Office for Nuclear Regulation (ONR)
Site Report for
Heysham Power Stations

Report for period 1 October 2020 – 31 December 2020

Foreword

This report is issued as part of ONR's commitment to make information about inspection and regulatory activities relating to the above site available to the public. Reports are distributed quarterly to members of the Local Community Liaison Committee and are also available on the ONR website (http://www.onr.org.uk/llc/).

Site inspectors from ONR usually attend the Heysham 1 and 2 Local Community Liaison Committee meetings and will respond to any questions raised there. Any person wishing to enquire about matters covered by this report should contact ONR.

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1 INSPECTIONS

1.1 Dates of inspection

1. The ONR nominated site inspectors made inspections on the following dates during the quarter:

Heysham 1

- 20 October (Onsite)
- 23 - 25 November (Onsite)
- 7 - 8 December (Onsite)

In addition, the site inspector and other ONR specialist inspectors were involved in interventions on the following dates during the quarter as part of the Reactor 1 statutory outage:

- 12, 14 -16, 19, 20 - 22 October (Remote)
- 5 - 7, 14 October (Onsite)
- 3 - 6, 11 November (Remote)

Heysham 2

- 10 November (Onsite)
- 18 November + 16 December (Remote and onsite)
- 14 – 17 December (Remote and onsite)

2 ROUTINE MATTERS

2.1 Inspections

2. Inspections are undertaken as part of the process for monitoring compliance with:

- the conditions attached by ONR to the nuclear site licence granted under the Nuclear Installations Act 1965 (NIA65) (as amended);
- the Energy Act 2013;
- the Health and Safety at Work Act 1974 (HSWA74); and
- Regulations made under HSWA74, for example the Ionising Radiations Regulations 2017 (IRR17) and the Management of Health and Safety at Work Regulations 1999 (MHSWR99).

3. The inspections entail monitoring the licensee's actions on the site in relation to incidents, operations, maintenance, projects, modifications, safety case changes and any other matters that may affect safety. The licensee is required to make and implement adequate arrangements under the conditions attached to the licence in order to ensure legal compliance. Inspections seek to judge both the adequacy of these arrangements and their implementation.

4. Due to the Covid-19 pandemic, access to site has been limited to urgent and essential regulatory inspections. (More details can be found in the News from ONR section at the back of this report and on our website).

5. We have however maintained regulatory oversight of both stations by:-

- Initiating increased dialogue with site management, the licensee's independent nuclear safety assurance function, and trade union safety representatives to develop a consistent picture of the measures put in place to manage the safety of both the workforce and the plant.

- Observing regular station meetings and special working groups the licensee established to assess the coronavirus pandemic and manage the response, such as the pandemic lead team meeting (which co-ordinated the site's response) and maintenance requirements review group (which managed the impact of potential or actual staff and supply chain shortfalls on safety-significant maintenance activities).

- Monitoring the minimum staffing levels required to deliver an adequate response in the event of an accident or emergency on the site.

6. Consequently, we consider that the site has managed its response to the pandemic during the period in a manner that, so far as is reasonably practicable, protected its own staff and ensured that there was no degradation in nuclear safety.

7. In this period, the following site and remote routine inspections were undertaken:

Heysham 1

Fire Safety Audit

8. The purpose of this intervention was to confirm that the General Fire Safety provisions on site are adequate, and to confirm that the licensee is complying with the requirements of the Regulatory Reform (Fire Safety) Order 2005. The intervention was completed remotely due to COVID-19 restrictions.

9. The intervention did not identify any significant departures from compliance that will require regulatory follow up. The site understands fire risk and continues to apply adequate control measures to reduce the risk to life from fire. Overall, ONR judged that NGL demonstrated an adequate standard of compliance with the Regulatory Reform (Fire Safety) Order 2005.

Licence Condition 7 – Incidents on the site

10. The purpose of LC7 is to ensure that incidents on the site are notified, recorded, investigated and reported by the licensee. ONR anticipates that only incidents with the potential to have an adverse effect on safety are notified to us. The inspection sampled the adequacy of NGL's arrangements for the management of investigations and the management of actions generated by investigations. The inspection observed the activity of the 'Corrective Action Review Board' (CARB) and an NGL governance body utilised to accept, challenge or reject proposals for the closure of investigation actions. ONR observed positive challenge at the CARB where a number of action closure proposals were declined as a result of further intelligence/trends being identified or where members considered additional measures are necessary to support action closure.

