EXH. RJR-20C
DOCKET UE-22___/UG-22___
2022 PSE GENERAL RATE CASE
WITNESS: RONALD J. ROBERTS

BEFORE THE
WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION

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

NINETEENTH EXHIBIT (CONFIDENTIAL) TO THE PREFILED DIRECT TESTIMONY OF

RONALD J. ROBERTS

ON BEHALF OF PUGET SOUND ENERGY

REDACTED VERSION

JANUARY 31, 2022

2021 CAPITAL JUSTIFICATION SUMMARY

PROJECT TITLE:	***U3 Burner Bucket and Aux Air Replacement***
DATE:	***5/14/2020***
Completed by:	***Ryan McKinney***

*****Project Previously Approved*****

Description of Project:

This is a 2 year project. A critical component of the SmartBurn NOx control system, the Burner buckets and Aux Air Tips, are essential to meeting environmental compliance. To maintain equipment function and help provide for NOx emission and opacity control, buckets (SOFA, TOFA, Burner) need to be replaced every 4 years during the overhaul. Buckets warp with heat exposure over an extended time, which causes buckets to bind up in the boiler and restrict movement during unit operation. Through inspection during overhaul the buckets are found to be at the end of life in 3-4 years. Burner buckets/Aux Air Tips are scheduled to be replaced on a 4 year plan during an overhaul, this allows physical access to all buckets (SOFA, TOFA, Burner) while scaffold is in the boiler. The preventative maintenance process of replacing buckets is most economical with scaffold as this allows for an effective and cohesive removal of buckets, repairs to support material, testing of movement, and alignment of all emission components associated with the boiler corners at the same time. Burner buckets/Aux Air Tips are a portion of the SmartBurn NOX control system and need to be in good repair for combustion optimization, and PM & NOX control .

Alternative 1:

Budgetary Price for Replacement of the Burner buckets and Aux Air: Capital project total: [redacted] with [redacted] in 2020 for preorder of material, [redacted] for purchase of material in 2021, with the rest for Replacing the Buckets or Tips. Replacement of the tips provides the benefit of ensuring the system is the best working order to assist in meeting emission & combustion requirements. Past inspections indicate that buckets are at the end of lifeafter 3-4 year run time. Given the need for proper combustion & the need to comply with NOX, PM, & Opacity it is recommended that this preventative maintenance project for Burner buckets & Aux air tips be conducted during the Unit 3 2021 outage.

Alternative 2:

Alternative 3: Do Nothing

The final option is to Do Nothing and replace Burner and Aux Air Tips during the Unit 3 2025 Outage. It is highly unlikely that environmental compliance (NOX, PM, Opacity) would be met if no action were taken to replace Burner & Aux Air Tips. The burner corners would bind up or be locked in place due to lack of control due to bucket warpage, linkage and pivot pin failures as well as damage to the beck drives. Combustion would suffer as a well. The Unit could be required to come offline or operate at reduced load until the burner system was repaired or replaced. Inspection of buckets indicates that the buckets are in need of repair after a 3-4 year run time, complete failure of the burner bucket and components is considered a high risk if not replace during the U3 2021 outage.

Comparison Table

	Alternative 1:	Alternative 2:	Alternative 3: Do Nothing
Recommended Alternative	X		
Risk	Low		High

Low/Medium/High

Capital Costs	[redacted]			
Incremental Annual Impacts				
Generation w/o impact to O&M - MWh				
$ impact				
Generation w/impact to O&M - MWh				
$-impact				
Heat Rate - btu/kwh				
$-impact				
O&M savings/(costs)				
Economic Metrics				
Internal Rate of Return (%)	Previously			
Net Present Value ($)	Approved			
Estimated Payback Period (Yrs)				
Profitability Index	Project			
Other Considerations				
Leadtime (months)	4			
Safety				
Environmental	Mitigates Risk		non-compliance	

2021 HURDLE RATE WORKSHEET

PROJECT TITLE:	3 Burner Bucket and Aux Air Replacement		W.O. #:			Project Closed	N	Y/N
DATE:	5/14/2020		PROJECT #:	10026967		Project Closed As date	-	(DD/MM/YYYY)
Manager:	E. Petritz		SUB PROJECT #:	900	Project Previously Approved	Engineer Signoff		Full Name
Completed by:	Ryan McKinney		Last Known Replacement Date	7/1/2017				
Revision	0		Plant Acct		Filled out by Finance team			
Date of Revision		(DD/MM/YYYY)	Bechtel System	3BA	Steam Generator (Fire Side)			
Environmental (Check With X)	Air:	X	Activity Code	0000asbl00	Boiler			
	Noise:		CRC #	4574				
	Solids:		Budget Category	sus				
	Water:		Current Budget Year	2021	(YYYY)			
Estimated Useful Life	4	(In Years)	Super Project #					
Estimated In-Service	7/1/2021	(MM/YYYY)	Location	Unit 3				
Estimated Final Payment Date	9/1/2021	(MM/YYYY)	Facility Code	A003 Unit 3				

