EXH. RPB-7
DOCKETS UE-22___/UG-22___
2022 PSE GENERAL RATE CASE
WITNESS: RYAN P. BLOOD

BEFORE THE
WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION

WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION, **Complainant,** **v.** **PUGET SOUND ENERGY,** **Respondent.**	**Docket UE-22____** **Docket UG-22____**

SIXTH EXHIBIT (NONCONFIDENTIAL) TO THE PREFILED DIRECT TESTIMONY OF

RYAN P. BLOOD

ON BEHALF OF PUGET SOUND ENERGY

JANUARY 31, 2022

Puget Sound Energy

Lower Baker Dam Seepage Reduction Project

Cost and Schedule Risk Analysis

Technical Memorandum

Prepared for:

PUGET SOUND ENERGY

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Report Date:
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Disclaimer

The risk-based estimating process, Cost and Schedule Risk Analysis (CSRA) is iterative in nature. This process represents a “snapshot in time” for the Lower Baker Dam Seepage Reduction project and characterizes the conditions known at the time of the workshop.

The structured process by which this workshop has been undertaken with the contribution, deliberation, and concurrence in the analysis and results by the stakeholders, project team and subject matter experts that participated provides the best assessment of exposure to risk as it pertains to this project at this point in time.

Risk exposure is by its very nature subjective. The risk exposure of this project will continuously evolve, and this report represents the best assessment of associated interviews and workshops as of the date of the report. The assessment is provided with the objective to assist PSE with a more informed decision-making process for the subject project.

The risk assessment, facilitated by HDR, records and models the views of the PSE project team and subject matter experts in attendance at the risk workshop along with any recordings of subsequent meetings. The risk assessment addresses issues that could arise on the project given the experiences of the PSE team. It is limited in scope with respect to time allotted to the workshop, the information available at the time of the workshop, and availability of the PSE project team and subject matter expert representation.

There is no representation that all risks have been identified or that the quantification of the risks is in any way a guarantee of limit of exposure to schedule delay or cost overrun or underrun to PSE.

EXCLUSIONS AND ASSUMPTIONS

The risk analysis is based on the following assumptions and exclusions:

- The quantitative risk analysis is based on credible ranges of costs and possible schedule deviations and the probability of the risk occurring,
- The risk analysis does not take into account changes in commodity prices or cost of labor, or major events such as wars, major earthquakes, stock market volatility, deaths and injuries from site accident(s), pandemics, epidemics, and acts of God, etc.,
- The risk analysis does not take into account impacts to funding and financial risks, and
- The risk analysis was prepared for the sole and exclusive use by PSE and is not for the benefit of any third party and may not be distributed to, disclosed in any form to, used by, or relied upon by, any third party without the prior written consent of HDR, which consent may be withheld in its sole discretion. PSE agrees to indemnify HDR and its officers, employees, subcontractors, and affiliated corporations from all claims, damages, losses, and costs, including but not limited to litigation expenses and attorney’s fees arising out of or related to the unauthorized disclosure, reuse, change, or alteration of the risk study.

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Cost and Schedule Risk Analysis

This technical memorandum presents the Cost and Schedule Risk Analysis (CSRA) results for the Puget Sound Energy (PSE) Lower Baker Dam Seepage Reduction project. A qualitative risk register was developed by PSE on June 30, 2021. An initial CSRA workshop, facilitated by HDR, quantified each previously identified risk on August 3, 2021. A CSRA workshop update was held on October 11, 2021 during which several risks were retired, and quantifications were updated as the project has progressed.

The results of the CSRA workshop update reflect the current cost, schedule, and risk data as of the time of the workshop as provided by the PSE project team and do not include risk mitigation quantifications. The analysis is based on information, costs, and risk factors provided and approved by PSE. Updated inputs for the base cost and project schedule were provided by PSE then input into a more robust, custom, risk modeling analysis tool to account for the multiple construction phases within the project schedule.

The initial qualitative risk register (June 2021) as well as the initial quantitative risk analysis sheets (August 2021) can be found in the previous Technical Memorandum dated August 20, 2021. The updated quantitative Risk Analysis Sheets (October 2021) are provided in Appendix C.

Project Description

The Baker River Hydroelectric Project, owned and operated by PSE, is located on the Baker River in Skagit and Whatcom counties, Washington and is comprised of both the Upper Baker and Lower Baker dams. The Lower Baker Dam (LBK) was constructed along the Baker River from 1925 to 1927 to generate hydroelectric power for northwestern Washington. The dam, which is located approximately one mile north of the town of Concrete, impounds a 7-mile-long reservoir known as Lake Shannon. This 285-foot-high concrete arch structure is located in a narrow canyon cut through limestone and shale bedrock by the Baker River.

LBK, since its original filling, has had a history of seepage through the foundation/abutment contact and features in the bedrock. Previous foundation grouting programs were conducted in 1934, 1959, and 1982. Seepage rates increased over the years following each grouting program and continued until another grouting program was undertaken.

This Project entails constructing a continuous, multiple line grouted seepage cutoff to reduce seepage and reduce the potential for bedrock erosion. Constructing the seepage cutoff will require working from a platform over the water, a work access pad on the left abutment, and barges and boats. Prior to completing the seepage cutoff, a seepage seal will be constructed over the soil and bedrock slope below the right abutment where previous dye tracing investigations have indicated seepage locations are located.

In addition, the work prior to the start of drilling and grouting will include constructing a concrete plug in the 1924/1925 diversion tunnel where the seepage cutoff crosses this abandoned diversion tunnel upstream of the intake structure on the left abutment.

Project Phases

Project phases have been determined by PSE as listed below. The phases were used to pair project risks with the appropriate construction contractor overhead costs.

- Phase 1A
  - Shall consist of offsite work
  - May include onsite work such as surveying, developing the required site and instrumentation as-builts, and installing project instrumentation
  - Notice to Proceed will be issued following award of the contract
- Phase 1B
  - Shall generally consist of onsite work needed to prepare the site and site access
  - Notice to Proceed will be issued after the necessary permits are secured after completion of Phase 1A
- Phase 2A
  - Shall generally consist of constructing the work elements that are required prior to production drilling and grouting for the Seepage Cutoff
  - Notice to Proceed will be issued after completion of Phase 1B
- Phase 2B
  - Shall generally consist of production drilling and grouting for the Seepage Cutoff
  - Notice to Proceed will be issued after completion of Phase 2A
- Phase 2C
  - Shall generally consist of deconstruction of the work platform and demobilization of grouting equipment
  - Notice to Proceed will be issued after completion of Phase 2B
- Phase 3
  - Shall generally consist of demobilization, site restoration of disturbed areas, and delivery of closeout submittals

Risk Model Inputs and Assumptions

PSE provided a summary of base costs, by project phase, that was used within the risk model. This summary is included as Appendix B.

A range of uncertainty of -1 to +5 percent on the base construction cost was provided by PSE which represents the range of uncertainty of quantities during construction. All base costs were assumed to be in current year dollars with no escalation or inflation added.

PSE provided a construction start date of November 1, 2021 and an overall construction duration of 44 calendar months broken into phases. Contractor Overhead Costs for delay were provided by PSE for each phase. Additional delay costs are also included in the model for Construction Management, Engineering Services During Construction, and PSE Oversight. These are included within the summary provided by PSE in Appendix B.

Risk Analysis

The risk analysis process quantified previously identified risk events by establishing the expected probability of occurrence and range of impacts through elicitation of information from

PSE. The range of impacts defines the representative distribution to be used when modeling the risk. The probability determines the relative frequency (or likelihood) of an event transpiring.

These values as well as risk interdependencies and unquantified risks (watchlist items) were developed by PSE. The individual Risk Analysis Sheets are provided in Appendix C. Escalation and overheads were modeled, as appropriate, to the risks that were quantified to have delay impacts.

Cost Results

Figure 1 depicts the total cost risk analysis results in the form of a probability distribution or "S-curve" graph. The S-curve shows the relationship between cost and the probability of not exceeding that cost. The graph indicates the best opinion of the cost ranges established by the PSE project team at the time of the analysis.

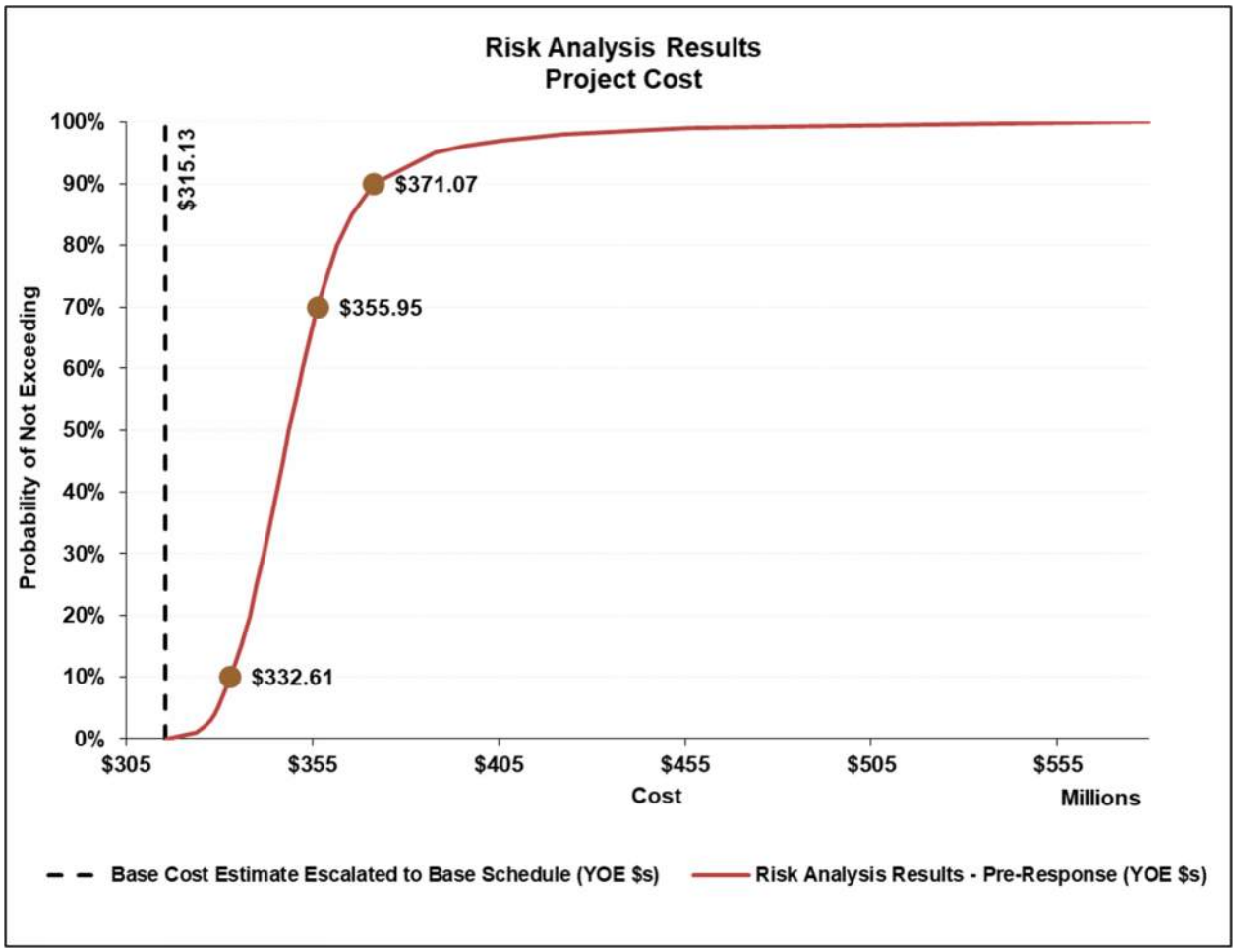

Figure 1: Total Project Costs

The vertical black dashed line represents the total base cost of $315.13 million.