11. From the evidence sampled ONR was content with management of investigations and the management of actions generated by investigations. There were no regulatory issues generated from the inspection and ONR judged that NGL adequately demonstrated compliance with the requirements of LC7 and therefore rated this inspection as Green, no formal action.

Licence Condition 26 – Control and supervision of operations

12. The purpose of LC 26 is to ensure the licensee carries out all operations which may affect safety under the control and supervision of suitably qualified and experienced persons appointed for that purpose by the licensee. Operations as

defined in LC 1 includes maintenance, examination, testing and operation of the plant and the treatment, processing, keeping, storing, accumulating or carriage of any radioactive material or radioactive waste and “operating” and “operational” shall be construed accordingly.

13. ONR inspected NGL’s arrangements for ‘control and supervision of operations’ sampling planned statutory outage electrical maintenance being conducted on the Quadrant Feed Trip (QFT) System associated with the quadrant C logic panel. ONR observed adequate control and supervision being applied in the areas sampled which covered:

- The ‘set to work’ brief delivered by the electrical maintenance team leader to the electrical technicians which included:
  - Questioning the technicians to gain confidence that the technicians understood the nuclear safety function of the QFT system;
  - The location of the QFT quadrant C logic panel;
  - The local hazards associated with work on the QFT logic panel;
  - Ensuring all appropriate safety and instructional documentation was in their possession; and
  - Ensuring adequate communications had been established with the Work Execution Centre and Central Control Room to inform that the work would be conducted.
- Observation of the technicians carrying out their planned work and completing the necessary step by step instructional tasks.

14. There were no regulatory issues generated as a result of this inspection and it was judged that NGL adequately demonstrated compliance with the requirements of LC 26 and therefore this inspection was rated as Green, requiring no formal action.

R1 Statutory Outage inspections

15. ONR completed a number of Reactor 1 outage inspections covering the following topics:

- Control and Instrumentation (Remote):
- Electrical (Remote):
- Mechanical (Remote):
- Structural Integrity (Remote):
- Conventional Health and Safety (Onsite);
- Graphite (Remote);
- Early Outage Review (Onsite);
- Civil structures (Remote); and
- Written Schemes of Examination assessment as required by the Pressure Systems Safety Regulations 2000 (PSSR) (Remote).

16. Any issues revealed during ONR inspections were satisfactorily addressed and there were no implications for the return to service of Reactor 1. Some minor matters will be followed up by ONR through routine regulatory business.

17. ONR’s assessment and inspection of the Heysham 1 Reactor 1 periodic shutdown confirmed that NGL had carried out EIMT in accordance with the requirements of its Plant Maintenance Schedule. Work had been conducted to the required quality standards and by competent personnel. No issues of such significance were identified by NGL or ONR that would prevent the safe start-up of Heysham 1

Reactor 1 following its 2020 periodic shutdown. The detail of ONR's decision is available on our web site (see Table 1).

Heysham 2

Annual Review of Safety (ARoS)

18. During the reporting period ONR held its ARoS with the Licensee. This consisted of a plant walkdown and a meeting which was dominated with a discussion around the actions and improvements as a result of the Log/Lin flux detector event which occurred on 16 April 2020.

19. The walkdown covered the following areas:-

- Fuelling Machine:- including discussion of the investigation into the CO2 leak (See Section 3).
- Central Control Room CCR:- including demonstration of new operational cameras.
- Safety circuit room:- including progress that had been made with respect to the log/lin flux detector event back in April 2020.
- DPCS temperature monitor and control improvements.
- Turbine Hall Improvements.