** Project Previously Approved**

Description of Project

This is a 2 year project. A critical component of the SmartBurn NOx control system the Burner buckets and Aux Air Tips are essential to meeting environmental compliance. To maintain equipment function and help provide for NOx emission and opacity control buckets (SOFA TOFA Burner) need to be replaced every 4 years during the overhaul. Buckets warp with heat exposure over an extended time which causes buckets to bind up in the boiler and restrict movement during unit operation. Through inspection during overhaul the buckets are found to be at the end of life in 3-4 years. Burner buckets/Aux Air Tips are scheduled to be replaced on a 4 year plan during an overhaul this allows physical access to all buckets (SOFA TOFA Burner) while scaffold is in the boiler. The preventative maintenance process of replacing buckets is most economical with scaffold as this allows for an effective and cohesive removal of buckets repairs to support material testing of movement and alignment of all emission components associated with the boiler corners at the same time. Burner buckets/Aux Air Tips are a portion of the SmartBurn NOX control system and need to be in good repair for combustion optimization and PM & NOX control .

Process

The process is to identify the issue and develop solutions to the known issue:Burner buckets warp with heat exposure during unit operation and are at the end of life in 3-4 years. Warped buckets bind up in the boiler which limits operation control this causes issues with air flow which can impact environmental emissions compliance. During the outage all Burner buckets/Air Tips are inspected to determine if replacement or repair is needed. Past inspection of Burner buckets/Aux Air tips indicates end of l fe due to the significant damage caused by heat exposure. These components are generally beyond repair after 3 years run time as the overhauls are extended to 4 year run time buckets are not expected to be repairable. Pictures of the Unit 3 burner corners taken during 2018 and at the beginning of March 2020 are attached in the supporting documents folder. Greater degrees of warping and degradation can be seen in the pictures from March

ATTRIBUTES	SAVINGS $/YR
Safety	0
Environmental	[redacted]
Plant Capacity	0
Heat Rate	0
O & M	0
Facility/Equipment Reliability	
TOTAL SAVINGS $/YR	[redacted]
PROFITABILITY INDEX	Project
INTERNAL RATE OF RETURN (%)	Previously
NET PRESENT VALUE ($)	Approved
ESTIMATED PAYBACK (yrs)	

SMD	EMD	RMD
Safety	Environmental	Reliability
Must	Must	Must
Do	Do	Do

PROJECT COST

Capital Cost ($): $2,400,000

	2020		2021		2022	
	Material	Contract	Material	Contract	Material	Contract
Jan						
Feb						
Mar			[redacted]			
Apr			[redacted]			
May						
Jun						
Jul						
Aug						
Sep		[redacted]				
Oct						
Nov						
Dec						
Total Annual Capital Spent	[redacted]	$0	[redacted]	[redacted]	$0	$0

Annual O&M Cost: 0

INCREMENTAL SAVINGS - RECOMMENDATION vs. CURRENT STATE.

NOTE: 2.0 points (MUST DO) in the Safety, Environmental or Facility/Equipment Reliability attribute passes the hurdle rate regardless of Internal Rate of Return.
Safety Environmental & Facility/Equipment Reliabil ty points can be assigned in tenths. The 0.0 0.5 1.0 and 2.0 are general guide lines to follow. One (1) point is equivalent to $50 000/yr.

SAFETY	$/YR	COMMENTS
0	0	

Improvements to alleviate a cond tion which adversely affects hea th, safety or security. Improvements to correct a major threat to health safety, security or to meet a firm contractual agreement. Requirements mandated by law, regulation or binding agreement.
No Impact 0.0 points
Minor Impact 0.5 points
Major Impact 1.0 points
Regulatory Requirement 2.0 points (MUST DO)
NOTE Safety savings cannot exceed 1/2 the Cap tal Cost.

