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Document Number: NK054-REP-01210-00109	Usage Classification: N/A
Retention: LOF	Revision: R000

Title:

**DNNP - SITE PREPARATION DECOMMISSIONING PLANNING LICENCE RENEWAL
ACTIVITY REPORT**


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**DNNP - Site Preparation
Decommissioning Planning Licence
Renewal Activity Report****NK054-REP-01210-00109-R000 LOF**


2019-11-04

Order Number: N/A
Other Reference Number:**Internal Use Only**

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Executive Summary

This report presents a review of Darlington New Nuclear Project (DNNP)'s licensing basis documents for decommissioning planning to determine if there are changes needed for the relicensing application. The DNNP's existing Power Reactor Site Preparation Licence (PRSL) will expire in August 2022, and OPG is seeking to renew the licence.

The review was focused on both site evaluation and site preparation of the current siting regulatory document REGDOC 1.1.1. As the technology for the new reactor has not yet been chosen, it is recognized that some information reviewed remains conceptual in nature. A systematic review has been performed following the methodology documented in the DNNP licence renewal plan [6].

For site evaluation, a compliance review of the previous licensing basis documents for decommissioning planning was performed to CSA N294-09 as required by REGDOC 1.1.1. The review used the two previously submitted PDPs (one for site preparation and one for end of operation) for the compliance review. The review identified only minor non-compliances noted for the existing PDPs against CSA N294, which can be resolved when the PDPs are updated as previously committed [13]. Thus, the licensing basis materials already submitted as part of the existing licencing basis documents are compliant with REGDOC 1.1.1 decommissioning planning requirements, and the conclusions of the existing site evaluation are deemed to be valid and appropriate. No further assessment for site evaluation decommissioning planning is required for the DNNP's PRSL renewal application.

For site preparation, a review was performed to determine the level of compliance of programs, procedures, and plans that make up the OPG Nuclear management system for the PRSL relicensing application in support of future site preparation activities. The review documented in this report determined the OPG Nuclear management system including interfacing programs for decommissioning planning is compliant with REGDOC 1.1.1 requirements. No further assessment for site preparation decommissioning planning is required for the DNNP licence renewal application.

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1.0 INTRODUCTION AND PURPOSE

Ontario Power Generation (OPG) currently maintains a Power Reactor Site Preparation Licence (PRSL) 18.00/2022 [1] for the Darlington New Nuclear Project (DNNP). To date, OPG has not initiated any licensed activities and has not selected a reactor technology.

While the PRSL expires in August 2022, OPG is seeking an early renewal, one year prior to its expiry date [2]. For this PRSL renewal, the project scope of DNNP as described in [3] remains unchanged.

The original application for the DNNP's PRSL was based on the CNSC RD-346 "Site Evaluation for Nuclear Power Plants" [4] which was replaced by REGDOC 1.1.1 "Site Evaluation and Site Preparation for New Reactor Facilities" [5] in 2018. The renewal application for the DNNP's PRSL will be assessed against REGDOC 1.1.1.

As part of the original licence application for the PRSL, OPG provided a Preliminary Decommissioning Plan (PDP) for site preparation [3]. Due to the update of the site evaluation regulatory requirements, a review is required to determine if the existing site evaluation conclusions (in this case the PDP) remain valid or if there are any gaps to be addressed for the licence application renewal, and that the existing OPG Nuclear management system including interfacing programs for decommissioning is in compliance with the modern codes, standards, and practices applicable to site preparation. A review of updated baseline data and its impact on decommissioning planning was not performed as it would be immaterial at this time given a reactor technology has not been selected. The new reactor design would take into account any necessary changes due to updated baseline data and thus would be included in decommissioning planning at that time.

2.0 SCOPE OF REVIEW

The DNNP's PRSL renewal plan [6] provides an overview of the systematic review required to ensure the licensing basis for the DNNP remains valid for the period following renewal. As the technology for the new reactor has not yet been chosen, some information will need to remain conceptual in nature. The review documented herein encompasses the decommissioning aspect of the DNNP licence renewal application and follows the systematic review methodology documented in the DNNP PRSL renewal plan [6].

