April 6, 2007

Mr. Karl W. Singer
Chief Nuclear Officer and
Executive Vice President
Tennessee Valley Authority
6A Lookout Place
1101 Market Street
Chattanooga, TN 37402-2801

SUBJECT: BROWNS FERRY NUCLEAR PLANT, UNIT 3 — ISSUANCE OF EMERGENCY REGARDING ONE-TIME EXTENSION OF DIESEL ALLOWED OUTAGE TIME (TAC NO. MD5148) (TS-460-T)

Dear Mr. Singer:

The Commission has issued the enclosed Amendment No. 257 to Renewed Facility Operating License No. DPR-68 for the Browns Ferry Nuclear Plant, Unit 3. This amendment is in response to your application dated April 6, 2007. This emergency amendment request was made under the provisions of Section 50.91(a)(5) to Title 10 of the *Code of Federal Regulations*. This amendment approves a one-time extension of the allowed outage time for the '3D' emergency diesel generator from 7 to 14 days.

A copy of the Safety Evaluation is also enclosed. Notice of Issuance will be included in the Commission's biweekly *Federal Register* notice.

Sincerely,

/RA/

Eva A. Brown, Project Manager
Plant Licensing Branch II-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-296

Enclosures:
1. Amendment No. 257 to DPR-68
2. Safety Evaluation

cc w/enclosures: See next page

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TENNESSEE VALLEY AUTHORITY

DOCKET NO. 50-296

BROWNS FERRY NUCLEAR PLANT, UNIT 3

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 257
Renewed License No. DPR-68

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by Tennessee Valley Authority (the licensee) dated April 6, 2007, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment and paragraph 2.C.(2) of Renewed Facility Operating License No. DPR-68 is hereby amended to read as follows:

   (2) Technical Specifications

   The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 257, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance and shall be implemented within 30 days from the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

Thomas H. Boyce, Chief
Plant Licensing Branch II-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment: Changes to the
Operating License
and Technical Specifications

Date of Issuance: April 6, 2007

ATTACHMENT TO LICENSE AMENDMENT NO. 257

TO RENEWED FACILITY OPERATING LICENSE NO. DPR-68

DOCKET NO. 50-296

Replace Page 3 of Renewed Operating License DPR-68 with the attached Page 3.

Replace the following pages of the Appendix A Technical Specifications with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

REMOVE	INSERT
3.8-3	3.8-3

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 257

TO RENEWED FACILITY OPERATING LICENSE NO. DPR-68

TENNESSEE VALLEY AUTHORITY

BROWNS FERRY NUCLEAR PLANT, UNIT 3

DOCKET NO. 50-296

1.0 INTRODUCTION

In a letter dated April 6, 2007,to the Nuclear Regulatory Commission (NRC), the Tennessee Valley Authority (TVA, or the licensee) requested changes to the Technical Specifications (TSs) for Browns Ferry Nuclear Plant (BFN), Unit 3. The proposed amendment requests a one-time change to the allowed outage time (AOT) for the '3D' emergency diesel generator (EDG) from 7 to 14 days. Specifically, the change would allow a one-time revision to the Unit 3 COMPLETION TIME for TS REQUIRED ACTION 3.8.1.B.4 from 7 to 14 days to support ongoing diesel generator '3D' component replacement activities.

On April 1, 2007, the licensee declared EDG '3D' inoperable in preparation for a scheduled performance of the routine monthly diesel generator operability surveillance tests prescribed by TS Surveillance Requirements (SRs) 3.8.1.1 and 3.8.1.2. This inoperability resulted in entering the ACTION statements of TS Limiting Condition for Operability (LCO) 3.8.1.B to conduct the associated SR tests.

During the performance of the SRs, the licensee discovered that EDG terminal voltage following the fast start signal was too high. The acceptance criteria range for this step is 3940 volts to 4400 volts, however the tested value was 4450 volts. The licensee indicated that the problem was related to the electronic governing-A (EG-A) component of the governor control circuitry. Although the root cause is unknown at this time, the licensee regards this as an isolated problem not impacting any of the other EDGs. The licensee's review of the previous monthly surveillance EDG operability tests for the other seven EDGs did not show similar high voltages or upward trends in voltage. This upward trend in voltage was not observed on the other seven EDGs. The licensee noted a small increase in voltage for the '3D' EDG over the previous surveillances; however this was not identified until after failure of the EG-A. This information has given the licensee high confidence that the remaining EDGs do not have a similar problem that was observed on EDG '3D.'

