

**ZION STATION RESTORATION PROJECT  
LICENSE TERMINATION PLAN  
SECTION 7, REVISION 1  
UPDATE OF THE SITE-SPECIFIC DECOMMISSIONING COSTS**

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1 **LIST OF ACRONYMS AND ABBREVIATIONS**

2	ComEd	Commonwealth Edison
3	Exelon	Exelon Corporation
4	<del>FRS</del>	<del>Final Radiation Survey</del>
5	FSAR	Final Safety Analysis Report
6	GTCC	Greater Than Class C
7	ISFSI	Independent Spent Fuel Storage Installation
8	LTP	License Termination Plan
9	NRC	Nuclear Regulatory Commission
10	PSDAR	Post-Shutdown Decommissioning Activities Report
11	TLG	TLG Services, Inc.
12	WCS	Waste Control Specialists
13	ZNPS	Zion Nuclear Power Station
14	ZSRP	Zion Station Restoration Project

## 15 7. UPDATE OF THE SITE-SPECIFIC DECOMMISSIONING COSTS

### 16 7.1. Introduction

17 In accordance with 10 CFR 50.82(a)(9)(ii)(F) (Ref 7-1) and Regulatory Guide 1.179 (Ref 7-2),  
18 the updated site specific cost estimates and funding plans for the Zion Station Restoration Project  
19 (ZSRP) are provided. Regulatory Guide 1.179 provides guidance on the details of the  
20 information to be presented in the License Termination Plan (LTP).

21 The LTP must provide an estimate of the remaining decommissioning costs at the time of LTP  
22 submittal and also compare these estimated costs with the present funds set aside for  
23 decommissioning. If it is determined that there is a deficit in the present funding, the LTP must  
24 indicate the means for ensuring that adequate funds are available to complete the  
25 decommissioning.

26 The decommissioning cost estimate, at a minimum, needs to include an evaluation of the  
27 following cost elements:

- 28 • Cost assumptions used, including contingency factor;
- 29 • Major decommissioning activities and tasks;
- 30 • Unit cost factors;
- 31 • Estimated costs of decontamination and removal of equipment and structures;
- 32 • Estimated costs of waste disposal, including disposal site surcharges;
- 33 • Estimated Final ~~Radiation Status~~-Survey (~~FRSFSS~~) costs; and
- 34 • Estimated total costs.

35 The cost estimate should focus on the remaining work, detailed activity by activity, including  
36 costs of labor, materials, equipment, energy, and services. The cost estimate should include the  
37 cost of the planned remediation activities as well as the cost of the transportation and disposal of  
38 the waste generated by the remedial work conducted.

### 39 Historical Perspective

40 By 1998, Exelon Corporation (Exelon), formerly Commonwealth Edison Company, or ComEd,  
41 had completely shut down the two unit Zion Nuclear Power Station (ZNPS) and made plans to  
42 implement a delayed-DECON decommissioning scenario, with decommissioning expected to  
43 commence at the original license expiration date (November 14, 2013). As part of its post  
44 shutdown planning, Exelon contracted a specialty decommissioning consultant, TLG Services,  
45 Inc. (TLG) to develop a decommissioning cost estimate for the ZNPS Units 1 and 2. This cost  
46 estimate was provided with the Post-Shutdown Decommissioning Activities Report (PSDAR)  
47 (Ref 7-3) Exelon submitted in 2000 to the NRC.

48 Exelon later entered into discussions with EnergySolutions for the possible transfer of the ZNPS  
49 licenses and the decommissioning fund to EnergySolutions to accelerate the decommissioning of  
50 the plant. As part of its application for the license transfers, ZionSolutions, LLC, a wholly  
51 owned subsidiary of EnergySolutions, amended the PSDAR and submitted it to the NRC in  
52 2008. This amended PSDAR provided significant decommissioning cost milestone changes and  
53 an estimate of expected decommissioning costs.

54 The license transfers were completed and *ZionSolutions* started decommissioning operations by  
55 September 2010. In compliance with 10 CFR 50.75(f)(1) (Ref 7-4) and 10 CFR 50.82(a)(8)(v)-  
56 (viii), *ZionSolutions* continues to demonstrate financial assurance on an annual basis.