ENVIRONMENTAL		
2	[redacted]	Burners need to be replaced every overhaul to maintain proper combustion, help control emissions and allow the unit to operate

Improvements to a levlate a condition which adversely affects the environment. Improvements to correct a major threat to the environment. Requirements mandated by law, regulation or binding agreement. No Impact 0.0 points Minor Impact 0.5 points Major Impact 1.0 points Regulatory Requirement 2.0 points (MUST DO) NOTE Environmental savings cannot exceed 1/2 the Capital Cost.			within environmental regulations
	PLANT CAPACITY	0	
Increased generation w/o increased O&M costs	mwhr/yr improvement 0	0	
Other increased generation (reduced outage time).	mwhr/yr improvement	0	
Increased efficiency Units 3 & 4 Based on $9,815/btu/kwhr/yr NPHR	HEAT RATE Units 3-4 Btu/kwhr/yr	0 0	
	O & M	0	
MATERIAL & CONTRACTS	Est. material & contract $/yr savings 0	0	
	Est. labor man-hours/yr reduced 0	0	
	FACILITY/EQUIPMENT RELIABILITY 2	[redacted]	In order to maintain the function of the burners, burner and aux air tip need to be replaced on a 4 year cycle. The equipment is non repairable
No Impact 0.0 points Employee Productivity Improvement 0.5 points Functional, but obsolete (cannot maintain in future) 1.0 points Beyond Repair, failure Imminent (MUST DO) 2.0 points **NOTE: Reliability savings cannot exceed 1/2 the Capital Cost.**			

2021 CAPITAL JUSTIFICATION SUMMARY

PROJECT TITLE:	***Cooling Tower Fill***
DATE:	***5/15/2020***
Completed by:	***Robert Olsen***

Description of Project:

The Unit 3 Cooling Tower Fill will be over 14 years old in 2021 (it was last replaced in 2007) . Cooling Tower fill is typically replaced every 10 years, per the manufacturer's recommendations. The fill is becoming brittle, as expected with age, and has been subjected to additional breakage due to structural failures in the tower. When the fill breaks the cooling tower efficiency is reduced and the pieces of broken fill migrate to the screens which can cause an increase in condenser backpressure. Additionally the fill has experienced significant fouling, increasing the weight of the fill and decreasing the efficiency. The project will replace 50% of the fill and 10% of the piping and nozzles, in conjunction with the structural maintenance during the 2021 overhaul. There is also significant damage to the cooling tower structural members and beams that will be addressed by this project. Additional information regarding the condition of the fill and the structural condition and risk is contained in the attachments. There is also special maintenance structural work planned on the Cooling Tower that will be reduced if this project is approved.

Alternative 1:

Split the project over two outages: We can split the fill replacement project over two outages and only replace fill directly over the new beams. The beams were inspected during the 2017 outage and many of the remaining beams have structural damage. The beams will be inspected again during the 2021 outage and prioritized. This alternative would replace the high priority beams and the fill over the top of them in 2021 (approximately 50% of the beams/fill). The remaining beams and fill will then be replaced in 2025. This option reduces the budget in 2021 from [redacted] to $3.5M but it adds an additional [redacted] project in 2025 for a total project cost of [redacted] ([redacted] more expensive overall). The extra cost is primarily due to mobilizing contractors and equipment for two outages instead of one outage as proposed in Alternative 2. In addition to being more expensive overall, there is additional risk associated with this alternative. The cooling tower has been in-service for an additional four years since the last inspection and we expect more structural damage to the beams has occurred. Beams and structural corbels with structural defects will be left in service with this alternative and will not be repaired until 2025 Also, approximately 50% of the old fill will remain in-service for another four years degrading even more.

Alternative 2:

The Unit 3 Cooling Tower Fill will be over 14 years old in 2021. Cooling Tower fill is typically replaced every 10 years, per the manufacturer's recommendations. The fill is becoming brittle, as expected with age, and has been subjected to additional breakage due to structural failures in the tower. Additionally the fill has experienced significant fouling, increasing the weight of the fill and decreasing the efficiency The project will replace 100% of the fill and 50% of the piping and nozzles, in conjunction with the structural maintenance during the 2021 overhaul. It will also replace all the structural fill beams that are degrading. In addition, repairs will be made to all degrading structure corbels. There is a high risk of breaking the existing fill while doing the beam replacement due to age. The budget to perform this option is [redacted] in 2021.

Alternative 3: Do Nothing

If we do not replace the fill, we will likely have failures in the cooling tower, resulting in unplanned outages. As the brittle cooling tower breaks away, it collects in the circulating water channels, ultimately ending up against the screens. This pluggage and throughout the system. This results in very high condenser back pressure, and can lead to unit outages. Additionally, this option creates a safety hazard for plant personnel performing standard operations and maintenance tasks on and around the tower.

