

2018 ESCALATION ANALYSIS
for the
HATCH NUCLEAR PLANT
DECOMMISSIONING COST STUDY



prepared for

SOUTHERN NUCLEAR OPERATING COMPANY

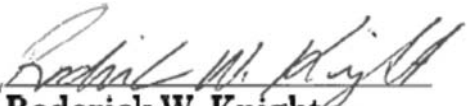
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DECOMMISSIONING COST ESCALATION STUDY

Purpose

This report presents escalated costs for the estimates of the costs to decommission the Hatch Nuclear Plant (Hatch) for the selected decommissioning scenarios following the scheduled cessation of plant operations. The estimates, escalated to the year of expenditure dollars, are designed to provide the Southern Nuclear Operating Company (Southern) with the information to assess its current decommissioning liability, as it relates to Hatch.

Basis

This escalation analysis is based upon the recent decommissioning cost analysis performed for Hatch.¹ Explanatory information from this report is provided below.

Operating licenses were issued for Hatch Unit 1 and Unit 2 in 1974 and 1978, respectively. Southern was granted License Renewals by the NRC for the Hatch reactors on January 15, 2002. Therefore, for the purposes of this study, the final shutdown dates (license expiration) are based on the current, 60-year operating life, with the permanent cessation of operations scheduled for August 6, 2034 and June 13, 2038 for Units 1 and 2, respectively.

The DECON decommissioning scenario was evaluated for the Hatch nuclear units. It assumes that the decommissioning of the Hatch site will be a coordinated effort between the two units. Both units will be promptly decommissioned upon the expiration of their operating license, i.e., in 2034 and 2038.

Spent fuel storage operations continue at the site until the transfer of the fuel to an appropriate disposal facility is complete, assumed to be in the year 2074.

The primary objectives of a Hatch decommissioning project would be to remove the facility from service, reduce residual radioactivity to levels permitting unrestricted release, restore the site, perform this work safely, and complete the work in a cost-effective manner. Consideration must be given to the cost of the decommissioning project, minimization of occupational radiation exposure, availability of low-level waste disposal facilities, availability of a high-level waste (spent fuel) repository or Department of Energy (DOE) interim storage facility, regulatory requirements, and

¹ "Decommissioning Cost Study for the Hatch Nuclear Plant," Document S18-1754-001, Rev. 1, TLG Services, Inc., December 2018

public concerns. In addition, 10 CFR 50.82(a)(3) requires decommissioning to be completed within 60 years of permanent cessation of operations.

Under the DECON methodology, the facility is transitioned to a decommissioning project soon after final shutdown. Spent fuel is removed from the reactor and placed within the spent fuel pools, awaiting eventual transfer to the on-site dry fuel storage facility, or direct transfer to the U.S. Department of Energy. Plant systems are drained and deenergized to conform to the site project schedule. Contaminated materials are removed, packaged, shipped and disposed of offsite. Clean materials are surveyed for radioactive contamination and released as scrap metal or construction debris. Following the license termination survey and termination of the NRC licenses on the power plant (the dry fuel storage ISFSI will remain under the NRC license until all fuel is shipped to the DOE and the ISFSI decommissioned), all site structures are removed to three foot below grade elevation, and the subgrade voids backfilled with concrete rubble and structural fill. The site is finally graded to conform to the surrounding area, and native vegetation placed for erosion control.

An Independent Spent Fuel Storage Installation (ISFSI) has been constructed adjacent to the power block. The spent fuel will be relocated from the spent fuel pools in the fuel handling buildings to the ISFSI to await transfer to a DOE facility. Assuming the first fuel shipment date is in 2035, the decommissioning estimate assumes that the removal of spent fuel from the site could be completed by the end of year 2074.

The currently projected total costs (in thousands of 2018 dollars) to decommission the nuclear station, for the DECON scenario analyzed, are as follows:

Unit 1	\$925,781
Unit 2	\$994,494
Station Total	\$1,920,275

The costs include the monies anticipated to be spent for operating license termination (radiological remediation), interim spent fuel storage and site restoration activities. The costs are based on several key assumptions in areas of regulation, component characterization, high-level radioactive waste management, low-level radioactive waste disposal, performance uncertainties (contingency) and site remediation and restoration requirements.

The following table reflects the percentage of each cost component relative to the total costs to decommission Hatch:

Escalation Category	Unit 1		Unit 2	
	Costs (Thousands of 2018\$)	% of Total Cost	Costs (Thousands of 2018\$)	% of Total Cost
Labor	515,184	55.6	559,090	56.2
Equipment & Material	134,090	14.5	148,099	14.9
Energy	4,251	0.5	4,266	0.4
LLRW Disposal	165,446	17.9	191,294	19.2
Other Items	106,811	11.5	91,745	9.2

The site-specific cost estimate was prepared by TLG Services, Inc. (TLG) in year-end 2018 (i.e., nominal) dollars. Because the actual decommissioning will not occur for many years and may continue for decades, the nominal-dollar estimates must be escalated into the year of expenditure if a Net Present Value for each unit of the decommissioning estimate is required. That is, we must determine the dollar value of each year's expenditure at the time it is expected to be incurred. Those escalated dollars then provide the basis for financial planning and asset management. Because many of the decommissioning activities occur long in the future, small fluctuations in escalation on the cost side, and investment earnings on the trust balance side, have a substantial impact on the resources required over the long periods of time associated with most decommissioning scenarios.

Methodology

In this analysis, TLG reviewed each of the five escalation cost components separately to determine the rate by which each component was expected to escalate annually. The following narrative describes the methodology used to escalate the schedules of decommissioning expenditures.

Having developed estimates of the cost to decommission Hatch using the DECON scenario, the mathematics to transform those costs to the year in which they will actually be incurred is relatively straightforward. The key to the analysis is selecting the appropriate forecasting indices for each of the major cost components. For that, TLG has relied upon NRC publications and the industry-wide recognized expertise of IHS-Markit.

In support of calculating the minimum funding assurance, the NRC divides its reference costs for decommissioning into categories of labor, energy, and Low Level

Radioactive Waste (LLRW) disposal. To provide guidance to operators and regulators and promote uniformity, the NRC periodically revises NUREG-1307, “Report on Waste Burial Charges.” NUREG-1307 is helpful in that it identifies the appropriate indices that should be used to escalate the labor and energy cost components and provides historical changes in low level radioactive waste disposal costs.

