



ONR GUIDE			
LC 30 – Periodic Shutdown			
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1 INTRODUCTION

- 1.1 Many of the licence conditions attached to the standard nuclear site licence require, or imply, that licensees should make arrangements to comply with regulatory obligations under the conditions. ONR inspects compliance with licence conditions, and also with the arrangements made under them, to judge the suitability of the arrangements made and the adequacy of their implementation. Most of the standard licence conditions are goal-setting, and do not prescribe in detail what the licensees' arrangements should contain; this is the responsibility of the duty-holder who remains responsible for safety. To support inspectors undertaking compliance inspection, ONR produces a suite of guides to assist inspectors in making regulatory judgements and decisions in relation to the adequacy of compliance, and the safety of activities on the site. This inspection guide is one of the suite of documents provided by ONR for this purpose.

2 PURPOSE AND SCOPE

- 2.1 The purpose of this guidance is to facilitate a consistent approach to LC 30 compliance inspection and to provide assistance to inspectors while carrying out their duties in this area. The guidance should not be regarded as either comprehensive or mandatory.
- 2.2 The guidance provided is split into four main elements:
- 1) purpose of the licence condition;
 - 2) guidance on arrangements for LC 30;
 - 3) guidance on inspection of arrangements; and
 - 4) guidance on inspection of implementation of arrangements.

3 LICENCE CONDITION 30

LC 30: PERIODIC SHUTDOWN

- 30(1) When necessary for the purpose of enabling any examination, inspection, maintenance or testing of any plant or process to take place, the licensee shall ensure that any such plant or process shall be shut down in accordance with the requirements of its plant maintenance schedule referred to in condition 28.
- 30(2) Notwithstanding paragraph (1) of this condition ONR may agree to an extension of a plant's operating period.
- 30(3) The licensee shall, if so specified by the Executive, ensure that when a plant or process is shut down in pursuance of paragraph (1) of this condition it shall not be started up again thereafter without the consent of ONR.

4 PURPOSE OF LICENCE CONDITION 30

- 4.1 The purpose of LC 30(1) is to ensure that, where it is necessary to do so, a licensee periodically shuts down plant in order to carry out any LC 28 requirements that require plant to be out of service.
- 4.2 LC 30(2) allows ONR to agree to an extension of the period between such regular shutdowns.
- 4.3 Where a specification under LC 30(3) has been issued and ONR has to formally consent to the restart, this consent will only be given when the licensee has satisfied both itself and ONR that the plant may be safely started up and safely operated until the next periodic shutdown.

5 GUIDANCE ON ARRANGEMENTS FOR LC 30

- 5.1 This licence condition does not formally require the licensee to make and implement adequate arrangements, but to effectively comply with this condition we would expect the licensee to have established arrangements or procedures which ensure that the requirements of the condition are met and, in the interests of economy and efficiency, to have established consistent and effective procedures and practices well known to its managers and the regulator.
- 5.2 The arrangements should identify plant or processes which it is necessary to shut down to carry out examination, inspection, maintenance and testing required by the maintenance schedule. The arrangements should ensure that all such maintenance schedule activities, and other safety related activities or requirements are systematically identified, planned, actioned, reviewed and recorded.
- 5.3 In the case of operational reactors and certain facilities at Sellafield, ONR has specified under LC 30(3) that when a plant or process is shut down pursuant to LC 30(1), it shall not be started up again thereafter without the consent of ONR.
- 5.4 In such cases, arrangements should define the process for obtaining LC 30(3) consent from ONR prior to start-up of the system or process which had been shut down in accordance with LC 30(1). Those arrangements should articulate key milestones that are associated with obtaining consent for return to service. These are addressed below in section 6.
- 5.5 In the case of currently operational reactor power stations, the associated plant maintenance schedules require that the licensee undertakes periodic shutdowns with interval no greater than three years.
- 5.6 Should the licensee wish to extend its operating interval, as defined within the plant maintenance schedule, its arrangements should reflect the requirement for agreement to be sought from ONR in accordance with LC 30(2). Those arrangements should define the process for seeking agreement from ONR for extending the operating period between shutdowns. These should include a requirement to provide an adequate safety justification.
- 5.7 In the case of operational reactor power stations, ONR has also approved part of the maintenance schedule referred to as the 'preface' under LC 28(4). In such cases the preface specifies the duration of operation between periodic shutdowns. Therefore, should the licensee wish to permanently amend such an interval, as defined within the preface, its arrangements should reflect the requirement for an approval to be sought from ONR in accordance with LC 28(5) as set out within NS-INSP-GD-028.

