-type: none"> Clarify: roles & responsibilities; authorities; scope & limits of assessment; flexibility to 	<p>✓</p>			<p>Edited to ensure better clarity on the ability of assessors to</p>

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<p>use professional judgment; remove or reduce prescriptive portions.</p> <ul style="list-style-type: none"> Many asked for the flexibility to use their professional judgment when necessary. Give the professional the leeway to undertake the assessments using any approach and methodology they believe is necessary to stand behind their work. 				use their professional judgment in the assessment.
<ul style="list-style-type: none"> Discuss / address: jurisdictional issues & regulatory gaps re. enhanced source water/watershed protection in multi-jurisdictional watersheds; source protection issues on private land Q42. What about access to and management of private land that is suspected to be a source protection issue? How are DWO's able to deal with non-cooperative landowners. i.e. cattle access to stream. Historically watersheds and water collection systems have been easier to manage if they were Crown land. The guidance does not address the obvious regulatory gaps regarding enhanced source water/watershed protection in multi-jurisdictional watersheds, which is probably the biggest weakness of any water protection legislation drafted in the post-Walkerton era. The document should state that it is not intended to be all encompassing or limit the ability of the water supplier and/or professional to identify issues outside the limitations or boundaries of the document. 			✓	Requires senior policy direction.
Q33.What is the legal basis for setting Terms of Reference for an assessment?			✓	DWO order. This question addresses processes that occur prior to an assessment, so it is not in the document's scope.
Q43. How do we categorize individual property owners with their own on-site water source/supply? Are they their own water suppliers?		✓		Single family residences are not regulated under the <i>Drinking Water Protection Act</i> .
We have been told for years by different ministries that we have no jurisdiction over activities in the watershed yet there seems to be an obvious downloading of cost and liability to us!				
DOCUMENT STYLE / STRUCTURE				
Address the inconsistent level of details found in each Step. Some Steps have considerable detail and are very prescriptive (e.g. Step 1) while other Steps have only	✓			

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minimal information (e.g. Step 5). Also, it is unclear as to why they are called steps if they are designed to be utilized independently of each other. Modules may be a more suitable term. The level of detail per Step might be based on who the document is written for.				
Make the document more effective and user-friendly; Steps 7 and 8 in particular. These two Steps were the subject of a sufficient number of comments and suggestions. It was suggested to use the proportion of the population that could potentially be affected, not population size. The idea of conducting a pilot project to test the utility of the document was suggested. Feedback from both the water supplier's perspective and the consultant's perspective would be invaluable.	✓			Pilots can provide input on improvements.
Reviewers commented on the need to omit the use of timelines in the Risk Management Strategy.		✓		Suggested timelines were retained because they provide a sense of the urgency of an action. They have, however, been given a lower emphasis in the revised draft.
Guideline should be modular (so it can address specific issues as well as full assessment) A particular module could then stand on its own in specifying mandatory content.	✓			Agree.
Either: make 2 documents (simple - purveyors, detailed - professionals) <ul style="list-style-type: none"> If the 'CS2TA' document is kept as is, a second document could be created as a companion document; executive summary, introductory text and objectives for each of the 8 Steps. When more detailed information is required the 'CS2TA' document could be utilized. 		✓		Document was revised to include three levels of detail: executive summary, core text in modules, technical detail in appendices
Or: move all technical material into appendix (e.g. majority of Step 1) <ul style="list-style-type: none"> Put most of the technical materials into an accompanying background document. It could be indexed in a way that would allow DWO's to easily refer to certain sections and outline which requirements they want followed in each assessment. This would potentially make the smaller water suppliers more receptive toward doing an assessment. 	✓			See above
Another suggestion was to end document after Step 7 as Step 8 is the costly step. That way the assessment would stay on risk. Also suggested, to make Step 8 part of the Assessment Response Plan (next phase) under		✓		Module 7 provides an analysis of the hazards and their relative importance. Module 8 includes objective recommendations for how to address the hazards. The