TLG also allocates its costs for decommissioning into categories, with the NRC’s labor category further subdivided into “labor,” “equipment and materials,” and an “other” category for miscellaneous fees, taxes and other unique or one-time expenditures.

Consistent with standards defined in the Financial Accounting Standards Board (FASB) Accounting Standards Codification (ASC), Topic 410-20,^[2] TLG develops future cash flows by escalating four of the cost categories (labor, equipment and materials, energy and other) with indices provided by IHS-Markit of Lexington, MA. IHS-Markit is a privately held company which acquired Global Insight in 2008. The combined company includes well-known businesses such as Cambridge Energy Research Associates (CERA), Jane's Information Group, and IHS Herold; it also includes the former companies known as DRI (Data Resources, Inc.) and WEFA (Wharton Econometric Forecasting Associates).

IHS-Markit has no direct index for escalation of low level radioactive waste disposal costs. The inflation index used for radioactive waste burial costs is the IHS-Markit Consumer Price Index, Services with an additional 1% per year to account for the historical difference between low-level waste disposal rates reported in NRC NUREG-1307 documents and inflation rates reported by the Bureau of Labor Statistics (CPI).

Since the timeframe of decommissioning typically exceeds that of the published indices, for years beyond the published index, the inflation factor is determined using a “moving-average” method, averaging the most recent 25 years of indices to determine the future year index. This is a well-accepted methodology for determining longer-term projections and one that has been reviewed and deemed appropriate by IHS-Markit as well.

² Accounting Standards Codification, Topic 410-20, Financial Accounting Standards Board, July 2009.

ASC 410-20-55-14 states: “It is expected that uncertainties about the amount and timing of future cash flows can be accommodated by using the expected present value technique and therefore will not prevent the determination of a reasonable estimate of fair value.”

Approach

The base year (2018) costs for the DECON scenario were extracted from Reference 1, Tables 3.1 and 3.2. For both units, plus the station total, this requires the escalation of three separate cash flows (Tables 1 through 3).

The cost elements in Tables 1 through 3 are assigned to one of three subcategories: “License Termination,” “Spent Fuel Management,” and “Site Restoration.” The subcategory “License Termination” is used to accumulate costs that are consistent with “decommissioning” as defined by the NRC in its financial assurance regulations (i.e., 10 CFR §50.75). The cost reported for this subcategory is generally sufficient to terminate the plant’s operating license, recognizing that there may be some additional cost impact from spent fuel management.

The “Spent Fuel Management” subcategory contains costs associated with the containerization and transfer of spent fuel from the pool to an appropriate disposal facility or to the ISFSI for interim storage, and the transfer of the multipurpose canisters from the ISFSI. Costs are also included for the operations of the pool and management of the ISFSI until such time that the transfer of all fuel from this facility to an off-site location is complete.

“Site Restoration” is used to capture costs associated with the dismantling and demolition of buildings and facilities demonstrated to be free from contamination. This includes structures never exposed to radioactive materials, as well as those facilities that have been decontaminated to appropriate levels. Structures are removed to a depth of three feet and backfilled to conform to local grade.

Decommissioning costs were divided into the five escalation categories, for which future rate of inflation factors were established. The five categories are:

<i>Labor</i>	Wages, fringes and benefits for craft, salaries and benefits for professional workers, clerical, administrative, service, contract workers, as well as for certain trades
<i>Equipment & Material</i>	Heavy equipment, specialty tooling, spent fuel canisters and shield overpacks, waste packaging, small tools, construction materials, consumables, rental equipment and temporary construction facilities
<i>Energy</i>	Electrical power purchases (as a large industrial customer) to support site operations

<i>LLRW Disposal</i>	Costs for the processing of low-level radioactive waste as well as for the controlled disposal of material that cannot be recovered (released for unrestricted use)
<i>Other</i>	Site operating costs (not already accounted for), for example, taxes, fees, and costs for specialized services and project support activities (may include unspecified contributions from labor, equipment and materials, and transportation), and payments for one-time disposal services (e.g., GTCC)

Escalation

The following escalation indices were established for each of the five cost categories. The escalation indices for Labor, Equipment and Material, Energy and Other were provided by IHS-Markit Company via their DataInsight-Web online service. The indices used show the last update as 6 September 2018. IHS-Markit does not provide historical or projections for disposal costs of radioactive waste. As such, a TLG-developed LLRW Disposal/Recycling index was used in this escalation analysis. This index is a combination of historical information through 2016 from NRC publications for disposal site rates and projections using the Consumer Price Index, Services information provided by IHS-Markit as discussed previously.

Forecast data for labor, equipment/ materials, energy, and general inflation were available through 2043. In order to extrapolate beyond the available IHS-Markit data, TLG calculated a 25-year moving average inflation factor to extend the IHS-Markit indices through 2075, the latest end point of the Hatch decommissioning cash flows.

Index Selection

The following table identifies the IHS-Markit forecast data sets used for the four cost categories (exclusive of LLRW disposal). Consistent with the NRC's guidance, TLG escalates the labor component of its decommissioning cost estimates using an Employment Cost Index (ECI) and the energy cost component with a Producer Price Index (PPI).

Use of the Consumer Price Index (CPI) for general services, site operating costs and one-time expenditures is consistent with the intent of the index (the measure of the average change in prices over time of goods and services).

IHS-Markit Forecast Database	TLG Cost Category
ECI Total Compensation (ECIPCTNS)	Labor Expenditures Inflation
Producer Price Index, Machinery & Equipment (WPIP11)	Equipment/Material Expenditures Inflation
Producer Price Index, Fuels and Related Products and Power (WPIP05)	Energy Expenditures Inflation
Consumer Price Index, Services (CUSASNS)	Other Items Expenditures Inflation
TLG-Developed LLRW Disposal Price Index [Historical data based upon NRC published data; forecast data based upon the Consumer price index, Services (CUSASNS) plus 1% additional to reflect above-inflation increases observed relative to the NRC data]	LLRW Disposal / Recycling

Labor

The decommissioning process is labor intensive, with labor representing more than half of the total cost. The estimates for Hatch include the cost of the craft labor performing field activities, the field supervision and support services, project management, administration, security, and costs for specialty contractors. The Employment Cost Index (ECI) is a quarterly measure of changes in labor costs. It is one of the principal economic indicators used by the Federal Reserve Bank. The index shows changes in wages and salaries and benefit costs, as well as changes in total compensation. The ECIPCTNS index, provided by IHS-Markit, is a yearly estimate of change in the cost of labor, defined as compensation per employee hour worked. The self-employed, owners-managers, and unpaid family workers are excluded from coverage. The ECI is designed as a fixed-weight index at the occupational level, thus eliminating the effects of employment shifts among occupations. Both components of compensation, wages/salaries, and benefits, are covered.