6 GUIDANCE ON INSPECTION OF ARRANGEMENTS FOR LC 30

- 6.1 In relation to the licensee's preparedness ahead of a periodic shutdown, check that the arrangements ensure that:
- 1) the persons responsible for the overall control of the periodic shutdown and for the orderly release, isolation, de-isolation, testing and return to service of plant systems are identified and Suitably Qualified and Experienced (SQEP) for their duties;
 - 2) in instances where ONR has issued a specification under LC 30(3) that a plant or process shall not be started up again thereafter without the consent of ONR;
 - 3) an outage plan or similar document should be produced. This should identify the maintenance schedule work and any other safety-related work to be carried out during the periodic shutdown and should be submitted to ONR in a timely fashion ahead of the shutdown in order that ONR can accurately plan its inspection programme;
 - 4) any proposal to permanently amend an operating interval, as defined within the plant maintenance schedule, is notified to ONR with sufficient time for consideration, assessment and agreement; any change to an interval declared within the maintenance schedule preface will require approval by ONR in accordance with LC 28(5) as set out within NS-INSP-GD-028;
 - 5) any proposed derogation to a plant maintenance schedule requirement during the periodic shutdown is notified to ONR with sufficient time for consideration, assessment and agreement;
- 6.2 In relation to activities undertaken during a periodic shutdown, check that the arrangements ensure that:
- 1) minimum levels of diversity and redundancy are maintained when plant is isolated and that those plant are protected through appropriate delineation;
 - 2) appropriate quality plans are developed for all safety related activities and subject to appropriate audit arrangements;
 - 3) periodic shutdown activities are subject to effective control and supervision with rigorous arrangements governing the release of operational plant to maintenance teams;
 - 4) contractor personnel undertaking invasive plant activities are subject to commensurate rigour of control and supervision to licensee personnel;
 - 5) ALARP radiation dose assessments are carried out covering periodic shutdown activities;
 - 6) an effective process is in place for screening, classifying and prioritising incidents occurring during the periodic shutdown to ensure early shortfalls in standards are corrected.
- 6.3 Ahead of submitting a request for consent to return the process or plant to service, check that the arrangements ensure that:
- 1) there is an agreed schedule of interactions with the ONR site or project inspector such as periodic shutdown review meetings and the formal start-up meeting.
 - 2) there is appropriate review and assessment (including where appropriate independent assessment) of all findings arising from examination, maintenance, inspection and testing activities, and for presenting the results to ONR where required;
 - 3) ONR is provided with appropriate evidence confirming satisfactory completion of any examination, maintenance, inspection and testing required by the maintenance schedule, shutdown plan and any other statutory requirements,

and confirming that the plant is fit to operate for the specified period. Exceptions from the maintenance schedule must be identified and dealt with in accordance with LC 28 arrangements;

- 4) an adequate safety case is produced for operation in the period up to the next scheduled shutdown or, in the event that the full period cannot be justified, proposals are made for the timely delivery of an adequate safety case, or the shutdown of the plant, or other committed action, in support of the request for start-up consent;
 - 5) a periodic shutdown report is submitted to ONR within 28 days, or other agreed period, of consent to start up. This should describe the totality of the outage work and confirm or otherwise that activities not completed at the time of the start-up meeting have been completed satisfactorily.
- 6.4 Review the procedures to confirm they are 'in ticket', and that they reflect accurately current practice (where known).
- 6.5 Check that the procedures require the consent of ONR prior to plant being started up, if this has been specified by ONR.
- 6.6 Confirm that the operational period between declared periodic shutdowns cannot be exceeded without the agreement of ONR and that any request for such agreement is treated as an amendment to the maintenance schedule.

