*Reviewer 1:*

*Authors introduced the research results of submerged electromagnetic pump (EMP) for liquid lead in BREST-OD-300 reactor, including EMP’s role, parameters and service life, etc. No suggestions for improvement.*

*Reviewer 2:*

*1. Topic is of interest. Nevertheless it would be useful to explain in more details the requirements associated to its future use (location in Brest,....) particularly in Introduction. A scheme showing its position in BREST-300 would be of interest for the lecturer.*Answer:

A more detailed description of the pump functions is added in introduction:

The EMF is installed in the reactor vessel at the commissioning stage after lead filling. The pump's task is to pump out an excess volume of lead to accurately set the coolant level in the reactor. After adjusting the lead level, it is planned to dismantle the pump, which will not be used during further operation of the reactor. In this regard, long-term operation of the pump is not planned.

Unfortunately, at present, the pump developers do not have a picture of a reactor unit with a built-in pump and cannot demonstrate it.

Some details are added to chapter 3.

*2. Is the any reason to identify this pump as "ALIP 10/2"?*

Answer:

According to the approach adopted in the Russian Federation, the pump designation is assigned as follows:

ALIP - annular linear induction pump;

10 - developed pressure in bar,

2 - nominal flow rate in m3/hr

This is added to chapter 3.

*3. In abstract (and some other parts of the paper) it is necessary to review english.*

Answer:

We have reviewed the paper and have done the best we could.

*4. May be to give more interest in the paper, some options should be explained:
- why cover gas is nitrogen + argon*

Answer: The composition of the gas medium above the lead level is set by the developers of the reactor. The percentage of nitrogen has been added to the paper (chapter 2).
*- why so short requirement on operation: duration: >1000 hours?*

Answer: Because the pump is used only to precisely adjust the lead level in the reactor vessel after it is filled with lead. After adjustment, the pump is removed from the reactor and is no longer used. This explanation is added to the introduction.

*5. Missing : results (measurements) to support chapter 4-1*

Answer:

We are speaking of the results that support our engineering approach to electromagnetic analysis. They are supported with many years of design and exploitation of EMPs developed in Efremov Institute.

Some correction is added to chapter 4.1

*6. It is said "Low efficiency 1.1% ..." what is the definition of this efficiency? why it is considered as acceptable? This result should be more discussed*

Answer:

Efficiency is defined as the ratio of useful power (product of developed pressure to flow rate) to the supplied power. Lead has relatively low electrical conductivity and large density. For this reason, the pump efficiency is low - 1.1% and cannot be significantly increased. But for the current pump application (for reactor lead level regulation during reactor vessel filling) efficiency is not as important as pump reliability and simplicity.

The description in paragraph 4.1 has been corrected and supplemented.

*7. It is said "Pump design satisfies structural design criteria.": Is it possible to give these criteria and compare with results in order to justify this conclusion:" Pump design satisfies structural design criteria"*

Answer: Structural design criteria and calculation results were added to Section 4.3

*8. Conclusions should be extended, in particular with regards BREST-300*

Answer: Conclusions were extended.

*Reviewer 3: Submerged EM pumps in a pool-type of liquid metal reactor is of interest in general. The paper is relatively short at 4 pages. Thus there is room to expand on this paper.*

*1. It would be useful to include a discussion on the physical location of this EM pump in the BREST reactor.*

Answer:

A more detailed description of the pump functions is given in introduction:

The EMF is installed in the reactor unit at the commissioning stage after lead filling. The pump's task is to pump out an excess volume of lead to accurately set the coolant level in the reactor. After adjusting the lead level, it is planned to dismantle the pump, which will not be used during further operation of the reactor. In this regard, long-term operation of the pump is not planned.

Unfortunately, at present, the pump developers do not have a picture of a reactor unit with a built-in pump and cannot demonstrate it. On the other hand, we believe that a more detailed description of the pump functions is sufficient for the reader of the article.

*2. In addition, it would be useful if there was information on the environmental conditions that this EM pump will see during operations.*

Answer: Environmental conditions for EMP are given in introduction and chapter 2. The surrounding mediums for the pump (lead, argon with nitrogen) and their temperature of 420 °C. are indicated.

*3. It is also not understood why this pump only needs to be tested or operated for 1,000 hours. Is this only for initial testing and then this test pump and its testing experience be used for development of a submerged EMP that can last the lifetime of the reactor?*Answer: Because the pump is only used to precisely adjust the lead level in the reactor unit after it is filled with lead. After adjustment, the pump is removed from the reactor and is no longer used.

A more detailed description is given in introduction.

*4. In addition, there should be a discussion of the materials of construction of the various systems and components that comprise the EM pump. As special emphasis should be on the electrical pump windings and the insulation that is used for those windings.*

Answer: In section 3, a list and description of the main materials used in the design of the EMP has been added.

*5. The paper should be edited for grammar.*Answer: ???

Again - given the that the paper is relatively short - the authors have the ability to expand this paper in a material and technical manner.

Overall: Dear authors, please upload a revised paper incorporating the corrections above. If you have new relevant data, you are welcome to include these. Please upload a revised paper in the next 5 weeks.