The **red** S-curve represents the cumulative probability distribution for the pre-response costs – prior to incorporating any risk mitigation strategies. This S-curve reveals that prior to risk

response, there was a **70 percent** probability to not exceed **$355.95 million** YOE (year of expenditure).

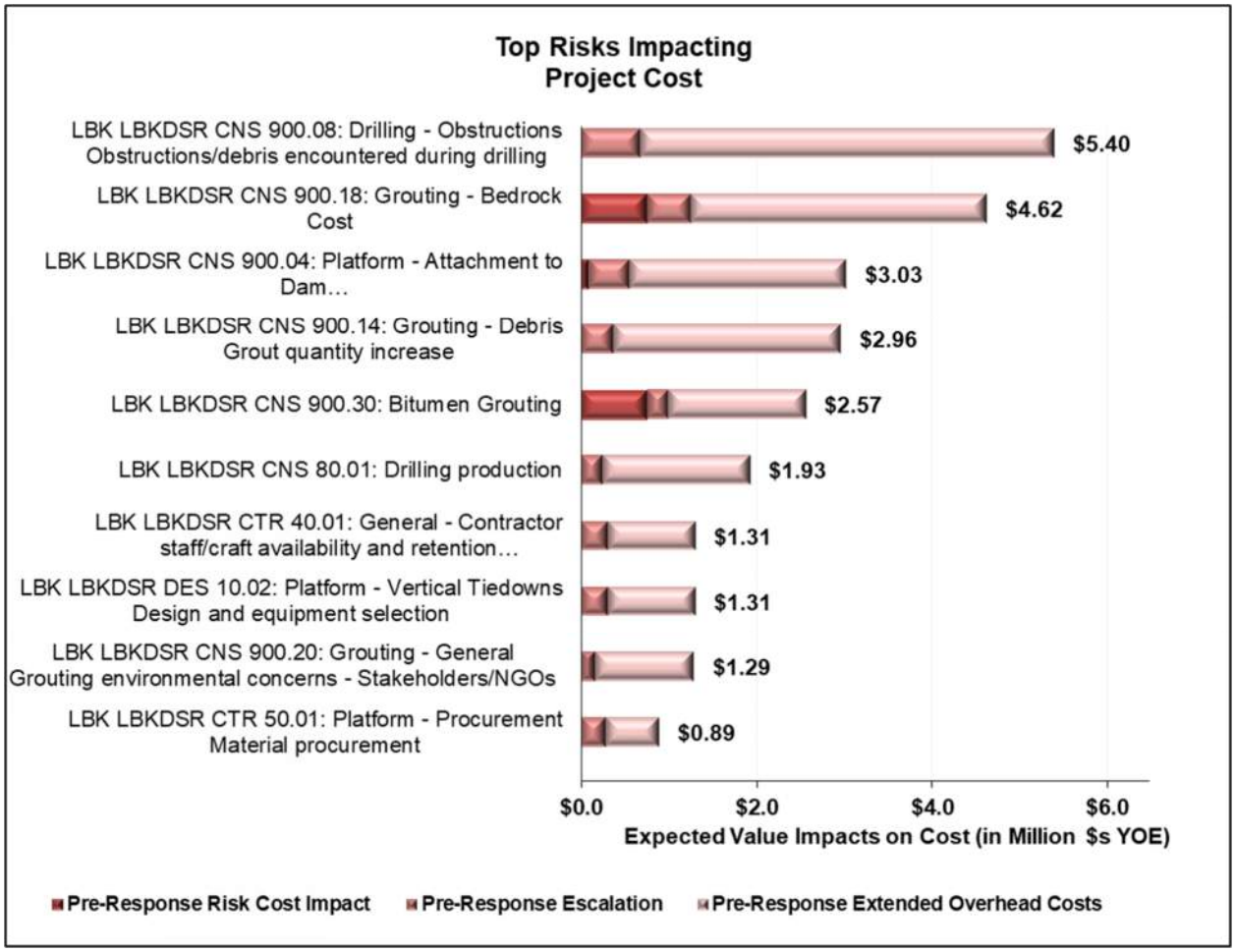

Figure 2: Top Cost Risks

Figure 2 is a diagram showing the top ten cost risks of the project. This “tornado” chart shows the expected value for each risk. The bars represent the pre-response cost impacts for each event risk. The overall impact of the risk may be comprised of three components:

- The quantified and modeled cost of the risk
- The cost of escalation to the risk caused by delay
- The contractor overhead cost impact caused by the risk occurring (shown in Appendix B), and additional support costs caused by those delay

The risks in the tornado chart are ranked in descending order, with the largest risks at the top of the diagram. Risk names are listed along the vertical axis with the expected impact (in million $) of the risk is shown along the horizontal axis.

The top three cost risks identified for the LBK Seepage Reduction project include obstructions/debris encountered during drilling, concentrated high flows increasing the grout

volume and leading to additional holes/grouting hours, and maintenance damage to the dam caused by platform attachment. Each risk is described in more detail in Appendix C.

Schedule Results

The probabilistic distribution of when the project is expected to be completed is shown in Figure 3. The base schedule project completion date is currently anticipated in July 2025.

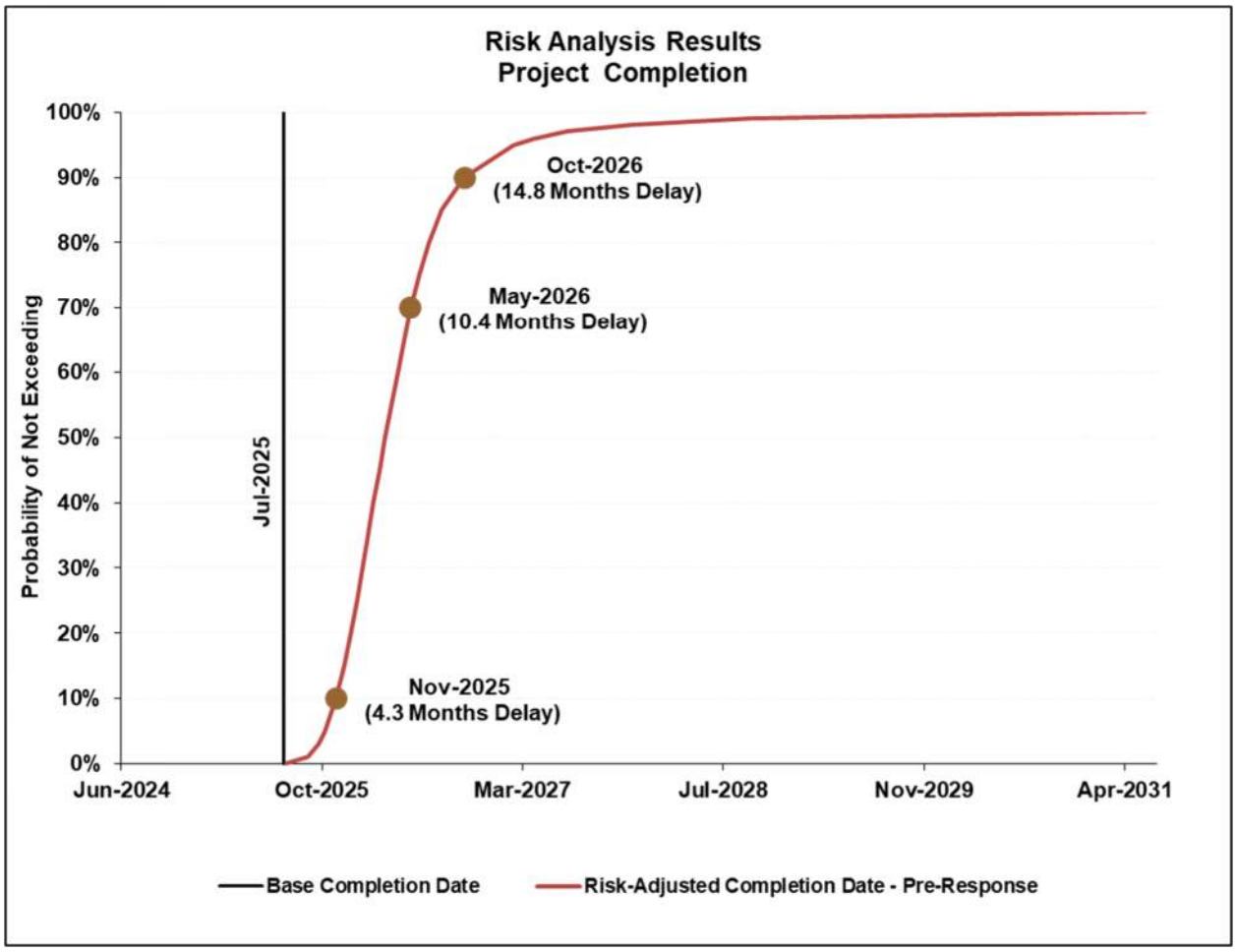

Figure 3: Project Completion Date

The **red** S-curve reveals that prior to risk response, there is a **70 percent** probability that the project completion date will be May 2026, a delay of 10.4 months when compared to the base schedule.

The schedule tornado chart in Figure 4, on the following page, depicts the expected value pre-response impacts of the top risks affecting the project schedule. During the analysis these delay impacts are monetized, in the form of extended overhead costs only, and are shown in the cost risk profile, where applicable. The schedule delay tornado with expected values allows the management team with a priority list to focus on those with the largest quantified schedule impacts.