7 GUIDANCE ON INSPECTION OF IMPLEMENTATION OF ARRANGEMENTS FOR LC30

7.1 In practice, the implementation of arrangements under LC 30 is an implicit focus during routine inspection activities during the course of a periodic shutdown. It is appropriate to undertake an explicit evaluation of compliance against the requirements of LC 30 either ahead of or during a periodic shutdown as part of planned regulatory activities. The following advice should help guide inspectors towards such a judgement:

- 1) Examine shutdown related requirements in the maintenance schedule and confirm with the responsible person or nominee and by sample inspections that they are scheduled for execution during the current (next) periodic shutdown. Confirm that programmes have been / will be submitted to ONR as necessary and check that changes required by ONR have been incorporated.
- 2) Inspect a sample of the safety documentation used to control access to and isolation of plant covering a range of permits, involving both major and minor isolations. Confirm that all have been completed and signed off by SQEPs and, where appropriate, Duly Authorised Persons (DAP)s.
- 3) Establish by inspection and discussions with plant personnel that the requirements of LC 22 (modifications), LC 28 (examination, inspection, maintenance and testing) and LC 21 (commissioning) have been satisfied prior to plant, equipment or systems being declared available for service.
- 4) During inspection for LC 28 compliance, establish that no changes to the declared period between shutdowns have been included in the maintenance schedule without appropriate approval.
- 5) During the outage, review the maintenance programme and verify that all activities scheduled for completion have been completed, and that all planned modifications are completed. If incomplete, ensure that a programme for outstanding activities has been prepared. Ensure a clear position statement on these matters is provided with the start-up request, together with the necessary commitments for completion.

- 6) Ensure that the start-up agenda covers discussion of the outcome of the periodic shutdown, the current position, and a review of the safety case(s) justifying start up and operation until the next LC 30 shutdown.
- 7) Clearly distinguish in the start-up meeting those actions required to be completed prior to the issue of a restart consent, those to be incorporated into the 28 day (or other) report and those on different timescales.
- 8) Check that the 28 day report adequately reports on the work undertaken during the outage, the findings of the maintenance, inspection and testing undertaken, confirms completion or otherwise of work declared incomplete at the time of the start-up request and identifies issues or problems arising during start up.
- 9) Seek specialist advice confirming the acceptability of continued operation in the event of new adverse findings being reported in the 28 day (or similar) report and in all cases circulate the report for information to relevant assessors.

ANNEX - PLANNING AND EXECUTION OF REGULATORY ACTIVITIES DURING PERIODIC SHUTDOWNS FOR OPERATIONAL REACTOR POWER STATIONS

A.1 At the present time, consent under LC 30 is required before any of the fifteen operational power reactors, owned and operated by EDF Nuclear Generation Ltd, can restart following a periodic shutdown. This Annex presents good practice principles for planning, execution and review of regulatory activities, specific to regulation of the existing fleet of operational reactors. In practice, these principles are applicable to the regulation of any operational facility subject to periodic shutdown.

It is the responsibility of individual divisions to develop strategies for resourcing and regulation of periodic shutdowns. For the existing fleet of operational reactors, division-specific *annual plans* should provide strategic governance of resource and priorities across the fleet, against which individual power station inspection plans should be aligned. It has been recognised that periodic shutdowns represent an opportune time for regulatory themes of strategic or corporate relevance to be examined given the scale of invasive work undertaken by licensees.

A.2 Good practice principles for effective planning and execution of such activities are presented below.

