Supplementary Material I. Potential Hazards Database

Potential hazards associated with carbon capture and storage (CCS) are summarized in the table below. These include hazards association with the four main components of CCS – capture, transportation, injection, and storage – as well as general hazards associated with CCS overall. To the extent possible, the probability and consequences of these hazards are indicated in the table as well. These results provide an overview of the types of hazards that warrant consideration in developing risk management strategies for CCS. The information on probability and consequences may also be used to characterize the risk associated with each of these hazards.

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Activity	Hazardous Events			Consequence	Reference	Probability	Reference	Magnitude	Reference
	Event	Description	Reference						
General	Hazardous Material Spill	Hazardous materials might be required during the project, either for construction or operation of the systems.	(Shell Canada Limited, 2010a, pp.17-4), (U.S. Department of Energy, 2007, pp.S-67~68)	Liquids such as lubricates, antifreezes, drilling mud and workover fluid may contain toxic, flammable or explosive components.	(Shell Canada Limited, 2010a, pp.17-4)	Unlikely Low	(Shell Canada Limited, 2010a, pp.17-4), (U.S. Department of Energy, 2007, pp.S-82)	Adverse effect on general population <5000 m from site	(U.S. Departme nt of Energy, 2007, pp.S-76)
General	Catastrophic accidents such as plant explosion, attack or sabotage	Exposure to CO, H_2S, SO_2, SO_3	(U.S. Department of Energy, 2007, pp.S-75)	Negative consequences to human health depend on exposure time and vary from no health effects to life-threatening. No health effects for CO_2 levels below 5000 ppm.	(U.S. Department of Energy, 2013, pp.3.17-5)	Probability of attack / sabotage unknown. Probability of explosion during construction is low.	(U.S. Department of Energy, 2013, pp.3.17-37), (U.S. Department of Energy, 2013, pp.3.16-5)	CO exposure: 2 to 26 irreversible accidents, 0 to 4 life threatening accidents SO_2 exposure: 2 to19 irreversible accidents, 1 to 10 life threatening accidents H_2S exposure: 12	(U.S. Departme nt of Energy, 2007, pp.S-75,76,105)

Activity	Hazardous Events			Consequence	Reference	Probability	Reference	Magnitude	Reference
	Event	**Description**	**Reference**						
Capture	Affecting Air quality	Emissions from the project in various phases can affect the air quality. Change to ambient nitrogen dioxide (NO_2) and respirable particulate matter (PM2.5) concentration	(Shell Canada Limited, 2010b, pp.8-1,2), (Shell Canada Limited, 2010a, pp.14-4)	Human short term and long-term exposure	(Shell Canada Limited, 2010a, pp.14-10)	Risk of cancer (not probability only) of 0.022x10^-6 to 0.222x10^-6	(U.S. Department of Energy, 2007, pp.S-102)	Negligible, excepted exposure to NO_2 for people in the industrial project area NO_2 concentrations is likely to be low enough so that it does not affect people with asthmatics PM2.5 concentration seems not to have a considerable environmental effect. Maximum PM2.5 annual and 24-hr increase are 0.038 and 0.524 $\mu g/m^3$, respectively. PM2.5 concentrations above are well below 5.8 $\mu g/m^3$ and have no impact on human mortality.	(Shell Canada Limited, 2010a pp.14-13,14,16,17), (U.S. Department of Energy, 2007, pp.S-78), (Evans et al., 2013)
Capture	Process upsets in the capture system	CO_2 leakage in the capture system from locations other than the vent. Affecting air quality specially during unplanned restarts as a result of plant upset.	(Shell Canada Limited, 2010a, pp.17-3), (U.S. Department of Energy, 2007, pp.S-77)	impairing effects on air quality and public health and safety Exhausting the vent to the atmosphere which releases the pollutants into the air.	(Shell Canada Limited, 2010a, pp.17-3), (U.S. Department of Energy, 2007, pp.S-77)	0.001 events per year	(Shell Canada Limited, 2010a, pp.17-11)	Less than failure of the pipeline	(Shell Canada Limited, 2010a, pp.17-3)