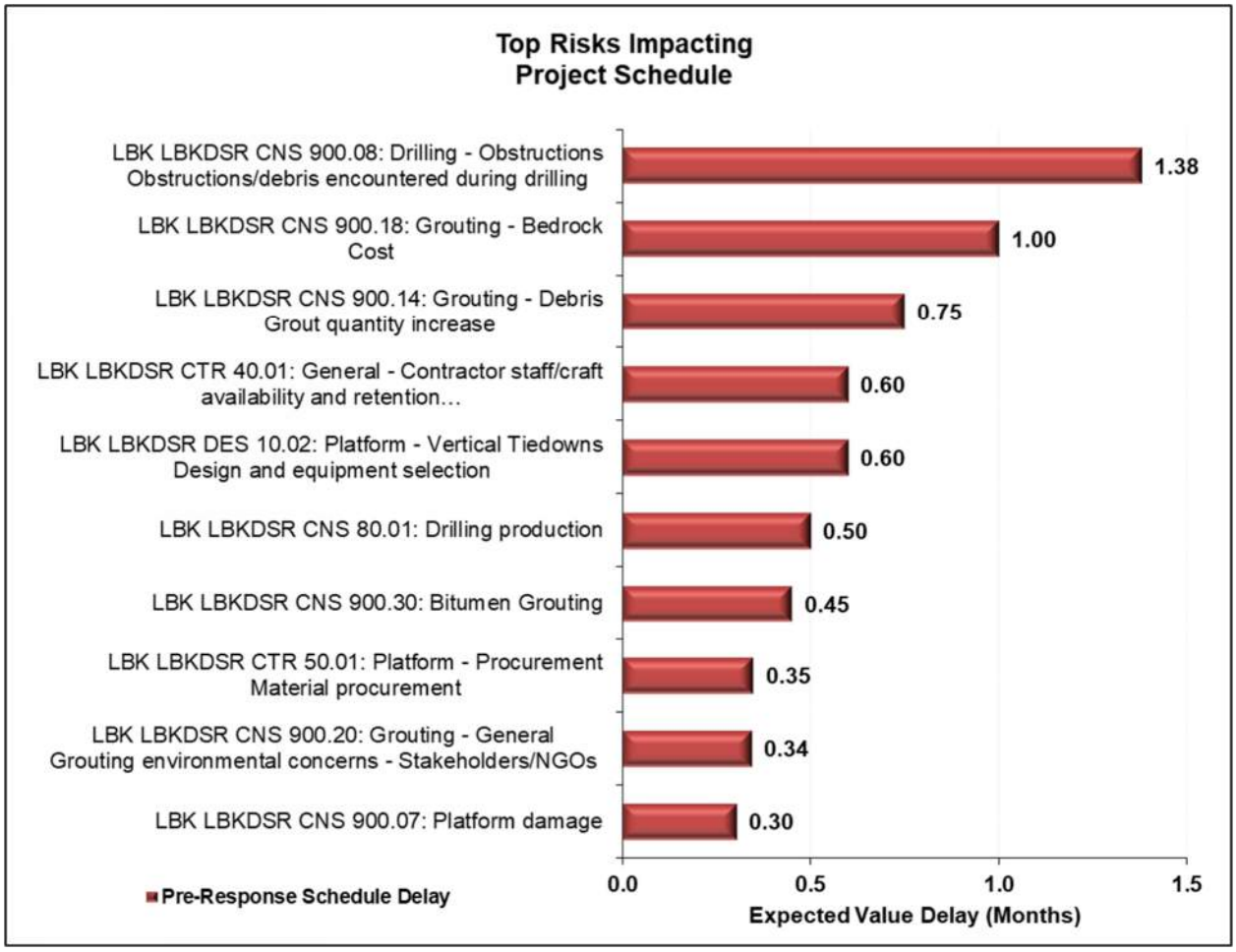

Figure 4: Top Schedule Risks

Risks in the tornado diagram are ranked in descending order, with the largest risks at the top of the diagram. Risk names are listed along the vertical axis, and the expected impact (in months) of the risk is shown along the horizontal axis. The expected value effect of each risk is calculated as the product of the risk's probability of occurrence and the risk's schedule impact as quantified in the workshop.

The top three schedule risks are encountering obstructions/debris during drilling, concentrated high flows increasing the grout volume and leading to additional holes/grouting hours, and grouting loss leading to a quantity increase. Any cost impacts as a result of a delay are monetized during the modeling process and are illustrated in the cost risk profile.

Conclusion

Ongoing cost and schedule risk analysis updates are an integral tool for successful project management practices. The purpose of periodic risk analysis updates is to use the forecasts of risk-adjusted cost and schedule outcomes to measure the probability of project success compared to the project's initial anticipated completion date and project cost. Where a project cost or schedule lies on the S-curve of cost and schedule results reveal the confidence level of the project being delivered on time and on budget.

The basis of the analysis is strongly dependent on risk information provided by the team. As the project evolves, new information will become available, and this information should be analyzed to determine the current impacts to the project. Mitigation of the top schedule risk does not necessarily imply a direct schedule reduction, as other risks may move up to take their place.

All efforts should be made to deliver the project within the established cost and schedule budget. Project Managers and teams must not plan on using the risk reserve from onset of a project. They should avoid or mitigate threats and exploit opportunities. If avoidance of a risk is not possible, the team should try to minimize the likelihood of occurrence or reduce the impact of threat.

Continuous monitoring and control of risks is critical for project success and every effort must be made to mitigate or control major project risks to maximize the benefits.

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Appendix A – Workshop Attendees

2021			Name	Organization – Position/Discipline	Contact
Aug		Oct			
3	4	11			
✓	✓	✓	Rachel Bernhard	HDR – Risk Assistant	rachel.bernhard@hdrinc.com
✓	✓	✓	John Bickford	PSE – Project Manager	john.bickford@pse.com
	✓	✓	Stan Boyle	Shannon & Wilson – Engineer of Record	srb@shanwil.com
✓	✓	✓	Jim Cockburn	Advanced Construction Inc – Subject Matter Expert	jcockburn3935@gmail.com
✓	✓	✓	Tom Danielson	PSE – Chief of Dam Safety	thomas.danielson@pse.com
✓	✓	✓	Michael Genduso	HDR – Resident Engineer	michael.genduso@hdrinc.com
✓	✓	✓	Blane Long	HDR – Risk Facilitator	blane.long@hdrinc.com
	✓	✓	Gen Sasaki	Shannon & Wilson – Geotechnical Engineer	gns@shanwil.com
✓	✓	✓	Kevin Snyder	HDR – Hydropower Practice Leader	kevin.snyder@hdrinc.com
✓	✓	✓	Patrick White	HDR – Project Manager	patrick.white@hdrinc.com

Appendix B – Contractor Overhead Costs

LOWER BAKER DAM SEEPAGE REDUCTION PROJECT

COST SUMMARY - BY PHASE

Description	Total Cost	Bid Scope
ph1 A	$ 10,270,000.00	insurance
	$ 1,507,000.00	bonds
	$ 3,520,000.00	mob
	$ 1,320,000.00	oh
ph1 B	$ 7,480,000.00	mob
	$ 3,500,000.00	oh
	$ 1,250,000.00	survey
	$ 4,515,000.00	access, env controls, signage
HDR	$ 997,674.42	
S&W	$ 200,000.00	
PSE Staff	$ 140,000.00	
PSE OH	$ 4,164,000.00	
Sub-total	**$ 38,863,674.42**	
Contractor OH (ph1 A)	*$ 110,000.00*	*weekly (12 week duration)*
Contractor OH (ph1 B)	*$ 175,000.00*	*weekly (20 week duration)*

Description	Total Cost	Bid Scope
ph2 A	$ 22,280,000.00	mob
	$ 13,200,000.00	oh
	$ 2,500,000.00	seepage seal
	$ 2,525,000.00	tunnel plug
	$ 1,050,000.00	demolition
	$ 1,210,000.00	woody debris
	$ 24,800,000.00	work platform
	$ 17,151,000.00	guide pipes
	$ 3,000,000.00	access pad
	$ 19,400,000.00	reservoir access
ph2 B	$ 27,600,000.00	oh
	$ 46,675,375.00	drilling and grouting (35 line items)
	$ 1,600,000.00	grouting env controls mob
	$ 10,295,000.00	wastewater treatment
	$ 5,290,000.00	automated grouting controls
ph2 C	$ 3,080,000.00	oh
	$ 6,200,000.00	platform removal
	$ 600,000.00	demob reservoir
	$ 3,700,000.00	demob general
HDR	$ 12,000,000.00	
S&W	$ 16,200,000.00	
PSE Staff	$ 1,675,000.00	
PSE OH	$ 29,044,000.00	
Sub-total	**$ 271,075,375.00**	

Contractor OH (ph2 A)	*$*	*220,000.00*	*weekly (60 week duration)*
Contractor OH (ph2 B)	*$*	*400,000.00*	*weekly (69 week duration)*
Contractor OH (ph2 C)	*$*	*140,000.00*	*weekly (22 week duration)*

Description	Total Cost	Bid Scope
ph3	$ 945,000.00	oh
	$ 499,970.00	vegetation
HDR	$ 1,330,200.00	
S&W	$ -	
PSE Staff	$ 186,000.00	
PSE OH	$ 356,000.00	
Sub-total	**$ 3,317,170.00**	

Contractor OH (ph3)	*$*	*105,000.00*	*weekly (9 week duration)*

Appendix C – Risk Analysis Sheets

The risks that were updated during the October 2021 CSRA Workshop are provided in the following Risk Analysis Sheets. Cost quantifications represent the Contractor Overhead Costs per Project Phase as shown in Appendix B. The initial qualitative risk register (June 2021) as well as the initial risk analysis sheets (August 2021) can be found in the previous Technical Memorandum dated August 20, 2021.

Project	Lower Baker Dam	Risk ID	LBK LBKDSR CNS 50.01
Sub-Project	Lower Baker Dam Seepage Reduction	Status	Active

Platform - Attachment to Dam
Concrete quality

Risk Trigger	Contractor identification of deviations.	Flowchart Activity	210
Dependency & Correlation	Delay is concurrent with Risk CNS 900.05		

Pre-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Program Rank Cost	Program Rank Schedule	Date Pre Last Updated
10%					9	29	
Cost ($M)	$0.39	$0.59	$0.78	$0.06	Project Rank Cost	Project Rank Schedule	11/15/2021
Schedule (Mo)				0.00	9	29	

Concrete quality different than anticipated, poorer=longer anchors required, better=harder drilling for divers extending duration. Phase 2A.

Post-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Additional Cost to Respond	Date Post Last Updated
10%						
Cost ($M)	$0.39	$0.59	$0.78	$0.06	Strategy	10/11/2021
Schedule (Mo)				0.00		

Monitoring and Control

Risk Owner	Risk Aging	From		Status Interval
Michael Genduso		To		

Review Comments

Last Review	Date MC Last Updated
	10/11/2021
Next Review	**Risk Assignment**
	Owner

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Project	Lower Baker Dam	Risk ID	LBK LBKDSR CNS 50.02
Sub-Project	Lower Baker Dam Seepage Reduction	Status	Active

Platform - Attachment to Dam
Concrete surface irregularities

Risk Trigger	Contractor identification of deviations.	Flowchart Activity	210
Dependency & Correlation			

Pre-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Program Rank Cost	Program Rank Schedule	Date Pre Last Updated
40%					7	14	
Cost ($M)	$0.20	$0.39	$0.39	$0.14	Project Rank Cost	Project Rank Schedule	10/11/2021
Schedule (Mo)	0.25	0.50	0.50	0.18	7	14	

Concrete surface irregularities may require field fitting/shimming leading to extended duration.
Phase 2A.

Post-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Additional Cost to Respond	Date Post Last Updated
40%						
Cost ($M)	$0.20	$0.39	$0.39	$0.14	Strategy	10/11/2021
Schedule (Mo)	0.25	0.50	0.50	0.18		

Track submittal schedule and LBC performance. Verify all concerns are addressed in submittal. Ensure there is a clear plan and approach through submittal review and RRM.