Licence Condition 6 :- Documents, records, authorities and certificates and Licence Condition 25 :- Operational records

20. The purpose of LC 6 is to ensure that the licensee makes and holds adequate records for a suitable period to demonstrate historical compliance with licence conditions, thus ensuring:

- That an up-to-date record of the issue, change or withdrawal of licence instruments is available at all times,
- that safety documentation is available at all times,
- that design and construction information is available throughout the life cycle of the plant,
- that operational records are available, for instance, to assist investigations in the event of an accident or incident, or for ascertaining details of historic operations when considering changes to the use of a facility,
- operational records are available for the statutory number of years after cessation of operations for the purpose of assisting any claims for damage to health as a result of exposure to ionising radiation (see LC 25).

21. The purpose of LC 25 is to ensure that the licensee makes records of what has happened on the plant, checks on safety related parameters and plant configuration, what was found as a result of inspection and what work was done to.

22. The following areas were covered as part of the inspection:

- The Records Schedule
- Environmental Monitoring of the Archive Store
- Register of Approved Documents
- Regulatory Correspondence and Hold Points
- Record Scanning and Quality
- Team resilience
- Key Performance Indicators (KPIs)
- Latest Audit findings and recommendations

23. We found that the site has effectively implemented the new fleet arrangements for record schedules and indexes using the computer management system AMS (Asset Management Suite). The arrangements for the fleet and the local arrangements appear to comprehensive. From the sample taken, the Heysham 2 site complies fully with the arrangements and no significant shortfalls were found.

24. The KPIs appear to be effective in helping station manage documents and records. All of the KPIs appear to be well managed and action is taken to address those which are potentially getting out of control e.g. overdue document reviews.

25. A minor regulatory issue was raised in relation to the environmental conditions in the record archive store. During many months of the year the relative humidity and temperature is slightly above the target specification and temperature is slightly above optimum specification. Improvements were made, by the site, in 2018 but the conditions are still often above the optimum. As per the fleet arrangements, a condition report is regularly raised to highlight the issue but there are no tangible plans at present to rectify the issue.

26. In conclusion, as no significant issues were raised the inspection was rated green.

System Based Inspections (SBI)

27. In addition to the programme of site licence compliance inspections, ONR also inspects operating reactors based on safety related systems. Each site has a safety case, which identifies the important aspects of operation and management required for maintaining safety. For both stations at Heysham, the key systems important to nuclear safety will be inspected against the requirements of the safety case over a five-year period. ONR considers that this will provide additional assurance that operations on the Heysham site are safe. Each of these system inspections considers the relevant licence conditions (where relevant) below:

- Licence condition 10: Training
- Licence condition 23: Operating rules
- Licence condition 24: Operating instructions
- Licence condition 27: Safety mechanisms
- Licence condition 28: Examination, inspection, maintenance and testing
- Licence condition 34: Leakage and escape of radioactive material and radioactive waste

Heysham 1

Fire SBI

28. We performed an SBI to confirm the implementation of the safety claims for fire systems (detection, suppression, barriers, doors and dampers).

29. Given the extensive nature of the station's fire detection, suppression and passive protection systems, the following equipment was sampled to ascertain the overall adequacy of the stations arrangements to manage fire protection systems:

- Fire barriers - including fire doors, fire screens and dampers;
- Fixed fighting suppression system – high velocity water spray and portable suppression equipment;
- Fire detection system – quartzoid bulbs, rate of rise detectors and linear heat detectors; and
- Fire suppression pipework.

30. From the evidence sampled against a variety of licence conditions during this SBI, it was judged that there were no matters that have the potential to impact significantly on nuclear safety. Consequently, an overall rating of Green was awarded for the fire protection systems as a whole. ONR considers NGL adequately demonstrated ownership and implementation of the fire protection systems safety case to ensure and maintain nuclear safety.

Electrical SBI

31. During the statutory outage, the routine electrical inspections normally conducted during outage were extended to include an SBI to confirm the implementation of the safety claims for the following electrical systems:

- No break supplies;
- Emergency generation and short break systems;
- Transformers;
- Main electrical system; and
- Grid systems and the main electrical system.

32. ONR carried out three remote inspections and we also involved NGL's own internal regulator (INA Evaluator) to carry out a plant walkdown of the following systems:

- Generator transformer;
- Unit and auxiliary transformers;
- 11kV, 3.3kV and 415V switchgear and boards;
- No break and short break supply boards;
- 50V and 110V DC and general instrument supplies; and
- Gas turbines.