Comparison Table

	Alternative 1:	Alternative 2:	Alternative 3: Do Nothing

Recommended Alternative	X			
Risk	Low		Medium	Low/Medium/High
Capital Costs	[redacted]			
Incremental Annual Impacts				
Generation w/o impact to O&M - MWh				
$ impact				
Generation w/impact to O&M - MWh	Mitigates Risk			
$-impact				
Heat Rate - btu/kwh				
$-impact				
O&M savings/(costs)				
Economic Metrics				
Internal Rate of Return (%)	Reliability			
Net Present Value ($)	Must			
Estimated Payback Period (Yrs)	Do			
Profitability Index	RMD			
Other Considerations				
Leadtime (months)				
Safety				
Environmental				

2021 HURDLE RATE WORKSHEET

PROJECT TITLE:	Cooling Tower Fill		**W.O. #:**		Project Closed	N	Y/N
DATE:	5/15/2020		**PROJECT #:**		Project Closed As date	-	(DD/MM/YYYY)
Manager:	E. Petritz		**SUB PROJECT #:**		Engineer Signoff		Full Name
Completed by:	Robert Olsen		**Last Known Replacement Date**				

Revision	1		Plant Acct		Filled out by Finance team	
Date of Revision	5/14/2020	(DD/MM/YYYY)	Bechtel System	3DA	Circulating Water System	
Environmental (Check With X)	**Air:**		Activty Code	0000AWCT00	Cooling Tower	
	Noise:		CRC #	4572		
	Solids:		Budget Category	sus		
	Water:		Current Budget Year	2021	(YYYY)	
Estimated Useful Life	10	(In Years)	Super Project #	Talen Montana LLC		
Estimated In-Service	7/1/2020	(MM/YYYY)	Location	Unit 3		
Estimated Final Payment Date	7/1/2020	(MM/YYYY)	Facility Code	A003 Unit 3		

Description of Project

The Unit 3 Cooling Tower Fill will be over 14 years old in 2021 (it was last replaced in 2007) . Cooling Tower f ll is typically replaced every 10 years per the manufacturer's recommendations. The fill is becoming brittle as expected with age and has been subjected to additional breakage due to structural failures in the tower. When the fill breaks the cooling tower efficiency is reduced and the pieces of broken fi l migrate to the screens which can cause an increase in condenser backpressure. Additionally the fill has experienced significant fouling increasing the weight of the fill and decreasing the efficiency. The project will replace 50% of the fill and 10% of the piping and nozzles in conjunction with the structural maintenance during the 2021 overhaul. There is also significant damage to the cooling tower structural members and beams that will be addressed by this project. Additional information regarding the condition of the fill and the structural condition and risk is contained in the attachments. There is also special maintenance structural work planned on the Cooling Tower that will be reduced if this project is approved.

Process

ATTRIBUTES	SAVINGS $/YR
Safety	0
Environmental	0
Plant Capacity	0
Heat Rate	0
O & M	0
Facility/Equipment Reliability	[redacted]
TOTAL SAVINGS $/YR	

		SMD	EMD	RMD
PROFITABILITY INDEX	RMD			
INTERNAL RATE OF RETURN (%)	Reliability	Safety	Environmental	Reliability
NET PRESENT VALUE ($)	Must	Must	Must	Must
ESTIMATED PAYBACK (yrs)	Do	Do	Do	Do

PROJECT COST

Capital Cost ($) [redacted]

	2021		2022		2023	
	Material	Contract	Material	Contract	Material	Contract
Jan	[redacted]					
Feb						
Mar						
Apr						
May	[redacted]					
Jun						
Jul						
Aug						
Sep						
Oct						
Nov						
Dec						
Total Annual Capital Spent	[redacted]	$0	$0	$0	$0	$0

Annual O&M Cost 0

INCREMENTAL SAVINGS - RECOMMENDATION vs. CURRENT STATE

NOTE: 2.0 points (MUST DO) in the Safety, Environmental or Facility/Equipment Reliability attribute passes the hurdle rate regardless of Internal Rate of Return.
Safety, Environmental & Facility/Equipment Reliabil ty points can be assigned in tenths. The 0.0, 0.5, 1.0 and 2.0 are general guide lines to follow. One (1) point is equivalent to [redacted] r.

SAFETY	$/YR	COMMENTS
0	0	

Improvements to alleviate a condition which adversely affects hea th, safety or security. Improvements to correct a major threat to health safety, security or to meet a firm contractual agreement. Requirements mandated by law, regulation or binding agreement.
No Impact 0.0 points
Minor Impact 0.5 points
Major Impact 1.0 points
Regulatory Requirement 2.0 points (MUST DO)
NOTE Safety savings cannot exceed 1/2 the Capital Cost.