Monitoring and Control

Risk Owner	Risk Aging	From		Status Interval
Michael Genduso		To		

Review Comments

Last Review	Date MC Last Updated
	10/11/2021
Next Review	**Risk Assignment**
	Owner

November 16, 2021 Risk Register Page 2 of 48

Project	Lower Baker Dam	Risk ID	LBK LBKDSR CNS 50.03
Sub-Project	Lower Baker Dam Seepage Reduction	Status	Active

Platform - Guide Pipe System
Contractor quality

Risk Trigger		Flowchart Activity	210
Dependency & Correlation			

Pre-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Program Rank Cost	Program Rank Schedule	Date Pre Last Updated
25%					12	10	
Cost ($M)				$0.00	Project Rank Cost	Project Rank Schedule	
Schedule (Mo)	0.50	1.00	1.50	0.25	12	10	

Contractor Performance Item - Difficult installation due to location, verticality tolerance, location of guide pipes. Could affect schedule and quality of seepage curtain installation and performance. Design may limit ability to add additional grout holes. Phase 2A.

Post-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Additional Cost to Respond	Date Post Last Updated
25%						
Cost ($M)				$0.00	Strategy	10/11/2021
Schedule (Mo)	0.50	1.00	1.50	0.25		

Consider additional grout holes to address deviations in guide pipe placement.

Monitoring and Control

Risk Owner	Risk Aging	From		Status Interval
Michael Genduso		To		

Review Comments

Last Review	Date MC Last Updated
	10/11/2021
Next Review	**Risk Assignment**
	Contractor

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Project	Lower Baker Dam	Risk ID	LBK LBKDSR CNS 50.04
Sub-Project	Lower Baker Dam Seepage Reduction	Status	Active

Penstock damage

Risk Trigger	Post grouting survey inside penstock	Flowchart Activity	210
Dependency & Correlation			

Pre-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Program Rank Cost	Program Rank Schedule	Date Pre Last Updated
5%					11	28	
Cost ($M)	$0.40	$0.40	$0.40	$0.02	Project Rank Cost	Project Rank Schedule	10/11/2021
Schedule (Mo)	0.25	0.25	0.25	0.01	11	28	

Tunnel Plug
New plug pushes old plug into penstock creating damage. Cost/delay is associated with response strategies to assess - otherwise this risk is a show stopper (years to fix, if occurs).
Phase 2A.

Post-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Additional Cost to Respond	Date Post Last Updated
5%						
Cost ($M)	$0.40	$0.40	$0.40	$0.02	Strategy	10/11/2021
Schedule (Mo)	0.25	0.25	0.25	0.01		

Built into contract - Control grout pressures

Monitoring and Control

Risk Owner	Risk Aging	From		Status Interval
Michael Genduso		To		

Review Comments

Last Review	Date MC Last Updated
	10/11/2021
Next Review	**Risk Assignment**
	Contractor

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Project	Lower Baker Dam	Risk ID	LBK LBKDSR CNS 80.01
Sub-Project	Lower Baker Dam Seepage Reduction	Status	Active

Drilling production

Risk Trigger		Flowchart Activity	220

Dependency & Correlation	

Pre-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Program Rank Cost	Program Rank Schedule	Date Pre Last Updated
25%					3	6	
Cost ($M)				$0.00	Project Rank Cost	Project Rank Schedule	11/16/2021
Schedule (Mo)	1.00	2.00	3.00	0.50	3	6	

Drilling - Production
Equipment, tooling, personnel, not appropriate to maintain projected production rates.
Phase 2B.

Post-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Additional Cost to Respond	Date Post Last Updated
25%						
Cost ($M)				$0.00	Strategy	11/16/2021
Schedule (Mo)	1.00	2.00	3.00	0.50		

Verify and track assumed production rates versus actual.

Monitoring and Control

Risk Owner	Risk Aging	From		Status Interval
Michael Genduso		To		

Review Comments

Last Review	Date MC Last Updated
	10/11/2021
Next Review	**Risk Assignment**
	Both

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Project	Lower Baker Dam	Risk ID	LBK LBKDSR CNS 90.01
Sub-Project	Lower Baker Dam Seepage Reduction	Status	Active

Construction accident

Risk Trigger		Flowchart Activity	220

Dependency & Correlation	

Pre-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Program Rank Cost	Program Rank Schedule	Date Pre Last Updated
5%					12	25	
Cost ($M)				$0.00	Project Rank Cost	Project Rank Schedule	
Schedule (Mo)	0.25	0.50	1.00	0.03	12	25	

General - Safety
An injury results in work stoppage or delay (near-miss or recordable incident).
Phase 2B.

Post-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Additional Cost to Respond	Date Post Last Updated
5%						
Cost ($M)				$0.00	Strategy	10/11/2021
Schedule (Mo)	0.25	0.50	1.00	0.03		

Site safety plan to be developed and site safety training program to be implemented prior to work being conducted. Regular safety meetings. Layout site and equipment and work areas to remove and reduce potential hazards.

Monitoring and Control

Risk Owner	Risk Aging	From		Status Interval
Michael Genduso		To		

Review Comments	Last Review	Date MC Last Updated
		10/11/2021
	Next Review	Risk Assignment
		Both

November 16, 2021 Risk Register Page 6 of 48

Project	Lower Baker Dam	Risk ID	LBK LBKDSR CNS 900.01
Sub-Project	Lower Baker Dam Seepage Reduction	Status	Active

Platform - Right Abutment
Non-uniform rock face/poor rock quality

Risk Trigger		Flowchart Activity	210

Dependency & Correlation	Mutually exclusive with CNS 900.02

Pre-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Program Rank Cost	Program Rank Schedule	Date Pre Last Updated
20%					8	17	
Cost ($M)	$0.39	$0.59	$0.78	$0.12	Project Rank Cost	Project Rank Schedule	10/11/2021
Schedule (Mo)	0.50	0.75	1.00	0.15	8	17	

Anchoring of formwork to rock face may add duration due to non-uniform rock face and/or poor rock quality. Phase 2A.

Post-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Additional Cost to Respond	Date Post Last Updated
20%						
Cost ($M)	$0.39	$0.59	$0.78	$0.12	Strategy	10/11/2021
Schedule (Mo)	0.50	0.75	1.00	0.15		

Track submittal schedule and LBC performance. Verify all concerns are addressed in submittal. Ensure there is a clear plan and approach through submittal review and RRM.

Monitoring and Control

Risk Owner	Risk Aging	From		Status Interval
Michael Genduso		To		

Review Comments

Last Review	Date MC Last Updated
	10/11/2021
Next Review	**Risk Assignment**
	Owner

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Project	Lower Baker Dam	Risk ID	LBK LBKDSR CNS 900.02
Sub-Project	Lower Baker Dam Seepage Reduction	Status	Active

Platform - Right Abutment
Framework installation

Risk Trigger		Flowchart Activity	210
Dependency & Correlation	Mutually exclusive with CNS 900.01		

Pre-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Program Rank Cost	Program Rank Schedule	Date Pre Last Updated
15%					12	21	
Cost ($M)				$0.00	Project Rank Cost	Project Rank Schedule	10/11/2021
Schedule (Mo)	0.25	0.50	0.50	0.07	12	21	

Installation of formwork and associated concrete may be impacted by fluctuating reservoir elevations and lack of cofferdam.
Delay in placing concrete due to location or stopping of operation due to concrete leak/spill.
Phase 2A.

Post-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Additional Cost to Respond	Date Post Last Updated
15%						
Cost ($M)				$0.00	Strategy	10/11/2021
Schedule (Mo)	0.25	0.50	0.50	0.07		

Need additional detail on contractor approach/plan to properly categorize risk.

Track submittal schedule and LBC performance. Verify all concerns are addressed in submittal. Ensure there is a clear plan and approach through submittal review and RRM. Incorporate risk mitigation strategy into schedule development/flexibility.

Monitoring and Control

Risk Owner	Risk Aging	From		Status Interval
Michael Genduso		To		

Review Comments

Last Review	Date MC Last Updated
	10/11/2021
Next Review	**Risk Assignment**
	Contractor

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Project	Lower Baker Dam	Risk ID	LBK LBKDSR CNS 900.03
Sub-Project	Lower Baker Dam Seepage Reduction	Status	Active

Platform - Intake Structure
Damage to power house

Risk Trigger		Flowchart Activity	210
Dependency & Correlation			

Pre-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Program Rank Cost	Program Rank Schedule	Date Pre Last Updated
5%					12	25	
Cost ($M)				$0.00	Project Rank Cost	Project Rank Schedule	
Schedule (Mo)	0.25	0.50	1.00	0.03	12	25	

Construction and work activities could introduce debris into power house resulting in damage.
Phase 2A.

Post-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Additional Cost to Respond	Date Post Last Updated
5%						
Cost ($M)				$0.00	Strategy	10/11/2021
Schedule (Mo)	0.25	0.50	1.00	0.03		

Direct cost impact to PSE. Review mitigation strategies with LBC.

Track submittal schedule and LBC performance. Verify all concerns are addressed in submittal, including construction debris management (netting). Ensure there is a clear plan and approach through submittal review and RRM.

Monitoring and Control

Risk Owner	Risk Aging	From		Status Interval
Michael Genduso		To		

Review Comments	Last Review	Date MC Last Updated
		10/11/2021
	Next Review	Risk Assignment
		Contractor

November 16, 2021 Risk Register Page 9 of 48

Project	Lower Baker Dam	Risk ID	LBK LBKDSR CNS 900.04
Sub-Project	Lower Baker Dam Seepage Reduction	Status	Active

Platform - Attachment to Dam
Maintenance damage to dam

Risk Trigger		Flowchart Activity	210, 220, 230

Dependency & Correlation	Equal opportunity to hit each activity

Pre-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Program Rank Cost	Program Rank Schedule	Date Pre Last Updated
5%					10	15	
Cost ($M)	$0.25	$0.50	$1.00	$0.03	Project Rank Cost	Project Rank Schedule	10/11/2021
Schedule (Mo)	1.00	2.00	12.00	0.18	10	15	

Attachment of platform may introduce maintenance damage to dam.
Phase 2A, 2B, 2C

Post-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Additional Cost to Respond	Date Post Last Updated
5%						
Cost ($M)	$0.25	$0.50	$1.00	$0.03	Strategy	10/11/2021
Schedule (Mo)	1.00	2.00	12.00	0.18		

Could have a direct cost impact component depending on type of issue.

Pre-core to verify concrete quality assumptions. Verify all concerns are addressed in submittal. Ensure there is a clear plan and approach through submittal review and RRM.

Monitoring and Control

Risk Owner	Risk Aging	From		Status Interval
Michael Genduso		To		

Review Comments

Last Review	Date MC Last Updated
	10/11/2021
Next Review	**Risk Assignment**
	Both

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Project	Lower Baker Dam	Risk ID	LBK LBKDSR CNS 900.05
Sub-Project	Lower Baker Dam Seepage Reduction	Status	Active

Platform - Attachment to Dam
Diver attachment at low elevation

Risk Trigger		Flowchart Activity	210

Dependency & Correlation	Delay is concurrent with Risk CNS 50.01.