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the direction of the DWO and include parameters such as costs, timeframes etc.				consultants who have just comprehensively assessed the drinking water supply system would be in the best position to recommend risk management strategies. The water supplier and the DWO review those recommendations, making decisions taking into consideration other factors outside the scope of the assessment. Ask Pilots to evaluate.
<ul style="list-style-type: none"> Is this a strategy, analysis, inventory, or risk assessment? 	✓			The assessment is an inventory and analysis of drinking water hazards in Module 1 to 6, Module 7 is the risk assessment, and Module 8 is a set of recommended risk management actions. This is stated clearly in the Introduction.
<ul style="list-style-type: none"> Guide is presented as a 'how to' document instead of a 'what is required' document. The author or agency will need to be careful that the document is not treated as a guidebook as guidebooks are treated very literally, or 'as is'. That is there is no deviation from what is identified in the guidebook. My impression is that the document provides guidance and that the final report is based on 'professional judgment'. Separate mandatory requirements from descriptions of methodologies. The guide is very complex and daunting at first and will benefit from some simplifications to it. The document is wordy, repetitious and somewhat confusing. A technical edit would take care of this. It is confusing to have a section starting with a summary, followed by objectives. 	✓			Agree. Assessment components presented on the first page of each module specify generally "what is required". These comments on the style of the document are addressed through edits to the document's introductory section and its structure.
<ul style="list-style-type: none"> I think that after the workshop I had better clarity on the document. The document does require revision to remove the prescriptive portions and to expand sections such as Step 6... Q18. What specifically are the pros and cons of the document being too prescriptive? Could this lead to more direct identification of hazards? If so, doesn't it equate into results? Results should be the goal of assessment. Are they? What about the document not being prescriptive enough? If it is not, could that leave the water supplier at the point of running out of money before the assessment is done to the satisfaction of the DWO? Would it be too narrow/simplistic (?) of a focus then? It was suggested the document be reformatted to have a small front end with a large 	✓			Modularization of the document and clarification of assessment objectives, "required" components and recommended methods are made.

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technical appendix.				
FUNDING				
<p>5. An appendix could outline how water suppliers could potentially fund the assessments, particularly for small water systems where funds beyond basic operating costs are limited. A reviewer said, "There is the danger that you impoverish the water purveyor and divert Operation & Maintenance dollars towards this assessment". Another said, "It doesn't much matter what's in the document if there are no financial resources available to get professional help." The issuers of the guideline document have been challenged to address the absence of funding mechanisms.</p>			✓	Addressing funding issues was considered to be out of scope for the guideline document itself. Information on possible funding options and sources may be provided separately from guideline document.
<p>A quote for doing an assessment of a small water system was \$150,000, based on an earlier version of this document. Money will be required to implement follow-up as well. How realistic is this?</p>			✓	See above.

SPECIFIC COMMENTS ON GUIDELINE CONTENT IN STEPS 1 TO 8 AND APPENDICES

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STEP 1 DELINEATE AND CHARACTERIZE DRINKING WATER SOURCE(S)						
3a	In Step 1 (p.14), is the source delineation reasonable? Yes 50%	<ul style="list-style-type: none"> The rationale for the 500 limit is not clearly expressed. Additional classification may be included based on the size of the lakes where the intakes are located. 	✓			<p>Rationale is more clearly expressed in revised draft.</p> <p>The revised draft is downplaying the categories of watershed types. Assessment area delineation approaches are presented as options and professionals can decide what portion of the watershed to delineate based on their professional judgment– need to define rationale.</p>
4a	In Step 1 (p.18) are the methods for defining assessment area suitable? Yes 27%	<ul style="list-style-type: none"> Heavily biased to groundwater data, inadequate for surface water assessment purposes [<i>in what way is it inadequate?</i>]. Inadequate for surface water assessment (e.g., large lakes with multiple intakes) Spatial or aerial delineation is not meaningful or necessarily cost effective <i>Disagree</i> Must be based on actual water quality measurements in a phased approach that narrows down contaminant source 			✓	<p style="background-color: #e0ffff;">Where are the gaps? Ask pilots to identify gaps</p> <p>Actual water quality measurements only would be informative for existing pollution; assessment also addresses potential contaminant sources.</p>

