Office for Nuclear Regulation

INTERVENTION RECORD			
Unique Document ID and Revision No:	ONR-SZB-IR-15-054 Rev 0	**TRIM Ref:**	2015/275820
Location and purpose of Intervention:	Sizewell B Power Station ONR readiness / compliance inspection in support of permissioning Dry Fuel Store Safety Case Stage Submission 1 Rev 1 covering Fuel Selection and Human Factors		
Inspector(s) taking part in Intervention:	[redacted]		
Date(s) of Intervention:	28 and 29 July 2015		

PRINCIPAL STAFF SEEN

The roles of principal staff seen, including those from licensees or other government departments (for example, the Environment Agency) seen during the visit

Record Section	Organisation	Role	Name
All	EDF Energy Nuclear Generation Ltd	[redacted]	[redacted]
	AMEC	[redacted]	[redacted]

(A) SYSTEM / STRUCTURES BASED INSPECTION RATINGS

Complete this section only where a System / Structures Based Inspection takes place. If Licence Condition not applicable, enter "n/a"

Record Section	System / Structures Based Inspection Details	Plan Name	Licence Condition (LC)	Rating	P/RUP*
Overall judgement that the System / Structure adequately fulfils the requirements of the safety case. Please delete “Yes” or "No" in the box provided as applicable.					

SECURITY CLASSIFICATION (delete or add as required)

* P = planned, RUP = reactive unplanned

(B) INTERVENTION RATINGS

Complete this section only where applicable, e.g. for a compliance inspection or assessment where the duty holder's arrangements are being rated. If not applicable, enter "n/a". Complete Part A in respect of System / Structures Based Inspection

Record Section	Intervention Details	Plan Name	LC / Series Code	Rating	P / RUP*
2.1	Dry Fuel Store Project	Sizewell B IP	10	3	P
2.1	Dry Fuel Store Project	Sizewell B IP	12	3	P
2.2	Dry Fuel Store Project	Sizewell B IP	21	2	P
2.3	Dry Fuel Store Project	Sizewell B IP	24	3	P
2.4	Dry Fuel Store Project	Sizewell B IP	26	3	P

* P = planned, RUP = reactive unplanned

(C) INTERVENTION RATINGS - (FOR USE ONLY BY CNS & CROSS ONR PROGRAMMES)

Complete this section only where applicable for a Security/Transport/Safeguards/Conventional Safety/Fire Inspection. If not applicable, enter "n/a". Complete Part A in respect of System / Structures Based Inspection, if applicable.

Record Section	Intervention Details	Plan Name	Series Code	Rating	P / RUP*

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SECURITY CLASSIFICATION (delete or add as required)

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1 EXECUTIVE SUMMARY

1.1 Purpose of Intervention

1. This Office for Nuclear Regulation (ONR) inspection was carried out to support ONR's assessment and evaluation of EDF Energy Nuclear Generation Ltd (EDF Energy) effectiveness in implementing the Sizewell B Dry Fuel Store Safety Case, NS/NP 7575, EC 338898S, Stage Submission 1 Revision 1 (SS1 Rev 1).

1.2 Interventions Carried Out by ONR

2. This inspection targeted EDF Energy's irradiated fuel selection and sentencing arrangements for dry storage of fuel and was focussed on fuel integrity evaluation and, given the complexity of the tasks involved, Human Factors interactions. The inspection built on ONR's assessment work undertaken on SS1, Rev 1 and addressed the following Licence Conditions (LC):

LC10: Training;
LC12: Duly Authorised and Suitably Qualified and Experienced Persons;
LC21: Commissioning;
LC24: Operating Instructions; and
LC26: Control and Supervision of Operations.

1.3 Explanation of Judgement if Safety System Not Judged to be Adequate

3. This was not a planned Safety System Inspection and so no judgement was made.

1.4 Key Findings, Inspector's Opinions and Reasons for Judgements Made

4. Overall, this inspection had a positive outcome providing ONR specialist Inspectors with evidence to support ONR's assessment conclusion that fuel selection and sentencing was adequate and that identified risks of loading incorrect or damaged fuel had been adequately mitigated through appropriate administrative controls.