Following the above failure, the EG-A component of the electrical governor was replaced with a refurbished spare. However, during post-maintenance testing the refurbished EG-A failed, in a different manner, on April 5, 2007. The licensee stated that Browns Ferry had no additional spare EG-As onsite and that spare EG-As are not readily available from vendors or in the

industry. Based on this information, the licensee is expediting the repair of the two EG-As at a vendor facility. Subsequently, the licensee obtained a second spare EG-A. This EG-A has since been installed and is currently being tested. The licensee stated that completion of repairs, post-maintenance testing, and surveillance testing to reestablish operability may not be completed prior to expiration of the 7-day allowed outage time timeframe. Therefore, the licensee is requesting a one-time extension of this 7-day allowed outage time by an additional 7 days to assure adequate time is available for completion of repairs, post-maintenance testing, and surveillance testing of the EDG.

2.0 REGULATORY EVALUATION

The Commission's regulatory requirements related to the content of TSs are set forth in Title 10 to the *Code of Federal Regulations* (10 CFR) Section 50.36. This regulation requires that the TSs include items in five specific categories. These categories include 1) safety limits, limiting safety system settings and limiting control settings, 2) limiting conditions for operation, 3) surveillance requirements, 4) design features, and 5) administrative controls.

Appendix A of 10 CFR 50, General Design Criterion (GDC) 17, “Electric power systems,” requires, in part, that nuclear power plants have onsite and offsite electric power systems to permit the functioning of structures, systems, and components that are important to safety. The onsite system is required to have sufficient independence, redundancy, and testability to perform its safety functions, assuming a single failure. The offsite power system is required to be supplied by two physically independent circuits that are designed and located so as to minimize, to the extent practical, the likelihood of their simultaneous failure under operating and postulated accident and environmental conditions. In addition, this criterion requires provisions to minimize the probability of losing electric power from the remaining electric power supplies as a result of loss of power from the unit, the offsite transmission network, or the onsite electric power supplies.

Appendix A of 10 CFR 50, GDC 18, “Inspection and testing of electric power systems,” requires that electric power systems that are important to safety must be designed to permit appropriate periodic inspection and testing.

Section 50.63 of 10 CFR, “Loss of all alternating current power,” requires that each light-water cooled nuclear power plant licensed to operate be able to withstand for a specified duration and recover from a station blackout.

3.0 TECHNICAL EVALUATION

3.1 Deterministic Review

At Browns Ferry, eight EDGs (four for Units 1 and 2, and four for Unit 3) are provided as standby power supplies to be used in the event of the loss of the normal auxiliary power system. The standby alternating current (AC) supply and distribution system for Unit 3, is separate from that of Units 1 and 2. Unit 3 has four diesel generators (‘3A,’ ‘3B,’ ‘3C,’ and ‘3D’), four 4.16 kilovolt (kV) shutdown boards, two 480 V shutdown boards, one 480 V heating, ventilation, and air conditioning board, five motor operated valve boards, four motor generator sets, two 480 V diesel auxiliary boards, one 480 V control bay vent board, and the standby gas treatment system (SBGT) board.

EDG ‘3A’ and ‘3C’ are the most important for Unit 3 EDGs in that they power the Division 1 and 2 480 V reactor motor operated valve boards. In the event of the loss of offsite power (LOOP), EDG ‘3D’ powers one of the four Unit 3, residual heat removal (RHR) pumps, one of the four core spray pumps, one out of eight common (i.e., shared among the three BFN units) RHR service water pumps (RHRSW)), and one out of three common SBGT system trains. Therefore, the licensee stated that the effect of the inoperability of EDG ‘3D’ on Units 1 and 2, operation is limited to one RHRSW pump and one SBGT system train. RHRSW and SBGT are shared systems among the three BFN units. With only Units 2 and 3 in power operation, there are excess RHRSW pumps available, so the unavailability of standby AC pump power for a single RHRSW pump is not a significant issue. With regard to SBGT, two SBGT trains are powered by the Units 1 and 2 EDGs, which are fully operable. The licensee stated that it is unlikely that during the EDG ‘3D’ AOT an LOOP will occur in combination with an event (i.e., pipe break with significant fuel damage), and loss of one of the remaining SBGT trains will also occur.

The licensee stated that Unit 1 is currently in Mode 4 following a lengthy reconstruction project and will not restart prior to May 2007. The Unit 1 core design consists of 672 fresh fuel assemblies and 92 previously irradiated fuel assemblies, which were discharged in March 2005 from the Unit 2 Cycle 13 core. Decay heat is extremely low (~.13 megawatt thermal), which is on the order of ambient heat loss from the reactor vessel. Therefore, the licensee stated that the likelihood of Unit 1 requiring standby AC power from one of the Units 1 and 2 shared EDGs is unlikely during the requested Unit 3 EDG ‘3D’ allowed outage time extension request.