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4b	Alternatives? Yes 20%	(Not given; would need to contact reviewers)		✓		
5a	In Step 1 (p.26, 30) is it clear why groundwater sources need to be characterized before area delineated? Yes 73%	Simplify language regarding characterizing groundwater sources before delineating them. Section is jargony.	✓			Changed in revised version.
6a	Is the level of detail in Step 1 sufficient to do an assessment? Yes 53%	<ul style="list-style-type: none"> • More emphasis on overall objectives • Identify mandatory requirements • To make the document more concise and reader friendly, the majority of the prescriptive portion of Step 1 should go into an Appendix. 	✓			Mandatory requirements are the assessment components.
Other Step 1 comments		<ul style="list-style-type: none"> • 1.1 (comments elsewhere) • 1.2 If the assessor does not know how to delineate the source area then they likely should not be conducting the assessment. • 1.3 Can have organic matter in non-turbid waters too. • Should include potential risk of flooding. • Use 'intake to tap' instead of 'source to tap' in the source assessment section. • 1.4 It needs to encourage a strategic watershed perspective rather than a limited assessment area. Include an example of how to delineate a watershed boundary. Pilots? • Should large lake systems have an intake protection zone? • 1.5 • 1.6 Inconsistent level of detail throughout the document with too much in this section. • Doesn't address time of travel, Table 1-1 does not address it either. • Nitrate could be used as a preliminary indicator of land use impacts. 	✓			These comments are addressed through the revision process.

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		<ul style="list-style-type: none"> 1.7 Needs discussion on groundwater under the influence of surface water as a drinking water hazard. This has the potential to be very significant from a cost/data standpoint. 1.8 Assessment should require the assessor to provide a justification/rationale for the assessment area selected. Q10. In Step 1, are watersheds oversimplified? Q11. In Step 1, does the use of arbitrary delineation methods work? The statement “identify the intrinsic vulnerabilities of the source area” is discussed on p. 15, 21, and 25. There does not seem to be much difference in the text or the points being expressed. Is this amount of repetition necessary? <p>There needs to be more consistency in the handling of impervious area issues (TIA/EIA). In some areas it is considered an “intrinsic vulnerability” of a catchment area and in other areas it isn’t mentioned.</p> <ul style="list-style-type: none"> Assessment of wells under the influence of surface water has the potential to be very costly. Should require the assessor to provide a justification/rationale for the assessment area selected. 				
STEP 2 CONDUCT CONTAMINANT SOURCE INVENTORY						
7	Do the Hazard ID Tables in Steps 1-6 provide:	<ul style="list-style-type: none"> Source identification could be a separate document as it is such a critical component to source protection 	✓			New modular format addresses this.
7a	Relevant examples? Yes 85%	Care needs to be taken with the examples. They need to be robust and beyond questions – as they are going to be used as templates for evaluation. For example chlorine disinfection is not effective against crypto – here filtration is the preventative measure. [Note that disinfection is a requirement for surface water anyway.] Also one should add the rider to the chlorine disinfection bit “ensure proper contact time”.			✓	Examples from pilots can be used.