Activity	Hazardous Events			Consequence	Reference	Probability	Reference	Magnitude	Reference
	Event	**Description**	**Reference**						
Transportation	Third party accidents	Accidents can compromise the integrity of the pipeline.	(U.S. Department of Energy, 2013, pp.3.17-37)	CO_2 leakage	(U.S. Department of Energy, 2013, pp.3.17-37)	1.88×10^{-3} per year for a 30 mile pipeline in Morgan County	(U.S. Department of Energy, 2013, pp.3.17-24)	Small (because of leakage detection system in the pipeline)	(Shell Canada Limited, 2011c, pp.4-100,101)
Transportation	Failure of pipeline	Due to frost heave	(Quintessa, 2012)	CO_2 leakage				Small (because of leakage detection system in the pipeline)	(Shell Canada Limited, 2011c, pp.4-100,101)
Transportation	Failure of the pipeline	Due to landslides	(Quintessa, 2012)	CO_2 leakage				Small (because of leakage detection system in the pipeline)	(Shell Canada Limited, 2011c, pp.4-100,101)
Transportation	Failure of the pipeline (or injection well head)	Release of CO_2 Release of H_2S	(Shell Canada Limited, 2011c, pp.4-87), (U.S. Department of Energy, 2007, pp.S-73)	Adverse effects on groundwater, surface water, soil, plants, animals and public health and safety	(Shell Canada Limited, 2011c, pp.4-87), (Shell Canada Limited, 2010a, pp.17-3), (U.S. Department of Energy, 2007, pp.S-84)	Low 0.00054 failures per km per year for pipelines and 0.000136 failures/well/year for well head Unlikely to extremely unlikely (one occurrence in 100 to 1,000,000 years) for pipeline rupture, likely to extremely unlikely (more than 1 occurrence in 100 to 1,000,000 years) for pipeline puncture	(Shell Canada Limited, 2011c, pp.4-87), (Shell Canada Limited, 2011a, pp.17-11), (U.S. Department of Energy, 2007, pp.S-73)	Limited (might only affect shallow groundwater formations) Effect of H_2S on human health: 0 to 52 adverse effects, 0 to 1 irreversible effects, 0 to 1 life threatening effects. Effect of CO_2 on human health: 0 (site specific)	(Shell Canada Limited, 2011c, pp.4-87), (U.S. Departme nt of Energy, 2007, pp.S-103)

Activity	Hazardous Events			Consequence	Reference	Probability	Reference	Magnitude	Reference
	Event	Description	Reference						
CO_2 Injection	Hydraulic fracture through the caprock	Injection pressure and buoyancy effects might lead to opening up existing fractures/fault in the caprock. Injection pressure might also exceed the fracture pressure of the caprock, causing caprock fracture.	(Shell Canada Limited, 2010b, pp.5-9), (Lavoie and Keith, 2010, pp.6,7), (Goodarzi and Settari, 2009, p.17), (Shell Canada Limited, 2010a, pp.17-6), (U.S. Department of Energy, 2007, pp.S-61), (Wilson and Monea, 2004,	CO_2 or brine leakage	(Lavoie and Keith, 2010, p.7), (Wilson and Monea, 2004, pp.30,215,234-235)	Low	(Shell Canada Limited, 2010b, pp.5-9), (Shell Canada Limited, 2011a)	Depends on escape path characteristics and where CO_2 or brine leak to	
CO_2 Injection	Hydraulic fracture through the caprock	Vertical fracture extension in any cases above	(Shell Canada Limited, 2010c, p.45)	CO_2 or brine leakage	(Shell Canada Limited, 2010c, p.45)	Low	(Shell Canada Limited, 2010c, p.45)	Depends on escape path characteristics and where CO_2 or brine leak to	
CO_2 Injection	Fracture through the injection well	Injection pressure and buoyancy effects might lead to opening up existing fractures/fault in the caprock and affect injection well integrity	(Shell Canada Limited, 2010c, pp.2-3)	CO_2 or brine leakage	(Shell Canada Limited, 2010c, pp.2-3)	Low	(Shell Canada Limited, 2011a, p.62)	Depends on escape path characteristics and leakage target	