#### 57 **7.1.1. Cost Estimates Previously Docketed with the NRC**

58 Exelon submitted its PSDAR to the NRC on February 14, 2000. As previously noted, in  
59 accordance with 10 CFR 50.82(a)(8)(iii), a Zion site-specific decommissioning cost estimate was  
60 also prepared and submitted in a letter dated February 14, 2000 (Ref 7-5). This submittal,  
61 docketed with the NRC, included an Attachment, “Zion Nuclear Power Station Units 1 and 2  
62 Site-Specific Decommissioning Cost Estimate” which was the cost estimate study prepared by  
63 TLG.

64 During the process of *ZionSolutions, LLC*’s application to take over the licenses of Zion Units 1  
65 and 2 from Exelon, *ZionSolutions* submitted an Amended PSDAR, including an estimate of  
66 expected decommissioning costs, on March 18, 2008. This submittal was also docketed with the  
67 NRC.

#### 68 **7.2. Decommissioning Cost Estimate**

69 The decommissioning cost estimate presented herein represents the cost to complete the  
70 remaining decommissioning work as of the end of the 3<sup>rd</sup> quarter 2014. This estimate was  
71 prepared based upon the schedule of the remaining work, incorporating the experience that has  
72 been gained while performing similar decommissioning tasks over the past four years. To a large  
73 extent, this decommissioning cost estimate is based upon an existing and operating  
74 decommissioning organization, in which actual contracts for services are already in place. As  
75 such, there is a high degree of certainty regarding expected work productivity, the cost of labor  
76 and the cost of services required to support the remainder of the project. The decommissioning  
77 cost estimate also includes application of contingency, as specific provision for unforeseeable  
78 elements of cost within the defined project scope. Contingencies are particularly important  
79 where previous experience has shown that unforeseeable events, which may increase costs, are  
80 likely to occur. The contingency, as used in this estimate, does not account for price escalation  
81 and inflation in the costs of decommissioning over the remaining project duration.

82 The cost estimate was prepared to include all costs associated with the decommissioning and  
83 unrestricted release of the Zion site other than the area bounded by the Independent Spent Fuel  
84 Storage Installation (ISFSI), and includes radiological decommissioning (i.e., those costs  
85 required to accomplish such unrestricted release), spent fuel management (transfer of the spent  
86 fuel to the ISFSI and operation of the ISFSI until the partial site release is achieved, at which  
87 time the released portion of the site and the remaining ISFSI will be transferred back to Exelon),  
88 and site restoration (i.e., non-radiological remediation aimed at leaving the site in a safe and  
89 stable condition). As was reflected in the Application relating to the transfer of the Zion licenses  
90 to *ZionSolutions*, Exelon has retained title to the spent fuel and Greater Than Class C (GTCC)  
91 waste, as well as the obligation for ultimate disposition of the spent fuel and the GTCC waste in  
92 the ISFSI and the decommissioning of the ISFSI.

93 The site-specific decommissioning cost estimate provided with this LTP has been prepared as a  
94 collaborative effort by *ZionSolutions* and TLG and presents a breakdown of the remaining costs

95 to complete the decommissioning process and release all portions of the site for unrestricted  
96 release, with the exception of the area bounded by the ISFSI.

97 The following subsections present a description of how the cost estimate was prepared and a  
98 summary and breakdown of the estimated costs.

### 99 **7.2.1. Cost Estimate Description and Methodology**

100 During the summer and fall of 2014, the *ZionSolutions* decommissioning project organization  
101 undertook an effort to update the baseline schedule, risks and the costs to complete the  
102 decommissioning project. This resulted in a revised work breakdown structure that provided a  
103 detailed listing of the remaining work activities and support services needed to complete the  
104 project. Task durations, crew compositions and material and contracted services needs were  
105 derived from the results of detailed process planning carried out by each of the decommissioning  
106 and support organizations (e.g., decommissioning operations, engineering, security, radiation  
107 protection, radiological engineering, waste management, safety, ~~FRSFSS~~, etc.).

108 Additionally, *ZionSolutions* performed a contingency and risk analysis so that the potential  
109 additional costs due to expected but undefined risks and uncertainties could be addressed and  
110 included in the cost estimate.