Planning phase

A.3 The inspection and assessment effort associated with the periodic shutdown of an operational reactor is typically multi-disciplinary in nature involving a variety of specialist inspectors, project and site inspectors. Periodic shutdowns across the fifteen operational reactors in the UK fleet therefore require a substantial proportion of inspector resource. ONR is obliged to discharge its regulatory functions in an effective and efficient manner; effective in this context through ensuring that all statutory elements of examination, inspection, maintenance and testing under LC 28 have been undertaken by the dutyholder; efficient in this context by ensuring regulatory activities are proportionate, well-planned and executed promptly.

A.4 Inspectors are encouraged, sufficiently in-advance of any periodic shutdown to develop a coherent plan of regulatory activities to be undertaken ahead of and during a periodic shutdown, including assessment and permissioning activity to enable a consent to restart under LC 30(3) where relevant. The following aspects are considered to be useful principles for inspectors to adopt:

- 1) it is useful to embody all aspects of planning into a fit-for-purpose *station plan*;
- 2) in deciding which specialist resource to employ, such plans should take into account division-specific strategic and corporate themes. For the existing fleet of operational reactors it is now common practice for a dedicated project inspector to assume responsibility for coordinating, at the strategic level, ONR resource to be employed on each power station. It is important that project inspectors with responsibility for delivering inspection and assessment programmes for individual stations are appropriately aligned to the *annual plan*;
- 3) it is considered good practice for *station plans* to identify aspects of the inspection programme which are routine in terms of examination, inspection, maintenance and testing to be undertaken by the licensee;
- 4) it is also an opportunity to anticipate and develop the necessary position on potentially contentious inspection findings or safety case anomalies that may emerge from the shutdown. This is particularly relevant where licensees undertake targeted inspections to support development of safety cases; for example normally inaccessible areas of plant such as reactor core fuel channels; boilers or other in-vessel components. Early engagement between

ONR and licensees is important to ensure possible inspection outcomes are understood in good time and an opportunity for ONR to lever an appropriate regulatory outcome.

A.4 In prioritising ONR's inspection and assessment effort across the fleet, *annual plans* should take into account the following factors:

- 1) due cognisance of OPEX arising from the fleet in previous periodic shutdowns to inform strategic inspection themes;
- 2) due cognisance of OPEX arising from individual stations both during normal operation and in previous shutdowns;
- 3) the content of individual station periodic shutdown intentions documents (often referred to as outage intentions documents);
- 4) it should not be a default expectation that each specialism undertakes an intervention on each individual periodic shutdown across the fleet. Such decisions should be made taking into account a range of possible factors including for example:
 - i. The importance of work undertaken in the overall context of the safety case and plant maintenance schedule;
 - ii. The novelty of the work;
 - iii. Relevant fleet OPEX;
 - iv. Relative division resource priorities.

A.5 It is common practice to undertake a pre-outage meeting approximately six months ahead of the shutdown to preview the licensee's intentions (as set out in the outage intentions document). The outcome from such meetings will help inform the development of individual station plans. Project inspectors should share draft individual station plans with station outage managers and iterate towards a mutually agreeable inspection schedule in sufficient time ahead of the shutdown, to allow for any significant changes in work scope.

Execution phase

A.6 It is recommended that finalised station plans be shared with individual stations approximately four weeks before a shutdown.

A.7 A dedicated project or site inspector should have responsibility for managing and delivering ONR's inspection and assessment scope. This role is discharged in accordance with the requirements set out ONR's HOW2 system.