5. However, the ONR Human Factors inspector was of the opinion that EDF Energy had missed opportunities to develop / strengthen its case by not having involved ONR Human Factors specialists earlier in the development of its equipment and documentation.

6. Out of the five LCs inspected for compliance, four were rated as 'adequate' given that the evidence presented by EDF Energy was judged to adequately meet ONR's guidance and standards. Some opportunities for improvement were identified which EDF Energy was aware of and actively pursuing. A rating of 'good' was given for LC21 compliance given that EDF Energy's approach to validating fuel element decay burn-up values employed determination by two methods: bespoke software and manual evaluation from tables. This approach was considered robust and demonstrated a level of defence-in-depth to the process.

1.5 Conclusion of Intervention

7. The inspection had a positive outcome with EDF Energy clearly having demonstrated a structured and methodical approach to irradiated fuel selection and sentencing for dry storage. The ONR Dry Fuel Store Project inspectors did however note and stress EDF Energy's need to maintain vigilance on safety document production and delivery of training given the continuing time pressures on the Dry Fuel Store project. Consequently, there is a need to ensure that the individual parts of the project are completed to the required quality and standard so that inactive commissioning of the Dry Fuel Store may be carried out effectively.

1.6 Recommendations

8. No recommendations were identified from this inspection.

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2 RECORD

1. This is one of a series of inspections undertaken to support ONR's assessment and permissioning activities of the Sizewell B Dry Fuel Store project. EDF Energy has presented its safety arguments and justifications in the Sizewell B Category 1 Safety Case Dry Fuel Store Operations, NS/NP 7575, EC 338898, Stage Submission 1 Revision 1 (SS1 Rev 1).

2. This inspection was structured to build on work to date in ONR's assessment work of SS1 Rev 1, targeting the irradiated fuel selection and sentencing process for placing fuel element into dry storage for a potential duration of up to 100 years.

3. The evidence gathered from this inspection will support ONR's decision for issuing a Licence Instrument Approving new Sizewell B limits and conditions identified in the interest of safety under Licence Condition (LC) 23: Operating Rules, and Consent under LC 21: Commissioning to allow commencement of active commissioning. The regulatory strategy and approach is set out in ONR letter Unique Reference SZB 76445R, sent to Sizewell B 10 November 2014 (TRIM Ref 2014/402097) and ONR Sizewell B Dry Fuel Store Project Assessment Scope Document issued 16 February 2015 (TRIM Ref 2015/59515) respectively.

4. ONR Inspection Commentary Document (TRIM Ref 2015/277221) was issued to EDF Energy before this inspection to allow Sizewell B Dry Fuel Store Project team to prepare for the intervention. This identified the purpose, scope and inspection activities to be undertaken.

5. The actual inspection was structured around three elements:

   - EDF Energy initially gave a series of presentations and supporting material on how irradiated fuel selection and sentencing for dry storage would take place. This was based on Station's documentation: commencing with Nuclear Safety Requirements (NSRs) and following down through Limiting Conditions of Operation (LCO); Surveillance requirements and Station / Plant Operating Instructions (SOIs) and (POIs).
   - A plant walk-down of the Fuel Building was undertaken to confirm fuel selection inspection and movement process.
   - The inspection concluded with a detailed technical review and discussion of identified ONR assessment observations from SS1 Rev 1 and information provided by EDF Energy during this inspection.

6. ONR Inspection standards applied during this intervention for judging the adequacy of EDF Energy compliance with safety case and LC requirements were based on ONR's Safety Assessment Principles for Nuclear Facilities, 2014 Edition Revision 0 and ONR Technical Inspection Guides for LCs inspected against.

7. Specialist Inspectors provided additional information in support of this inspection through Inspection Notes (Fuel Selection recorded under TRIM Ref 2015/277251 and Human Factors recorded under TRIM Ref 2015/277254). This information was used to support assessments of SS1 Rev 1.