Unit 2 is currently in a refueling outage and is scheduled to restart within the next week. However, with the minimal needs for AC power on Unit 1 due to the prolonged shutdown condition, Unit 2 will restart with the four shared Units 1 and 2 EDGs essentially dedicated exclusively to Unit 2 service.

The licensee stated that it established protocols to improve communications between TVA grid operators and BFN operating staff in response to Generic Letter 2006-02, “Grid Reliability and the Impact on Plant Risk and the Operability of Offsite Power.” The licensee further stated that this includes daily communications regarding plant activities and TVA system grid activities, coordination of scheduling activities on matters related to offsite power and onsite power systems, contingency planning for degraded configurations, and prompt notification of BFN plant operators in the event of degraded grid situations. The licensee has also established adverse weather contingency procedures for meteorological conditions that could potentially affect offsite power availability. The licensee reiterated its Generic Letter 2006-02 regulatory commitment to maintain the aforementioned communication protocols during the time that EDG ‘3D’ inoperability exceeds the original AOT of 7 days. The licensee committed to carefully monitor and restrict switchyard activities to those needed for plant operation.

One compensatory measure proposed by the licensee was provided in a commitment. The licensee committed to avoid planned maintenance and testing that could result in inoperability or equipment loss, or would increase the probability of an unplanned plant transient during the time EDG ‘3D’ inoperability exceeds the original AOT of 7 days. These components/systems include those features specifically redundant to the features supported by the inoperable EDG ‘3D’ such as SBGT Systems A and B, Division I of Unit 3 Core Spray, Division I of Unit 3 RHR, and the three Unit 3 EDGs and four Units 1 and 2 EDGs. Also, the licensee will avoid testing

and maintenance of the Unit 3 high pressure injection systems with the exception of required TS testing.

The standby AC system is designed with sufficient redundancy such that an EDG may be removed from service for maintenance or testing. The remaining EDGs are, therefore, capable of carrying sufficient electrical loads to satisfy the BFN Updated Final Safety Analysis Report requirements for accident mitigation or unit safe shutdown. Therefore, the NRC staff finds that the proposed change does not impact the redundancy or availability requirements of offsite power supplies or change the ability of the plant to cope with station blackout events.

Based on the above evaluation, the NRC staff finds the proposed one-time revision to the Unit 3 TS 3.8.1 will continue to ensure the availability of the required AC power to shut down the reactor and to maintain the reactor in a safe condition after an anticipated operational occurrence or a postulated design basis accident. Furthermore, the NRC staff concludes that the proposed TS change does not affect compliance with the requirements of GDC 17 and 18, and 10 CFR 50.63.

3.2 Risk Insights

The licensee stated that they qualitatively evaluated the risk of an additional 7 days of operation with the EDG '3D' out-of-service and concluded that the one-time, single EDG AOT extension has a very small impact on overall plant risk. The licensee stated that Units 1 and 2 share four EDGs and Unit 3 has four EDGs (one of which will remain unavailable for 7 additional days). The licensee further explained that the onsite AC distribution system has the capability to manually align Unit 1/Unit 2 EDGs, including the '3D' EDG, with the corresponding Unit 3 4-kV shutdown boards if needed.

Unit 1 is shut down (Mode 4) following a lengthy shutdown with little decay heat generation (on the order of ambient heat loss from the reactor vessel) indicating there is limited AC power requirements for Unit 1 which will remain shutdown during the 7-day extension. Therefore, the remaining seven operable EDGs could be dedicated to shutdown of Unit 2 and Unit 3 if there was an LOOP during the extended outage. This configuration, minimal demand for AC power by Unit 1, is similar to the site configuration at the time of the NRC staff's August 2, 1999, authorization for a permanent extension of Units 2 and 3 EDG AOTs from 7 to 14 days. In support of the restart of Unit 1, the licensee requested an amendment to restore the Units 2 and 3 TS COMPLETION TIME for the EDGs to 7 days for both units. This request was approved on January 26, 2007.

As the NRC staff finds that the one-time extension will have a very small impact on overall plant risk given the current configuration at the site, the NRC staff concludes that the qualitative evaluation is acceptable to support this one-time request to extend the AOT to 14 days.