33. ONR were content with the plant walk down undertaken by the INA Evaluator and were satisfied that no matters of significant safety concern were revealed from the walk down.

34. ONR inspections identified a small number of areas for improvement although none gave rise to any significant concern. Consequently, from the evidence sampled against a variety of licence conditions, an overall rating of Green was awarded for the electrical systems SBI. ONR considers NGL adequately demonstrated ownership and implementation of the electrical systems safety case to ensure and maintain nuclear safety.

Heysham 2

System Based Inspection – Heating, Ventilation and Air Conditioning (HVAC) Systems

35. We performed a System Based Inspection (SBI) to confirm the implementation of safety claims made for a sample of HVAC systems on site against a variety of licence conditions.

36. The areas targeted were the H&V systems:

- HVCR – Central Control Room (CCR)
- HVCV – Contaminated Ventilation Discharge
- HVHG – Hot Gas & Steam Release
- HVSS – Secondary Shutdown (SSD) Rooms
- HVDG – Essential Service Buildings (ESB) & Diesel House

37. The inspection comprised discussions with the licensee staff remotely via Skype, a desktop review of the licensee's records and other associated safety documentation and a physical walkdown of plant, conducted by the site inspector and mechanical nuclear associate. Based on the sample, we consider that the HVAC systems met the requirements of the safety case, with minor areas for improvement identified. The inspection findings were shared and accepted by the licensee during the feedback session. Two regulatory issues have been raised to resolve the minor shortfalls identified.

38. Consequently, from the evidence sampled against a variety of licence conditions, an overall rating of Green was awarded for the HVAC systems SBI. ONR considers NGL adequately demonstrated ownership and implementation of the HVAC systems safety case to ensure and maintain nuclear safety.

3 NON-ROUTINE MATTERS

39. Licensees are required to have arrangements to respond to non-routine matters and events. ONR inspectors judge the adequacy of the licensee's response, including actions taken to implement any necessary improvements.

Heysham 1

40. There were no such matters or events of significance during this period.

Heysham 2

Fuel Route CO2 Leak (INF1 2020/693)

41. During preparations for a control rod exchange on reactor 7, the fuelling machine interspace unexpectedly depressurised. This was stopped and the new actuator was returned to the maintenance cell. The fuelling machine was then taken out of service for fault investigations. There were no safety consequences as a result of this event but ONR has been maintaining oversight of the licensee's technical investigation into this event. At present the fuelling machine is not being used to refuel the reactor which has had a knock-on effect to the power output of the station during the quarter.

4 REGULATORY ACTIVITY

42. ONR may issue formal documents to ensure compliance with regulatory requirements. Under nuclear site licence conditions, ONR issues regulatory documents, which either permit an activity or require some form of action to be taken. These are usually collectively termed Licence Instruments (LIs), but can take other forms. In addition, inspectors may issue Enforcement Notices to secure improvements to safety.

Heysham 1 Direction

43. The previous 2020 Q3 LCLC report described that a shortfall in the delivery of Written Schemes of Examination, as required by the Pressure Systems Safety Regulations 2000 (PSSR) had been revealed. This shortfall was subject to review against ONR's Enforcement Management Model (EMM).

44. Following the EMM review, ONR issued a formal Direction to NGL on the 14 December requiring NGL to carry out a thorough and robust review of the site's arrangements necessary to secure compliance with PSSR. NGL are to report to ONR the outcome of their review by the 31 March 2021.

45. ONR requested and was provided with adequate PSSR compliance and risk mitigation assurances necessary to support Reactor 1 re-start before 31 December.

Heysham 1 Reactor 1 Statutory Outage

46. The planned statutory outage of Reactor 1 commenced on the 28 September when the reactor was manually tripped and safely shutdown.

47. ONR specialist inspectors carried out the inspections detailed in section 2 above and other assessment activities to establish that:

- Requirements set out in the Station's Plant Maintenance Schedule (PMS) have been complied with;
- Work has been carried out in accordance with arrangements for identified Structures, Systems and Components (SSC) to the required quality by competent persons;
- Safety issues identified during the reactor outage have been adequately addressed with suitable and sufficient justification provided to allow a regulatory judgement to be made that start-up of the reactor is safe.