In addition to TLG's judgment, IHS-Markit has confirmed that the selected index is appropriate to use in determining the rate at which the labor costs will escalate over time.

Equipment and Material

Equipment and material costs in the decommissioning estimates include small tools and consumables as well as the heavy construction equipment involved in the dismantling, demolition and movement of materials around the site. The Producer Price Indexes (PPI) measures monthly average changes in selling prices received by domestic producers for their output. Most of the information used in the PPI is obtained by sampling of industries in the mining and manufacturing sectors of the economy. The indexes reflect price trends for a constant set of goods and services representing the total output of an industry.

In addition to TLG's judgment, IHS-Markit has confirmed that the selected index is appropriate to use in determining the rate at which the equipment and material costs will escalate over time.

Energy

Energy costs in the decommissioning estimate include only direct energy purchases, primarily electric power and fuel oil for heating. TLG uses a broad based power escalation index, the Producers Price Index for Fuels and Related Products and Power (WPIP05). While the WPIP05 index has some volatility (since it tracks in part the price of oil), the cost of energy in the decommissioning estimates is a small percentage and therefore has little effect on the overall escalation rate for decommissioning cost.

In addition to TLG's judgment, IHS-Markit has confirmed that the selected index is appropriate to use in determining the rate at which energy costs will escalate over time.

Low-Level Radioactive Waste Disposal

The inflation index used for radioactive waste burial costs is the IHS-Markit Consumer Price Index, Services with an additional 1% per year to account for differences (past 20 years) between low-level waste disposal rates reported in NRC NUREG-1307 documents and general inflation rate (CUSASNS) reported by the Bureau of Labor Statistics.

Other

"Other" costs in the decommissioning estimates include such items as licensing fees, taxes, special services (for example, a fee for the geologic disposal of Greater-than-Class C waste), as well as labor-intensive activities such as radiological surveys that include costs for off-site analytical services. Because the "Other" costs contain this variety of cost components, TLG uses the Consumer Price Index, Services to project future expenditures. The CUSASNS index measures changes in the prices of services. It is therefore more representative of the cost elements included in the

decommissioning estimates. Accordingly, the use of the CUSASNS index for “Other” costs reflects more accurately the cost components with the “Other” category than the use of the “Labor” escalation factor as a proxy.

In addition to TLG’s judgment, IHS-Markit has confirmed that the selected index is appropriate to use in determining the rate at which the “other” costs will escalate over time.

Results

With the proper escalation indices identified, TLG escalated the cost per year for the five escalation categories using the IHS-Markit index corresponding to that year and escalation category. Tables 1 through 3 provide escalated schedules of annual expenditures for the DECON scenario for each Hatch unit individually, plus a combined total of both units. The schedules detail each of the five cost categories through to the end of the decommissioning period (*i.e.*, 2075) for Total Costs, as well as the three cost categories of License Termination, Spent Fuel Management, and Site Restoration.

No discounting of the escalated dollars was performed.

Using the escalated cash flows for each unit, TLG determined the single-value yearly escalation rate which yielded the same sum of escalated dollars for each of the three tables. The rate, referred to as a composite average annual escalation rate, is tabulated for the three decommissioning cost cash flows as follows:

Unit 1	2.789%
Unit 2	2.804%
Station Total	2.800%

In a similar fashion, the composite average annual escalation rates for each of the five escalation categories can be developed. The following table details the composite annual average rates for the DECON decommissioning scenario.

Escalation Category	Composite Average Annual Rate (%)		
	Unit 1	Unit 2	Station
Labor	2.806	2.797	2.805
Equipment/ & Material	1.202	1.213	1.207
Energy	2.295	2.228	2.263
LLRW Disposal	3.852	3.832	3.842
Other Items	2.816	2.807	2.817

Similarly, the composite average annual escalation rates for the three cost categories identified in the decommissioning cost estimate can also be developed. The values for the DECON decommissioning scenario are provided in the following table.

Escalation Category	Composite Average Annual Rate (%)		
	Unit 1	Unit 2	Station
License Termination	2.961	2.965	2.965
Spent Fuel Management	2.605	2.578	2.598
Site Restoration	2.351	2.269	2.309

Hatch Nuclear Plant
2018 Escalation Analysis

ESCALATION ANALYSIS OF CASHFLOWS

Source Documentation:	Decommissioning Cost Study for the Hatch Nuclear Plant
Source Document Number:	S18-1754-001 Rev. 1
	Tables 3.1a, 3.1b, 3.1c and 3.1d
Unit Identification	Financial Escalation Analysis-2018 Update-Hatch Nuclear Plant - Unit 1
Estimate basis year:	2018
Decommissioning Scenario:	DECON
Operating Lifetime	Decommissioning After 60 Year Operation

Single Value Escalation % by Major Cost Categories			
Single value escalations: Cost Category	Single-value Yearly Escal.	Total Costs	
		2018 \$	Escalated \$
Total Costs	2.789%	925,781	1,821,811
License Termination Costs	2.961%	697,767	1,277,551
Spent Fuel Management Costs	2.605%	180,090	446,646
Site Restoration Costs	2.351%	47,924	97,614
Labor Costs	2.806%	515,184	1,032,018
Equipment & Material Costs	1.202%	134,090	176,085
Energy Costs	2.295%	4,251	6,599
LLRW Disposal Costs	3.852%	165,446	365,334
Other Costs	2.816%	106,811	241,775