ENVIRONMENTAL	
0	0

Improvements to alleviate a condition which adversely affects the environment. Improvements to correct a major threat to the environment. Requirements mandated by law, regulation or binding agreement. No Impact 0.0 points Minor Impact 0.5 points Major Impact 1.0 points Regulatory Requirement 2.0 points (MUST DO) NOTE Environmental savings cannot exceed 1/2 the Capital Cost.			
	PLANT CAPACITY	0	
	mwhr/yr improvement		
Increased generation w/o increased O&M costs	0	0	
	mwhr/yr improvement		
Other increased generation (reduced outage time).		0	
Increased efficiency	**HEAT RATE**	0	
Units 3 & 4 Based on $9,815/btu/kwhr/yr NPHR	Units 3-4 Btu/kwhr/yr		
		0	
	O & M	0	
MATERIAL & CONTRACTS	Est. material & contract $/yr savings		
	0	0	
	Est. labor man-hours/yr reduced		
	0	0	
	FACILITY/EQUIPMENT RELIABILITY		
	2	[redacted]	The fill will be over its recommended life span in 2021. Additionally, we will need to remove the fill to replace the structural beams. This will cause further degradation and breakage, resulting in reliability issues.
No Impact 0.0 points Employee Productivity Improvement 0.5 points Functional, but obsolete (cannot maintain in future) 1.0 points Beyond Repair, failure imminent (MUST DO) 2.0 points **NOTE: Reliability savings cannot exceed 1/2 the Capital Cost.**			

2021 CAPITAL JUSTIFICATION SUMMARY

PROJECT TITLE:	***Turbine/Generator Base Overhaul***
DATE:	***5/5/2020***
Completed by:	***Andrea Garvin***

**** ***PROJECT APPROVED IN PRIOR YEAR*** ****

Description of Project:

PROJECT APPROVED IN PRIOR YEAR. This is a 2 year project. The first year provides funding to begin the turbine valve rebuild following the Unit 4 overhaul. The second year provides the remainder of funding to perform base maintenance on the turbine/generator associated with the overhaul on Unit 3. The work to be performed is consistent with OEM recommendations and includes the mobilization of labor, the high velocity oil flush, bearing work as required, general open and close on the generator, GV, TV, IV and RHS valve routine rebuilds, contractor overhead (site support staff, project management, contract engineering support, office/clerical help, etc.), scaffolding, insulation, tool use, general steam chest maintenance, NDE testing and maintenance of the bolts and studs on the valves and steam chest and other assigned duties. This base maintenance is performed every overhaul as preventative maintenance to ensure proper operation and reliability of the turbine/generator.

Alternative 1: Inspect/Repair

The first year includes [redacted] to begin rebuilding turbine valves following the U4 overhaul in 2020. This project includes labor for mobilization, valve inspection, valve repair/replacement, throttle valve pinned seat installation, high velocity oil flush, bearing work as required, open/close generator, contractor overhead, lifetime assessment, NDE, and general repair. Given the consequences of an overspeed event, we recommend performing the turbine/generator base in 2021.

Alternative 2:

Alternative 3: Do Nothing

The second option is to do nothing to the main turbine/generator train or associated valves and defer the work until the 2025 overhaul. The risks run by doing nothing is that main turbine valves will experience leaks to the point of either overspeeding the turbine or leading to not being able to stop the turbine when the unit trips. If an overspeed event occurred, it could lead to large amounts of damage in the main turbine train, leading to an extended outage of 1 year or more as repairs are made on an unscheduled outage. A failure such as this could cause a loss of [redacted] incremental value) as well as potential collateral damate to other steam turbine generator component. Due to the level of risk and severe consequences of failure, we recommend performing the turbine/generator base maintenance in 2021.

Comparison Table

	Alternative 1: Inspect/Repair	Alternative 2:	Alternative 3: Do Nothing	
Recommended Alternative	X			
Risk	low		Medium	Low/Medium/High
Capital Costs	[redacted]			
Incremental Annual Impacts				

Generation w/o impact to O&M - MWh				
$ impact				
Generation w/impact to O&M - MWh	Mitigates Risk		[redacted]	
$-impact	Mitigates Risk		[redacted]	
Heat Rate - btu/kwh				
$-impact				
O&M savings/(costs)				
Economic Metrics				
Internal Rate of Return (%)	Reliability			
Net Present Value ($)	Must			
Estimated Payback Period (Yrs)	Do			
Profitability Index	RMD			
Other Considerations				
Leadtime (months)				
Safety				
Environmental				

2021 HURDLE RATE WORKSHEET **PROJECT APPROVED IN PRIOR YEAR**

PROJECT TITLE:	Turbine/Generator Base Overhaul		W.O. #:			Project Closed	N	Y/N
DATE:	5/5/2020		PROJECT #:	10026949	PROJECT APPROVED IN PRIOR YEAR	Project Closed As date	-	(DD/MM/YYYY)
Manager:	E. Petritz		SUB PROJECT #:	900		Engineer Signoff		Full Name
Completed by:	Andrea Garvin		Last Known Replacemnet Date	6/1/2017				