Pre-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Program Rank Cost	Program Rank Schedule	Date Pre Last Updated
40%					12	12	
Cost ($M)				$0.00	Project Rank Cost	Project Rank Schedule	10/11/2021
Schedule (Mo)	0.25	0.50	0.75	0.20	12	12	

Diver attachment at low elevation, limited time at depth leading to longer installation duration.
Greater dive time required for installing platform and riser pipe anchorages and seepage seal. Limited dive time per individual diver results in delays completing work.
Phase 2A.

Post-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Additional Cost to Respond	Date Post Last Updated
40%						
Cost ($M)				$0.00	Strategy	10/11/2021
Schedule (Mo)	0.25	0.50	0.75	0.20		

Track submittal schedule and LBC performance. Verify all concerns are addressed in submittal. Ensure there is a clear plan and approach through submittal review and RRM.

Develop installation and anchorage techniques that do not require high precision work or long duration effort per task to be performed underwater. Use equipment that reduces diver effort for underwater installations, drilling, bolt tightening, etc.

Monitoring and Control

Risk Owner	Risk Aging	From		Status Interval
Michael Genduso		To		

Review Comments

Last Review	Date MC Last Updated
	10/11/2021
Next Review	**Risk Assignment**
	Contractor

November 16, 2021 Risk Register Page 11 of 48

Project	Lower Baker Dam	Risk ID	LBK LBKDSR CNS 900.06
Sub-Project	Lower Baker Dam Seepage Reduction	Status	Active

Platform - Guide Pipe System
Installation complexity

Risk Trigger		Flowchart Activity	210
Dependency & Correlation			

Pre-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Program Rank Cost	Program Rank Schedule	Date Pre Last Updated
20%					12	12	
Cost ($M)				$0.00	Project Rank Cost	Project Rank Schedule	10/11/2021
Schedule (Mo)	0.50	1.00	1.50	0.20	12	12	

Difficult installation due to location, assembly (in water work), attachment to Dam at low elevation (depth).
Phase 2A.

Post-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Additional Cost to Respond	Date Post Last Updated
20%						
Cost ($M)				$0.00	Strategy	10/11/2021
Schedule (Mo)	0.50	1.00	1.50	0.20		

Review contractor's plan and approach to address deviations and mitigate.

Monitoring and Control

Risk Owner	Risk Aging	From		Status Interval
Michael Genduso		To		

Review Comments

Last Review	Date MC Last Updated
	10/11/2021
Next Review	**Risk Assignment**
	Contractor

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Project	Lower Baker Dam	Risk ID	LBK LBKDSR CNS 900.07
Sub-Project	Lower Baker Dam Seepage Reduction	Status	Active

Platform damage

Risk Trigger		Flowchart Activity	220
Dependency & Correlation			

Pre-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Program Rank Cost	Program Rank Schedule	Date Pre Last Updated
50%					12	9	
Cost ($M)				$0.00	Project Rank Cost	Project Rank Schedule	10/11/2021
Schedule (Mo)	0.25	0.50	1.00	0.27	12	9	

Platform failure, requiring stop of work for repairs or rework. Impacts to the contractor. Phase 2B.

Post-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Additional Cost to Respond	Date Post Last Updated
50%						
Cost ($M)				$0.00	Strategy	10/11/2021
Schedule (Mo)	0.25	0.50	1.00	0.27		

Require platform designer to review fabrication and installation prior to loading/use.

Monitoring and Control

Risk Owner	Risk Aging	From		Status Interval
Michael Genduso		To		

Review Comments	Last Review	Date MC Last Updated
		10/11/2021
	Next Review	Risk Assignment
		Contractor

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Project	Lower Baker Dam	Risk ID	LBK LBKDSR CNS 900.08
Sub-Project	Lower Baker Dam Seepage Reduction	Status	Active

Drilling - Obstructions
Obstructions/debris encountered during drilling

Risk Trigger		Flowchart Activity	220
Dependency & Correlation			

Pre-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Program Rank Cost	Program Rank Schedule	Date Pre Last Updated
60%					1	1	
Cost ($M)				$0.00	Project Rank Cost	Project Rank Schedule	11/16/2021
Schedule (Mo)	0.50	2.00	4.00	1.25	1	1	

More obstructions and debris than anticipated. Abandoned steel / wire from previous construction activities. Phase 2B.

Post-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Additional Cost to Respond	Date Post Last Updated
60%						
Cost ($M)				$0.00	Strategy	11/16/2021
Schedule (Mo)	0.50	2.00	4.00	1.25		

Potentially delete bid item and pay T&M

Monitoring and Control

Risk Owner	Risk Aging	From		Status Interval
Michael Genduso		To		

Review Comments

Last Review	Date MC Last Updated
	10/11/2021
Next Review	**Risk Assignment**
	Owner

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Project	Lower Baker Dam	Risk ID	LBK LBKDSR CNS 900.09
Sub-Project	Lower Baker Dam Seepage Reduction	Status	Active

Drilling - Verticality
Grout hole deflection during collaring

Risk Trigger		Flowchart Activity	Watchlist
Dependency & Correlation			

Pre-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Program Rank Cost	Program Rank Schedule	Date Pre Last Updated
					12	29	
Cost ($M)				$0.00	Project Rank Cost	Project Rank Schedule	10/11/2021
Schedule (Mo)				0.00	12	29	

Grout hole deflection during collaring when entering exposed rock, debris, and steep bedrock below debris. Watchlist risk at this time.

Post-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Additional Cost to Respond	Date Post Last Updated
Cost ($M)				$0.00	Strategy	
Schedule (Mo)				0.00		

Tooling and practices

Monitoring and Control

Risk Owner	Risk Aging	From		Status Interval
Michael Genduso		To		

Review Comments

Last Review	Date MC Last Updated
	10/11/2021
Next Review	**Risk Assignment**

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Project	Lower Baker Dam	Risk ID	LBK LBKDSR CNS 900.10
Sub-Project	Lower Baker Dam Seepage Reduction	Status	Active

Drilling - Verticality
Driller performance

Risk Trigger		Flowchart Activity	Watchlist
Dependency & Correlation			

Pre-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Program Rank Cost	Program Rank Schedule	Date Pre Last Updated
					12	29	
Cost ($M)				$0.00	Project Rank Cost	Project Rank Schedule	10/11/2021
Schedule (Mo)				0.00	12	29	

Driller performance during drilling could impact deviation. Watchlist at this time.

Post-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Additional Cost to Respond	Date Post Last Updated
Cost ($M)				$0.00	Strategy	
Schedule (Mo)				0.00		

Monitor driller performance

Monitoring and Control

Risk Owner	Risk Aging	From		Status Interval
Michael Genduso		To		

Review Comments

Last Review	Date MC Last Updated
	10/11/2021
Next Review	**Risk Assignment**

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Project	Lower Baker Dam	Risk ID	LBK LBKDSR CNS 900.11
Sub-Project	Lower Baker Dam Seepage Reduction	Status	Active

Drilling - Verticality
Grout hole deviation due to geological formation

Risk Trigger		Flowchart Activity	220
Dependency & Correlation			

Pre-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Program Rank Cost	Program Rank Schedule	Date Pre Last Updated
20%					12	19	
Cost ($M)				$0.00	Project Rank Cost	Project Rank Schedule	10/11/2021
Schedule (Mo)	0.25	0.50	0.75	0.10	12	19	

Grout hole deviation in rock due to geological formation. Grout hole may tend to follow bedding or fracture planes. Phase 2B.

Post-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Additional Cost to Respond	Date Post Last Updated
20%						
Cost ($M)				$0.00	Strategy	10/11/2021
Schedule (Mo)	0.25	0.50	0.75	0.10		

Ensure correct drill tooling is used

Monitoring and Control

Risk Owner	Risk Aging	From		Status Interval
Michael Genduso		To		

Review Comments

Last Review	Date MC Last Updated
	10/11/2021
Next Review	**Risk Assignment**
	Contractor

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Project	Lower Baker Dam	Risk ID	LBK LBKDSR CNS 900.12
Sub-Project	Lower Baker Dam Seepage Reduction	Status	Active

Drilling - Verticality
Grout hole deviation due to shifting of debris

Risk Trigger		Flowchart Activity	220
Dependency & Correlation			

Pre-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Program Rank Cost	Program Rank Schedule	Date Pre Last Updated
5%					12	27	
Cost ($M)				$0.00	Project Rank Cost	Project Rank Schedule	10/11/2021
Schedule (Mo)	0.25	0.50	0.50	0.02	12	27	

Grout hole deviation due to shifting of debris.
Phase 2B.

Post-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Additional Cost to Respond	Date Post Last Updated
5%						
Cost ($M)				$0.00	Strategy	10/11/2021
Schedule (Mo)	0.25	0.50	0.50	0.02		

Tools and practices - Stiff rods/tooling, care taken when collaring adjacent holes

Monitoring and Control

Risk Owner	Risk Aging	From		Status Interval
Michael Genduso		To		

Review Comments

Last Review	Date MC Last Updated
	10/11/2021
Next Review	**Risk Assignment**
	Contractor

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Project	Lower Baker Dam	Risk ID	LBK LBKDSR CNS 900.13
Sub-Project	Lower Baker Dam Seepage Reduction	Status	Active

Drilling - Installation MPSP
MPSP installation

Risk Trigger	Water testing of valves prior to grouting and optical survey of casing	Flowchart Activity	Watchlist
Dependency & Correlation			

Pre-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Program Rank Cost	Program Rank Schedule	Date Pre Last Updated
					12	29	
Cost ($M)				$0.00	Project Rank Cost	Project Rank Schedule	10/11/2021
Schedule (Mo)				0.00	12	29	

Installation: prevent damage of valves and placing valves at correct location. Sealing, and performance of valve design. MPSP -multi port sleeve pipes. Watchlist risk at this time.

Post-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Additional Cost to Respond	Date Post Last Updated
Cost ($M)				$0.00	Strategy	
Schedule (Mo)				0.00		

Contractor Risk - replacement due to non-performance

Monitoring and Control

Risk Owner	Risk Aging	From		Status Interval
Michael Genduso		To		

Review Comments

Last Review	Date MC Last Updated
	10/11/2021
Next Review	**Risk Assignment**

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Project	Lower Baker Dam	Risk ID	LBK LBKDSR CNS 900.14
Sub-Project	Lower Baker Dam Seepage Reduction	Status	Active

Grouting - Debris
Grout quantity increase

Risk Trigger	Water quality monitoring, grouting volumes, schedule, testing.	Flowchart Activity	220
Dependency & Correlation			

Pre-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Program Rank Cost	Program Rank Schedule	Date Pre Last Updated
75%					2	3	
Cost ($M)				$0.00	Project Rank Cost	Project Rank Schedule	11/16/2021
Schedule (Mo)	0.50	1.00	1.50	0.75	2	3	

Loss of grout, high porosity leads to quantity increase.
Phase 2B.