Financial Escalation Analysis-2018 Update-Hatch Nuclear Plant - Unit 1 DECON Cash Flows by Category - Decommissioning After 60 Year Operation Total Costs - Thousands of Year of Expenditure Dollars							
Year	Labor	Equipment & Materials	Energy	LLRW Disposal	Other	Yearly Totals	
2034	44,530	3,480	424	52	18,273	66,759	
2035	115,639	12,850	1,499	1,904	30,727	162,619	
2036	120,038	35,098	1,152	119,778	15,455	291,521	
2037	115,700	33,125	1,006	112,304	15,141	277,276	
2038	95,416	19,752	850	31,323	10,393	157,734	
2039	95,974	20,011	864	32,479	10,673	162,001	
2040	38,637	7,312	303	38,030	21,365	105,647	
2041	7,291	305	0	27	1,664	9,287	
2042	7,487	309	0	28	1,709	9,533	
2043	7,687	313	0	29	1,755	9,784	
2044	35,282	1,495	127	83	2,208	39,195	
2045	37,503	8,378	161	35	4,029	50,106	
2046	29,533	10,393	132	0	4,607	44,665	
2047	13,703	3,595	42	0	2,379	19,719	
2048	6,427	498	0	0	1,363	8,288	
2049	6,585	503	0	0	1,397	8,485	
2050	6,764	509	0	0	1,435	8,708	
2051	6,947	515	0	0	1,474	8,936	
2052	7,154	523	0	0	1,519	9,196	
2053	7,327	528	0	0	1,556	9,411	
2054	7,523	535	0	0	1,598	9,656	
2055	7,725	541	0	0	1,642	9,908	
2056	7,953	550	0	0	1,691	10,194	
2057	8,145	555	0	0	1,732	10,432	
2058	8,364	562	0	0	1,780	10,706	
2059	8,590	569	0	0	1,828	10,987	
2060	8,846	578	0	0	1,883	11,307	
2061	9,060	583	0	0	1,929	11,572	
2062	9,306	591	0	0	1,982	11,879	
2063	9,558	598	0	0	2,036	12,192	
2064	9,844	607	0	0	2,098	12,549	
2065	10,083	613	0	0	2,149	12,845	
2066	10,356	621	0	0	2,208	13,185	
2067	10,637	629	0	0	2,269	13,535	
2068	10,956	638	0	0	2,338	13,932	
2069	11,223	644	0	0	2,395	14,262	
2070	11,527	652	0	0	2,461	14,640	
2071	11,840	660	0	0	2,529	15,029	
2072	12,194	671	0	0	2,605	15,470	
2073	12,490	677	0	0	2,669	15,836	
2074	12,904	1,775	0	0	29,205	43,884	
2075	15,270	2,744	39	29,262	21,626	68,941	
Totals	1,032,018	176,085	6,599	365,334	241,775	1,821,811	

Financial Escalation Analysis-2018 Update-Hatch Nuclear Plant - Unit 1 DECON Cash Flows by Category - Decommissioning After 60 Year Operation License Termination Costs - Thousands of Year of Expenditure Dollars							
Year	Labor	Equipment & Materials	Energy	LLRW Disposal	Other	Yearly Totals	
2034	43,806	2,571	424	52	11,097	57,950	
2035	113,188	9,699	1,499	1,904	18,918	145,208	
2036	115,545	27,185	1,152	119,778	13,329	276,989	
2037	111,149	24,669	1,006	112,304	12,962	262,090	
2038	91,314	10,891	850	31,323	7,986	142,364	
2039	93,762	11,033	864	32,479	8,201	146,339	
2040	34,119	6,405	303	38,030	20,808	99,665	
2041	3,509	244	0	27	1,309	5,089	
2042	3,603	247	0	28	1,344	5,222	
2043	3,700	251	0	29	1,380	5,360	
2044	30,333	1,212	127	83	1,821	33,576	
2045	14,622	543	35	64	35	914	16,178
2046	227	0	0	0	477	704	
2047	72	0	0	0	152	224	
2048	0	0	0	0	0	0	
2049	0	0	0	0	0	0	
2050	0	0	0	0	0	0	
2051	0	0	0	0	0	0	
2052	0	0	0	0	0	0	
2053	0	0	0	0	0	0	
2054	0	0	0	0	0	0	
2055	0	0	0	0	0	0	
2056	0	0	0	0	0	0	
2057	0	0	0	0	0	0	
2058	0	0	0	0	0	0	
2059	0	0	0	0	0	0	
2060	0	0	0	0	0	0	
2061	0	0	0	0	0	0	
2062	0	0	0	0	0	0	
2063	0	0	0	0	0	0	
2064	0	0	0	0	0	0	
2065	0	0	0	0	0	0	
2066	0	0	0	0	0	0	
2067	0	0	0	0	0	0	
2068	0	0	0	0	0	0	
2069	0	0	0	0	0	0	
2070	0	0	0	0	0	0	
2071	0	0	0	0	0	0	
2072	0	0	0	0	0	0	
2073	0	0	0	0	0	0	
2074	515	1,047	0	0	26,512	28,074	
2075	3,385	665	0	29,262	19,207	52,519	
Totals	662,849	96,662	6,289	365,334	146,417	1,277,551	

Financial Escalation Analysis-2018 Update-Hatch Nuclear Plant - Unit 1 DECON Cash Flows by Category - Decommissioning After 60 Year Operation Spent Fuel Management Costs - Thousands of Year of Expenditure Dollars							
Year	Labor	Equipment & Materials	Energy	LLRW Disposal	Other	Yearly Totals	
2034	396	909	0	0	7,176	8,481	
2035	1,392	3,151	0	0	11,809	16,352	
2036	3,521	7,862	0	0	2,126	13,509	
2037	3,752	8,267	0	0	2,130	14,149	
2038	3,784	8,226	0	0	2,187	14,197	
2039	3,886	8,334	0	0	2,246	14,466	
2040	4,305	836	0	0	535	5,676	
2041	3,782	61	0	0	356	4,199	
2042	3,884	61	0	0	365	4,310	
2043	3,988	62	0	0	375	4,425	
2044	4,948	282	0	0	387	5,617	
2045	5,906	474	97	0	596	7,073	
2046	6,065	470	132	0	680	7,347	
2047	6,237	486	42	0	1,130	7,895	
2048	6,427	498	0	0	1,363	8,288	
2049	6,585	503	0	0	1,397	8,485	
2050	6,764	509	0	0	1,435	8,708	
2051	6,947	515	0	0	1,474	8,936	
2052	7,154	523	0	0	1,519	9,196	
2053	7,327	528	0	0	1,556	9,411	
2054	7,523	535	0	0	1,598	9,656	
2055	7,725	541	0	0	1,642	9,908	
2056	7,953	550	0	0	1,691	10,194	
2057	8,145	555	0	0	1,732	10,432	
2058	8,364	562	0	0	1,780	10,706	
2059	8,590	569	0	0	1,828	10,987	
2060	8,846	578	0	0	1,883	11,307	
2061	9,060	583	0	0	1,929	11,572	
2062	9,306	591	0	0	1,982	11,879	
2063	9,558	598	0	0	2,036	12,192	
2064	9,844	607	0	0	2,098	12,549	
2065	10,083	613	0	0	2,149	12,845	
2066	10,356	621	0	0	2,208	13,185	
2067	10,637	629	0	0	2,269	13,535	
2068	10,956	638	0	0	2,338	13,932	
2069	11,223	644	0	0	2,395	14,262	
2070	11,527	652	0	0	2,461	14,640	
2071	11,840	660	0	0	2,529	15,029	
2072	12,194	671	0	0	2,605	15,470	
2073	12,490	677	0	0	2,669	15,836	
2074	12,389	728	0	0	2,693	15,810	
2075	0	0	0	0	0	0	
Totals	305,659	55,359	271	0	85,357	446,646	