111 The resulting information was then compiled into a decommissioning cost estimate by TLG. The  
112 following sections provide a summary of those results.

### 113 **7.2.2. Summary of the Site-Specific Decommissioning Cost Estimate**

114 The overall remaining decommissioning cost (including scope risk contingency) was estimated  
115 to be \$389 Million (in year of expenditure dollars), with a base estimated cost of \$358 Million  
116 (without the scope risk contingency). The cost estimates include provisions for cost escalation  
117 based upon the following assumptions:

- 118 • Labor costs are assumed to escalate at 1.992% per year, this cost escalation factor being  
119 based on the forecast of the Consumer Price Index, Services, CUSASNS as published by  
120 Global Insight Company, and applied per the Zion project Asset Sale Agreement.
- 121 • Non-Labor costs that are not covered by fixed prices, fixed rates or escalation provisions  
122 in contractual agreements, are similarly assumed to escalate at 1.992% per year, this cost  
123 escalation factor being based on the Consumer Price Index, Services, CUSASNS as  
124 published by Global Insight Company, and applied per the Zion project Asset Sale  
125 Agreement.
- 126 • For Class A and Class B&C waste costs, *ZionSolutions* has largely mitigated this  
127 escalation risk by having a fixed price arrangement with *EnergySolutions* (Class A) and  
128 contractually defined costs for B/C waste.

129 The cost estimate includes the costs for radiological decommissioning, spent fuel management,  
130 and site restoration. A breakout of the cost for each part of the decommissioning program is  
131 provided in Table 7-1.

132 **Table 7-1 Cost for Radiological Decommissioning, Spent Fuel Management,**  
 133 **and Site Restoration**

	<b>Radiological Decommissioning</b>	<b>Spent Fuel Management*</b>	<b>Site Restoration*</b>
<b>Base Amount</b>	\$284.3 Million	\$37.4 Million	\$36.2 Million
<b>Contingency</b>	\$24.7 Million	\$3.3 Million	\$3.2 Million
<b>Total</b>	<b>\$309.0 Million</b>	<b>\$40.7 Million*</b>	<b>\$39.4 Million*</b>

134 \*included for completeness, but not required for license termination funding purposes.

135 Detailed breakdowns of the estimated costs for radiological decommissioning, spent fuel  
 136 management and site restoration programs are provided in sections 7.2.3, 7.2.4 and 7.2.5,  
 137 respectively. Section 7.2.6 presents the estimated contingency costs for each of these programs.

138 **7.2.3. Radiological Decommissioning Costs**

139 Consistent with the NRC definition of decommissioning under 10 CFR 50.2, the radiological  
 140 decommissioning costs under this category consider only those costs associated with normal  
 141 decommissioning activities necessary for release of the site (other than the ISFSI) for  
 142 unrestricted use. It does not include costs associated with the disposal of non-radiological  
 143 materials or structures beyond those necessary to terminate the Part 50 license or the costs  
 144 associated with construction or operation of an ISFSI.

145 As summarized in section 7.2.2 above, the total estimated cost for radiological decommissioning,  
 146 including contingency is \$309 Million. The estimated cost for the anticipated base work scope is  
 147 \$284.3 Million. Application of a contingency of \$24.7 Million results in a total estimated cost of  
 148 \$309 Million.

149 The remaining decommissioning scope of work included in this estimate is described in detail in  
 150 other chapters of this LTP. Overall, that work scope includes completion of the removal,  
 151 transportation and disposal of the major components; completion of the removal, transportation  
 152 and disposal of the remaining equipment; decontamination and/or bulk demolition of  
 153 radiological impacted structures and transportation and disposal of the resulting radioactive  
 154 wastes; performance of the ~~FRS-FSS~~ and associated license termination activities. The estimated  
 155 costs include the labor, equipment, materials, services and fees needed to conduct the work. The  
 156 estimated cost also includes all of the program support activities and services necessary to  
 157 manage and safely carry out a large scale dismantlement and demolition project. These program  
 158 support activities include project management, work controls and site administration; technical  
 159 support services, such as radiation protection, safety, engineering, security, QA/QC,  
 160 environmental monitoring, waste management and decommissioning subject matter experts  
 161 needed to support the project.

162 A high level breakdown of the estimated base radiological decommissioning cost, by major  
 163 resource category, is provided in Table 7-2.