Activity	Hazardous Events			Consequence	Reference	Probability	Reference	Magnitude	Reference
	Event	Description	Reference						
CO_2 Injection	Thermal fracture through the caprock	Thermal stresses are created in caprock when the injected CO_2 is at a lower temperature than the reservoir. This can lead to the opening of existing fractures or the creation of new ones. Flow paths in the caprock can be created by fault reactivation, propagation of fractures, or shear failure of rock.	(Goodarzi and Settari, 2009, pp.5,6,20,25, 28~30)	CO_2 or brine leakage	(Lavoie and Keith, 2010, p.7)			Depends on escape path characteristics and where CO_2 or brine leak to	
CO_2 Injection	Failure in injection well wellhead		(Shell Canada Limited, 2010a, pp.17-6), (U.S. Department of Energy, 2007, pp.S-63)	CO_2 or brine leakage		Unlikely	(Shell Canada Limited, 2010a,, pp.17-6)	Depends on escape path characteristics and where CO_2 or brine leak to	
CO_2 Injection	Failure in injection well casing or cementation	Micro annulus formation in the casing cement due to shrinkage and pressure and temperature conditions	(Shell Canada Limited, 2011a, p.76), (Dusseault et al., 2000)	CO_2 or brine leakage		Low	(Shell Canada Limited, 2011a, p.76)	Depends on escape path characteristics and where CO_2 or brine leak to	

Activity	Hazardous Events			Consequence	Reference	Probability	Reference	Magnitude	Reference
	Event	**Description**	**Reference**						
CO_2 Injection	Failure in injection well casing	CO_2 can affect elastomers used in the construction of wells. For example a reduction in pressure that is accompanied by a phase change can result in a large drop in temperature that could affect components used in wells construction.	(DET NORSKE VERITAS (DNV), 2011, pp.9,30~32)	CO_2 or brine leakage				Depends on escape path characteristics and where CO_2 or brine leak to	
CO_2 Injection	Pressure induced surface uplift	Pressure build up, especially in vicinity of the injection well, causes ground surface deformation. The uplift might lead to the creation of leakage pathways in wells.	(Shell Canada Limited, 2010c, pp.5-10), (Shell Canada Limited, 2011a, p.71), (Nygaard, 2010, p.18), (DET NORSKE VERITAS (DNV), 2011,	Effect on groundwater flow patterns, rate, or chemistry	Quest Project, Additional Information on ERCB Application No 1670112, December 2011, Page 71	Low Low (probability of significant deformation so that groundwater could be affected)	(Shell Canada Limited, 2010c, pp.5-10), (Shell Canada Limited, 2011a, p.71)	Geomechanical modelling using site rock properties show a insignificant maximum uplift of 60mm Low	(Shell Canada Limited, 2010c, pp.5-10), (Shell Canada Limited, 2011a, p.71)
CO_2 Injection	Lateral migration of CO_2 or brine within the storage system	Through any possible pathway	(Shell Canada Limited, 2010c, pp.5-10)	Displace the fluids towards leakage pathways	(Shell Canada Limited, 2010c, pp.5-10)	Low	(Shell Canada Limited, 2010c, pp.5-10)		
CO_2 Injection	Human exposure to chemicals	Potential NO_s and $PM_{2.5}$ emissions	(Shell Canada Limited, 2011c, pp.3-159)	Depends on time and amount of exposure	(Shell Canada Limited, 2011c, pp.3-188,189,194)			Negligible (given conditions in Shell Quest project)	(Shell Canada Limited, 2011c, pp.3-202)

Activity	Hazardous Events			Consequence	Reference	Probability	Reference	Magnitude	Reference
	Event	Description	Reference						
CO_2 Injection	Loss or reduction of integrity of injection wells	A cycling of temperatures and pressures could affect the integrity of the injection well.	(Lavoie and Keith, 2010, p.8),(DET NORSKE VERITAS (DNV), 2011, p.30~32)	Leakage of CO_2 (or brine) from storage reservoir	(Lavoie and Keith, 2010, p.7),(Nygaard, 2010, p.7)			Depends on escape path characteristics and where CO_2 or brine leak to	
CO_2 Injection	Loss or reduction of integrity of injection wells	The degradation of wells can take the form of the yielding or cracking of components due to temperature changes.	(DET NORSKE VERITAS (DNV), 2011, p.30~32)	Leakage of CO_2 (or brine) from storage reservoir				Depends on escape path characteristics and where CO_2 or brine leak to	
CO_2 Injection	Induced seismicity	Seismic events can open up existing fractures / faults.	(Quintessa, 2012), (Verdon et al., 2010, p.1)	Damage to buildings, farmlands, etc. Creation of leakage	(Verdon et al., 2010, p.1)	Low (site specific)	(U.S. Department of Energy, 2007, pp.S-81)	Low (site specific)	(U.S. Department of Energy, 2007, pp.S-81)
CO_2 Injection	Induced seismicity	Opening of fractures Damage to injection wells and the caprock. Pore pressure changes might affect the stresses leading to the reactivation of existing faults damaging wellbore.	(DET NORSKE VERITAS (DNV), 2010, p.74), (Wilson and Monea, 2004, p.221), (Prestona et al., 2005, pp.1563,1565), (Nicot and Duncan, 2012, pp.358,359)	CO_2 or brine leakage	(Mazzoldi et al., 2012)	Low (site specific)	(U.S. Department of Energy, 2007, pp.S-81)	$2 < M < 3.9$ Low (site specific)	(Mazzoldi et al., 2012), (U.S. Department of Energy, 2007, pp.S-81)