The previous siting requirement (RD-346) has been superseded by REGDOC 1.1.1, therefore the previously submitted information needs to be assessed against the new requirements for both site evaluation and site preparation. The review will systematically evaluate the existing licensing basis documents (i.e. for decommissioning, this will be the PDPs) and the applicable OPG governing documents against the requirements in REGDOC 1.1.1 and the regulations, codes, standards, and guides referenced in REGDOC 1.1.1.

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2.1 Regulatory Requirement for DNNP PRSL Licence Renewal

REGDOC 1.1.1 provides the requirements and guidance for both site evaluation and site preparation for nuclear power plants. Decommissioning planning is included as one of the requirements in REGDOC 1.1.1. The major difference between the previous siting requirement in RD-346 and REGDOC 1.1.1 is the previous siting requirement only looked at decommissioning planning for the life cycle stage to be licenced (i.e. site preparation and construction), while REGDOC 1.1.1 requires evaluation of decommissioning planning for the entire life cycle of the facility (i.e. through to the end of operation). Specific requirements for each phase (i.e., site evaluation and site preparation) defined in REGDOC 1.1.1 are identified below.

2.1.1 REGDOC 1.1.1 Requirements for Site Evaluation

For site evaluation for decommissioning planning, Section 3.9 of REGDOC 1.1.1 requires:

“The site evaluation shall demonstrate how facility decommissioning at the end of the project is being considered in the overall lifecycle of the facility.”

Further, the following documents are listed as references for more information:

- G-219, *Decommissioning Planning for Licenced Activities* [7]
- CSA N294, *Decommissioning of facilities containing nuclear substances* [8]
- NEA/OECD *Decommissioning Considerations for New Nuclear Power Plants* [9]
- NEA/OECD, *Applying Decommissioning Experience to the Design and Operation of New Nuclear Power Plants* [10]
- IAEA TECDOC-1657, *Design Lessons Drawn from the Decommissioning of Nuclear Facilities* [11]

2.1.2 REGDOC 1.1.1 Requirements for Site Preparation

For site preparation for decommissioning planning, Section 4.11.2 of REGDOC 1.1.1 states:

“At site preparation, the applicant shall consider two areas of decommissioning:

- **site evaluation from a decommissioning perspective:** *the applicant shall demonstrate that the site evaluation process:*
 - *has appropriately considered future decommissioning in the planning for the nuclear facility*

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- *has adequately considered end-of-life decommissioning*
 - **activities encompassed by the licence to prepare site:** *a preliminary decommissioning plan and financial guarantee that cover the scope of work and related costs to return the site from the conditions expected at the end of a licence to prepare site to an agreed-upon end state (including, if the project is halted, restoration of the site to the original condition)”*

The following documents are listed for more information:

- G-219, *Decommissioning Planning for Licenced Activities* [7]
- CSA N294, *Decommissioning of facilities containing nuclear substances* [8]

2.1.3 Decommissioning requirements in the PRSL

The Site Preparation Licence PRSL 18.00/2022 [1] Section 8.2 requires:

“The licensee shall maintain a preliminary decommissioning plan for site preparation in accordance with the requirements of Canadian Standards Association (CSA) standard N294: DECOMMISSIONING OF FACILITIES CONTAINING NUCLEAR SUBSTANCES. The preliminary decommissioning plan shall be revised every five years or when required by the Commission, or persons authorized by the Commission.”

2.2 Additional Documented Commitments for DNNP

In addition to the regulatory requirements, OPG has also made commitments in the DNNP licence hearings, and recommendations have been made by the Joint Review Panel (JRP) and accepted by the Government of Canada (GoC) regarding the DNNP.

Table 1 provides an excerpt from the Licence Condition Handbook (LCH) of the JRP recommendation and the GoC response specific to decommissioning planning (LCH Appendix D [12]). This recommendation is captured in the DNNP commitments report [13].