Financial Escalation Analysis-2018 Update-Hatch Nuclear Plant - Unit 1 DECON Cash Flows by Category - Decommissioning After 60 Year Operation Site Restoration Costs - Year of Expenditure Dollars						
Year	Labor	Equipment & Materials	Energy	LLRW Disposal	Other	Yearly Totals
2034	329	0	0	0	0	329
2035	1,058	0	0	0	0	1,058
2036	972	51	0	0	0	1,023
2037	798	189	0	0	49	1,036
2038	318	636	0	0	220	1,174
2039	326	644	0	0	226	1,196
2040	213	71	0	0	22	306
2041	0	0	0	0	0	0
2042	0	0	0	0	0	0
2043	0	0	0	0	0	0
2044	0	0	0	0	0	0
2045	16,974	7,361	0	0	2,519	26,854
2046	23,241	9,923	0	0	3,450	36,614
2047	7,394	3,109	0	0	1,098	11,601
2048	0	0	0	0	0	0
2049	0	0	0	0	0	0
2050	0	0	0	0	0	0
2051	0	0	0	0	0	0
2052	0	0	0	0	0	0
2053	0	0	0	0	0	0
2054	0	0	0	0	0	0
2055	0	0	0	0	0	0
2056	0	0	0	0	0	0
2057	0	0	0	0	0	0
2058	0	0	0	0	0	0
2059	0	0	0	0	0	0
2060	0	0	0	0	0	0
2061	0	0	0	0	0	0
2062	0	0	0	0	0	0
2063	0	0	0	0	0	0
2064	0	0	0	0	0	0
2065	0	0	0	0	0	0
2066	0	0	0	0	0	0
2067	0	0	0	0	0	0
2068	0	0	0	0	0	0
2069	0	0	0	0	0	0
2070	0	0	0	0	0	0
2071	0	0	0	0	0	0
2072	0	0	0	0	0	0
2073	0	0	0	0	0	0
2074	0	0	0	0	0	0
2075	11,885	2,079	39	0	2,420	16,423
Totals	63,508	24,063	39	0	10,004	97,614

Hatch Nuclear Plant
2018 Escalation Analysis

ESCALATION ANALYSIS OF CASHFLOWS

Source Documentation:	Decommissioning Cost Study for the Hatch Nuclear Plant
Source Document Number:	S18-1754-001 Rev. 1
	Tables 3.2a, 3.2b, 3.2c and 3.2d
Unit Identification	Financial Escalation Analysis-2018 Update-Hatch Nuclear Plant - Unit 2
Estimate basis year:	2018
Decommissioning Scenario:	DECON
Operating Lifetime	Decommissioning After 60 Year Operation

Single Value Escalation % by Major Cost Categories			
Single value escalations: Cost Category	Single-value Yearly Escal.	Total Costs	
		2018 \$	Escalated \$
Total Costs	2.804%	994,494	2,104,821
License Termination Costs	2.965%	768,427	1,560,038
Spent Fuel Management Costs	2.578%	162,917	421,122
Site Restoration Costs	2.269%	63,150	123,661
Labor Costs	2.797%	559,090	1,187,482
Equipment & Material Costs	1.213%	148,099	201,933
Energy Costs	2.228%	4,266	7,052
LLRW Disposal Costs	3.832%	191,294	480,078
Other Costs	2.807%	91,745	228,277

Financial Escalation Analysis-2018 Update-Hatch Nuclear Plant - Unit 2 DECON Cash Flows by Category - Decommissioning After 60 Year Operation Total Costs - Thousands of Year of Expenditure Dollars						
Year	Labor	Equipment & Materials	Energy	LLRW Disposal	Other	Yearly Totals
2038	59,352	5,862	627	82	13,482	79,405
2039	119,693	17,418	1,731	10,491	16,271	165,604
2040	147,944	39,491	1,117	164,442	18,251	371,245
2041	145,563	33,154	1,048	124,822	16,092	320,679
2042	138,593	21,375	911	45,664	11,758	218,301
2043	139,749	21,449	904	50,395	13,989	226,486
2044	80,530	10,315	379	54,885	26,126	172,235
2045	41,434	12,404	161	35	3,917	57,951
2046	33,925	15,778	132	0	4,613	54,448
2047	15,100	5,283	42	0	2,381	22,806
2048	6,427	498	0	0	1,363	8,288
2049	6,585	503	0	0	1,397	8,485
2050	6,764	509	0	0	1,435	8,708
2051	6,947	515	0	0	1,474	8,936
2052	7,154	523	0	0	1,519	9,196
2053	7,327	528	0	0	1,556	9,411
2054	7,523	535	0	0	1,598	9,656
2055	7,725	541	0	0	1,642	9,908
2056	7,953	550	0	0	1,691	10,194
2057	8,145	555	0	0	1,732	10,432
2058	8,364	562	0	0	1,780	10,706
2059	8,590	569	0	0	1,828	10,987
2060	8,846	578	0	0	1,883	11,307
2061	9,060	583	0	0	1,929	11,572
2062	9,306	591	0	0	1,982	11,879
2063	9,558	598	0	0	2,036	12,192
2064	9,844	607	0	0	2,098	12,549
2065	10,083	613	0	0	2,149	12,845
2066	10,356	621	0	0	2,208	13,185
2067	10,637	629	0	0	2,269	13,535
2068	10,956	638	0	0	2,338	13,932
2069	11,223	644	0	0	2,395	14,262
2070	11,527	652	0	0	2,461	14,640
2071	11,840	660	0	0	2,529	15,029
2072	12,194	671	0	0	2,605	15,470
2073	12,490	677	0	0	2,669	15,836
2074	12,904	1,775	0	0	29,205	43,884
2075	15,270	2,479	0	29,262	21,626	68,637
Totals	1,187,481	201,933	7,052	480,078	228,277	2,104,821