Activity	Hazardous Events			Consequence	Reference	Probability	Reference	Magnitude	Reference
	Event	Description	Reference						
CO_2 Injection	Reservoir injectivity could be less than expected	More wells needs to be drilled to keep the injection rate as expected. Capacity estimates could have overestimated the true capacity of reservoir. The CO_2 would have no place to be stored.	(Shell Canada Limited, 2010c, pp.4-2), (DET NORSKE VERITAS (DNV), 2010, p.74)	Because of the minimum required distance between the wells (to avoid pressure interference), CO_2 footprint increases. This increases the chance for encountering leakage pathways.	(Shell Canada Limited, 2010c, pp.4-2)	Low	(Shell Canada Limited, 2011c, pp.4-133)		
CO_2 Injection	Reduced injectivity over time	Salt precipitation might occur within a small radius from the injection well (~15m)	(Shell Canada Limited, 2011a, p.66),	Over time the ability to inject CO_2 could be reduced, affecting the amount of CO_2 that can be stored.	(DET NORSKE VERITAS (DNV), 2010, p.74)	Low	(Shell Canada Limited, 2011a, p.66)		
Long Term Storage	Loss or reduction of integrity of the caprock	CO_2 dissolution acidifies the brine. Chemical reactions with the seal might have the potential to increase (or decrease) permeability of the seal.	(Shell Canada Limited, 2010c, pp.5-10), (Shell Canada Limited, 2010a, pp.17-6), (Wilson and Monea, 2004, p.221), (U.S. Department of Energy, 2007, pp.S-61)	Corrosion of the seal which might lead to CO_2 or brine leakage	(Shell Canada Limited, 2010c, pp.5-10)	Low	(Shell Canada Limited, 2011a, p.40)		
Long Term Storage	Loss or reduction of integrity of the caprock	CO_2 causes the dehydration of the shale caprock causing it to shrink, reducing the pressure required to fracture the caprock.	(Liu et al., 2012, p.163)	CO_2 or brine leakage	(Liu et al., 2012, p.163)				

Activity	Hazardous Events			Consequence	Reference	Probability	Reference	Magnitude	Reference
	Event	Description	Reference						
Long Term Storage	Loss or reduction of integrity of the caprock	External forces such as earthquakes and alleviation due to stresses might affect caprock integrity.	(U.S. Department of Energy, 2007, pp.S-61)	CO_2 or brine leakage	(U.S. Department of Energy, 2007, pp.S-61)	Small Possible but not common (site specific)	(U.S. Department of Energy, 2007, pp.S-61) (U.S. Department of Energy, 2007, pp.S-80)	Small	(U.S. Departme nt of Energy, 2007, pp.S-61)
Long Term Storage	CO_2 or brine migration through the caprock	CO_2 can escape the injection formation through fractures or faults in the caprock	(Ghaderi and Leonenko, 2009, p.18), (DET NORSKE VERITAS (DNV), 2010, pp.14,24,58,74), (Prestona et al., 2005, pp.1563,1564), (Wilson and Monea, 2004, pp.30,215,234-235), (Nicot and Duncan, 2012,	Contamination of potable water, human exposure, CO_2 leakage into homes/buildings through foundations, mitigation of GHG reduction targets	(Nygaard, 2010, p.5), (Wilson and Monea, 2004, pp.213,238~240)	Low (site specific)	(U.S. Department of Energy, 2007, pp.S-83)		