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Table 1
Excerpt of JRP recommendation and GoC response for decommissioning planning.
From the LCH [12]

#	JRP Recommendation	Government of Canada Response
6	The Panel recommends that prior to site preparation, the Canadian Nuclear Safety Commission require OPG to update its preliminary decommissioning plan for site preparation in accordance with the requirements of Canadian Standards Association (CSA) Standard N294-09. The OPG preliminary decommissioning plan for site preparation must incorporate the rehabilitation of the site to reflect the existing biodiversity in the event that the Project does not proceed beyond the site preparation phase. OPG shall prepare a detailed preliminary decommissioning plan once a reactor technology is chosen, to be updated as required by the Canadian Nuclear Safety Commission.	The Government of Canada accepts the intent of the recommendation to require OPG maintain a preliminary decommissioning plan for site preparation in accordance with the requirements of CSA Standard N294-09, which provides direction on the decommissioning of licenced facilities and activities consistent with Canadian and international recommendations. The Government of Canada accepts the recommendation to require OPG to revise the preliminary decommissioning plan once a reactor technology is selected.

2.3 Documentation Available for Review to Demonstrate Compliance

The original DNNP site preparation licence application required a PDP to be submitted as part of the licensing requirements. As such, the site preparation PDP [14] was submitted with the licence application [3]. OPG was granted a site preparation licence for the Darlington New Nuclear Project and the licence [1], and the LCH [12], both list Canadian Standards Association (CSA) Standard N294-09 [8] as the regulatory requirement for decommissioning. As part of the Environmental Assessment, an end of operation PDP was included with the Environmental Impact Statement (EIS) submission [15, 16]. At the time of preparation of the PDP, CSA N294 was not yet in effect, so the site preparation PDP developed for the original PRSL was prepared using CNSC regulatory guidance document G-219 [7].

For the current review, where compliance cannot be shown directly from the available PDPs, other licensing basis documents, such as the licence application, submitted Environmental Assessment (including supporting documentation), formal correspondence, and current programs and associated procedures can be used to demonstrate compliance, where applicable.

3.0 REVIEW METHODOLOGY

The DNNP's PRSL renewal plan was reviewed to determine the assessment type, the level, and extent of review required for the decommissioning aspect for the licence renewal for both site evaluation and site preparation. For site evaluation, a high level

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compliance review of the existing licensing basis documentation to REGDOC 1.1.1 was performed [18]. This overall compliance review report was consulted, and additional requirements for a more detailed compliance review were identified in the DNNP's PRSL renewal plan [6]. The freeze date for the applicable current codes, standards and practices were those in effect on or before December 31, 2018 [6]. The goal of the site evaluation and site preparation compliance reviews is to determine if there are significant changes which have the potential to alter the conclusions for decommissioning planning of the Darlington New Nuclear Project and to ensure the OPG Nuclear management system can support future site preparation activities.

3.1 Site Evaluation Methodology

The DNNP's PRSL renewal plan [6] was consulted to determine the level of review identified for the site evaluation phase for decommissioning planning and the plan identifies a high level review is appropriate for DNNP decommissioning planning. A high level review is defined in the licensing plan as "An assessment conducted to establish the degree of conformance to the intent of a clause or groups of clauses of a current code, standard or practice." The identified standard for decommissioning is CSA N294-09 [8] and this standard has not been updated since the PRSL was issued.

The adoption of REGDOC 1.1.1 for the DNNP's PRSL renewal has brought in additional requirements [17]. Where previously RD-346 required only decommissioning planning for the site preparation phase, REGDOC 1.1.1 requires the site evaluation process to appropriately consider future decommissioning in the planning for the nuclear facility and adequately consider end-of-life decommissioning. As such, as part of the PRSL licence renewal compliance with REGDOC 1.1.1, preliminary decommissioning plans are needed for site preparation as well as end of operation. As part of the DNNP licence renewal project, a compliance assessment [18] was completed based on a gap assessment between RD-346 to REGDOC 1.1.1 [17]. The compliance assessment was reviewed to determine if there were compliance gaps between information submitted as part of the PRSL licence application, and the new siting evaluation standard REGDOC 1.1.1. This review was used to satisfy the requirement for a high-level review as require by the DNNP PRSL renewal plan [6].

