

APPENDIX D
DRAFT Version 1.1 – September 28, 2007

**Supplementary Guidance for CSAPs Conducting Review of
Confirmation of Remediation Reports**

GENERAL TOPIC	Suggested Points of Review (Confirmation of Remediation)	Reference	Note 2	Note 3
AUTHORS AND RELIANCE	<ol style="list-style-type: none"> 1. Does the investigator: <ol style="list-style-type: none"> a. identify who the primary authors are of the plan and state his/her qualifications? 2. Does the report or cover letter: <ol style="list-style-type: none"> a. provide reliance of the report to the ministry; and b. provide reliance of the report to CSAP if CSAP is not a member of the same organization which prepared the report? 3. Does the investigator describe the relationship of the current study, in particular: <ol style="list-style-type: none"> a. how the findings of the previous investigation(s) was/were used to design and carry out the current work; b. the extent to which the previous investigations were or were not relied on; and, c. that the findings of the previous work and/or the Approval in Principle on which the remediation was based remain relevant or if they deviated, that the deviations are immaterial to the final conclusions? 	<p>CSR S. 63 CSSAF</p> <p>CSSAF</p>	<p>M</p> <p>M</p> <p>M</p>	
OBJECTIVES	<ol style="list-style-type: none"> 4. Are the objectives and scope of the remediation for the site (or each AEC): <ol style="list-style-type: none"> a. clearly stated; b. is the scope likely to achieve the objectives; and c. are any limitations to the scope where professional judgement has been applied clearly indicated? 5. Does the investigator clearly indicate whether the remediation work was completed under an Approval in Principle (AIP) issued within the previous five years, or under the Independent Remediation process? 			<p>M</p>
SITE DESCRIPTION <i>Description of the site and contamination</i>	<ol style="list-style-type: none"> 6. If it is a standalone report, has the investigator provided: <ol style="list-style-type: none"> a. a legal description and PID of the property; b. the civic address of the property (if applicable); and; c. the BC Site ID number (if it exists) and; d. the latitude and longitude of the centroid of the property? 7. If it is a standalone report, has the investigator: <ol style="list-style-type: none"> a. provided a summary and interpretation of soil stratigraphy and hydrogeology of the site, including any identified preferential pathways and potential receptors; b. provided a clear summary of the pre-remediation data (AEC and associated COC) for each media at the site; 		<p>M</p>	

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	<ul style="list-style-type: none"> c. reviewed current environmental quality standards, and re-evaluated the data with respect to current standards if they have changed since the DSI or remediation plan; and, d. reviewed and commented on the Stage 1 PSI if it is more than six months old, to confirm that no additional APECs or PCOCs exist? 			
<i>Site Plans</i>	<p>8. Has the investigator provided scaled site map(s) clearly showing:</p> <ul style="list-style-type: none"> a. pre- and post-remediation conditions including land use, relevant structures found on site, and the boundaries of all AECs; b. potential receptors (e.g., wells or natural features such as lakes, rivers, and streams) found adjacent to or within the boundaries of the property; c. extent of remedial excavations (both lateral and vertical) with respect to all AECs and COCs identified during site characterization; d. removed/decommissioned structures (if different from pre-remediation); and, e. a legal sketch plan or survey drawings showing the boundaries (both lateral and vertical) of any offsite remediation? 	CSSAF	M	
NOTIFICATIONS	<p>9. If the remediation was completed under Independent Remediation, was notification at commencement and completion sent to the ministry and a copy appended to the report?</p> <p>10. If remedial excavations were extended off the property, was a notification provided to the neighbouring property owners and the ministry?</p>	<p>CSR S. 57</p> <p>CSR S. 60.1</p>		<p>M</p> <p>M</p>
<i>Remediation Standards and Conditions</i>	<p>11. Has the investigator:</p> <ul style="list-style-type: none"> a. clearly identified the applicable numeric or risk-based remediation standard(s) for each of the contaminated media considering existing and proposed future land, sediment and water use (as applicable); b. documented requirements and factors for risk-based remediation standards, if used, and how the remediation and/or risk management measures undertaken achieved risk-based objectives; and, c. confirmed ministry approval of use of local background concentrations or site-specific standards, if used? <p>12. If an AIP was issued for the site prior to remediation, were all conditions of the remediation plan and AIP clearly stated and achieved; and</p>	<p>CSR S. 17 and 18</p> <p>CSR S. 49(2)(c)</p>		<p>M</p>