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7b	Current preventative measures? Yes 42%		✓			Need to include more examples (e.g., main flushing, increase chlorine dosage, secondary chlorination)
7c	Are the tables useful tools? Yes 67%	It should be made abundantly clear that the table only shows examples and should not be used as a reference list.	✓			Agreed.
7d	Should they be used as templates to ensure consistency? Yes 73%				✓	Easy fix.
Other Step 2 comments		<u>2.2</u> Avoid listing section number and page number in a table. Needs to account for upstream contaminants that have the potential to reach the intake. Must consider the type of activity, the threat the activity poses and the mode of transport to the intake rather than just look at the distance.	✓			Addressed in revised version of guideline.
STEP 3 ASSESS WATER SYSTEM COMPONENTS						
		<ul style="list-style-type: none"> Distribution system monitoring & maintenance needs more detail More material on treatment distribution and intakes would be helpful in the assessment/planning process. Q47. The distribution system and associated hazards are only minimally addressed in the document. 	✓		✓	Additional comments received by Michael Wu. Pilots to test.
Other Step 3 comments		Some references to adequacy of alarm system that tracks the plants performance.	✓			Electronic monitoring (performance, security) added to scope section of module
		Could refer to other parameters such as pumps hours, flows, population	✓			Done

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		data/number of connection etc.				
		3.1 Could add a column to Table 3-1 on reliability of the system. E.g. back-up power, back-up source, spare parts etc.	✓			Reliability added as component of "condition" assessment
		3.2 Table 3-2 should be reworded to say 'treatment' instead of disinfection as they are not the same. Another suggestion is to use 'no primary treatment system beyond disinfection' and/or 'current treatment system does not meet treatment goals'.			✓	Would like to use real examples from pilots to complete sample hazard identification tables in all modules
		Very cursory discussion of condition assessment of supply elements. Could expand on various pipe materials.		✓		Considered too detailed.
		Reflection of the extent water supply systems are designed for fire protection purposes.	✓			
		Need linkage to Step 6 vis a vis asset management.		✓		Adequately addressed in Module 6. It is a separate assessment component.
		<ul style="list-style-type: none"> Fig 3-1: no secondary chlorination beyond point which well water enters? Figure implies distribution network is the endpoint for source to tap. Figure 3-1 – change PRV symbol (shown as pump on figure). A process and instrumentation diagram would be useful instead of a schematic). 	✓			
STEP 4 EVALUATE WATER SYSTEM MANAGEMENT, OPERATION, AND MAINTENANCE						
8a	Should Section 4.2.3 (p.48-49) require that info is backed up & stored off-site?	<ul style="list-style-type: none"> Management practices should entail "best practices" (e.g., records back-up) What "best practices" standard does the Province want for financial management, governance, service delivery, etc? 4.2 Best practices should be embedded in management practices e.g. backing up records and store off-site to ensure a duplicate exists. It should			✓	Can pilots provide direction?

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	Yes 86%	be a strong recommendation.				
	Is this addressed in Step 5 (p.54)? Yes 7%	<ul style="list-style-type: none"> Since the different sections may be used independently, the point about providing historical records (stated in section 5) should be repeated in Section 4. 	✓			
	Other comments	<ul style="list-style-type: none"> Distribution system monitoring and maintenance needs to be fleshed out more as it is very cursory. Some items to add are a reservoir cleaning and recycling schedule, chlorine residual monitoring, temperature and pH monitoring, bacterial and chemical monitoring of source, reservoirs and distribution components. In regards to a backflow/cross connection control program what checks and balances do they perform to ensure it is successful? Self inspection of entire water system frequency? Frequency of sampling and ensuring QA/QC? 	✓			Addressed in revised version of guideline.
Other Step 4 comments		<ul style="list-style-type: none"> Reference to the use and adequacy of other complimentary legislation that are in place to regulate water systems, for example, municipal bylaws on cross connection control, building and land development etc. 	✓			Discuss generally who they can go to for more information.
		<ul style="list-style-type: none"> 4.2.4 could be expanded to include reservoir and pump maintenance, PRV maintenance. Talk about need for backup power. 4.2.5 Should reference BCERMS model System monitoring should include: <ul style="list-style-type: none"> Reservoir cleaning and recycling schedule Chlorine residual monitoring Temperature and pH monitoring Bacterial and chemical monitoring – source, reservoirs and distribution Backflow prevention/cross-connection control program not just is it in place but what checks and balances do they perform to ensure it is successful. Flushing/swabbing schedule – entire system annually or? 	✓			Addressed in revised version of guideline.