4.0 EMERGENCY CIRCUMSTANCES

In its April 6, 2007 letter, the licensee requested that this amendment be treated as an emergency amendment. In accordance with 10 CFR 50.91(a)(5), the licensee provided information regarding why this emergency situation occurred and how it could not be avoided.

The licensee provided the following explanation.

Reason for Requesting Emergency Amendment

10 CFR 50.91(a)(5) states that where the NRC finds that an emergency situation exists, in that failure to act in a timely manner would result in derating or shutdown of a nuclear power plant, or in prevention of either resumption of operation or of increase in power output up to the plant's licensed power level, it may issue a license amendment involving no significant hazards consideration without prior notice and opportunity for a hearing or for public comment. The regulation also states that the NRC will decline to dispense with notice and comment on the determination of no significant hazards if it determines that the licensee has abused the emergency provision by failing to make timely application for the amendment and thus itself creating the emergency.

The regulation requires that a licensee requesting an emergency amendment explain why the emergency situation occurred and why the licensee could not avoid the situation. As explained below, an emergency amendment is needed to preclude an unnecessary plant shutdown, and TVA could not have reasonably avoided the situation or made timely application for an amendment.

Reason Emergency Situation Has Occurred

On April 1, 2007, at 0815 hours Central Time, EDG 3D was declared inoperable in preparation for a scheduled performance of the routine monthly diesel generator operability surveillance tests prescribed by TS SR 3.8.1.1 and 3.8.1.2. This inoperability resulted in entering the action statements of TS LCO 3.8.1.B to conduct the SR tests. During the test, the SR test acceptance criteria on output voltage were not satisfied; thus, the EDG has since remained inoperable. In the course of troubleshooting activities, the existing EG-A component of the electrical governor for DG 3D was determined to be suspect and was replaced with a refurbished spare. During post-maintenance testing on April 5, 2007, the refurbished EG-A also failed, although in a different manner. There were no additional spare EG-As in-house and spare compatible EG-As are not readily available from vendors or in the industry. One spare EG-A has been obtained from another utility, installed, and is being tested. In parallel, TVA is expediting the repair of the two EG-As at a vendor facility. However, repair, replacement, and in-situ testing of the EG-A may exceed the seven-day EDG AOT.

Reason the Situation Could Not Have Been Avoided

Failure of the EDG to pass the monthly operability SR was unexpected. Troubleshooting and repair activities were promptly commenced and have been ongoing around the clock. To date, the following activities have been completed in attempting to diagnose and remedy the problem

- Diagnosed the voltage regulation issue due to a failed EG-A
- Replaced the suspect EG-A with a refurbished spare
- During post-maintenance testing, the refurbished EG-A failed and has been removed for repair

- A replacement EG-A from another utility has been installed and is being tested

The efforts to repair and return the EDG to a fully operable status have not been successful due to the unexpected failure of the EG-A and failure of the replacement EG-A. Thus, the net time to troubleshoot and repair the EDG 3D has been longer than typically experienced, and has resulted in an unexpectedly lengthy duration of EDG 3D inoperability. TVA could not have reasonably foreseen these added difficulties in returning EDG 3D to operable status within the existing seven-day Completion Time of TS LCO 3.8.1.B.4.

Completion of repairs, post-maintenance testing, and surveillance testing to reestablish EDG 3D operability may not be completed prior to expiration of the existing seven-day AOT timeframe. Therefore, TVA is requesting a one-time extension of this seven-day AOT by an additional seven days to assure adequate time is available for completion of repairs, post-maintenance testing, and surveillance testing of the EDG.

TVA has determined that the risk of the requested AOT extension does not warrant subjecting Unit 3 to a shutdown transient. This requested extension would be limited to the current period of EDG 3D inoperability. TVA, therefore, considers that the situation could not have been avoided and there is justification for requesting the proposed license amendment on an emergency basis.

Based on the above, the Commission finds that an emergency situation exists, in that failure to act in a timely way would result in derating or shutdown of the plant. The licensee has explained why the emergency situation occurred and why it could not be avoided. Therefore, this request was handled under the provisions of 10 CFR 50.91(a)(5).

5.0 REGULATORY COMMITMENTS

In the April 6, 2007, submittal the licensee made the following commitments:

1. During the time period the EDG 3D inoperability exceeds the original AOT of 7 days, planned maintenance and testing activities on components/systems, which could result in inoperability or equipment loss, or which would increase the probability of an unplanned plant transient will be avoided. These components/systems include those features specifically redundant to the features supported by the inoperable EDG 3D such as SBGT Systems A and B, Division I of Unit 3 Core Spray, Division I of Unit 3 RHR, and the three Unit 3 EDGs and four Units 1/2 EDGs. Also, testing and maintenance of the Unit 3 high pressure injection systems will be avoided except for required TS testing.