A.8 It is common practice to have a start-up meeting, approximately 15-20 days before planned return to service, between the licensee and ONR inspector(s) including a superintending inspector. Start-up meetings are formal regulatory meetings between the licensee and ONR, typically chaired by the licensee. The meeting should be conducted to a mutually agreed agenda and formally minuted, with clear actions agreed. The purpose of the meeting will be to summarise the findings of examination, inspection, maintenance and testing carried out on the plant under LC 28, to confirm that the licensee's objectives for the periodic shutdown have been met and to demonstrate by reference to the current safety case, that the plant is fit to return to service for a further period of operation, usually specified within the maintenance schedule. The timing of the meeting should be agreed ahead of the periodic shutdown to ensure the availability a superintending inspector, but may have to move due to delays from emergent issues. Prior to the start-up meeting it is common to have a site tour where the licensee can highlight notable work packages and modifications and

demonstrate the progress towards readiness to restart the reactor. Typical start-up meeting agendas for AGR and PWR stations are included at the end of this annex.

- A.9 The findings presented at the start-up meeting and the closure of any actions relating to the restart of the plant will provide evidence to support the issue of a consent. The start-up meeting will highlight the main regulatory issues the licensee must address before ONR will grant consent for operation, recognising that further issues may emerge after the start-up meeting, which may require prompt escalation.
- A.10 The dedicated project or site inspector should plan carefully all elements necessary to secure consent to restart, in accordance with the permissioning guidance set out within ONR's HOW2 system (NS-PER-GD-014). Inspectors should ensure any necessary delegations of authority, to ensure timely granting of consent, are put in place in sufficient time.
- A.11 The required documentation necessary for ONR to recommend consent will vary depending on reactor technology. It is essential that a schedule for submission of each element by the power station is agreed and monitored proactively by ONR and the licensee during the course of the shutdown.
- A.12 Where practicable, ONR's assessment and permissioning processes should be planned such that they do not align with the licensee's own critical path. This may not always be practicable, depending on emergent nuclear safety significant issues arising during the shutdown.
- A.13 Before recommending consent it is established practice to notify other competent regulatory authorities such as the Environment Agency, SEPA or Natural Resources Wales (where appropriate) of ONR's intention; this is primarily to ensure there are no specific objections that may compromise other regulatory requirements. Such practice is also embedded within respective Memoranda of Understanding.
- A.14 The issue of consent under LC 30(3) does not require any specific input from civil nuclear security (CNS) inspectors. However, in the interests of improved integration it is appropriate to notify the relevant CNS site inspector of intentions to grant consent. It is recognised that periodic shutdowns attract a significant amount of invasive work on the station and a commensurate inflation of contractor personnel.
- A.15 The following elements constitute an outline framework for periodic shutdown related CNS interventions. It is important that the CNS intervention programme, where undertaken, is appropriately informed by the wider planning of regulatory activities to be undertaken during a periodic shutdown:
- 1) Six months inspection of preparedness ahead of shutdown:
 - i. Evaluation of outage intentions document and engage with station Head of Security.
 - ii. Evaluation of guard-force preparedness and temporary security plans.
 - iii. Examination of vetting.
 - iv. Availability and readiness of search equipment.
 - 2) Inspection of effectiveness during shutdown:
 - i. Inspection of searching regimes.
 - ii. Evaluation of security culture.
 - iii. Confirmation that Independent Nuclear Assessment (INA) will provide oversight of effective security walkdowns pre-start-up.

Review phase

- A.16 It is considered good practice to undertake promptly a review/learn/improve exercise at the end of the shutdown on individual stations; this should be documented in a concise and auditable manner to assist future inspections identifying relevant OPEX when planning for future periodic shutdowns.
- A.17 It is also appropriate for delivery groups to review and document on an annual basis, to ensure effective capture of regulatory intelligence, key themes, trends or safety case issues emerging from the fleet.