Revision	0		Plant Acct		Filled out by Finance team
Date of Revsion		(DD/MM/YYYY)	Bechtel System	3AC	Main Turbine
Environmental (Check With X)	Air:		Activty Code	0000ASTG00	Turbine Generator
	Noise:		CRC #	4571	
	Solids:		Budget Category	SUS	
	Water:		Current Budget Year	2021	(YYYY)
Estimated Useful Life	4	(In Years)	Super Project #	Talen Montana LLC	
Estimated In-Service	Jul-21	(MM/YYYY)	Location	Unit 3	
Estimated Final Payment Date	Aug-21	(MM/YYYY)	Facility Code	A003 Unit 3	

Description of Project

PROJECT APPROVED IN PRIOR YEAR. This is a 2 year project. The first year provides funding to begin the turbine valve rebuild following the Unit 4 overhaul. The second year provides the remainder of funding to perform base maintenance on the turbine/generator associated with the overhaul on Unit 3. The work to be performed is consistent with OEM recommendations and includes the mobilization of labor the high velocity oil flush bearing work as required general open and close on the generator GV TV IV and RHS valve routine rebuilds contractor overhead (site support staff project management contract engineering support office/clerical help etc.) scaffolding insulation tool use general steam chest maintenance NDE testing and maintenance of the bolts and studs on the valves and steam chest and other assigned duties. This base maintenance is performed every overhaul as preventative maintenance to ensure proper operation and reliability of the turbine/generator.

Process

The process is to identify any known issues and develop solutions to those issues. We evaluated two options 1) Inspect/Repair the turbine/generator component and 2) Do Nothing. This worksheet shows the incremental impact of inspection and repair as found issues compared to doing nothing.

ATTRIBUTES	SAVINGS $/YR
Safety	0
Environmental	0
Plant Capacity	0
Heat Rate	0
O & M	0
Facility/Equipment Reliability	[redacted]
TOTAL SAVINGS $/YR	

		SMD	EMD	RMD
PROFITABILITY INDEX	RMD	Safety	Environmental	Reliability
INTERNAL RATE OF RETURN (%)	Reliability	Must	Must	Must
NET PRESENT VALUE ($)	Must	Do	Do	Do
ESTIMATED PAYBACK (yrs)	Do			

PROJECT COST

Capital Cost ($) [redacted]

	2020		2021		2022	
	Material	Contract	Material	Contract	Material	Contract
Jan						
Feb						
Mar						
Apr						
May			[redacted]			
Jun						
Jul						
Aug						
Sep		[redacted]				
Oct						
Nov						
Dec						
Total Annual Capital Spent	$0	[redacted]		[redacted]	$0	$0

Annual O&M Cost: 0

INCREMENTAL SAVINGS - RECOMMENDATION vs. CURRENT STATE.

NOTE: 2.0 points (MUST DO) in the Safety, Environmental or Facility/Equipment Reliability attribute passes the hurdle rate regardless of Internal Rate of Return.
Safety Environmental & Facility/Equipment Reliability points can be assigned in tenths. The 0.0 0.5 1.0 and 2.0 are general guidelines to follow. One (1) point is equivalent to [redacted]/yr.

SAFETY	$/YR	COMMENTS
0	0	

Improvements to alleviate a condition which adversely affects health, safety or security. Improvements to correct a major threat to health safety, security or to meet a firm contractual agreement. Requirements mandated by law, regulation or binding agreement.
No Impact 0.0 points
Minor Impact 0.5 points
Major Impact 1.0 points
Regulatory Requirement 2.0 points (MUST DO)
NOTE Safety savings cannot exceed 1/2 the Capital Cost.

ENVIRONMENTAL	
0	0

Improvements to alleviate a condition which adversely affects the environment. Improvements to correct a major threat to the environment. Requirements mandated by law, regulation or binding agreement.
No Impact 0.0 points
Minor Impact 0.5 points
Major Impact 1.0 points
Regulatory Requirement 2.0 points (MUST DO)
NOTE Environmental savings cannot exceed 1/2 the Capital Cost.