The DNNP's PRSL renewal plan also identified that the standard for the DNNP decommissioning planning had not changed since the original application (i.e. CSA N294-09 [8]). However, it did identify that the previous submitted PDP [14] was compliant with the regulatory guide G-219 [7] as CSA N294 was not yet in effect at the time of PDP preparation. Therefore a CSA N294 compliance review to the life cycle PDPs (i.e. site preparation and end of operation PDPs) was performed and is documented herein. The review was performed to determine if there were any non-compliances, the significance level of the non-compliances, and propose disposition for non-compliances requiring resolution. Significance level of the non-compliances were determined by the criteria shown in Table 2. Major non-compliances would require either immediate update to the PDP, or would revision of the DNNP commitments report [13] to add the required material to the PDP. Thus the major non-compliances would be corrected immediately or identified and tracked for completion

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through the commitments report. Minor non-compliances or identified improvements would be recommended for incorporation when the PDP is updated per the DNNP commitments report [13] based on a low risk significance.

Table 2
Significance level criteria for CSA N294 compliance review of DNNP PDPs

Significance Level	Description	General Disposition
Major	<ul style="list-style-type: none">Decommissioning strategy not definedDemonstration of feasibility of decommissioning lackingWaste management not definedCost estimate lacking detail or absentAssessment of hazards lackingProtection provisions for workers, public, and the environment not defined	Identify for immediate update or add as update item to commitments document [13].
Minor	Items already part of OPG's Nuclear management system or other documentation, but not mentioned specifically in the text of the PDP. Items which are not time sensitive that can be added in future versions of the PDP without affecting current conclusions.	Identify for future update for PDP (per regular schedule or as committed [13]).

REGDOC 1.1.1 section 3.9 also identified 3 guidance documents as part of site evaluation for a new nuclear facility [9, 10, 11]. The licence plan identified these documents are referenced as supporting information for REGDOC 1.1.1 and require no further assessment as they are addressed adequately through G-219 and CSA N294. Thus, review of these guidance documents is not addressed in this report.

3.2 Site Preparation Methodology

A review was performed determine the level of compliance of programs, procedures, and plans that make up OPG's Nuclear management system to the codes, standards and practices in REGDOC 1.1.1 applicable to site preparation. As no site preparation activities have taken place to date, the review is required to determine the degree of conformance of OPG's Nuclear management system that will inform the future conduct of site preparation activities. For site preparation, REGDOC 1.1.1 identifies G-219 [7] and CSA N294-09 [8] as the required decommissioning planning documents for compliance.

The requirement for decommissioning planning in the PRSL is CSA N294-09 which is the current decommissioning standard reflected in the OPG nuclear site licences and

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the decommissioning program [19] and interfacing procedures. Thus the PRSL requirement for decommissioning is the current requirement for OPG's decommissioning program, and therefore is fully compliant with REGDOC 1.1.1.

4.0 REVIEW FINDINGS (CONFORMANCES AND POTENTIAL GAPS)

4.1 Site Evaluation

The compliance assessment performed for REGDOC 1.1.1. has identified that the licence materials already submitted for the PRSL site evaluation are compliant for decommissioning [18]. This meets the requirements in the licensing plan for a high level review.

The licence plan additionally identified the PDP was prepared to regulatory guidance document G-219, as this was the only guidance available at the time of PDP preparation. Therefore a compliance review to CSA N294-09 [8] was performed for the PDPs which document the decommissioning planning for the life cycle of the new nuclear facility and this review is documented in [20]. The PDPs are conceptual in nature as the technology has not yet been chosen. The review identifies that the PDPs were compliant with CSA N294, with only minor non-compliances identified. The findings of the review of the PDPs to CSA N294 are summarized in Table 3 and Table 4 and dispositions for the items identified are outlined. All non-compliances identified are dispositioned as minor in nature according to the significance level screening in Table 2. These non-compliances are standard items required by CSA N294 and will be addressed in the update to the PDP which has already been committed in [13].

The non-compliances for the PDPs can be grouped generally: updates are needed due to the changes in the DNNP schedule (see [6]) and changes to the interfacing regulations, codes, standards, and guidance referenced by CSA N294-09 since the PDPs were produced. Updates of this nature are regular update items already captured in CSA N294 and OPG's Decommissioning Program [19] governance and associated standards, thus this is a minor non-compliance. Another general non-compliance is some items that are required by CSA N294 are not documented in the PDPs, however the required information is located in other documents (e.g. licence submissions) or are already part of the Decommissioning Program [19] as expressed through governance and the associated standards. As the information is available, these were considered minor items that can be addressed on the next update of the PDPs. Another non-compliance was also noted for identifying requirements for surveys at the time of decommissioning. Since these activities are scheduled far in the future, the deficiency was noted as minor in nature and will be addressed in future updates of the PDPs as these are standard items required by CSA N294.