Typical Start Up Meeting Agenda (Advanced Gas-Cooled Reactor)

AGENDA:

No	Item	Lead
1	Safety message – local safety arrangements	Licensee
2	Introduction and apologies	Licensee
3	Approval of minutes of last meeting (Review/Start-up meeting dd/mm/yy)	Licensee/ONR
4	Review of actions from previous meetings	Licensee
4.1	Last Review meeting	Licensee
4.2	Last Start-up meeting	Licensee
4.3	Outage Intentions meeting	Licensee
5	Strategic Outage Manager's report	Licensee
6	Feedback from ONR site tour	Licensee/ONR
7	Safety management review	
7.1	Nuclear safety	Licensee
7.2	Industrial safety	Licensee
7.3	Fire safety	Licensee
7.4	Radiological safety	Licensee
7.5	Environmental safety	Licensee
7.6	Quality assurance	Licensee
7.7	Operational experience	Licensee
8	Maintenance review	
8.1	Reactor internal inspections	Licensee
8.2	Graphite core inspections	Licensee
8.3	Boilers	Licensee
8.4	Gas circulators and reactor auxiliary systems	Licensee
8.5	Turbine, feed and condensate and cooling water	Licensee
8.6	Electrical systems and C&I	Licensee
8.7	Pressure systems	Licensee
8.8	External inspections including Outage Assessment Panel statement	Licensee

8.9	Pre-stressed concrete pressure vessel – Appointed Examiner’s report	Licensee
8.10	Modification progress statement	Licensee
8.11	Statement on maintenance schedule/licensing compliance	Licensee
8.12	Control rod drop test	Licensee
9	Safety case review	Licensee
10	Working Time Regulations	Licensee
11	Return to service testing	Licensee
12	Review of Consent/Start-up issues	Licensee/ONR
13	Internal Regulator report	Licensee
14	Review of actions placed at the meeting	Licensee/ONR
15	Any other business	Licensee/ONR
16	Completion of Regulatory Nuclear Interface Protocol	Licensee/ONR

Frequency: As required	Meeting attendees: NG: Station Director/ Managers; Internal Regulator
Duration: 2-3 hours	ONR: Superintending Inspector (Operating Reactors sub-programme); Site Inspector

Typical Start Up Meeting Agenda (Pressurised Water Reactor)

AGENDA:

No	Item	Lead
1	Safety message – local safety arrangements	Licensee
2	Introduction and apologies	Licensee
3	Approval of minutes of last meeting (Review/Start-up meeting dd/mm/yy)	Licensee/ONR
4	Review of actions from previous meetings	Licensee
4.1	Last Review meeting	Licensee
4.2	Last Start-up meeting	Licensee
4.3	Outage Intentions meeting	Licensee
5	Strategic Outage Manager's report	Licensee
6	Feedback from ONR site tour	Licensee/ONR
7	Safety management review	
7.1	Nuclear safety	Licensee
7.2	Industrial safety	Licensee
7.3	Fire safety	Licensee
7.4	Radiological safety	Licensee
7.5	Environmental safety	Licensee
7.6	Quality assurance	Licensee
7.7	Operational experience	Licensee
8	Maintenance review	
8.1	Reactor pressure vessel inspections	Licensee
8.2	Circulating water inspections	Licensee
8.3	Turbine Generators	Licensee
8.4	Reactor systems	Licensee
8.5	Steam, condensate and feed systems	Licensee
8.6	Electrical systems and C&I	Licensee
8.7	Pressure systems	Licensee
8.8	External inspections	Licensee

8.9	Appointed Examiner's report	Licensee
8.10	Modification progress statement	Licensee
8.11	Statement on maintenance schedule/licensing compliance	Licensee
8.12	Control rod drop test	Licensee
9	Safety case review	Licensee
10	Working Time Regulations	Licensee
11	Return to service testing	Licensee
12	Review of Consent/Start-up issues	Licensee/ONR
13	Internal Regulator report	Licensee
14	Review of actions placed at the meeting	Licensee/ONR
15	Any other business	Licensee/ONR
16	Completion of Regulatory Nuclear Interface Protocol	Licensee/ONR

Frequency: As required	Meeting attendees: NG: Station Director/ Managers; Internal Regulator
Duration: 2-3 hours	ONR: Superintending Inspector (Operating Reactors sub-programme); Site Inspector