Financial Escalation Analysis-2018 Update-Hatch Nuclear Plant - Unit 2 DECON Cash Flows by Category - Decommissioning After 60 Year Operation License Termination Costs - Thousands of Year of Expenditure Dollars						
Year	Labor	Equipment & Materials	Energy	LLRW Disposal	Other	Yearly Totals
2038	57,522	2,336	627	82	11,997	72,564
2039	116,194	11,123	1,731	10,491	13,541	153,080
2040	142,707	31,276	1,117	164,442	15,938	355,480
2041	140,773	25,085	1,048	124,822	13,637	305,365
2042	134,726	13,620	911	45,664	9,079	204,000
2043	135,343	13,730	904	50,395	11,362	211,734
2044	71,307	7,437	379	54,885	25,739	159,747
2045	15,250	574	64	35	798	16,721
2046	95	0	0	0	477	572
2047	30	0	0	0	152	182
2048	0	0	0	0	0	0
2049	0	0	0	0	0	0
2050	0	0	0	0	0	0
2051	0	0	0	0	0	0
2052	0	0	0	0	0	0
2053	0	0	0	0	0	0
2054	0	0	0	0	0	0
2055	0	0	0	0	0	0
2056	0	0	0	0	0	0
2057	0	0	0	0	0	0
2058	0	0	0	0	0	0
2059	0	0	0	0	0	0
2060	0	0	0	0	0	0
2061	0	0	0	0	0	0
2062	0	0	0	0	0	0
2063	0	0	0	0	0	0
2064	0	0	0	0	0	0
2065	0	0	0	0	0	0
2066	0	0	0	0	0	0
2067	0	0	0	0	0	0
2068	0	0	0	0	0	0
2069	0	0	0	0	0	0
2070	0	0	0	0	0	0
2071	0	0	0	0	0	0
2072	0	0	0	0	0	0
2073	0	0	0	0	0	0
2074	515	1,047	0	0	26,512	28,074
2075	3,385	665	0	29,262	19,207	52,519
Totals	817,847	106,893	6,781	480,078	148,439	1,560,038

Financial Escalation Analysis-2018 Update-Hatch Nuclear Plant - Unit 2 DECON Cash Flows by Category - Decommissioning After 60 Year Operation Spent Fuel Management Costs - Thousands of Year of Expenditure Dollars						
Year	Labor	Equipment & Materials	Energy	LLRW Disposal	Other	Yearly Totals
2038	1,622	3,525	0	0	1,485	6,632
2039	2,933	6,291	0	0	2,730	11,954
2040	3,845	8,137	0	0	2,313	14,295
2041	3,724	7,778	0	0	2,368	13,870
2042	3,434	7,077	0	0	2,432	12,943
2043	3,654	6,864	0	0	2,387	12,905
2044	5,974	897	0	0	387	7,258
2045	5,906	474	97	0	596	7,073
2046	6,065	470	132	0	680	7,347
2047	6,237	486	42	0	1,130	7,895
2048	6,427	498	0	0	1,363	8,288
2049	6,585	503	0	0	1,397	8,485
2050	6,764	509	0	0	1,435	8,708
2051	6,947	515	0	0	1,474	8,936
2052	7,154	523	0	0	1,519	9,196
2053	7,327	528	0	0	1,556	9,411
2054	7,523	535	0	0	1,598	9,656
2055	7,725	541	0	0	1,642	9,908
2056	7,953	550	0	0	1,691	10,194
2057	8,145	555	0	0	1,732	10,432
2058	8,364	562	0	0	1,780	10,706
2059	8,590	569	0	0	1,828	10,987
2060	8,846	578	0	0	1,883	11,307
2061	9,060	583	0	0	1,929	11,572
2062	9,306	591	0	0	1,982	11,879
2063	9,558	598	0	0	2,036	12,192
2064	9,844	607	0	0	2,098	12,549
2065	10,083	613	0	0	2,149	12,845
2066	10,356	621	0	0	2,208	13,185
2067	10,637	629	0	0	2,269	13,535
2068	10,956	638	0	0	2,338	13,932
2069	11,223	644	0	0	2,395	14,262
2070	11,527	652	0	0	2,461	14,640
2071	11,840	660	0	0	2,529	15,029
2072	12,194	671	0	0	2,605	15,470
2073	12,490	677	0	0	2,669	15,836
2074	12,389	728	0	0	2,693	15,810
2075	0	0	0	0	0	0
Totals	293,207	57,877	271	0	69,767	421,122

Financial Escalation Analysis-2018 Update-Hatch Nuclear Plant - Unit 2 DECON Cash Flows by Category - Decommissioning After 60 Year Operation Site Restoration Costs - Year of Expenditure Dollars						
Year	Labor	Equipment & Materials	Energy	LLRW Disposal	Other	Yearly Totals
2038	209	0	0	0	0	209
2039	566	4	0	0	0	570
2040	1,392	78	0	0	0	1,470
2041	1,065	291	0	0	86	1,442
2042	433	678	0	0	247	1,358
2043	751	855	0	0	240	1,846
2044	3,248	1,981	0	0	0	5,229
2045	20,279	11,356	0	0	2,523	34,158
2046	27,765	15,309	0	0	3,456	46,530
2047	8,833	4,797	0	0	1,100	14,730
2048	0	0	0	0	0	0
2049	0	0	0	0	0	0
2050	0	0	0	0	0	0
2051	0	0	0	0	0	0
2052	0	0	0	0	0	0
2053	0	0	0	0	0	0
2054	0	0	0	0	0	0
2055	0	0	0	0	0	0
2056	0	0	0	0	0	0
2057	0	0	0	0	0	0
2058	0	0	0	0	0	0
2059	0	0	0	0	0	0
2060	0	0	0	0	0	0
2061	0	0	0	0	0	0
2062	0	0	0	0	0	0
2063	0	0	0	0	0	0
2064	0	0	0	0	0	0
2065	0	0	0	0	0	0
2066	0	0	0	0	0	0
2067	0	0	0	0	0	0
2068	0	0	0	0	0	0
2069	0	0	0	0	0	0
2070	0	0	0	0	0	0
2071	0	0	0	0	0	0
2072	0	0	0	0	0	0
2073	0	0	0	0	0	0
2074	0	0	0	0	0	0
2075	11,885	1,814	0	0	2,420	16,119
Totals	76,426	37,163	0	0	10,072	123,661