164 **Table 7-2 Estimated Base Radiological Decommissioning Cost by Resource Category**

Labor	[REDACTED]	\$119.8 Million (b)
Equipment, Materials and Supplies		\$24.9 Million
Fixed- Price Contracts, Services & Fees		\$55.5 Million
Radioactive Waste Packaging, Transportation & Disposal		\$84.1 Million
<b>Total (c)</b>		<b>\$284.3 Million</b>

165 [REDACTED]

- 166 (b) Includes contracted specialty labor costs  
 167 (c) Columns may not add due to rounding

168 A high level breakdown of the estimated radiological decommissioning cost, alternatively by  
 169 major project activity, is provided in Table 7-3.

170 **Table 7-3 Estimated Radiological Decommissioning Cost by Major Project Activity**

Major Component Removal	\$30.8 Million
Equipment and Structure Decontamination / Removal	\$63.8 Million
Waste Disposition	\$84.1 Million
Program Management and Support Services (excluding Final Status Survey and License Termination Activities)	\$75.7 Million
Final <del>Radiation-Status</del> Survey and License Termination Activities	\$8.0 Million
Other Lump-Sum Costs (e.g., regulatory fees, financing)	\$21.9 Million
<b>Total (a)</b>	<b>\$284.3 Million</b>

- 171 (a) Columns may not add due to rounding

172 A more detailed breakdown of the costs by resource requirements (e.g., labor, materials,  
 173 services, etc.) and by decommissioning activity (e.g., component removal, structural  
 174 decontamination, program support functions, waste management functions, etc.) are provided in  
 175 Tables 7-6 and 7-7 respectively.

176 The total estimated cost for radioactive waste disposition (containers, transportation and  
 177 disposal) is \$84.1 Million. As presented in Table 7-7, these waste management costs are  
 178 comprised of four distinct categories; Class A Large Components, Class B/C Waste, Class A  
 179 Containerized Wastes and Class A Bulk Materials. Costs for on-site handling of GTCC waste  
 180 (i.e., reactor vessel internals) are included in the “Major Component Removal” category shown



181 on Table 7-7. However, no costs for disposal of this waste is included in the estimate, as it is  
182 assumed that disposal of this waste will be included as a part of spent fuel disposition.

183 The project has in place a unique contracting approach for disposal of the resulting radioactive  
184 wastes that eliminates much of the cost uncertainty and waste volume estimation risk that is  
185 often associated with decommissioning projects. As such, the reported waste management costs  
186 are unlikely to vary due to waste volume uncertainties. The resulting radioactive waste streams  
187 and the disposal and transportation contracts that are in place can be categorized by the  
188 following:

189 7.2.3.1. Class A Large Components

190 This category of waste includes equipment that will be transported and disposed of intact,  
191 enclosed in rail cars or prepared to serve as its own waste container. These items have been  
192 radiologically and physically characterized. As such, the inventory of these items and their  
193 disposal volumes are known. The associated waste management costs are covered by existing  
194 fixed-price contracts with EnergySolutions. Therefore, the waste management costs for these  
195 items are well known and not likely to vary. [REDACTED]

196 [REDACTED]  
197 [REDACTED]  
198 [REDACTED]

199 7.2.3.2. Class A Bulk Materials

200 This category of waste primarily consists of concrete rubble or similar materials contaminated  
201 with very low levels of radioactivity (and large components described above). This material will  
202 be transported in covered gondola rail cars to the EnergySolutions disposal site in Clive, Utah.  
203 The cost for disposal and transportation of this material is covered by a fixed-price contract that  
204 covers any and all material of this type from this decommissioning project, without regard to the  
205 total mass or volume. Therefore, these costs are known and are unlikely to vary. This category of  
206 waste comprises > 95% of the total volume and mass and > 80% of the estimated waste  
207 management costs for all radioactive waste expected to be generated by this decommissioning  
208 effort. [REDACTED]

209 7.2.3.3. Class A Containerized Wastes

210 This category of waste primarily consists of material that will need to be packaged in strong-tight  
211 / Industrial containers, such as intermodals or steel boxes. Typically, this would include small  
212 pieces of contaminated equipment, pipe or debris which require containerization to meet DOT  
213 regulations or mitigate radiological handling concerns. This material will be transported by rail,  
214 for disposal at the EnergySolutions disposal site in Clive, Utah. [REDACTED]