PLANT CAPACITY 0

mwhr/yr improvement

Increased generation w/o increased O&M costs: 0 | 0

mwhr/yr improvement

Other increased generation (reduced outage time): | 0

HEAT RATE 0

Increased efficiency

Units 3 & 4 Based on $9,815/btu/kwhr/yr NPHR

Units 3-4 Btu/kwhr/yr

0

O & M 0

MATERIAL & CONTRACTS

Est. material & contract $/yr savings

0 | 0

Est. labor man-hours/yr reduced

0 | 0

FACILITY/EQUIPMENT RELIABILITY

2 | [redacted]

No Impact 0.0 points
Employee Productivity Improvement 0.5 points
Functional, but obsolete (cannot maintain in future) 1.0 points
Beyond Repair, failure imminent (MUST DO) 2.0 points
NOTE: Reliability savings cannot exceed 1/2 the Capital Cost.

Historical data on Unit 3 has indicated damage to the turbine valves after a 3-yr run time (See pages 10-13 of file 99114 pgit20170719179188 429628 v1.pdf for typical damage and repair to turbine valves). With the extension to a 4 year run time on the turbine valves, it is expected that damages would be greater than typically seen after a 3 year runtime. Inability for the turbine valves to operate properly increases the risks of an overspeed event, which could cause serious damage to the entire turbine train and to personnel causing an extended outage of a year or longer. It is critical to perform the basic turbine/generator maintenance on a consistent schedule.

2021 CAPITAL JUSTIFICATION SUMMARY

PROJECT TITLE:	***Design/Build Dry Waste Disposal System***
DATE:	***9/24/2020***
Completed by:	***Richard Borsheim***

****Project Previously Approved for [redacted] 2021 Rev0 budget was [redacted]***

Description of Project:

This project is required by a Settlement dated 7/19/16 regarding a challenge from Sierra Club, MEIC, and the National Wildlife Federation challenging the legality of the AOC and other claims related to disposal of CCR (see project folder). The Settlement requires a "non-liquid" disposal system for CCR material generated by Units 3&4 at the EHP no later than July 1, 2022. This project provides for design/build of that "non-liquid" disposal system. This project will cover a three year period to design and complete construction so that the system will be fully operatioal by 7/1/2022 ($[redacted] in 2020, [redacted] in 2021, and [redacted] in 2022). Pilot testing has been conducted in 2020 to identify the technology (pressure filters) that will provide a cost-effective "non-liquid" disposal system. This project is considered an Environmental Must Do project because of the Settlement requirements.

Alternative 1:

Implement the design/build of the 3&4 EHP Dry Waste Disposal System to meet the requirements of the 7/19/16 Settlement with Sierra Club, MEIC, and National Wildlife Federation challenging the legality of the AOC and other claims related to disposal of CCR.

Alternative 2:

Alternative 3: Do Nothing

The Do Nothing alternative would result in a violation of the Settlement, and would result in a Notice of Violation (NOV) and likely litigation and fines/penalties.

Comparison Table

	Alternative 1:	Alternative 2:	Alternative 3: Do Nothing	
Recommended Alternative				
Risk	medium		High	Low/Medium/High
Capital Costs	[redacted] in 2021,	[redacted] in 2022		

Incremental Annual Impacts				
Generation w/o impact to O&M - MWh				
$ impact				
Generation w/impact to O&M - MWh				
$-impact				
Heat Rate - btu/kwh				
$-impact				
O&M savings/(costs)				
Economic Metrics				
Internal Rate of Return (%)	Environmental			
Net Present Value ($)	Must			
Estimated Payback Period (Yrs)	Do			
Profitability Index	EMD			
Other Considerations				
Leadtime (months)				
Safety				
Environmental			non-compliance	

2021 HURDLE RATE WORKSHEET

PROJECT TITLE:	Design/Build Dry Waste Disposal System		W.O. #:			Project Closed	N	Y/N
DATE:	9/24/2020		PROJECT #:	10027022	Project Previously Approved for $6m less	Project Closed As date	-	(DD/MM/YYYY)
Manager:	G. Criswell		SUB PROJECT #:			Engineer Signoff		Full Name
Completed by:	Richard Borsheim		Last Known Replacement Date					
Revision	2		Plant Acct		Filled out by Finance team			
Date of Revision	11/4/2020	(DD/MM/YYYY)	Bechtel System	3SP	Paste Plant			
Environmental (Check With X)	Air:		Activity Code	0000AGER00	General Environmental			
	Noise:		CRC #	4584				
	Solids:		Budget Category	ENV				
	Water:	X	Current Budget Year	2020	(YYYY)			
Estimated Useful Life	20	(In Years)	Super Project #	Talen Montana LLC				
Estimated In-Service	5/1/2022	(MM/YYYY)	Location	Unit 3-4				
Estimated Final Payment Date	5/1/2022	(MM/YYYY)	Facility Code	A034 Units 3&4				

Description of Project

This project is required by a Settlement dated 7/19/16 regarding a challenge from Sierra Club MEIC and the National Wildlife Federation challenging the legality of the AOC and other claims related to disposal of CCR (see project folder). The Settlement requires a "non-liquid" disposal system for CCR material generated by Units 3&4 at the EHP no later than July 1 2022. This project provides for design/build of that "non-liquid" disposal system. This project will cover a three year period to design and complete construction so that the system will be fully operatioal by 7/1/202[redacted] in 2020 [redacted] in 2021 and [redacted] n 2022). Pilot testing has been conducted in 2020 to identify the technology (pressure filters) that will provide a cost-effective "non-liquid" disposal system. This project is considered an Environmental Must Do project because of the Settlement requirements.