Thus for site evaluation, the licensing basis materials already submitted are compliant with REGDOC 1.1.1 requirements and the conclusions of the existing site evaluation for decommissioning planning are deemed to be valid and appropriate.

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**Table 3
Items identified on compliance review of DNNP Site Preparation PDP [14].**

Site Preparation PDP			
Section in CSA N294-09	Requirement in CSA N294-09	Compliance gap identified	Disposition
4.1.1	Decommissioning activities shall be executed in accordance with relevant regulations and standards and in keeping with relevant guides. Responsibility for the funding of the decommissioning shall be identified.	Update for current guides, regulations, and standards. Could more clearly state in the PDP that OPG is responsible for funding.	To be addressed in update to PDP [13]. OPG's funding responsibility is clearly declared in [21]. To be addressed in update to PDP [13].
8.2.4.2	At the completion of a decontamination or dismantling task or work package, a survey shall be performed to demonstrate that the planned end state has been achieved.	Not specifically identified as a survey.	To be included in update to PDP [13].
9.2.3	For nuclear facilities, the final end-state report shall be filed with the CNSC to demonstrate that the final end state has been achieved in accordance with the DDP and regulatory requirements.	Does not specifically address submission of final end state report to the regulator.	Included in OPG's Decommissioning Program governance documents [19]. To be addressed in update to PDP [13].
Section in non-mandatory CSA N294-09 Annex A			
A.2 (e)	a decommissioning work plan, including ... (vi) a conceptual schedule showing the approximate year of facility shutdown and the approximate sequencing and duration of the decommissioning work packages and, where relevant, storage periods;	Update for current scheduled required. See [6].	To be addressed in update to PDP [13].
A.2 (h)	the cost and a financial guarantee, specifying: ... (iii) a description of how the required funds will be provided;	Same as item 4.1.1.	OPG's funding responsibility is clearly declared in [21]. To be addressed in update to PDP [13].

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Table 4
Items identified on compliance review of DNNP End of Operation PDP [15].

End of Operation PDP			
Section in CSA N294-09	Requirement in CSA N294-09	Compliance gap identified	Disposition
4.1.1	Decommissioning activities shall be executed in accordance with relevant regulations and standards and in keeping with relevant guides. Responsibility for decommissioning shall be clearly established throughout the life cycle of a facility. Responsibility for the funding of the decommissioning shall be identified.	Next review, update for current guides, regulations, and standards. Could more clearly state that OPG is responsible for decommissioning throughout the life cycle. Could more clearly state in the PDP that OPG is responsible for funding.	To be addressed in update to PDP [13]. Responsibility for decommissioning is implied. Could more clearly state that OPG is responsible for decommissioning. To be addressed in update to PDP [13]. OPG's funding responsibility is clearly declared in [21]. To be addressed in update to PDP [13].
7.1	Preparation for decommissioning shall include... (a) an assessment of the records from the previous life-cycle phases and the state of the facility (e.g., baseline configuration) at the time of shutdown;...	Assessment of records not stated explicitly.	To be addressed in update to PDP [13].
8.4	Where decommissioning of the facility is to take place in discrete phases, an interim end-state report shall be prepared when each planned interim end state is achieved.	Does not explicitly identify interim end state report to be produced.	Included in OPG's Decommissioning Program governance documents [19]. To be addressed in update to PDP [13].