8. The ONR Specialist Inspectors (Fuel and Human Factors) considered that evidence presented by EDF Energy during this inspection supported their assessment findings of SS1 Rev 1. Safety concerns and risks from potential error traps in the selection and sentencing of irradiated fuel for dry storage were adequately evaluated and suitable and sufficient controls were in place.

9. Throughout this inspection I (ONR Dry Fuel Store Project Inspector) noted that most documentation presented was still identified as Draft and had not gone through EDF Energy's formal validation process. In my opinion this is an area of concern given project timescales. I would have anticipated that EDF Energy should have formalised its approach by now. EDF Energy countered this view on the grounds that active

commissioning was not scheduled to take place until the end of January 2016 and that there was sufficient time to approve and have all documentation in place.

2.1 LC10: Training

10. I have given an inspection rate of Adequate for LC10 based on all Sizewell B Nuclear Safety Group (NSG) staff have attended the Westinghouse Cask Works training course. Cask Works is proprietary software produced by Westinghouse for the selection of irradiated fuel element for Dry Storage within Multi-Purpose Container (MPC).

11. EDF Energy stated that all NSG staff are Suitably Qualified and Experienced Persons (SQEP) in Cask Works given this Westinghouse training. EDF Energy justify this claim given NSG staff experience in the use of Shuffle Works which is another Westinghouse software package used for the management of fuel elements stored within the station cooling pond. Both applications share a common platform and are used together in carrying out Dry Fuel Store MPC packing.

12. EDF Energy reported that their Sizewell B Site training course database was being updated to include Westinghouse Cask Works training. Role proficiency graphs for NSG staff had been updated to identify these staff members as trained in Cask Works. EDF Energy intends to develop it own Cask Works training course based on training material provided by Westinghouse. An EDF Energy mentoring guide for Cask Works was being developed by Sizewell B NSG team to allow new staff to be trained in the use of Cask Works.

12.2 LC12: Suitably Qualified and Experienced Persons

13. In reviewing EDF Energy's arrangements for demonstrating personnel as SQEPed to carry out irradiated fuel selection and sentencing and verification of documentation I have given an inspection rating of Adequate for LC12. This is based on all NSG staff completing the Westinghouse Cask Works training and all being proficient in Shuffle Works. They are competent in the irradiated fuel selection and sentencing procedure developed by EDF Energy given that they were instrumental in developing the process to be applied.

14. In the case of verification of fuel selection documentation I consider NSG staff are SQEPed to carry out this role given their understanding of the process. EDF Energy confirmed an NSG individual would not verify their own work and that the Reactor Control Room Supervisor (in this particular case Work Exaction Centre (WEC) Duly Appointed Person (DAP)) would give final approval of fuel selection documentation.

15. EDF Energy has developed a Training Matrix to identify all personnel involved in Dry Fuel Store operation and their training needs. In the case of Fuel Selection the WEC DAP will receive overview training of Tech Spec requirements and fuel selection process. This training will also be given to the Fuel Route DAP given their role in signing off Station Operating Instruction (SOIs) for Dry Fuel Store operations. The production and approval of irradiated fuel selection and sentencing documentation is an identified hold-point within SOI Dry Fuel Store procedure.

2.3 LC21: Commissioning

16. I have given an inspection rating of 'good' standard for LC21 for the work of EDF Energy's Sizewell B NSG team in validating Cask Works computer code for calculating decay heat burn up values for irradiated fuel elements and the independent check based on FISPIN computer code analysis.

17. EDF Energy qualify Cask Works software by forcing it to select 168 fuel elements identified as meeting Dry Fuel Store requirements and comparing these results with values calculated from FISPIN. Both Cask Works and FISPIN calculations use the same fuel performance data held in EDF Energy's PANTHER database. The

calculated decay heat burn-up values from both Cask Works and manual table analysis using FISPIN were shown to be within acceptable limits.

2.4 LC24: Operating Instructions

18. I have given an inspection rate of Adequate for LC24 based on a clear line of sight from Dry Fuel Store NSRs through to LCO, Surveillance Technical Instructions and POIs; with SOIs used to controlled procedural steps. I have also noted that most of these documents are still in DRFAT and have not gone through EDF Energy's verification process which would alleviate the time pressure on the Dry Fuel Store project.