Post-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Additional Cost to Respond	Date Post Last Updated
75%						
Cost ($M)				$0.00	Strategy	11/16/2021
Schedule (Mo)	0.50	1.00	1.50	0.75		

Use established bid items

Monitoring and Control

Risk Owner	Risk Aging	From		Status Interval
Michael Genduso		To		

Review Comments

Last Review	Date MC Last Updated
	10/11/2021
Next Review	**Risk Assignment**
	Owner

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Project	Lower Baker Dam	Risk ID	LBK LBKDSR CNS 900.15
Sub-Project	Lower Baker Dam Seepage Reduction	Status	Active

Grouting - Debris
Reduced grout spread

Risk Trigger	Water quality monitoring, grouting volumes, schedule, testing.	Flowchart Activity	220
Dependency & Correlation			

Pre-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Program Rank Cost	Program Rank Schedule	Date Pre Last Updated
60%					5	15	
Cost ($M)				$0.00	Project Rank Cost	Project Rank Schedule	11/16/2021
Schedule (Mo)	0.25	0.25	0.50	0.18	5	15	

Localized low porosity leads to reduced grout spread and/or fracking of low porosity material creating new pathway through debris. Phase 2B.

Post-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Additional Cost to Respond	Date Post Last Updated
60%						
Cost ($M)				$0.00	Strategy	11/16/2021
Schedule (Mo)	0.25	0.25	0.50	0.18		

Use established bid items

Monitoring and Control

Risk Owner	Risk Aging	From		Status Interval
Michael Genduso		To		

Review Comments

Last Review	Date MC Last Updated
	10/11/2021
Next Review	**Risk Assignment**
	Owner

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Project	Lower Baker Dam	Risk ID	LBK LBKDSR CNS 900.16
Sub-Project	Lower Baker Dam Seepage Reduction	Status	Active

Grouting - Transition Zone Rock (SCC)
Higher order holes

Risk Trigger	Water quality monitoring, grouting volumes, schedule, testing.	Flowchart Activity	Watchlist
Dependency & Correlation			

Pre-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Program Rank Cost	Program Rank Schedule	Date Pre Last Updated
					12	29	
Cost ($M)				$0.00	Project Rank Cost	Project Rank Schedule	10/11/2021
Schedule (Mo)				0.00	12	29	

Effectiveness of performance could lead to additional holes and grout quantity needs: Successfully grouted individual holes may not be effective, leading to higher order holes. Watchlist risk at this time.

Post-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Additional Cost to Respond	Date Post Last Updated
Cost ($M)				$0.00	Strategy	
Schedule (Mo)				0.00		

Use established bid items and contract procedures

Monitoring and Control

Risk Owner	Risk Aging	From		Status Interval
Michael Genduso		To		

Review Comments

Last Review	Date MC Last Updated
	10/11/2021
Next Review	**Risk Assignment**

November 16, 2021 Risk Register Page 22 of 48

Project	Lower Baker Dam	Risk ID	LBK LBKDSR CNS 900.17
Sub-Project	Lower Baker Dam Seepage Reduction	Status	Active

Grouting - Transition Zone Rock (SCC)
Angles holes under dam - cost

Risk Trigger	Water quality monitoring, grouting volumes, schedule, testing.	Flowchart Activity	Watchlist
Dependency & Correlation			

Pre-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Program Rank Cost	Program Rank Schedule	Date Pre Last Updated
					12	29	
Cost ($M)				$0.00	Project Rank Cost	Project Rank Schedule	10/11/2021
Schedule (Mo)				0.00	12	29	

Effectiveness of performance could lead to additional holes and grout quantity needs: Failure to grout contact between Dam/bedrock interface, leading to angled holes under dam. Watchlist at this time.

Post-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Additional Cost to Respond	Date Post Last Updated
Cost ($M)				$0.00	Strategy	
Schedule (Mo)				0.00		

Use established bid items and contract procedures

Monitoring and Control

Risk Owner	Risk Aging	From		Status Interval
Michael Genduso		To		

Review Comments

Last Review	Date MC Last Updated
	10/11/2021
Next Review	**Risk Assignment**

November 16, 2021 Risk Register Page 23 of 48

Project	Lower Baker Dam	Risk ID	LBK LBKDSR CNS 900.18
Sub-Project	Lower Baker Dam Seepage Reduction	Status	Active

Grouting - Bedrock Cost

Risk Trigger		Flowchart Activity	220
Dependency & Correlation			

Pre-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Program Rank Cost	Program Rank Schedule	Date Pre Last Updated
50%					4	2	
Cost ($M)	$1.00	$1.50	$2.00	$0.75	Project Rank Cost	Project Rank Schedule	10/11/2021
Schedule (Mo)	1.00	2.00	3.00	1.00	4	2	

Concentrated high flows increases grout volume, potential cost increase due to additional holes, grouting hours, etc. Phase 2B.

Post-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Additional Cost to Respond	Date Post Last Updated
50%						
Cost ($M)	$1.00	$1.50	$2.00	$0.75	Strategy	10/11/2021
Schedule (Mo)	1.00	2.00	3.00	1.00		

Use established bid items and contract procedures

Monitoring and Control

Risk Owner	Risk Aging	From		Status Interval
Michael Genduso		To		

Review Comments

Last Review	Date MC Last Updated
	10/11/2021
Next Review	**Risk Assignment**
	Owner

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Project	Lower Baker Dam	Risk ID	LBK LBKDSR CNS 900.20
Sub-Project	Lower Baker Dam Seepage Reduction	Status	Active

Grouting - General
Grouting environmental concerns - Stakeholders/NGOs

Risk Trigger		Flowchart Activity	220
Dependency & Correlation			

Pre-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Program Rank Cost	Program Rank Schedule	Date Pre Last Updated
5%					12	8	
Cost ($M)				$0.00	Project Rank Cost	Project Rank Schedule	10/11/2021
Schedule (Mo)	1.00	6.00	12.00	0.31	12	8	

Stakeholders or NGO's block execution through legal or other means due to environmental concerns Phase 2B.

Post-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Additional Cost to Respond	Date Post Last Updated
5%						
Cost ($M)				$0.00	Strategy	10/11/2021
Schedule (Mo)	1.00	6.00	12.00	0.31		

Ongoing clear communication

Monitoring and Control

Risk Owner	Risk Aging	From		Status Interval
Michael Genduso		To		

Review Comments

Last Review	Date MC Last Updated
	10/11/2021
Next Review	**Risk Assignment**
	Owner

November 16, 2021 Risk Register Page 25 of 48

Project	Lower Baker Dam	Risk ID	LBK LBKDSR CNS 900.21
Sub-Project	Lower Baker Dam Seepage Reduction	Status	Active

Grouting - General
Grouting environmental concerns - State/federal

Risk Trigger		Flowchart Activity	220

Dependency & Correlation	

Pre-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Program Rank Cost	Program Rank Schedule	Date Pre Last Updated
10%					12	19	
Cost ($M)				$0.00	Project Rank Cost	Project Rank Schedule	10/11/2021
Schedule (Mo)	0.50	1.00	1.50	0.10	12	19	

State or Federal regulators shut down project due to (environmental) permit violations or worse than anticipated impacts Phase 2B.

Post-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Additional Cost to Respond	Date Post Last Updated
10%						
Cost ($M)				$0.00	Strategy	10/11/2021
Schedule (Mo)	0.50	1.00	1.50	0.10		

Ongoing clear communication

Monitoring and Control

Risk Owner	Risk Aging	From		Status Interval
Michael Genduso		To		

Review Comments	Last Review	Date MC Last Updated
		10/11/2021
	Next Review	Risk Assignment
		Both

November 16, 2021 Risk Register Page 26 of 48

Project	Lower Baker Dam	Risk ID	LBK LBKDSR CNS 900.22
Sub-Project	Lower Baker Dam Seepage Reduction	Status	Active

Grouting - Schedule/Cost
Grouting production

Risk Trigger		Flowchart Activity	Watchlist
Dependency & Correlation			

Pre-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Program Rank Cost	Program Rank Schedule	Date Pre Last Updated
					12	29	
Cost ($M)				$0.00	Project Rank Cost	Project Rank Schedule	10/11/2021
Schedule (Mo)				0.00	12	29	

Production grouting not as efficient as anticipated, project runs longer and cost increases. Watchlist, covered with other risks

Post-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Additional Cost to Respond	Date Post Last Updated
Cost ($M)				$0.00	Strategy	
Schedule (Mo)				0.00		

Monitor schedule and grout volumes

Monitoring and Control

Risk Owner	Risk Aging	From		Status Interval
Michael Genduso		To		

Review Comments	Last Review	Date MC Last Updated
		10/11/2021
	Next Review	Risk Assignment

November 16, 2021 Risk Register Page 27 of 48

Project	Lower Baker Dam	Risk ID	LBK LBKDSR CNS 900.23
Sub-Project	Lower Baker Dam Seepage Reduction	Status	Active

Tunnel Plug
Concrete volumes

Risk Trigger		Flowchart Activity	Watchlist
Dependency & Correlation			

Pre-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Program Rank Cost	Program Rank Schedule	Date Pre Last Updated
					12	29	
Cost ($M)				$0.00	Project Rank Cost	Project Rank Schedule	10/11/2021
Schedule (Mo)				0.00	12	29	

Increased concrete volumes due to containment ineffectiveness. Watchlist risk at this time.
Phase 2A.

Post-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Additional Cost to Respond	Date Post Last Updated
Cost ($M)				$0.00	Strategy	
Schedule (Mo)				0.00		

Require survey (spec)

Monitoring and Control

Risk Owner	Risk Aging	From		Status Interval
Michael Genduso		To		

Review Comments

Last Review	Date MC Last Updated
	10/11/2021
Next Review	**Risk Assignment**

November 16, 2021 Risk Register Page 28 of 48

Project	Lower Baker Dam	Risk ID	LBK LBKDSR CNS 900.24
Sub-Project	Lower Baker Dam Seepage Reduction	Status	Active

Tunnel Plug
Poor plug placement

Risk Trigger		Flowchart Activity	Watchlist
Dependency & Correlation			

Pre-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Program Rank Cost	Program Rank Schedule	Date Pre Last Updated
					12	29	
Cost ($M)				$0.00	Project Rank Cost	Project Rank Schedule	10/11/2021
Schedule (Mo)				0.00	12	29	

Risk of increased grouting volumes due to poor plug placement. Watchlist risk at this time.
Phase 2A.

Post-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Additional Cost to Respond	Date Post Last Updated
Cost ($M)				$0.00	Strategy	
Schedule (Mo)				0.00		

Require survey (spec)

Monitoring and Control

Risk Owner	Risk Aging	From		Status Interval
Michael Genduso		To		

Review Comments

Last Review	Date MC Last Updated
	10/11/2021
Next Review	**Risk Assignment**

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Project	Lower Baker Dam	Risk ID	LBK LBKDSR CNS 900.25
Sub-Project	Lower Baker Dam Seepage Reduction	Status	Active

Seepage seal
Seepage seal installation/performance

Risk Trigger		Flowchart Activity	Watchlist
Dependency & Correlation			

Pre-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Program Rank Cost	Program Rank Schedule	Date Pre Last Updated
					12	29	
Cost ($M)				$0.00	Project Rank Cost	Project Rank Schedule	10/11/2021
Schedule (Mo)				0.00	12	29	

Installation and performance. Insufficient reduction in seepage may lead to additional grout holes and grout. Watchlist. Phase 2A.