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		<ul style="list-style-type: none"> - Sanitation/maintenance scheduling of related equipment/structures - Structural repair/replacement/inspection scheduling - Self inspection of entire water system frequency - Water system security – locked building and accesses to reservoirs <p>Section refers to water quality monitoring parameters. Could also refer to other parameters – flows, pump hours, population data/ number of connections, etc. Would be good to have a supporting re: selection of sampling locations, frequency and parameter selection.</p>				
STEP 5 AUDIT FINISHED WATER QUALITY AND QUANTITY						
9	Define “adequate margin” (Step 5, p.55)	<ul style="list-style-type: none"> • Requires professional judgment of individual system to be given a numerical value. • Leave it up to the evaluator to assess. Do not use a hard number. • The bottom line is that the available source capacity should be in excess of peak day demand. • Adequate margin of 10 to 20 percent seems pretty standard. • Most systems are designed to deliver peak day with balancing storage for events greater than peak day. The adequate margin would depend on the amount of storage that is available and the frequency of peak day events. The real indicator would be is there times during the year during normal demand occurrences that the reservoir runs below its balancing storage level. The assessment must consider the entire system and not just look at the source. • I think the professional consultant would have to select the numerical margin and justify his selection. 	✓			Consult with Bill Worobets and person who made comment on 10-20% seems pretty standard.
Other Step 5 comments		<p>Monitoring requirements are inconsistent. Frequency, QA/QC and statistics are not clearly defined. Some guidelines for this are needed.</p> <p>Would be good to have parameters on selection of sampling locations, frequency etc.</p>	✓			Refer to conditions on operating permit and existing guidelines

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STEP 6 REVIEW FINANCIAL CAPACITY AND GOVERNANCE OF THE WATER SERVICE AGENCY						
		<ul style="list-style-type: none"> This section is very rudimentary & inadequate 	✓		✓	Discuss with CAWS; defer to pilots
10	In Step 6 (p.60), is it feasible for all operators to deal with growth management issues? Yes 14%	(No suggestions given to clarify this) <ul style="list-style-type: none"> There is a need for all systems to deal with growth management issues. Some small systems are dealing with a declining population issue, not a growth management issue. Absolutely. This is fundamental to good asset management – a knowledge of the capacity of the system, and how you are going to address additional demand – so that you can plan for it and adjust you water revenues to make sure there is enough being invested for future upgrades. 	✓			Assessment is intended to assess the ability of the water supplier to manage growth issues.
11a	Can purveyors afford to do assessments? No 100%	<ul style="list-style-type: none"> Prioritize who does assessments first (e.g., large/small systems, or base on population served) 			✓	This is a comment pertains to issues out of scope of how to do the assessment itself. DWO discretion and screening assessments determine who does assessments first.
11b	Should other funding sources be made available? Yes 92%	<ul style="list-style-type: none"> N/A (outside scope of Guideline) 			✓	Out of scope
11c	Should the document address this? Yes 38%	<ul style="list-style-type: none"> Most felt it was not necessary to address funding alternatives in Guideline 			✓	Out of scope
Other Step 6 comments		<ul style="list-style-type: none"> Reference BCWWA BMPs & National Guide for Sustainable 	✓			Addressed in revised