19. NSRs for Dry Fuel Store operations are detailed in section 3.9 Fuel Storage & Movement under clauses (b) and (c) and establish the following conditions and limits:

    b) MPC shall not be transferred out of the Fuel Building if it contains fuel rods that have been determined as **FAILED** or fuel assemblies that have been determined as **NON RETRIEVABLE**.
    c) The assessed decay heat emitted by the contents of an MPC shall not exceed 26 kW.

20. Dry Fuel Store LCO 3.9.1 established parameters for identified NSR conditions and limits, with Surveillance Technical Test procedure STT-KE-005 (Dry Fuel Store MPC Loading) detailing Technical Instruction to be followed confirm conditions and limits have been met. Surveillance Technical Instruction SZB/TNDI/098 details process to be carried out in evaluating irradiated fuel structural integrity from information held on Fuel Element Database. POI-KE106 details visual inspection requirements of fuel carried out in the cooling pond before loading. Other POIs have been developed for establishing Caesium level in MPC water and Krypton concentration in Helium gas when MPC is sealed and dried. SOI 9.2.4 Fuel Component Movement in Fuel Storage Pond and SOI 9.3.2 are used to control activities and have identified hold points to confirm LCO parameters and ultimately NSR conditions and limits have not been breached.

2.5 LC26: Control and Supervision of Operations

21. I have given an inspection rate of Adequate for LC26 on the grounds that throughout procedures hold points are identified requiring independent verification involving checking documentation to confirm no errors have occurred. All checks carried out will be undertaken by SQEPed individuals in line with EDF Energy procedures.

22. I challenged EDF Energy on the level of supervision applied to the irradiated fuel selection and sentencing process as there was no clear involvement by senior management. EDF Energy responded that the same level of rigor has been applied to the Dry Fuel Storage process as for reactor core refuelling. An over-arching Quality Plan will follow the Dry Fuel Store process requiring senior management sign off for identified stages. This will require senior management sampling of activities to ensure compliance and quality standards have been met.

2.7 Conclusion

23. I consider EDF Energy has produced an adequate process for the selection and sentencing of irradiated fuel for dry storage operation which aligns with requirements set out in the Dry Fuel Store safety case SS1 Rev 1.

24. It is my opinion that the Dry Fuel Store project team need to complete formal verification of all Dry Fuel Store procedures and training requirements before inactive commissioning commences. The Dry Fuel Store Project and Commissioning Managers noted this concern and will monitor this through the Dry Fuel Store Operational Control Centre daily progress brief.

SECURITY CLASSIFICATION (delete or add as required)

3 ISSUES

3.1 Issues Raised

No	Issue Title	Category	Issue Level	Licensee/Duty Holder Role	Owner (Inspector)	Completion /Review Date
	No Issues Raised					

3.2 Issues Closed

No	Issue Title	Category	Issue Level	Licensee/Duty Holder Role	Owner (Inspector)	Completion /Review Date
	No Issues Closed					

RECORD APPROVAL, SIGN-OFF AND ISSUE

RECORD APPROVAL AND SIGN-OFF

Note: Documents must be finalised on TRIM when signed-off / approved for issue.

Revision	Name	Responsibility	Executive Summary Approved	Date
0A	[redacted]	[redacted]		31 July 2015
0	[redacted]	[redacted]	[redacted]	3 August 2015

VERSION CONTROL

Revision	Date	Description of Change
0A	31 July 2015	Draft
0	03 August 2015	Issued for approval of Executive Summary

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CIRCULATION LIST

Electronic copy unless stated otherwise, e.g. if enforcement action is being considered hard copy records may be needed

Organisation	Name / Responsibility	Date
Office for Nuclear Regulation	[redacted] TRIM Folder 4.4.2.11112.	03/08/2015
Other Government Agencies Environment Agency Nuclear Decommissioning Agency	[redacted]	
EDF Energy NGL Sizewell B	[redacted]	

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