Post-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Additional Cost to Respond	Date Post Last Updated
Cost ($M)				$0.00	Strategy	
Schedule (Mo)				0.00		

Preinstallation survey, modify modular approach, direct kill grout into high seepage zones

Monitoring and Control

Risk Owner	Risk Aging	From		Status Interval
Michael Genduso		To		

Review Comments

Last Review	Date MC Last Updated
	10/11/2021
Next Review	**Risk Assignment**

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Project	Lower Baker Dam	Risk ID	LBK LBKDSR CNS 900.26
Sub-Project	Lower Baker Dam Seepage Reduction	Status	Active

Reservoir - Spilling

Risk Trigger		Flowchart Activity	210
Dependency & Correlation			

Pre-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Program Rank Cost	Program Rank Schedule	Date Pre Last Updated
10%					12	23	
Cost ($M)				$0.00	Project Rank Cost	Project Rank Schedule	10/11/2021
Schedule (Mo)	0.50	0.50	1.00	0.06	12	23	

Spilling operations may impact contractor's scheduled activities. Specifically during platform erection and riser pipe installation. Phase 2A.

Post-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Additional Cost to Respond	Date Post Last Updated
10%						
Cost ($M)				$0.00	Strategy	10/11/2021
Schedule (Mo)	0.50	0.50	1.00	0.06		

Seek to mitigate where possible, accept when unavoidable

Monitoring and Control

Risk Owner	Risk Aging	From		Status Interval
Michael Genduso		To		

Review Comments

Last Review	Date MC Last Updated
	10/11/2021
Next Review	**Risk Assignment**
	Both

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Project	Lower Baker Dam	Risk ID	LBK LBKDSR CNS 900.27
Sub-Project	Lower Baker Dam Seepage Reduction	Status	Active

General - Environmental
Environmental concerns to public/permitting agencies

Risk Trigger		Flowchart Activity	220
Dependency & Correlation			

Pre-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Program Rank Cost	Program Rank Schedule	Date Pre Last Updated
50%					6	18	
Cost ($M)				$0.00	Project Rank Cost	Project Rank Schedule	
Schedule (Mo)	0.25	0.25	0.25	0.13	6	18	

Overwater work and near-shore work could result in oils or contaminants in water. Necessity of disturbing sediment, drilling and grout injection will cause turbidity and pH impacts downstream of dam - and be visible to public. Permitting agencies or public Phase 2B.

Post-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Additional Cost to Respond	Date Post Last Updated
50%						
Cost ($M)				$0.00	Strategy	10/11/2021
Schedule (Mo)	0.25	0.25	0.25	0.13		

Environmental controls are included in the contract and methods. Pre-project permitting agency engagement to alert them to turbidity and pH increases and get these concerns addressed in the permits has been performed. Further education of public and permitting agencies when elevated turbidity and pH conditions occur.

Monitoring and Control

Risk Owner	Risk Aging	From		Status Interval
Michael Genduso		To		

Review Comments	Last Review	Date MC Last Updated
		10/11/2021
	Next Review	Risk Assignment
		Owner

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Project	Lower Baker Dam	Risk ID	LBK LBKDSR CNS 900.28
Sub-Project	Lower Baker Dam Seepage Reduction	Status	Active

General - Project Setup, Getting to Grouting
Contractor delays - submittals

Risk Trigger		Flowchart Activity	Watchlist
Dependency & Correlation			

Pre-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Program Rank Cost	Program Rank Schedule	Date Pre Last Updated
					12	29	
Cost ($M)				$0.00	Project Rank Cost	Project Rank Schedule	
Schedule (Mo)				0.00	12	29	

Contractor delays start or is slow in preparing complete submittals. Delay in review and acceptance of submittals. Watchlist risk at this time.

Post-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Additional Cost to Respond	Date Post Last Updated
Cost ($M)				$0.00	Strategy	
Schedule (Mo)				0.00		

PSE construction management team monitor and work with LBC to reduce delays during work progress.

Monitoring and Control

Risk Owner	Risk Aging	From		Status Interval
Michael Genduso		To		

Review Comments

Last Review	Date MC Last Updated
	10/11/2021
Next Review	**Risk Assignment**

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Project	Lower Baker Dam	Risk ID	LBK LBKDSR CNS 900.29
Sub-Project	Lower Baker Dam Seepage Reduction	Status	Active

General - Project Setup, Getting to Grouting
Contractor delays - permitting

Risk Trigger		Flowchart Activity	Watchlist
Dependency & Correlation			

Pre-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Program Rank Cost	Program Rank Schedule	Date Pre Last Updated
					12	29	
Cost ($M)				$0.00	Project Rank Cost	Project Rank Schedule	
Schedule (Mo)				0.00	12	29	

Contractor delays start or is slow in preparing complete permit packages. Delay receiving building permits. Watchlist risk at this time.

Post-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Additional Cost to Respond	Date Post Last Updated
Cost ($M)				$0.00	Strategy	10/11/2021
Schedule (Mo)				0.00		

PSE construction management team monitor and work with LBC to reduce delays during work progress.

Monitoring and Control

Risk Owner	Risk Aging	From		Status Interval
Michael Genduso		To		

Review Comments

Last Review	Date MC Last Updated
	10/11/2021
Next Review	**Risk Assignment**

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Project	Lower Baker Dam	Risk ID	LBK LBKDSR CTR 40.01
Sub-Project	Lower Baker Dam Seepage Reduction	Status	Active

General - Contractor staff/craft availability and retention
Market conditions - labor

Risk Trigger		Flowchart Activity	210, 220, 230
Dependency & Correlation	Equally weighted across activities		

Pre-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Program Rank Cost	Program Rank Schedule	Date Pre Last Updated
30%					12	4	
Cost ($M)				$0.00	Project Rank Cost	Project Rank Schedule	10/11/2021
Schedule (Mo)	1.00	2.00	3.00	0.60	12	4	

Due to ongoing work in the region, remote location of the project, and large amount of off shift activities: the Contractor may struggle to staff the job consistently with their project schedule
Phase 2A, 2B, 2C.

Post-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Additional Cost to Respond	Date Post Last Updated
30%						
Cost ($M)				$0.00	Strategy	10/11/2021
Schedule (Mo)	1.00	2.00	3.00	0.60		

Monitoring and Control

Risk Owner	Risk Aging	From		Status Interval
Michael Genduso		To		

Review Comments

Last Review	Date MC Last Updated
	10/11/2021
Next Review	**Risk Assignment**
	Contractor

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Project	Lower Baker Dam	Risk ID	LBK LBKDSR CTR 50.01
Sub-Project	Lower Baker Dam Seepage Reduction	Status	Active

Platform - Procurement
Material procurement

Risk Trigger		Flowchart Activity	210
Dependency & Correlation			

Pre-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Program Rank Cost	Program Rank Schedule	Date Pre Last Updated
10%					12	7	
Cost ($M)				$0.00	Project Rank Cost	Project Rank Schedule	
Schedule (Mo)	1.00	3.00	6.00	0.32	12	7	

Availability of standard materials (concrete, steel in high demand) may delay procurement and installation. Phase 2A.

Post-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Additional Cost to Respond	Date Post Last Updated
10%						
Cost ($M)				$0.00	Strategy	10/11/2021
Schedule (Mo)	1.00	3.00	6.00	0.32		

Monitor progress and schedule performance.

Monitoring and Control

Risk Owner	Risk Aging	From		Status Interval
Michael Genduso		To		

Review Comments

Last Review	Date MC Last Updated
	10/11/2021
Next Review	**Risk Assignment**
	Contractor

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Project	Lower Baker Dam	Risk ID	LBK LBKDSR CTR 60.01
Sub-Project	Lower Baker Dam Seepage Reduction	Status	Active

Schedule performance

Risk Trigger		Flowchart Activity	Watchlist
Dependency & Correlation			

Pre-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Program Rank Cost	Program Rank Schedule	Date Pre Last Updated
					12	29	
Cost ($M)				$0.00	Project Rank Cost	Project Rank Schedule	
Schedule (Mo)				0.00	12	29	

Contractor may take longer to complete work for their own reasons, resulting in delayed delivery of project. Increased PSE cost to provide contract administration staff for longer duration. Watchlist risk at this time.

Post-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Additional Cost to Respond	Date Post Last Updated
Cost ($M)				$0.00	Strategy	
Schedule (Mo)				0.00		

PSE construction management team monitor and work with LBC to reduce delays during work progress.

Monitoring and Control

Risk Owner	Risk Aging	From		Status Interval
Michael Genduso		To		

Review Comments

Last Review	Date MC Last Updated
	10/11/2021
Next Review	**Risk Assignment**

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Project	Lower Baker Dam	Risk ID	LBK LBKDSR CTR 900.01
Sub-Project	Lower Baker Dam Seepage Reduction	Status	Active

General - Instrumentation
Instrumentation data

Risk Trigger		Flowchart Activity	Watchlist
Dependency & Correlation			

Pre-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Program Rank Cost	Program Rank Schedule	Date Pre Last Updated
					12	29	
Cost ($M)				$0.00	Project Rank Cost	Project Rank Schedule	10/11/2021
Schedule (Mo)				0.00	12	29	

Difficulty getting instrumentation data for piezometers, water quality, and ATMS integrated with grouting instrumentation and monitoring and control system. Watchlist
Phase 1A.

Post-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Additional Cost to Respond	Date Post Last Updated
Cost ($M)				$0.00	Strategy	
Schedule (Mo)				0.00		

Requirement for design and testing of the instrumentation integration with the grout control system is required to be completed prior to initiating grouting.

Monitoring and Control

Risk Owner	Risk Aging	From		Status Interval
Michael Genduso		To		

Review Comments

Last Review	Date MC Last Updated
	10/11/2021
Next Review	**Risk Assignment**
	Owner

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Project	Lower Baker Dam	Risk ID	LBK LBKDSR CTR 900.03
Sub-Project	Lower Baker Dam Seepage Reduction	Status	Active

General - Decision Making Process

Risk Trigger		Flowchart Activity	220

Dependency & Correlation	

Pre-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Program Rank Cost	Program Rank Schedule	Date Pre Last Updated
25%					12	22	
Cost ($M)				$0.00	Project Rank Cost	Project Rank Schedule	10/11/2021
Schedule (Mo)	0.25	0.25	0.25	0.06	12	22	

PSE, PSE team members, unable to make timely decisions regarding approval of work or timely direction needed for grouting program (e.g., mix changes, in-hole testing, hole additions).
Phase 2B.

Post-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Additional Cost to Respond	Date Post Last Updated
25%						
Cost ($M)				$0.00	Strategy	10/11/2021
Schedule (Mo)	0.25	0.25	0.25	0.06		

Establish decision process and protocols prior to start of test grouting program. Establish guidelines for grouting program decisions and actions prior to starting grouting and update as ground conditions and operations understanding advance.