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	13. If there were deviations to the conditions of the AIP, and/or remediation plan during the course of remediation, were these deviations clearly identified as did the deviations alter the conclusions of the confirmation of remediation report?			M
IN SITU REMEDIATION	14. Has the investigator: <ul style="list-style-type: none"> a. described the remediation methodology; b. provided schematics and as-built drawings of the system(s); c. provided relevant field monitoring and analytical data collected during operations; d. charted remediation progress over the remediation period; and e. provided adequate post-remediation data both within and at the boundaries of the contaminant mass to demonstrate that the remediation standards have been achieved for all COCs? 	CSR S. 49(1)(b)(iii)	M	
WASTE MANAGEMENT	15. Did the investigator provide sufficient details to confirm that: <ul style="list-style-type: none"> a. soil stockpiles were characterized and classified in accordance with applicable ministry guidance; b. Hazardous Waste was characterized, stored, transported and disposed of in accordance with provincial regulations and applicable ministry technical guidance; c. field methodologies and controls were sufficient to prevent dilution of Hazardous Waste; d. manifests were completed for all Hazardous Waste transported off-site; e. Hazardous Waste was transported to a facility permitted to accept the Hazardous Waste; f. Hazardous Waste managed on site was registered and delisted; g. other non-Hazardous Wastes generated during remediation activities were managed and disposed of appropriately; and h. soil exceeding CSR Schedule 7 standards was either sent to a receiving site under a CSRA or to a permitted landfill? 			M M M

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BACKFILL MATERIAL	<p>16. If imported backfill was used, has documentation been provided:</p> <ul style="list-style-type: none"> a. for the source of the imported backfill material; b. to confirm the environmental quality of the backfill material; c. to confirm the characterization methodology for the backfill; and, d. to record the volume of imported backfill, and where it was placed on site? <p>17. If site material was reused as backfill, has documentation been provided:</p> <ul style="list-style-type: none"> a. that the material was adequately characterized before reuse, and of sufficient quality so as to meet site remediation standards; and, b. to record the volume of material used, and where it was placed on site? 		<p>M</p> <p>M</p> <p>M</p> <p>M</p> <p>M</p> <p>M</p>	
CONFIRMATORY SAMPLING	<p>18. Does the report:</p> <ul style="list-style-type: none"> a. contain a clear description of the sample locations and methods used to obtain the confirmatory samples; b. clearly document the confirmatory sampling results from each stage of remediation if remediation is carried out in multiple stages; c. document all field observations, and monitoring measurements collected during the remediation work; and, d. document the sampling methodology and results of all confirmatory analytical test results? <p>19. If <i>in situ</i> investigation results have been used as confirmatory sampling locations:</p> <ul style="list-style-type: none"> a. was there sufficient control to provide confidence that the <i>in situ</i> samples are representative of conditions at the limits of the remediation area; b. do the <i>in situ</i> samples provide sufficient confirmatory sampling density; and, c. is the methodology and results of the <i>in situ</i> testing clearly documented and summarized? 	<p>CSR S. 49(2)(b)(i)</p> <p>CSR S. 49(2)(b)(ii)</p> <p>CSR S. 49(2)(b)(iii)</p>	<p>M</p>	<p>M</p> <p>M</p> <p>M</p>
QA/QC	<p>20. Were the sample collection and handling methods suitable for the PCOCs?</p> <p>21. Were field and laboratory methods described, along with documentation of field calibration procedures?</p>			