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		<p>Municipal Infrastructure</p> <ul style="list-style-type: none"> • Renewal and replacement planning is omitted • address asset management • The use of the term “tax base” should be avoided as generally water costs are not all recovered on the basis of a property tax but through a user fee. • Change the term ‘self-supporting’ or ‘self-sufficient’ to self-sustaining. • The agency is also responsible for keeping up to date and maintaining water license obligations. • There should be a clear indication of what must be described and assessed with respect to governance and accountability structures, how service delivery is organized, how the service is funded and how costs are recovered. The requirements as presently set out are very general. • The interrelationship between issues related to the physical production of drinking water (e.g., watershed, source and system itself) and the governance, organizational capacity and funding should be assessed. This perhaps reflects my bias and experience but most problems related to the supply of safe drinking water have their genesis in inadequate funding (both capital and O&M), lack of accountability in the governance structure and inadequate organizational capacity to properly organize and oversee the supply, treatment and distribution of drinking water. • The interrelationships between funding, governance, organizational capacity for service delivery leads to lack of properly skilled staff which in turn leads to poor financial practices etc. The assessment should identify how the issues reinforce or perpetuate one another. • The assessment should also indicate whether the water supplier would ever be in a position to achieve the standards or implement the best practices required to supply safe drinking water. In my experience, the major issue facing many of the small purveyors is that they do not exhibit any economies of scale which would enable them to do what is necessary. Perhaps the guide could discuss governance or business 				version of guideline.

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		<p>models restructure options available to suppliers that cannot do what is being asked of them.</p> <ul style="list-style-type: none"> I could not find any reference in the guide on legal requirements. For example, the issue of water licenses and permits does not come up <i>Addressed in Module 4</i>. Nor is there discussion of whether elements of the water supply system including source are protected by easements, ROW or other tenures. <i>Addressed in Module 3</i> The risk assessment should evaluate whether community growth and development poses significant risk to the provision of safe drinking water (whether it is a small or large system). If the growth related risks are low, then the requirements of the water supplier will not likely be onerous. Section 6.2.1 refers to an engineering report for a water system assessment. This is not even discusses in Step 3 and 4 (where it is probably most relevant). <p><u>6.2</u> Water suppliers have limited skills in the source assessment area and will need to hire professionals. This subsection calls for an engineering report!</p>				
STEP 7 CHARACTERIZE RISKS FROM SOURCE TO TAP						
12	In Step 7 (p.63) does the risk characterization methodology meet stated objectives? Yes 54%	<ul style="list-style-type: none"> Some criticism of the measures of consequence. Percentage or portion of community system affected might be a better descriptor to use rather than population size Some confusion between hazard and situation that could lead to a hazard. Table 4-1 'no cross-connection control program established' is in itself not the hazard. Contamination is the hazard and the potential cross-connection the mechanism (or vulnerability). A preventative measure would be 'develop and implement a cross-connection program'. This is more in line with the HAZOP methodology of 	✓			Module 7 completely restructured and reworked.

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		<p>vulnerability assessment whereby (1) hazards are first identified (2) each component in the system is assessed in terms of the identified hazards to identify their vulnerabilities. This enforces a more rigorous and systematic focus on the hazards and the vulnerability of the system – rather than the other way around.</p> <ul style="list-style-type: none"> • Need background information on regulatory violations Box 7-1 needs to be highlighted in the text and how to respond to these situations. • The objectives need to be written more clearly – these sentences are good examples of “foggy” writing. 				
		<ul style="list-style-type: none"> • Need to better link risk characterization process with (related) multi-barrier assessment; (e.g., identify which specific ‘barrier’ addresses which hazard) 	✓			Module 7 completely restructured and reworked.
13a	Are there other / better risk characterization methods that could be used? Yes 8%	<ul style="list-style-type: none"> • Focuses too much on the source protection barrier: need to include more information on evaluation of treatment barriers 	✓			
13b	Could you describe them? Yes 20%	(Not given; would need to contact reviewers)		✓		
14a	Are the data sources in Appendix E accessible? Yes 58%		✓			
14b	Are they too costly? Yes 40%		✓			
Other Step 7 comments		<ul style="list-style-type: none"> • One way to test the approach provided is to have a group of individuals apply the risk analysis to the same source and see if the results are consistent. • The methodology is a bit fuzzy relative to the second objective 	✓			