215 [REDACTED]

216 7.2.3.4. Class B/C Waste

217 This category of waste is primarily composed of segmented pieces of the activated reactor  
218 internals and, to a much lesser extent, higher radioactivity level resins, filters, sludge and cutting  
219 fines. These materials will require packing in liners or high integrity containers, and transported

220 in shielded licensed transportation casks by truck to the Waste Control Specialists (WCS) facility  
221 in Andrews, Texas. The volume (or mass) of this waste material is well known, characterized,  
222 and will be generated from a limited set of reactor components. [REDACTED]  
223 [REDACTED] Disposal cost variability for this  
224 category of waste has been largely mitigated by established contractual terms in place with  
225 WCS.

#### 226 7.2.4. Spent Fuel Management Costs

227 *ZionSolutions* acknowledges that the costs to construct and operate an ISFSI (previously defined)  
228 and other spent fuel related management costs are not considered by the NRC staff as part of  
229 decommissioning costs. Nevertheless, as there is significant interest by many stakeholders in  
230 these costs, they are presented herein. As presented in Section 7.2.2 above, the estimated cost for  
231 the anticipated base work scope is \$37.4 Million. A contingency of \$3.3 Million was applied  
232 resulting in total spent fuel management costs of \$40.7 Million.

233 Overall, the spent fuel management work scope includes transfer of the remaining spent fuel to  
234 the ISFSI and operation of the ISFSI until termination of the reactor license, with the exception  
235 of the area bounded by the ISFSI, projected to take place in 2019.

236 Construction of the ISFSI was completed in April 2013 and spent fuel transfer operations were  
237 started by December 2013 with the first spent fuel cask being placed on the ISFSI in early  
238 January 2014. As of the end of September 2014, approximately 64% of the spent fuel has been  
239 transferred to the ISFSI, contained in 39 dry storage casks on the ISFSI pad. Note that spent fuel  
240 transfer was completed on January 10, 2015.

241 The estimated costs include the labor, equipment, materials, services, fees, and program support  
242 activities necessary to safely manage the spent nuclear fuel. ISFSI operational costs are  
243 estimated through mid-year 2019, when partial site release and the transfer of the site and ISFSI  
244 back to Exelon are expected, and subsequent management of the spent fuel is consistent with the  
245 Irradiated Fuel Management Plan for Zion under 10 CFR 50.54 (bb) (Ref 7-6). Exelon has  
246 provided a decommissioning funding plan to the NRC for the Zion ISFSI (Ref 7-7).

247 A high level breakdown of the estimated base spent fuel management cost, by major resource  
248 category, is provided in Table 7-4.

249

250 **Table 7-4 Estimated Base Spent Fuel Management Cost by Major Resource**

Labor	[REDACTED]	\$29.9 Million (b)
Equipment, Materials and Supplies		\$1.3 Million
Fixed- Price Contracts, Services & Fees		\$6.2 Million
Radioactive Waste Packaging, Transportation & Disposal		\$0
<b>Total (c)</b>		<b>\$37.4 Million</b>

251 [REDACTED]  
 252 [REDACTED]

253 (b) Includes contracted specialty labor costs  
 254 (c) Columns may not add due to rounding

255 A more detailed breakdown of the cost by resource requirements (e.g., labor, materials, services,  
 256 etc.) is provided in Table 7.8.

257 **7.2.5. Site Restoration Costs**

258 *ZionSolutions* acknowledges that the costs to restore the Zion Plant property are not considered  
 259 by the NRC staff as part of decommissioning costs. Nevertheless, there is significant interest by  
 260 many stakeholders in these costs and they are presented herein. The estimated cost for the  
 261 anticipated work scope is \$36.2 Million. A contingency of \$3.2 Million was estimated, bringing  
 262 the total to \$39.4 Million. Overall, that work scope includes removal of any remaining hazardous  
 263 materials, demolition of remaining structures, backfilling of any open excavations or void  
 264 spaces, and final grading and stabilization against erosion.