Hatch Nuclear Plant
2018 Escalation Analysis

ESCALATION ANALYSIS OF CASHFLOWS

Source Documentation:	Decommissioning Cost Study for the Hatch Nuclear Plant
Source Document Number:	S18-1754-001 Rev. 1 [Summation of Unit 1 and Unit 2 values]
Unit Identification	Financial Escalation Analysis-2018 Update-Hatch Nuclear Plant - Station
Estimate basis year:	2018
Decommissioning Scenario:	DECON
Operating Lifetime	Decommissioning After 60 Year Operation

Single Value Escalation % by Major Cost Categories			
Single value escalations: Cost Category	Single-value Yearly Escal.	Total Costs	
		2018 \$	Escalated \$
Total Costs	2.800%	1,920,275	3,930,105
License Termination Costs	2.965%	1,466,195	2,838,914
Spent Fuel Management Costs	2.598%	343,007	869,667
Site Restoration Costs	2.309%	111,074	221,526
Labor Costs	2.805%	1,074,274	2,221,735
Equipment & Material Costs	1.207%	282,189	377,881
Energy Costs	2.263%	8,517	13,668
LLRW Disposal Costs	3.842%	356,740	845,875
Other Costs	2.817%	198,556	470,947

Financial Escalation Analysis-2018 Update-Hatch Nuclear Plant - Station DECON Cash Flows by Category - Decommissioning After 60 Year Operation Total Costs - Thousands of Year of Expenditure Dollars							
Year	Labor	Equipment & Materials	Energy	LLRW Disposal	Other	Yearly Totals	
2034	44,530	3,480	424	52	18,273	66,759	
2035	115,639	12,850	1,499	1,904	30,727	162,619	
2036	120,038	35,098	1,152	119,778	15,455	291,521	
2037	115,700	33,125	1,006	112,304	15,141	277,276	
2038	154,768	25,614	1,476	31,405	23,876	237,139	
2039	217,667	37,429	2,595	42,970	26,944	327,605	
2040	186,381	46,803	1,420	202,472	39,616	476,892	
2041	152,854	33,458	1,048	124,848	17,757	329,965	
2042	146,079	21,683	911	45,692	13,467	227,832	
2043	147,621	21,742	911	50,503	15,766	236,543	
2044	115,969	11,798	511	55,059	28,374	211,711	
2045	79,053	20,762	325	70	7,958	108,168	
2046	63,549	26,147	266	0	9,234	99,196	
2047	28,843	8,870	84	0	4,768	42,565	
2048	12,874	995	0	0	2,731	16,600	
2049	13,190	1,005	0	0	2,799	16,994	
2050	13,550	1,017	0	0	2,876	17,443	
2051	13,919	1,030	0	0	2,955	17,904	
2052	14,335	1,045	0	0	3,044	18,424	
2053	14,682	1,055	0	0	3,119	18,856	
2054	15,077	1,068	0	0	3,204	19,349	
2055	15,482	1,082	0	0	3,291	19,855	
2056	15,942	1,098	0	0	3,390	20,430	
2057	16,328	1,109	0	0	3,473	20,910	
2058	16,769	1,123	0	0	3,569	21,461	
2059	17,223	1,137	0	0	3,666	22,026	
2060	17,739	1,154	0	0	3,777	22,670	
2061	18,171	1,165	0	0	3,870	23,206	
2062	18,666	1,180	0	0	3,976	23,822	
2063	19,173	1,195	0	0	4,086	24,454	
2064	19,749	1,213	0	0	4,210	25,172	
2065	20,231	1,225	0	0	4,314	25,770	
2066	20,783	1,240	0	0	4,433	26,456	
2067	21,350	1,255	0	0	4,555	27,160	
2068	21,993	1,274	0	0	4,693	27,960	
2069	22,531	1,287	0	0	4,810	28,628	
2070	23,144	1,303	0	0	4,943	29,390	
2071	23,774	1,319	0	0	5,079	30,172	
2072	24,487	1,339	0	0	5,233	31,059	
2073	25,084	1,352	0	0	5,362	31,798	
2074	25,921	1,354	0	0	58,675	88,140	
2075	30,676	5,213	40	58,818	43,458	138,205	
Totals	2,221,734	377,881	13,668	845,875	470,947	3,930,105	