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		<p>(‘Assess risks in the multi-barrier system....’)</p> <ul style="list-style-type: none"> • 7.1 Box 7-1, page 70 is just there, there is no mention of it in the text. Could its inclusion potentially cause the document to become outdated as regulations change? • Footnote 3, b) refers to water quality being unacceptable if it is aesthetically displeasing to consumers. A reviewer commented that there is no regulatory authority regarding aesthetically displeasing water. • If risk is considered to be high as per the drinking water officer this could be the basis for deciding which systems must undertake an assessment. • Graphics need improvement (font too large; does graphic convey what we want it to?) • Q35. Are ‘regulatory infractions’ higher priority than a newly identified hazard? On page 66, Regulatory Requirements section; Should simple regulatory requirements automatically be assigned the highest level of risk? What about the idea of ‘progressive compliance’? • The arbitrariness of the section was questioned and it was suggested that judgment (especially by DWO’s) could be a larger part of the process. • DWO’s charged with using judgment to address most immediate health issues could utilize timelines, action steps and provisional measures etc. • Q38. Regulatory violations, as a blanket statement verses regulatory violations plus it being a hazard. Would each require different responses? i.e. immediate action to less immediate action. What if the regulatory violation is a repeat violator? • We could improve the process by including more management information on how the ratings were arrived at. This would help the assessors, especially for those working on small systems. • The main weakness seems to be tying together the risk characterization (7.2.1) with the integrated supply system evaluation 				

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		<p>(7.2.2)</p> <ul style="list-style-type: none"> Step 7 may not be a detailed methodology but it gives the fundamentals and principles of risk assessment. Maybe “principles” or “fundamentals” should be in the title/subtitles. Would it be useful to consider frequency of a hazard event as part of risk? 				
STEP 8 PROPOSE A DRINKING WATER RISK MANAGEMENT STRATEGY						
		<ul style="list-style-type: none"> Step 8 may be better in an Assessment Response Plan guidance document 		✓		<p>Guideline will include Module 8 as it identifies the necessary actions to address drinking water hazards. If an assessment response plan is done following the assessment it will be the plan developed by the water supplier to say how he will implement the necessary measures for drinking water protection, taking into account the hazard characterization and risk management strategy in the assessment report, as well as other factors unique to the water supplier.</p> <p>Rationale for Module 8 and difference between Module 8 and Assessment Response Plan is clarified through Figure 8-1.</p>

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Other Step 8 comments		<ul style="list-style-type: none"> The term planning should not be used as it takes into account broader considerations, tradeoffs, priority setting and which must include the political process it is to be effective. Allow for the assessment to make recommendations only based on a purely objective assessment. 	✓			Yes, Module 8 is purely objective. The Assessment Response Plan will take into consideration these external factors.
		<ul style="list-style-type: none"> It was suggested by several reviewers that this section might be substantially modified to provide "Recommendations and Priorities" as its main function. Step 8: I think that calling this section "Recommendations" rather than a strategy may be appropriate. If the assessment is able to become specific and reach a consensus of a strategy, then a strategy could be presented. Otherwise, perhaps a list of option strategies could be brought forth with their pros and cons presented. 	✓			Module 8 has been modified to address this.
		<ul style="list-style-type: none"> 45. In 8.2.3, the categories of timelines were felt not to be useful. Step 8 should not include timelines. This is an assessment guide and not an assessment response plan guide. Step 8 should be simplified to only include recommendations and cost estimates. The implementation plan is part of a planning process that better resides in an assessment response plan. Implementation decisions are not made by the professional but rather by the water supplier with consideration for public input and other political items. 		✓		Suggested timelines were retained to include with the recommended risk management actions because they provide a sense of the urgency of the task and establish a target to work towards. These timelines can be reviewed and adjusted by the water supplier when establishing their risk management plan.
		<ul style="list-style-type: none"> 8.2 Step 8 is reasonable in terms of prioritizing the recommendations and assigning them to four timeline categories. Q37. Priority of actions verses Action Plan? Q44. Does Step 8 achieve its goal? Does it succeed in what it attempts to do? First paragraph of Next Steps should be part of Step 8. No discussion of public processes? 	✓			
APPEND						