Monitoring and Control

Risk Owner	Risk Aging	From		Status Interval
Michael Genduso		To		

Review Comments	Last Review	Date MC Last Updated
		10/11/2021
	Next Review	Risk Assignment
		Owner

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Project	Lower Baker Dam	Risk ID	LBK LBKDSR DES 10.02
Sub-Project	Lower Baker Dam Seepage Reduction	Status	Active

Platform - Vertical Tiedowns
Design and equipment selection

Risk Trigger		Flowchart Activity	100, 200, 210
Dependency & Correlation	Equal weight to each activity		

Pre-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Program Rank Cost	Program Rank Schedule	Date Pre Last Updated
30%					12	4	
Cost ($M)				$0.00	Project Rank Cost	Project Rank Schedule	10/11/2021
Schedule (Mo)	1.00	2.00	3.00	0.60	12	4	

Contractor's design and equipment selection for this Critical Path activity has not yet been finalized. Duration to complete design/approach could delay operation and project by extension.
Phase 1A, 1B, 2A.

Post-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Additional Cost to Respond	Date Post Last Updated
30%						
Cost ($M)				$0.00	Strategy	10/11/2021
Schedule (Mo)	1.00	2.00	3.00	0.60		

Track submittal schedule and LBC performance. Verify all concerns are addressed in submittal. Ensure there is a clear plan and approach through submittal review and RRM.

Monitoring and Control

Risk Owner	Risk Aging	From		Status Interval
Michael Genduso		To		

Review Comments

Last Review	Date MC Last Updated
	10/11/2021
Next Review	**Risk Assignment**
	Contractor

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Project	Lower Baker Dam	Risk ID	LBK LBKDSR DES 50.01
Sub-Project	Lower Baker Dam Seepage Reduction	Status	Active

Platform - Vertical Tiedowns
Inadequate environmental controls

Risk Trigger		Flowchart Activity	210
Dependency & Correlation			

Pre-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Program Rank Cost	Program Rank Schedule	Date Pre Last Updated
10%					12	24	
Cost ($M)				$0.00	Project Rank Cost	Project Rank Schedule	10/11/2021
Schedule (Mo)	0.25	0.50	0.50	0.05	12	24	

Inadequate environmental controls may lead to permit violation, resulting in delay to operation.
Phase 2A.

Post-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Additional Cost to Respond	Date Post Last Updated
10%						
Cost ($M)				$0.00	Strategy	10/11/2021
Schedule (Mo)	0.25	0.50	0.50	0.05		

Track submittal schedule and LBC performance. Verify all concerns are addressed in submittal. Ensure there is a clear plan and approach through submittal review and RRM.

Monitoring and Control

Risk Owner	Risk Aging	From		Status Interval
Michael Genduso		To		

Review Comments	Last Review	Date MC Last Updated
		10/11/2021
	Next Review	Risk Assignment
		Contractor

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Project	Lower Baker Dam	Risk ID	LBK LBKDSR DES 900.01
Sub-Project	Lower Baker Dam Seepage Reduction	Status	Active

Platform
FERC review and approval

Risk Trigger		Flowchart Activity	100
Dependency & Correlation			

Pre-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Program Rank Cost	Program Rank Schedule	Date Pre Last Updated
20%					12	11	
Cost ($M)				$0.00	Project Rank Cost	Project Rank Schedule	10/11/2021
Schedule (Mo)	0.75	1.00	2.00	0.23	12	11	

Additional analysis and design needed. Seismic design for anchoring block and rock slope stability must meet permanent seismic criteria. Phase 1A.

Post-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Additional Cost to Respond	Date Post Last Updated
20%						
Cost ($M)				$0.00	Strategy	10/11/2021
Schedule (Mo)	0.75	1.00	2.00	0.23		

Clearly monitor Contractor's design and planning performance. Internal project level review prior to submission to FERC. Utilize schedule flexibility to mitigate impact.

Monitoring and Control

Risk Owner	Risk Aging	From		Status Interval
Michael Genduso		To		

Review Comments

Last Review	Date MC Last Updated
	10/11/2021
Next Review	**Risk Assignment**
	Contractor

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Project	Lower Baker Dam	Risk ID	LBK LBKDSR CNS 900.19
Sub-Project	Lower Baker Dam Seepage Reduction	Status	Retired

Grouting - Bedrock
Schedule

Risk Trigger		Flowchart Activity	
Dependency & Correlation			

Pre-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Program Rank Cost	Program Rank Schedule	Date Pre Last Updated
					12	29	
Cost ($M)				$0.00	Project Rank Cost	Project Rank Schedule	10/11/2021
Schedule (Mo)				0.00	12	29	

10/11/2021 Update: Retired risk at this time, delay included in risk CNS 900.18.
Concentrated high flows increases grout volume, requires additional holes, and results in schedule delays. Watchlist risk

Post-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Additional Cost to Respond	Date Post Last Updated
Cost ($M)				$0.00	Strategy	
Schedule (Mo)				0.00		

Use established bid items and contract procedures

Monitoring and Control

Risk Owner	Risk Aging	From		Status Interval
		To		

Review Comments

Last Review	Date MC Last Updated
Next Review	**Risk Assignment**

November 16, 2021 Risk Register Page 43 of 48

Project	Lower Baker Dam	Risk ID	LBK LBKDSR CTR 900.02
Sub-Project	Lower Baker Dam Seepage Reduction	Status	Retired

General - Instrumentation
Instrumentation responsibility

Risk Trigger		Flowchart Activity	
Dependency & Correlation			

Pre-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Program Rank Cost	Program Rank Schedule	Date Pre Last Updated
					12	29	
Cost ($M)				$0.00	Project Rank Cost	Project Rank Schedule	
Schedule (Mo)				0.00	12	29	

10/11/2021 Update: This is an owner's risk covered in Risk CRT 900.01, retire risk at this time.
Unclear assignment of responsibility for reviewing instrumentation data results in confusion.
Phase 1A.

Post-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Additional Cost to Respond	Date Post Last Updated
Cost ($M)				$0.00	Strategy	
Schedule (Mo)				0.00		

Monitoring and Control

Risk Owner	Risk Aging	From		Status Interval
		To		

Review Comments

Last Review	Date MC Last Updated
Next Review	**Risk Assignment**

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Project	Lower Baker Dam	Risk ID	LBK LBKDSR DES 10.01
Sub-Project	Lower Baker Dam Seepage Reduction	Status	Retired

Platform - Vertical Tiedowns
Design assumptions inaccurate

Risk Trigger	Initial CPM and final pricing submittal.	Flowchart Activity	
Dependency & Correlation	Mutually exclusive with DES 10.02		

Pre-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Program Rank Cost	Program Rank Schedule	Date Pre Last Updated
5%					12	29	
Cost ($M)	$0.78	$0.78	$2.34	$0.00	Project Rank Cost	Project Rank Schedule	10/11/2021
Schedule (Mo)	1.00	1.00	3.00	0.00	12	29	

10/11/2021 Update: Retire risk at this time, CMP and final pricing submittals have been turned in.
Design assumptions are inaccurate, additional design and approval may be needed, leading to extended duration.
Phase 2A.

Post-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Additional Cost to Respond	Date Post Last Updated
Cost ($M)				$0.00	Strategy	
Schedule (Mo)				0.00		

Track submittal schedule and LBC performance. Verify all concerns are addressed in submittal. Ensure there is a clear plan and approach through submittal review and RRM.

Monitoring and Control

Risk Owner	Risk Aging	From		Status Interval
		To		

Review Comments

Last Review	Date MC Last Updated
	11/16/2021
Next Review	**Risk Assignment**
	Owner

November 16, 2021 Risk Register Page 45 of 48

Project	Lower Baker Dam	Risk ID	LBK LBKDSR DES 10.03
Sub-Project	Lower Baker Dam Seepage Reduction	Status	Retired

Platform - Alignment
Contractor design

Risk Trigger		Flowchart Activity	
Dependency & Correlation			

Pre-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Program Rank Cost	Program Rank Schedule	Date Pre Last Updated
					12	29	
Cost ($M)				$0.00	Project Rank Cost	Project Rank Schedule	10/11/2021
Schedule (Mo)				0.00	12	29	

10/11/2021 Update: Retire risk at this time, this risk is covered in Risk CNS 50.02.
Contractor design may not be flexible enough to accommodate irregularities in Dam surface. Vertical and Horizontal Phase 2A.

Post-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Additional Cost to Respond	Date Post Last Updated
Cost ($M)				$0.00	Strategy	10/11/2021
Schedule (Mo)				0.00		

Require pre-erection survey of Dam surface

Monitoring and Control

Risk Owner	Risk Aging	From		Status Interval
Michael Genduso		To		

Review Comments

Last Review	Date MC Last Updated
	10/11/2021
Next Review	**Risk Assignment**

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Project	Lower Baker Dam	Risk ID	LBK LBKDSR DES 900.02
Sub-Project	Lower Baker Dam Seepage Reduction	Status	Retired

Platform - General
FERC review and approval - platform (general)

Risk Trigger		Flowchart Activity	
Dependency & Correlation			

Pre-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Program Rank Cost	Program Rank Schedule	Date Pre Last Updated
					12	29	
Cost ($M)				$0.00	Project Rank Cost	Project Rank Schedule	11/15/2021
Schedule (Mo)				0.00	12	29	

Retire risk at this time, this risk is covered in DES 900.01.

Post-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Additional Cost to Respond	Date Post Last Updated
Cost ($M)				$0.00	Strategy	
Schedule (Mo)				0.00		

Through analysis and detailed design presentation to BOC and FERC

Monitoring and Control

Risk Owner	Risk Aging	From		Status Interval
		To		

Review Comments	Last Review	Date MC Last Updated
	Next Review	Risk Assignment

November 16, 2021 Risk Register Page 47 of 48

Project	Lower Baker Dam	Risk ID	LBK LBKDSR CNS 900.30
Sub-Project	Lower Baker Dam Seepage Reduction	Status	Active

Bitumen Grouting

Risk Trigger		Flowchart Activity	220
Dependency & Correlation			

Pre-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Program Rank Cost	Program Rank Schedule	Date Pre Last Updated
30%							
Cost ($M)	$1.50	$2.50	$3.50	$0.75	Project Rank Cost	Project Rank Schedule	11/15/2021
Schedule (Mo)	1.00	1.50	2.00	0.45			

Bitchumen Grouting - optional item to date
Phase 2B

Post-Response Quantification

Probability	Low	Most Likely	High	Total Expected Value Impact	Additional Cost to Respond	Date Post Last Updated
30%						
Cost ($M)	$1.50	$2.50	$3.50	$0.75	Strategy	11/15/2021
Schedule (Mo)	1.00	1.50	2.00	0.45		

Monitoring and Control

Risk Owner	Risk Aging	From		Status Interval
Owner		To		

Review Comments

Last Review	Date MC Last Updated
	11/16/2021
Next Review	**Risk Assignment**
	Owner

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