Process

ATTRIBUTES	SAVINGS $/YR
Safety	0
Environmental	[redacted]
Plant Capacity	0
Heat Rate	0
O & M	0
Facility/Equipment Reliability	0
TOTAL SAVINGS $/YR	[redacted]
PROFITABILITY INDEX	EMD
INTERNAL RATE OF RETURN (%)	Environmental
NET PRESENT VALUE ($)	Must
ESTIMATED PAYBACK (yrs)	Do

SMD	EMD	RMD
Safety	Environmental	Reliability
Must	Must	Must
Do	Do	Do

PROJECT COST

Capital Cost ($) [redacted]0,000 in 2021, $3,000,000 in 2022

	2020		2021		2022	
	Material	Contract	Material	Contract	Material	Contract
Jan						
Feb						
Mar						
Apr		[redacted]				
May						
Jun						
Jul						
Aug						
Sep						
Oct						
Nov						
Dec						
Total Annual Capital Spent	$0		$0	[redacted]	$0	[redacted]

Annual O&M Cost 0

INCREMENTAL SAVINGS - RECOMMENDATION vs. CURRENT STATE.

NOTE: 2.0 points (MUST DO) in the Safety, Environmental or Facility/Equipment Reliability attribute passes the hurdle rate regardless of Internal Rate of Return.
Safety Environmental & Facility/Equipment Reliability points can be assigned in tenths. The 0.0 0.5 1.0 and 2.0 are general guidelines to follow. One (1) point is equivalent to [redacted]yr.

SAFETY	$/YR	COMMENTS
0	0	

Improvements to alleviate a condtion which adversely affects hea th, safety or security. Improvements to correct a major threat to health safety, security or to meet a firm contractual agreement. Requirements mandated by law, regulation or binding agreement.
No Impact 0.0 points
Minor Impact 0.5 points
Major Impact 1.0 points
Regulatory Requirement 2.0 points (MUST DO)
NOTE Safety savings cannot exceed 1/2 the Captial Cost.

ENVIRONMENTAL		
2	[redacted]	This project is required by a Settlement dated 7/19/16 regarding a challenge from Sierra Club, MEIC, and the National Wildlife

Improvements to a levlate a condition which adversely affects the environment. Improvements to correct a major threat to the environment. Requirements mandated by law, regulation or binding agreement.
No Impact 0.0 points
Minor Impact 0.5 points
Major Impact 1.0 points
Regulatory Requirement 2.0 points (MUST DO)
NOTE Environmental savings cannot exceed 1/2 the Capital Cost.

Federation challenging the legality of the AOC and other claims related to disposal of CCR (see project folder). The Settlement requires a "non-liquid" disposal system for CCR material generated by Units 3&4 at the EHP no later than July 1, 2022. This project provides for design/build of that "non-liquid" disposal system. This project will cover a three year period to design and complete construction so that the system will be fully operatioal by 7/1/2022 [redacted] in 2020,[redacted] in 2021, and[redacted] in 2022). Pilot testing has been conducted in 2020 to identify the technology (pressure filters) that will provide a cost-effective "non-liquid" disposal system. This project is considered an Environmental Must Do project because of the Settlement requirements.

PLANT CAPACITY 0

mwhr/yr improvement

Increased generation w/o increased O&M costs: 0 | 0

mwhr/yr improvement

Other increased generation (reduced outage time).: | 0

HEAT RATE 0

Increased efficiency

Units 3 & 4 Based on $9,815/btu/kwhr/yr NPHR

Units 3-4 Btu/kwhr/yr

0

O & M 0

MATERIAL & CONTRACTS

Est. material & contract $/yr savings

0 | 0

Est. labor man-hours/yr reduced

0 | 0

FACILITY/EQUIPMENT RELIABILITY

0 | 0

No Impact 0.0 points
Employee Productivity Improvement 0.5 points
Functional, but obsolete (cannot maintain in future) 1.0 points
Beyond Repair, failure Imminent (MUST DO) 2.0 points
NOTE: Reliability savings cannot exceed 1/2 the Capital Cost.