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ICES						
15a	Should Appendix E add timeline & cost estimates for data acquisition? Yes 50%			✓		Not applicable
15b	Are timeline & cost estimates in Step 8 adequate? (leave Appendix E as is) Yes 30%	<ul style="list-style-type: none"> Timelines will vary & cannot be too prescriptive 			✓	Ask pilots
16a	Are there any concepts that need further explanation for peer reviewer? Yes 8%		✓			
16c	Add terms to glossary? Yes 18%	<ul style="list-style-type: none"> Change “purveyor” to definition for “water supplier” 	✓			
		APPENDIX A <ul style="list-style-type: none"> Individual comments; Include the Screening Tool in an Appendix. Include a summary of ‘Assessment Response Planning’ as an Appendix. APPENDIX B <ul style="list-style-type: none"> Individual comments; Add some treatment design reference literature such as the “10-State 	✓			

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		<p>Standards”, actual title ‘Recommended Standards for Water Works – Policies for the Review and Approval of Plans and Specifications for Public Water Supplies’, 2003 edition.</p> <ul style="list-style-type: none"> • BCERMS Model reference for emergency response discussion, Step 4. <p>APPENDIX C</p> <ul style="list-style-type: none"> • Individual comments; • Step 4 should include general sanitation of facilities, directional markings on equipment. <p>APPENDIX D</p> <p>APPENDIX E</p> <ul style="list-style-type: none"> • Individual comments; • Page A-17 needs to include; contaminated sites, land use, waste management permitted sites. <p>APPENDIX F</p> <p>APPENDIX G</p> <p>APPENDIX H</p> <p>APPENDIX I</p> <p>APPENDIX J</p> <p>APPENDIX K</p>				
OTHER						
17a	<p>Are there any concepts that need further explanation for the intended user? Yes 38%</p>	<p>Examples:</p> <ul style="list-style-type: none"> • Clarify what is meant by responsibility of the water supplier to make the results of the assessment public If it is the responsibility of the water supplier to make the results of the assessment public what does this refer to exactly? One reviewer asked if it was referring to the costs of making the results public or that there might a choice of whether to report or not. Another expressed concern that it might not be wise to disclose information on a system’s vulnerabilities to the public for security reasons. Guiding principle refers to ‘some format’ which is not very specific. More guidance is requested on this parameter. <p>Q51. Do monitoring and transparency both need further refinement? Public</p>	✓			Results of the assessment will be made public as directed by the DWO.

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		release of the assessment has some problems associated with it, including security concerns. The need to publish the assessment would need to be changed either via policy or in the legislation itself. Transparency is built into the regulations already. How much disclosure is too much?				
18a	Over-simplified or repetitious areas? Yes 36%	(See #20)	✓			Editing will take care of this.
19a	Are there assessment components that are missing? Yes 67%	<ul style="list-style-type: none"> • The interrelationship and causal relationships between the various risk factors would also be important to develop a “systems” view if the supplier. (e.g., inability to measure cumulative water quality risks (how can mitigation occur if risks not understood?) <i>Terms such as ‘synergistic effects’ and ‘secondary by-products were mentioned.</i> • Reporting – how the results of the assessment are reported given the need to publish the results and possible concerns with releasing confidential information about a water system. • Monitoring – how the assessment items are monitored to determine when the risks become reality or when assumptions can be verified. <p>Suggested references:</p> <ul style="list-style-type: none"> – recommended standards for water works – policies for the review and approval of plans and specifications for public water supplies, 2003 edition – BC Health Authorities recommendations for standards for design and performance 			✓	Ask pilots for input on interacting risks, how to report to the public, and to locate references identified.
20	Document needs no further editing? No 100%	<ul style="list-style-type: none"> • Needs a technical edit (wordy, repetitious and somewhat confusing) • Peer review lists errata. 	✓			