48. ONR's inspections of the Heysham 1 Reactor 1 periodic shutdown confirmed that NGL was carrying out maintenance activities in accordance with the requirements of its Plant Maintenance Schedule and that work was conducted to the required quality standards and by competent personnel. No issues of safety significance were identified from the inspections or assessments and ONR were satisfied to issue consent to re-start Reactor 1 on 31 December 2020. Further details can be found within the ONR's project assessment report for the Reactor 1 outage that is / will be published on the ONR website.

Table 1
Licence Instruments and Enforcement Notices Issued by ONR during this period

Heysham 1 and 2

Date	Type	Ref No	Description
14 December 2020	Direction	2020/302340	LI 632 Direction under Licence Condition 15(4)
31 December 2020	Consent	2020/324050	Heysham 1 Reactor 1 Periodic Shutdown 2020 - Consent to Start-Up Reactor 1 Following Periodic Shutdown

Reports detailing the above regulatory decisions can be found on the ONR website at http://www.onr.org.uk/pars/.

News from ONR (October – December 2020)

COVID-19

We are continuing to obtain assurance that nuclear site licensees and other dutyholders are adequately resourced to continue to safely and securely carry out their activities.

We remain satisfied with industry's response at this time and there has been no significant change to dutyholders' safety and security resilience.

As COVID-19 restrictions change, our focus is on the preparedness for the weeks and months ahead and maintaining safe and secure operations.

All licensed sites are required to determine minimum staffing levels necessary to ensure safe and secure operations and contingency arrangements in the event that these levels are not met. This condition is specifically designed to ensure that industry can adequately manage and control activities that could impact on nuclear safety and security under all foreseeable circumstances, including pandemics.

ONR staff continue to work at home, primarily. We have considered our priorities, deferred non-critical activities, and are carrying out as much of our work as possible via videoconference, phone and email.

We continue to inspect, assess and permission remotely where necessary to protect staff, workers on site, and the public around sites.

Enforcement action

In December, we announced that The Atomic Weapons Establishment (AWE) had been fined £660,000 after pleading guilty to an offence under Section 3 of the Health and Safety at Work etc. Act (1974).

AWE was also ordered to pay costs of £9,945.71 during a virtual hearing at High Wycombe Magistrates Court.

It followed an electrical incident on 20 June 2019 at the AWE Aldermaston site which resulted in a contractor narrowly avoiding injury when a flash over of electricity occurred from a 415V electrical source. The incident was a conventional health and safety matter and took place in a 'non-nuclear' building, so there was no radiological risk to workers or the public.

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In October, we notified Sellafield Ltd that it would be prosecuted under Section 2 (1) of the Health and Safety at Work etc. Act (1974).

The charge related to an incident on Friday, 24 April 2020 at the Sellafield site where an employee sustained injuries while working on high voltage electrical equipment. This incident was also a conventional health and safety matter and there was no radiological risk to workers or the public.

The hearing took place at Carlisle Magistrates Court on 18 December 2020, where Sellafield Ltd was fined £320,000 and ordered to pay costs of £12,079.07 after pleading guilty to the offence.

Regulatory updates

In October, we announced an Information Exchange Arrangement (IEA) with the Canadian Nuclear Safety Commission (CNSC).

The IEA is a bilateral agreement between our two organisations which provides a framework for the sharing of information, experience, and good practice to enable both parties to learn from and train each other on technical regulatory issues. It also allows for more effective communication between the two regulators.

The agreement had already been used to develop a Memorandum of Cooperation (MoC) between ONR and the CNSC which allows the sharing of best practices and experience around reviewing advanced reactor and small modular reactor (SMR) technologies.

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In November, our Chief Nuclear Inspector (CNI), Mark Foy, published his annual report detailing the performance of Great Britain's nuclear industry during 2019/20.

The CNI reports he is satisfied that overall the nuclear industry has continued to meet the high standards of safety and security required to protect workers and the public.