Financial Escalation Analysis-2018 Update-Hatch Nuclear Plant - Station DECON Cash Flows by Category - Decommissioning After 60 Year Operation License Termination Costs - Thousands of Year of Expenditure Dollars							
Year	Labor	Equipment & Materials	Energy	LLRW Disposal	Other	Yearly Totals	
2034	43,806	2,571	424	52	11,097	57,950	
2035	113,188	9,699	1,499	1,904	18,918	145,208	
2036	115,545	27,185	1,152	119,778	13,329	276,989	
2037	111,149	24,689	1,006	112,304	12,962	262,090	
2038	148,836	13,227	1,476	31,405	19,983	214,927	
2039	209,856	22,156	2,595	42,970	21,742	299,419	
2040	176,826	37,681	1,420	202,472	36,746	455,145	
2041	144,282	25,329	1,048	124,848	14,946	310,453	
2042	138,329	13,867	911	45,692	10,423	209,222	
2043	139,217	13,968	911	50,503	12,760	217,359	
2044	101,779	8,641	511	55,059	27,599	193,589	
2045	29,916	1,116	130	70	1,714	32,946	
2046	323	0	0	0	955	1,278	
2047	103	0	0	0	304	407	
2048	0	0	0	0	0	0	
2049	0	0	0	0	0	0	
2050	0	0	0	0	0	0	
2051	0	0	0	0	0	0	
2052	0	0	0	0	0	0	
2053	0	0	0	0	0	0	
2054	0	0	0	0	0	0	
2055	0	0	0	0	0	0	
2056	0	0	0	0	0	0	
2057	0	0	0	0	0	0	
2058	0	0	0	0	0	0	
2059	0	0	0	0	0	0	
2060	0	0	0	0	0	0	
2061	0	0	0	0	0	0	
2062	0	0	0	0	0	0	
2063	0	0	0	0	0	0	
2064	0	0	0	0	0	0	
2065	0	0	0	0	0	0	
2066	0	0	0	0	0	0	
2067	0	0	0	0	0	0	
2068	0	0	0	0	0	0	
2069	0	0	0	0	0	0	
2070	0	0	0	0	0	0	
2071	0	0	0	0	0	0	
2072	0	0	0	0	0	0	
2073	0	0	0	0	0	0	
2074	1,035	2,090	0	0	53,265	56,390	
2075	6,800	1,328	0	58,818	38,596	105,542	
Totals	1,481,090	203,527	13,083	845,875	295,339	2,838,914	

Financial Escalation Analysis-2018 Update-Hatch Nuclear Plant - Station DECON Cash Flows by Category - Decommissioning After 60 Year Operation Spent Fuel Management Costs - Thousands of Year of Expenditure Dollars							
Year	Labor	Equipment & Materials	Energy	LLRW Disposal	Other	Yearly Totals	
2034	396	909	0	0	7,176	8,481	
2035	1,392	3,151	0	0	11,809	16,352	
2036	3,521	7,862	0	0	2,126	13,509	
2037	3,752	8,267	0	0	2,130	14,149	
2038	5,406	11,751	0	0	3,672	20,829	
2039	6,819	14,625	0	0	4,976	26,420	
2040	8,150	8,973	0	0	2,848	19,971	
2041	7,506	7,839	0	0	2,724	18,069	
2042	7,318	7,139	0	0	2,797	17,254	
2043	7,652	6,920	0	0	2,766	17,338	
2044	10,937	1,178	0	0	774	12,889	
2045	11,829	947	195	0	1,193	14,164	
2046	12,147	938	266	0	1,363	14,714	
2047	12,491	971	84	0	2,263	15,809	
2048	12,874	995	0	0	2,731	16,600	
2049	13,190	1,005	0	0	2,799	16,994	
2050	13,550	1,017	0	0	2,876	17,443	
2051	13,919	1,030	0	0	2,955	17,904	
2052	14,335	1,045	0	0	3,044	18,424	
2053	14,682	1,055	0	0	3,119	18,856	
2054	15,077	1,068	0	0	3,204	19,349	
2055	15,482	1,082	0	0	3,291	19,855	
2056	15,942	1,098	0	0	3,390	20,430	
2057	16,328	1,109	0	0	3,473	20,910	
2058	16,769	1,123	0	0	3,569	21,461	
2059	17,223	1,137	0	0	3,666	22,026	
2060	17,739	1,154	0	0	3,777	22,670	
2061	18,171	1,165	0	0	3,870	23,206	
2062	18,666	1,180	0	0	3,976	23,822	
2063	19,173	1,195	0	0	4,086	24,454	
2064	19,749	1,213	0	0	4,210	25,172	
2065	20,231	1,225	0	0	4,314	25,770	
2066	20,783	1,240	0	0	4,433	26,456	
2067	21,350	1,255	0	0	4,555	27,160	
2068	21,993	1,274	0	0	4,693	27,960	
2069	22,531	1,287	0	0	4,810	28,628	
2070	23,144	1,303	0	0	4,943	29,390	
2071	23,774	1,319	0	0	5,079	30,172	
2072	24,487	1,339	0	0	5,233	31,059	
2073	25,084	1,352	0	0	5,362	31,798	
2074	24,886	1,454	0	0	5,410	31,750	
2075	0	0	0	0	0	0	
Totals	600,448	113,189	545	0	155,485	869,667	

Financial Escalation Analysis-2018 Update-Hatch Nuclear Plant - Station DECON Cash Flows by Category - Decommissioning After 60 Year Operation Site Restoration Costs - Year of Expenditure Dollars						
Year	Labor	Equipment & Materials	Energy	LLRW Disposal	Other	Yearly Totals
2034	329	0	0	0	0	329
2035	1,058	0	0	0	0	1,058
2036	972	51	0	0	0	1,023
2037	798	189	0	0	49	1,036
2038	527	636	0	0	220	1,383
2039	892	648	0	0	226	1,766
2040	1,606	149	0	0	22	1,777
2041	1,065	291	0	0	86	1,442
2042	433	678	0	0	247	1,358
2043	752	855	0	0	240	1,847
2044	3,252	1,979	0	0	0	5,231
2045	37,308	18,700	0	0	5,050	61,058
2046	51,079	25,209	0	0	6,917	83,205
2047	16,250	7,899	0	0	2,201	26,350
2048	0	0	0	0	0	0
2049	0	0	0	0	0	0
2050	0	0	0	0	0	0
2051	0	0	0	0	0	0
2052	0	0	0	0	0	0
2053	0	0	0	0	0	0
2054	0	0	0	0	0	0
2055	0	0	0	0	0	0
2056	0	0	0	0	0	0
2057	0	0	0	0	0	0
2058	0	0	0	0	0	0
2059	0	0	0	0	0	0
2060	0	0	0	0	0	0
2061	0	0	0	0	0	0
2062	0	0	0	0	0	0
2063	0	0	0	0	0	0
2064	0	0	0	0	0	0
2065	0	0	0	0	0	0
2066	0	0	0	0	0	0
2067	0	0	0	0	0	0
2068	0	0	0	0	0	0
2069	0	0	0	0	0	0
2070	0	0	0	0	0	0
2071	0	0	0	0	0	0
2072	0	0	0	0	0	0
2073	0	0	0	0	0	0
2074	0	0	0	0	0	0
2075	23,876	3,885	40	0	4,862	32,663
Totals	140,197	61,169	40	0	20,120	221,526