265 The estimated costs include the labor, equipment, materials, services and fees needed to conduct  
 266 the work. In general, most of this work is anticipated to be performed by contractors; however  
 267 the estimated cost also includes all of the program support activities and services necessary to  
 268 manage and safely carry out project.

269 A high level breakdown of the estimated site restoration cost, by major resource category, is  
 270 provided in Table 7-5.

271

272 **Table 7-5 Estimated Site Restoration Cost by Major Resource Category**

Labor	[REDACTED]	\$58.8 Million (b)
Equipment, Materials and Supplies		\$0.71 Million
Fixed- Price Contracts, Services & Fees		\$29.7 Million
Radioactive Waste Packaging, Transportation & Disposal		\$0
<b>Total (c)</b>		\$36.2 Million

- 273  
 274 (a) [REDACTED]  
 275 (b) Includes contracted specialty labor costs  
 276 (c) Columns may not add due to rounding  
 277

278 A more detailed breakdown of the cost by resource requirements (e.g., labor, materials, services,  
 279 etc.) is provided in Table 7.8.

280 **7.2.6. Contingency**

281 Uncertainty associated with the decommissioning cost estimate, and the need to allocate  
 282 additional funding to cover contingency for this project has been included in this estimate.  
 283 Accounting for contingency has been evaluated from two standpoints, operational efficiency and  
 284 scope expansion risk. Within the context of this cost estimate, operational efficiency contingency  
 285 is defined as the occurrence of events or circumstances that can prolong project duration or make  
 286 the execution of a given work scope more difficult. Examples of these types of events include  
 287 weather related delays, equipment or tool breakage or unavailability, and interferences from  
 288 other work activities. Scope expansion risk within the context of this estimate is defined as the  
 289 need to perform unplanned work activities or expansion of the work activities that were planned.  
 290 Examples of this type of project risk would be discovering new or additional contaminated media  
 291 requiring remediation, or a need to perform work in a different manner due to unforeseen  
 292 conditions or changes in requirements.

293 As was initially shown in section 7.2.2, contingency was estimated at \$31.1 Million; apportioned  
 294 as \$24.7 Million for radiological decommissioning, \$3.3 Million for spent fuel management and  
 295 \$3.2 Million for site restoration. This contingency was estimated using a quantitative Monte  
 296 Carlo type probability analysis, with the \$31.1 Million amount corresponding to the resulting 85  
 297 percent confidence level amount.

298 **7.3. Decommissioning Funding Plan**

299 As indicated in section 7.2, the estimated cost to complete the radiological decommissioning of  
 300 the Zion nuclear station, including contingency, is \$309 Million (year of expenditure dollars) as  
 301 of Sept 30, 2014. These decommissioning costs will be paid for with funds from the station's  
 302 nuclear decommissioning trust fund (NDT). Discounting those escalated costs at the rate of cost  
 303 inflation described in section 7.2.2 yields a cost of radiological decommissioning at constant  
 304 2014 dollars of [REDACTED].

305 The actual cash balance of the NDT, as recorded by the *ZionSolutions* trustee as of Sept 30,  
306 2014, was [REDACTED]. Recognizing that there were project costs incurred and recorded on  
307 Sept 30, 2014 that had not been paid for from the NDT (outstanding disbursements), plus other  
308 transactions in the last quarter of 2014 that have a bearing on these outstanding disbursements,  
309 the net balance of the NDT available to cover the future costs of radiological decommissioning  
310 was \$317.1 Million.

311 Based on a time phased cash flow analysis of the radiological decommissioning costs, and  
312 assuming NDT returns at an annual 2% real, after tax rate of return, the required minimum  
313 funding assurance amount to fund the future radiological decommissioning costs equals \$302.6  
314 Million, which is below the \$317.1 Million available balance described above.

315 This NDT position, together with *EnergySolutions* resources and the \$200 Million Letter of  
316 Credit backup for the NDT agreed with Exelon in the Zion Nuclear Power Station Unit 1 and 2  
317 Asset Sale Agreement, that are available but are not relied upon here, provides for sufficient  
318 funding and financial assurance for completion of radiological decommissioning of the Zion  
319 Project.