2. The communications protocols described in the previous section will be maintained during the time that EDG 3D inoperability exceeds the original AOT of 7 days. Also, switchyard activities will be carefully monitored and restricted to those needed for plant operation.

The NRC staff finds that reasonable controls for the implementation and for subsequent

evaluation of proposed changes pertaining to the above regulatory commitments are best provided by the licensee's administrative processes, including its commitment management program. Unless otherwise identified, the above regulatory commitments do not warrant the creation of regulatory requirements (items requiring prior NRC approval of subsequent changes).

6.0 FINAL NO SIGNIFICANT HAZARDS CONSIDERATION DETERMINATION

The Commission's regulations in 10 CFR 50.92(c) state that the Commission may make a final determination that a license amendment involves no significant hazards consideration if operation of the facility in accordance with the amendment would not:

(1) Involve a significant increase in the probability or consequences of an accident previously evaluated; or,

(2) Create the possibility of a new or different kind of accident from any previously evaluated; or,

(3) Involve a significant reduction in a margin of safety.

The following analysis was provided by the licensee in its letter of April 6, 2007.

1. Does the proposed TS change involve a significant increase in the probability or consequences of an accident previously evaluated?

Response: No

The proposed change does not affect the design of the EDGs, the operational characteristics or function of the EDGs, the interfaces between the EDGs and other plant systems, or the reliability of the EDGs. Required Actions and their associated Completion Times are not considered initiating conditions for any accident previously evaluated, nor are the EDGs considered initiators of any previously evaluated accidents. The EDGs are provided to mitigate the consequences of previously evaluated accidents, including a loss of off site power. The consequences of previously evaluated accidents will not be significantly affected by the extended EDG Completion Time because a sufficient number of onsite Alternating Current power sources will continue to remain available to perform the accident mitigation functions associated with the EDGs, as assumed in the accident analyses. Thus, the consequences of accidents previously evaluated are not affected by the proposed change in Completion Time.

A qualitative probabilistic risk assessment was performed for the proposed seven-day AOT extension for EDG 3D by comparing the results of previous calculations which quantified approximate values of Core Damage Frequency and Large Early Release Frequency for extended out-of-service times for EDGs versus the baseline risk with nominal equipment unavailability. Based on this comparison, BFN has concluded that a one-time, single EDG AOT extension has a very small impact on overall plant risk.

2. Does the proposed TS change create the possibility of a new or different kind of accident from any accident previously evaluated?

Response: No

The proposed change does not involve a change in the design, configuration, or method of operation of the plant. The proposed change will not alter the manner in which equipment operation is initiated, nor will the functional demands on credited equipment be changed. The proposed change allows operation of the unit to continue while EDG 3D is repaired and retested. The proposed extension does not affect the interaction of EDG 3D with any system whose failure or malfunction can initiate an accident. As such, no new failure modes are being introduced. Therefore, this proposed change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. Does the proposed TS change involve a significant reduction in a margin of safety?

Response: No

BFN's standby AC system is designed with sufficient redundancy such that an EDG may be removed from service for maintenance or testing. The remaining EDGs are capable of carrying sufficient electrical loads to satisfy the Updated Final Safety Analysis Report requirements for accident mitigation or unit safe shutdown. The proposed change does not impact the redundancy or availability requirements of offsite power supplies or change the ability of the plant to cope with station blackout events.

For these reasons, the proposed amendment does not involve a significant reduction in a margin of safety.

The Commission agrees with the licensee's analysis and, thus, makes a final determination that the amendment does not involve a significant hazards consideration.

7.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Alabama State official was notified of the proposed issuance of the amendment. The State official had no comments.

8.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The NRC staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has made a final no significant hazards finding with respect to this amendment. Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in

10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

9.0 CONCLUSION

The Commission has concluded, based on the discussion provided in Sections 3.1 and 3.2 of this safety evaluation, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of these amendments will not be inimical to the common defense and security or to the health and safety of the public.

Additionally, the Commission has concluded, based on the considerations discussed above, that (1) the amendment does not: (a) involve a significant increase in the probability or consequences of an accident previously evaluated; or, (b) create the possibility of a new or different kind of accident from any previously evaluated; or, (c) involve a significant reduction in a margin of safety and therefore, the amendment does not involve a significant hazards consideration; (2) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (3) such activities will be conducted in compliance with the Commission's regulations, and (4) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributors: Matthew McConnell
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Date: April 6, 2007

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