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End of Operation PDP			
Section in CSA N294-09	Requirement in CSA N294-09	Compliance gap identified	Disposition
9.2.3	<p>Following the completion of decommissioning, a final end-state report shall be prepared and retained.</p> <p>For nuclear facilities, the final end-state report shall be filed with the CNSC to demonstrate that the final end state has been achieved in accordance with the DDP and regulatory requirements.</p> <p>Where a decommissioning program involves completing a number of separately approved decommissioning projects, interim end-state reports shall be submitted for each project.</p>	Documentation of interim and/or final end state reports and submission to the regulator not stated explicitly.	Included in OPG's Decommissioning Program governance documents [19]. To be addressed in update to PDP [13].
11.1	Decommissioning records shall include, as applicable, ...	Documentation requirements not stated explicitly.	This pertains to records following the completion of decommissioning. Records requirements are part of OPG's Decommissioning Program documents [19]. To be addressed in update to PDP [13].
Section in non-mandatory CSA N294-09 Annex A			
A.2 (e)	a decommissioning work plan, including... (vi) a conceptual schedule showing the approximate year of facility shutdown and the approximate sequencing and duration of the decommissioning work packages and, where relevant, storage periods;	Update for current scheduled required. See updated schedule in [6].	To be addressed in update to PDP [13].
A.2 (j)	a commitment to periodically review and update the PDP until a DDP is prepared...	Periodic update of PDP is not explicitly stated.	Periodic review requirements are licence condition [1], and a requirement OPG's decommissioning program documents [19]. To be addressed in update to PDP [13].

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End of Operation PDP			
Section in CSA N294-09	Requirement in CSA N294-09	Compliance gap identified	Disposition
A.2 (I)	the records required for decommissioning, including a description of the facility operational records that will be maintained to periodically update the PDP and prepare the DDP(s); ...	Does not explicitly address records requirements.	Records requirements are part of OPG Nuclear management system and decommissioning program documents [19]. To be addressed in update to PDP [13].

4.2 Site Preparation

The compliance assessment against REGDOC 1.1.1. has identified that the licence materials already submitted for the PRSL site preparation are compliant for decommissioning [18]. In regards to decommissioning planning, the compliance assessment identifies OPG has completed a preliminary decommissioning plan, and the PDP provides a cost estimate for decommissioning as included in the guidance for Clause 4.11.2 in REGDOC-1.1.1. In addition, Section 1.6 of licence application [3] provides a summary of OPG’s proposed decommissioning plan. This section also states that a financial guarantee from OPG to CNSC is not required, as OPG has substantial financial assets that would support the cost of decommissioning at the conclusion of site preparation activities, if warranted. Chapter 12 of the EIS [15] provides a preliminary decommissioning plan inclusive of end-of-life activities such as safe storage, dismantling, disposal and site restoration. Therefore, these documents demonstrate compliance with Clause 4.11.2 of REGDOC-1.1.1 and meet the requirement for a high level review per the licence plan [6].

Additionally, the requirement for decommissioning in the PRSL is CSA N294-09 which is the current decommissioning standard reflected in the OPG nuclear site licences and the decommissioning program [19] governance and interfacing procedures. Thus, the PRSL requirement for decommissioning is the current requirement for OPG’s decommissioning program, and therefore is fully compliant with REGDOC 1.1.1.

Subsequent to the PRSL licence application and the granting of the licence to prepare the site, OPG recently sent a correspondence in 2017 to re-affirm the DNNP PDP [22]. The CNSC responded that the decommissioning plan was acceptable in September 2018 [23].

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5.0 OVERALL ASSESSMENT AND CONCLUSIONS

5.1 Site Evaluation

The goal of this review was to determine if there are significant changes needed for DNNP's PRSL renewal application based on the compliance review of the previous licensing basis documents for decommissioning planning. The review documented in this report has identified only minor non-compliances noted for the existing PDPs against CSA N294, which can be resolved when the PDPs are updated as previously committed [13]. Thus, the licensing basis materials already submitted as part of the existing licensing basis documents are compliant with REGDOC 1.1.1 decommissioning planning requirements and the conclusions of the existing site evaluation are deemed to be valid and appropriate. No further assessment for site evaluation decommissioning planning is required for the DNNP licence renewal application.

5.2 Site Preparation

The goal of this review was to determine the level of compliance of programs, procedures, and plans that make up the OPG Nuclear management system for the PRSL relicensing application which will support future site preparation activities. The review documented in this report determined the OPG Nuclear management system including interfacing programs for decommissioning planning is compliant with REGDOC 1.1.1 requirements. No further assessment for site preparation decommissioning planning is required for the DNNP licence renewal application.

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