320 On or before March 31, 2015, as required by 10 CFR 50.75(f)(1) and 10 CFR 50.82(a)(8)(v)-  
321 (viii), *ZionSolutions* will be submitting the annual demonstration of financial assurance for the  
322 year ending Dec 31, 2014. That submission will be based upon future project costs of  
323 radiological decommissioning and the NDT balance as of that date.

324

325 **7.4. References**

- 326 7-1 Code of Federal Regulations, Title 10, Part 50.82, “Termination of License”
- 327 7-2 US Nuclear Regulatory Commission Regulatory Guide 1.179, Revision 1, “Standard  
328 Format and Content of License Termination Plans for Nuclear Power Reactors”, June  
329 2011
- 330 7-3 Letter from *ZionSolutions* ,LLC to the U.S. Nuclear Regulatory Commission,  
331 “Notification of Amended Post-Shutdown Decommissioning Activities Report (PSDAR)  
332 for Zion Nuclear Power Station, Units 1 and 2 in Accordance with 10 CFR 50.82(a)(7)”,  
333 dated March 18, 2008
- 334 7-4 Code of Federal Regulations, Title 10, Part 50.75, “Reporting and Recordkeeping for  
335 Decommissioning Planning”
- 336 7-5 Letter from Commonwealth Edison to the U.S. Nuclear Regulatory Commission,  
337 “Submittal of the Zion Nuclear Power Station Site-Specific Decommissioning Cost  
338 Estimate”, dated February 14, 2000
- 339 7-6 Letter from Commonwealth Edison to the U.S. Nuclear Regulatory Commission,  
340 “Submittal of the Zion Nuclear Power Station Irradiated Fuel Management Plan”, dated  
341 February 14, 2000
- 342 7-7 Letter from Exelon Generation to the U.S. Nuclear Regulatory Commission, “Proposed  
343 Independent Spent Fuel Storage Installation (ISFSI) Decommissioning Funding Plan for  
344 Zion”, dated October 17, 2013

345

346

347  
 348

**Table 7-6 Detailed Breakdown of Radiological Decommissioning Costs  
 by Resource Requirement**

<b>Labor:</b>	<b>TOTAL</b> [REDACTED]	<b>\$119.8 Million</b>
	Craft [REDACTED]	\$38.6 Million
	Technician [REDACTED]	\$14.3 Million
	Professional (Sci. & Eng.) [REDACTED]	\$36.8 Million
	Management [REDACTED]	\$18.1 Million
	Other - contract service labor [REDACTED]	\$11.9 Million
<b>Equipment &amp; Materials:</b>	<b>TOTAL</b>	<b>\$24.9 Million</b>
	Durable Equipment	\$5.3 Million
	Consumable Supplies	\$16.0 Million
	Utilities and Energy	\$3.6 Million
<b>Contracts, Services &amp; Fees:</b>	<b>TOTAL</b>	<b>\$55.5 Million</b>
	Equipment Rental	<\$0.1 Million
	Contracted Services	\$27.9 Million
	Laboratory & Analytical Services	\$1.8 Million
	Travel & Living	\$1.5 Million
	Insurance and Finance Fees	\$20.1 Million
	Licensee Fees & Permits	\$4.2 Million
<b>Radioactive Waste Packaging, Transportation &amp; Disposal:</b>	<b>TOTAL</b>	<b>\$84.1 Million</b>
	Class A Waste	[REDACTED]
	Class B/C Waste	[REDACTED]
<b>TOTAL</b>		<b>\$284.3 Million</b>

349 Columns may not add due to rounding

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**Table 7-7 Detailed Breakdown of Radiological Decommissioning Costs  
 by Decommissioning Activity**