Activity	Hazardous Events			Consequence	Reference	Probability	Reference	Magnitude	Reference
	Event	**Description**	**Reference**						
Long Term Storage	Capillary CO_2 or brine migration through the caprock	CO_2 can escape the injection formation	(Shell Canada Limited, 2010c, pp. 5-11), (U.S. Department of Energy, 2007, pp.S-61)	CO_2 or brine leakage	(Shell Canada Limited, 2010c, pp.5-11)	Low	(Shell Canada Limited, 2010c, pp.5-10)	In Quest site conditions, capillary migration of fluids from the caprock (in case injection pressure exceeds the capillary entry pressure of the caprock) takes hundreds of years and migration flux would be very small. However, localized heterogeneities in the caprock could result in higher local rates.	(Shell Canada Limited, 2010c, pp.5-11)
Long Term Storage	Molecular CO_2 or brine diffusion through the caprock	CO_2 might diffuse through the caprock in a molecular level, regardless of presence or absence of an interconnected pore space	(Shell Canada Limited, 2010 c, pp.5-11), (Shell Canada Limited, 2011a, p.48), (Wilson and Monea, 2004, p.234)	CO_2 or brine leakage	(Shell Canada Limited, 2010c, pp.5-11)	Low Very unlikely	(Shell Canada Limited, 2010c, pp.5-10), (Shell Canada Limited, 2011a, p.48)	Low	(Shell Canada Limited, 2010c, pp.5-10)
Long Term Storage	Corrosion of injection well cementation	CO_2 dissolution acidifies the brine which can cause cementation corrosion.	(Shell Canada Limited, 2011c, pp.3-104), (U.S. Department of Energy, 2007, pp.S-61)	CO_2 or brine leakage	(Shell Canada Limited, 2010 c, pp.5-8)	Very unlikely	(Shell Canada Limited, 2011 c, pp.3-104)	Depends on escape path characteristics and where CO_2 or brine leak to	

Activity	Hazardous Events			Consequence	Reference	Probability	Reference	Magnitude	Reference
	Event	**Description**	**Reference**						
Long Term Storage	Degradation of abandoned well cementation	Degradation of Abandoned well cement can occur in the presence of Magnesium Chloride, sulphates, fatigue, carbonation, leaching	(DET NORSKE VERITAS (DNV), 2011, p.30~32)**,** (Wilson and Monea, 2004, p.242)	CO_2 or brine leakage	(Shell Canada Limited, 2010 c, pp.5-3)			Depends on escape path characteristics and where CO_2 or brine leak to	

Activity	Hazardous Events			Consequence	Reference	Probability	Reference	Magnitude	Reference
	Event	**Description**	**Reference**						
Long Term Storage	Leakage of CO_2 or brine through wells	Leakage through wells (abandoned, injection, exploration, monitoring) can be caused by degradation of cement, fractures in cement, interfaces between materials in wells, corrosion of the casing.	(Shell Canada Limited, 2010c, pp.2-3) (Nygaard, 2010, pp.5-18,30), (DET NORSKE VERITAS (DNV), 2011, pp.18,19,30~32), (Ghaderi and Leonenko, 2009, p.18),(DET NORSKE VERITAS (DNV), 2010, pp.14,23,24,58,74), (DET NORSKE VERITAS (DNV), 2011, p.30~32), (U.S. Department of Energy, 2007, pp.S-61,63,73), (Wilson and Monea, 2004, pp.215,224,226), (Prestona et al.,2005	CO_2 or brine leakage Contamination of groundwater, soil or emission into atmosphere Contamination of potable water	(Lawton et al., 2010, p.3), (Nygaard, 2010, p.5), (Nicot and Duncan, 2012, pp.356,358)	Low	(Shell Canada Limited, 2011a), (U.S. Department of Energy, 2007, pp.S-83)	Impact of H_2S leakage from the wells: 0.3 to 26 adverse effects.	(U.S. Departmet of Energy, 2007, pp.S-104)