In areas where dutyholders have fallen short of these standards, the CNI is satisfied that these facilities remain safe and that ONR has intervened in a proportionate manner to ensure plans are in place to improve performance.

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In November, we also announced the appointment of a new member to the Chief Nuclear Inspector's Independent Advisory Panel (IAP).

Chris McDonald has joined the panel, which was set up in in 2016 to provide independent advice on technically complex nuclear matters by engaging with industry experts to inform our regulatory strategies and approaches.

Chris has a wealth of experience in industrial strategy and manufacturing research. He has a degree in Chemical Engineering and has been the CEO of the Materials Processing Institute since it was founded in 2014. Chris also has a proven record in the areas of innovation and low-carbon energy which will be of great benefit to ONR.

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In December, we became an Affiliated Organisation member of the Society for Radiological Protection (SRP).

We have actively participated and supported SRP for many decades. This affiliation formally recognises our involvement and contributions towards radiological protection and enhances the links between the two organisations.

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In November, we played a leading role in the first ever virtual IRRS Mission.

The virtual mission to Lithuania was conducted via the IAEA's International Regulatory Review Service and explored the feasibility of using modern communications tools for future missions.

The mission was led by ONR's Technical Director Dr Anthony Hart and supported by Superintending Inspector Colin Tait. Other countries taking part in the mission included Canada, Pakistan, Finland and the Netherlands.

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In December, we became the UK's nuclear safeguards regulator, in charge of the domestic safeguards regime and operating the UK State System of Accountancy for, and Control of, Nuclear Materials (SSAC).

Following the end of the transition period as laid out in the Withdrawal Agreement, ONR assumed its responsibilities at 23.00 on Thursday 31 December 2020.

This has been a major project for ONR, setting up a new team, new systems and new processes, led by Dr Mina Golshan.

Since being tasked by Government to establish a domestic safeguards regime after Brexit, we have developed a team of safeguards specialists, including inspectors and nuclear material accountants, and implemented a bespoke IT system, SIMRS (Safeguards Information Reporting and Management System).

Nuclear safeguards are measures to verify that countries comply with their international obligations not to use nuclear materials from their civil nuclear programmes to manufacture nuclear weapons.

The safeguards work remains a key priority for the organisation and sits in our Civil Nuclear Security and Safeguards Division.

Corporate updates

In October, we announced that Chief Executive Adriènne Kelbie had been appointed a Commander of the Order of the British Empire (CBE) in the Queen's Birthday Honours List 2020 for services to the nuclear industry and to diversity and inclusion.

Adriènne said: "This honour is a tribute to the ONR team and all others who work tirelessly to create a more inclusive world and safe nuclear sector, as well as those on the long and sometimes arduous journey of leadership and self-development.

"Inclusion goes hand in hand with safety, because diverse teams are essential to improve decision making – therefore it's a non-negotiable in nuclear. That's why, as Chief Executive of ONR, I've been personally committed to visibly drive the inclusion agenda and encourage others to do so too."

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In December, we announced plans to align our leadership structure to other nuclear regulators around the world with a new combined post of Chief Nuclear Inspector/Chief Executive.

Chief Nuclear Inspector Mark Foy will take up the new combined post, subject to detailed government approvals, supported by current Deputy Chief Executive, Sarah High. A new senior regulatory role, Executive Director of Operations/Deputy Chief Inspector, will also be established. The exact timescales have yet to be confirmed, but the changes will come into effect later in 2021.

Under existing contractual arrangements, current Chief Executive Adriènne Kelbie CBE was always expected to step down as her extended term of office comes to an end in January 2022.

The change reflects ONR's successful transition into a mature and high performing organisation since becoming an independent Public Corporation in 2014.

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In December, we were delighted to announce that our Deputy Chief Inspector and Director of ONR's Sellafield, Decommissioning, Fuel and Waste Division, Dr Mina Golshan, had been awarded a Commander of the Order of the British Empire (CBE) in the New Year's Honours 2021, for 'services to nuclear regulation'.

Mina said: "I am very grateful to have been awarded this honour. It reflects the work of many talented and dedicated professionals that I am lucky to work with. It also shows the significance of ONR's role in securing safe nuclear operations for the protection and benefit of the society."

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