<b>Major Component Removal</b>	<b>TOTAL</b>	<b>\$30.8 Million</b>
	Reactor Vessels and Internals	\$21.1 Million
	Steam Generators	\$9.0 Million
	Pressurizers	\$0.7 Million
<b>SSC Removal and Decontamination</b>	<b>TOTAL</b>	<b>\$27.2 Million</b>
	Equipment Removal / Structural Decontamination	\$18.4 Million
	Bulk Structural Material Removal	\$7.9 Million
	In-process Characterization and Remedial Action Support	\$0.9 Million
<b>Waste Management</b>	<b>TOTAL</b>	<b>\$84.1 Million</b>
	Class B/C Waste: Packaging, Transportation and Disposal Surveys and Sampling	██████████
	Class A Waste: Rail Car Preparation for Large Components	██████████
	Class A Bulk Waste: Rail Car Transportation and Disposal	██████████
	Class A Packaged Waste: Containers, Transportation and Disposal	██████████
<b>Program Management and Support Services</b>	<b>TOTAL</b>	<b>\$120.3 Million</b>
	Program and Project Management and Site Administration	\$32.1 Million
	Technical Services and Services- (e.g., Engineering, Rad. Protection, Environmental Monitoring, Site Characterization, Waste Mgmt, QA/QC, Safety, Worker Qualifications)	\$47.9 Million
	Security	\$7.7 Million
	Site O&M	\$4.9 Million
	Special Projects (Cold & Dark, Bld. Mods.)	\$8.5 Million
	Equipment, Materials, Consumable Supplies and Utilities	\$11.2 Million
	FSS, LT and Material Release Program	\$8.0 Million
	<b>Other Lump-Sum Costs</b>	<b>TOTAL</b>
Financing	\$9.8 Million	
Regulatory Fees	\$12.1 Million	
<b>TOTAL</b>		<b>\$284.3 Million</b>

353 Columns may not add due to rounding



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**Table 7-8 Detailed Breakdown of Spent Fuel Management Costs  
 by Resource Requirement**

<b>Labor:</b>	<b>TOTAL</b> [REDACTED]	<b>\$29.9 Million</b>
	Craft [REDACTED]	\$3.7 Million
	Technician [REDACTED]	\$1.5 Million
	Professional (Sci. & Eng.) [REDACTED]	\$3.7 Million
	Management [REDACTED]	\$1.8 Million
	Other (contract service labor, primarily security - exclusive of management) [REDACTED]	\$19.2 Million
<b>Equipment &amp; Materials:</b>	<b>TOTAL</b>	<b>\$1.7 Million</b>
	Durable Equipment	<\$0.1 Million
	Consumable Supplies	\$1.2 Million
	Utilities and Energy	\$0.4 Million
<b>Contracts, Services &amp; Fees:</b>	<b>TOTAL</b>	<b>\$5.8 Million</b>
	Equipment Related Services	\$1.3 Million
	Contracted Services (excluding security provided in labor above)	\$2.2 Million
	Laboratory & Analytical Services	<\$0.1 Million
	Travel & Living	<\$ 0.1 Million
	Insurance, Finance, Licensee and Permit fees	\$2.3 Million
<b>Radioactive Waste Packaging, Transportation &amp; Disposal:</b>	<b>TOTAL</b>	<b>\$0</b>
	Class A Waste	\$0
	Class B/C Waste	\$0
<b>TOTAL</b>		<b>\$37.4 Million</b>

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Columns may not add due to rounding

358 **Table 7-9 Detailed Breakdown of Site Restoration Costs by Resource Requirement**

<b>Labor:</b>	<b>TOTAL</b> [REDACTED]	<b>\$5.8 Million</b>
	Craft [REDACTED]	\$2.2 Million
	Technician [REDACTED]	\$0.16 Million
	Management and Professional (Sci. & Eng.) [REDACTED]	\$1.9 Million
	Other- contract service labor [REDACTED]	\$1.6 Million
<b>Equipment &amp; Materials:</b>	<b>TOTAL</b>	<b>\$1.2 Million</b>
	Durable Equipment	<\$0.1 Million
	Consumable Supplies	\$0.7 Million
	Utilities and Energy	\$0.5 Million
<b>Contracts, Services &amp; Fees:</b>	<b>TOTAL</b>	<b>\$29.2 Million</b>
	Equipment Rental	<\$0.1 Million
	Contracted Services	\$27.6 Million
	Laboratory & Analytical Services	<\$0.1 Million
	Travel & Living	<\$0.1 Million
	Insurance, Finance, Licensee & Permit fees,	\$1.6 Million
<b>Radioactive Waste Packaging, Transportation &amp; Disposal:</b>	<b>TOTAL</b>	<b>\$0</b>
	Class A Waste	\$0
	Class B/C Waste	\$0
<b>TOTAL</b>		<b>\$36.2 Million</b>

359 Columns may not add due to rounding

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