Activity	Hazardous Events			Consequence	Reference	Probability	Reference	Magnitude	Reference
	Event	**Description**	**Reference**						
Long Term Storage	Migration of CO_2 or brine to above the final seal	Leakage could happen into hydrocarbon resources.	(Shell Canada Limited, 2010c, pp.5-2), (Shell Canada Limited, 2011c, pp.3-83)	Salinity or acidity of hydrocarbon reservoir could increase.	(Shell Canada Limited, 2010c, pp.5-2), (Shell Canada Limited, 2011c,	Low	(Shell Canada Limited, 2010c, pp.5-2), (Shell Canada Limited, 2011c,		
Long Term Storage	Migration of CO_2 or brine to above the final seal	Saline water could leak into protected ground water zone	(Shell Canada Limited, 2010c, pp.2-2,5-3)	Potential consequences to the groundwater are discussed in the environmental assessment	(Shell Canada Limited, 2010c, pp.5-3)	Unlikely (brine leakage) Low (affecting groundwater)	(Shell Canada Limited, 2011a, p.21), (U.S. Department of Energy, 2007, pp.S-83)	Depends on release rate and volume, pressure and temperature, aquifer mineralogy and hydraulic parameters, groundwater gradients and velocities, etc.	(Shell Canada Limited, 2011c, pp.3-113)
Long Term Storage	Migration of CO_2 or brine to above the final seal	Soil could be contaminated. Migration of CO_2 into the soil may increase soil acidity and introduce contaminants mobilized and transported by the passage of CO_2 through the subsurface.	(Shell Canada Limited, 2010c, pp.5-3)	Resulting changes in soil quality could harm the "flora and fauna".	(Shell Canada Limited, 2010c, pp.5-3)				
Long Term Storage	Migration of CO_2 or brine to above the final seal	CO_2 could be released to the atmosphere.	(Shell Canada Limited, 2010c, pp.5-3)	In addition to other mentioned leakage consequences (e.g. air quality), project effectiveness in mitigating the global warming reduces.	(Shell Canada Limited, 2010c, pp.5-3)	Unlikely	(Shell Canada Limited, 2011a, p.19)		

Activity	Hazardous Events			Consequence	Reference	Probability	Reference	Magnitude	Reference
	Event	**Description**	**Reference**						
Long Term Storage	Migration of CO_2 or brine because of third party activities	Activities such as mining, agriculture, or landfill	(Shell Canada Limited, 2010c, pp.5-10), (Wilson and Monea, 2004, p.221), (Prestona et al., 2005, p.1565)	Loss of containment	(Shell Canada Limited, 2010c, pp.5-10)				
Long Term Storage	Unexpected plume migration	Loss of conformance	(Shell Canada Limited, 2011a), (Wilson and Monea, 2004), (Nicot and Duncan, 2012, p.358)	Contamination of fresh water resources Loss of containment	(Shell Canada Limited, 2011c, pp.3-148) (Shell Canada Limited, 2010 c, pp.5-	Low	(Shell Canada Limited, 2011a)		
Long Term Storage	Contamination of groundwater with heavy metals	CO_2 dissolution acidifies the groundwater. Acid can react with alkaline in the groundwater formation and release materials containing heavy metals	(Shell Canada Limited, 2011c, pp.3-148)	Contamination of fresh water resources	(Shell Canada Limited, 2011c, pp.3-148)	Low (for shallow water formations)	(Shell Canada Limited, 2011c, pp.3-149)		

Activity	Hazardous Events			Consequence	Reference	Probability	Reference	Magnitude	Reference
	Event	**Description**	**Reference**						
Long Term Storage	Escape of H_2S (Hydrogen Sulphide)	H_2S may be present in the resident brine and could escape the storage aquifer via brine leakage	(Lavoie and Keith, 2010, pp.5,6), (Ghaderi and Leonenko, 2009, pp.19,20), (DET NORSKE VERITAS (DNV), 2011, pp.30,32)	Cracking / Fouling	(DET NORSKE VERITAS (DNV), 2011, pp.9,30~32)				
Long Term Storage	Presence of other chemicals in CO_2 stream	Oxygen, Hydrogen, etc. Oxygen may promote corrosion.	(DET NORSKE VERITAS (DNV), 2011, pp.9,30~32)	Degradation of existing wells, leading to leakage.	(DET NORSKE VERITAS (DNV), 2011, pp.9,30~32)				

References

DET NORSKE VERITAS (DNV). 2010. 2009-1425 CO2QUALSTORE, Guideline for Selection and Qualification of Sites.