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	<p>22. Has the investigator:</p> <ul style="list-style-type: none"> a. evaluated the potential for systematic bias during the sampling procedure, including collection, preparation and analysis by describing the quality assurance/quality control (QA/QC) program undertaken; b. undertaken a QA/QC program to verify data tables in the report with original analytical records; c. reviewed and commented on sample integrity when received by the laboratory, and sample holding times prior to testing including, for samples that undergo extraction in the laboratory, holding times both before and after extraction; d. stated the data quality objectives, calculated a relative percent difference for sample pairs or relative standard deviation for multiple replicate samples, and evaluated results in terms of the data quality objectives; e. provided a satisfactory explanation where QA/QC data do not meet the data quality objectives including implications to interpretation of the environmental quality data; f. provided clear assertion of reliability of all data that is significant to the study's conclusions based on QA/QC; and, g. documented any corrective action taken if QA/QC reveals significant bias or high imprecision? 			
<p>DATA</p> <p><i>Confirmatory Sampling Results</i></p>	<p>23. Has the investigator clearly differentiated between interim and final confirmatory samples?</p> <p>24. Has the investigator demonstrated that:</p> <ul style="list-style-type: none"> a. confirmatory samples have been collected at appropriate depths and locations, and analyzed at a sufficient frequency for all COCs that apply to each AEC; and, b. confirmatory sample frequency was consistent with ministry guidance (e.g. TG1) (or a rationale for variations provided)? <p>25. Has the investigator demonstrated and stated that:</p> <ul style="list-style-type: none"> a. the confirmatory sampling program was adequate to determine that all AECs have been remediated to the appropriate environmental quality standards or criteria for all COCs? 	<p>CSR S 49(3)</p>	<p>M</p> <p>M</p>	<p>M</p>
<p><i>Figures and Drawings</i></p>	<p>26. Has the investigator provided:</p> <ul style="list-style-type: none"> a. a scaled site map(s) showing final confirmatory sampling locations and corresponding analytical results to show that all contamination has been remediated, for each media; and b. scaled cross section(s) showing the lateral and vertical extent of contamination that has been excavated or treated <i>in situ</i>? 	<p>CSSAF</p>	<p>M</p> <p>M</p>	

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<i>Statistics</i>	27. If the investigator is classifying soil using statistics, is the classified material based on the data being demonstrably representative of one population; and, for that data set: <ul style="list-style-type: none"> i. the upper 90th percentile of the sample concentrations is less than the standard concentration; ii. the upper 95 percent confidence limit of the average concentration of the samples is less than the standard concentration; and iii. no sample within the data set has a concentration exceeding two times the standard concentration? 	TG 2		
STOCKPILE SAMPLING	28. For the characterization of stockpiles, did the investigator: <ul style="list-style-type: none"> a. carry out a sampling program that ensures a fair representation of the contaminant concentrations in the entire pile; and b. determine if the material within the pile is sufficiently homogenous to warrant classifying the entire stockpile under a single classification? 	TG 1		
POST REMEDIATION MONITORING	29. Has the investigator: <ul style="list-style-type: none"> a. obtained sufficient data to confirm that the site has been satisfactorily remediated to meet the applicable environmental quality standards for all affected media, considering seasonal or weather related factors, if appropriate; b. tested affected media for all COCs that were identified during the DSI or remedial plan; and, c. presented post remediation monitoring data in tabulated format (and graph format, if appropriate) and on scaled site map(s), and provided an interpretation of trends and variations in the data? 			M M M
REFERENCES	30. Has the investigator referenced: <ul style="list-style-type: none"> a. all data sources, previous studies and other sources that contributed information to the study; and b. any technical literature that provides additional detail on procedures used in the study? 			
APPENDICES	31. Has the investigator provided: <ul style="list-style-type: none"> a. printed copies of all analytical laboratory results used in this study; b. tabulated analytical data for confirmatory samples compared with applicable remediation standards; c. copies of any waste discharge permits; d. copies of Hazardous Waste manifests for any Hazardous Waste transported from site; e. as-built drawings of any permanent remedial structures such as barriers installed at the property perimeter to prevent recontamination; f. photographs of remediation progress and/or measures; g. copy of Notice of Independent Remediation and Notice of Completion of Independent Remediation; 		M M M M M M	

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	<ul style="list-style-type: none"> h. copy of the notice for any offsite migration; and i. legal sketch plan or engineering drawing showing boundaries of any off site remediation and any associated "Management Areas" (e.g. as required for the Certificate of Compliance documentation)? 		<ul style="list-style-type: none"> M M 	

Notes

1. This guideline inherently assumes that adequate site characterization has been completed as part of the PSI and DSI, and that information is included as part of the submission package (for a COC) or previously approved (for an AIP).
2. M signifies these points are a mandatory requirement of the site investigator's report.
3. M signifies these points must be commented on by the CSAP in the Summary of Site Conditions.
4. This guideline has been developed based upon ministry regulations, procedures, policies and guidelines in effect at the time of their preparation. The CSAP should always check the ministry's website to identify if any new information is in effect.