DET NORSKE VERITAS (DNV). 2011. 2011-0448 CO2WELLS, Guideline for the risk management of existing wells at CO2 geological storage sites.

Dusseault, M.B., Gray, M.N. and Nawrocki, P.A., 2000. Why Oil wells Leak: Cement Behavior and Long- Term Consequences. In SPE International Oil and Gas Conference. Beijing, China, 2000. SPE International.

Evans, J. van Donkelaar, A., Martin, R.V. et al. 2013. Estimates of global mortality attributable to particulate air pollution using satellite imagery. Environ Res. 120, pp. 33-42

Ghaderi, S. and Leonenko, Y. 2009. Reservoir Modelling, Wabamun Area CO2(WASP). Calgary: University of Calgary Institute fo Sustainable Energy, Environment and Economy (ISEEE).

Goodarzi, S. and Settari, A., 2009. Geomechanical Modelling and Analysis, Wabamun Area CO2 Sequestration Project (WASP). Calgary: University of Calgary Institute of Sustainable Energy, Environment and Economy (ISEEE).

Lavoie, R. and Keith, D., 2010. Executive Summary of Wabamun Area CO2 Sequestration Project (WASP). Calgary: University of Calgary Institute fo Sustainable Energy, Environment and Economy (ISEEE).

Lawton, D. et al., 2010. Recommendations for Injection and Storage Monitoring, WABAMUN AREA CO2 SEQUESTRATION PROJECT (WASP). Calgary:

Institute for Sustainable Energy, Environment and Economy (ISEEE), University of Calgary.

Liu, F., Lu, P., Griffith, C., Hedges, S.W., Soong, Y., Hellevangc, H. and Zhu, C. 2012. CO2–brine–caprock interaction: Reactivity experiments on Eau Claire shale and a review of relevant literature. Int J Greenhouse Gas Control. Vol. 7, pp. 152-167

Mazzoldi, A., Rinaldi, A.P., Borgia, A. and Rutqvist, J., 2012. Induced seismicity within geological carbon sequestration projects: Maximum earthquake magnitude and leakage potential from undetected faults. International Journal of Greenhouse Gas Control, 10, p.434–442.

Nicot, J.-P. and Duncan, I.J., 2012. Common attributes of hydraulically fractured oil and gas production and CO2 geological sequestration. Greenhouse Gas Science and Technology, 2, p.352–368.

Nygaard, R., 2010. Well Design and Well Integrity, Wabamun Area CO2 Sequestration Project (WASP). Calgary: University of Calgary Institute fo Sustainable Energy, Environment and Economy (ISEEE).

Prestona, C. et al., 2005. IEA GHG Weyburn CO2 monitoring and storage project. Fuel Processing Technology, 86, p.1547– 1568.

Quintessa, 2012. Generic CO2 FEP Database, Version

1.1.0. [Online] Available at: http://www.quintessa- online.com/fep.php [Accessed 2012].

Shell Canada Limited. 2010a. Quest Carbon Capture and Storage Project Environmental Assessment.

Shell Canada Limited. 2010b. Quest Carbon Capture and Storage Project, Volume 1: Project Description.

Shell Canada Limited. 2010c. Quest Carbon Capture and Storage Project, Volume 1, Appendix A: Measurement, Monitoring and Verification Plan.

Shell Canada Limited. 2011a. Quest Carbon Capture and Storage Project, Additional Information on ERCB Application No 1670112.

Shell Canada Limited. 2011b. Quest Carbon Capture and Storage Project, Quantitative Risk Assessment: CO2 Pipeline and Injection Wells.

Shell Canada Limited. 2011c. Quest Carbon Capture and Storage Project, Response To The Supplemental Information Request From Alberta Environment.

Verdon, J., Kendall, J.-M., White, D.J., Angus, D.A., Fisher, Q.J., Urbancic, T. 2010. Passive seismic monitoring of carbon dioxide storage at Weyburn. *The Leading Edge*, February Issue, pp. 200-206.

Wilson, M.and Monea, M. 2004. IEA GHG Weyburn CO2 Monitoring and Storage Project Summary Report 2000-20004. In 7th International Conference on Greenhouse Gas COntrol Technologies. Vancouver, Canada, 2004. Petroleum Technology Research Center.