

UVP Doel 4 – Tihange 3

Yes No

Evaluation of Belgium answer to

Austrian questions and clarifying questions

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CONTENTS

UVP D4 T3 EIA REVIEW.....	5
Question 1	5
Question 2	5
Question 3	6
Question 4	6
Question 5	7
Question 6	7
Question7	7
Question 8	7
Question 9	7
Question 10	7
Question 11	8
Question 12	8
Question 13	8
Question 14	8
Question 15	9
Question 16	9
Question 17	9
Question18	9
Question 19	10
Question 20	10
Question 21	11
Question 22	11
Question 23	11
Question 24	11
Question25	11
Question 26	12
Question 27	12
Question 28	13

UVP D4 T3 EIA REVIEW

In the course of the evaluation, a total of 28 questions were raised in relation with 6 different areas of interest, from available alternatives for electric supply, over severe accidents to the transboundary impact. Although all of the questions were answered, not all answers were assessed as technically completed to the extent that a full understanding could be reached. The reviewer felt that in some of the answers the information provided was a repeat of what was already in the EIA report, which in the view of the reviewer was not sufficient or not sufficiently clear – which is why the question was asked in the first place.

The analysis as below is to document the evaluation of the answers received, with emphasis on the questions that should be discussed in more detail during proposed bilateral in-person consultations.

Question 1

Do the conditions imposed in the EIA procedure have a binding effect on the subsequent procedures, in particular the nuclear procedure?

Evaluation From the answer it does not seem that the EIA is binding in any way. Although this is mentioned in the answer (*"The EIA report includes some non-binding, both radiological and non-radiological, recommendations to further follow-up and/or further reduce the environmental impact"*) no radiological-related recommendations for the follow-up have been identified in the EIA report. It is further unclear what is meant by the statement that the PSR is a *"legally binding process"*. While the requirement to perform a PSR is legally binding, any findings are subject to discussion and ultimately agreement between the Regulator and Operator. It is also unclear whether the *"FANC expectations"* that are mentioned in the EIA and in some of the answers are legally binding in this framework, or just suggestions.

Question/discussion During bilateral in-person consultations, specific aspects of areas that are legally binding vs. those that are not are to be discussed. In particular when/if during the safety update process as well as the LTO activities there are solutions that would impact the results of the EIA, we would like to understand how those would be reflected in the EIA process.

Question 2

In the unlikely event that D4/T3 are not restarted for an extended period of time (e.g. until 2029), what would be the impact of such a scenario on the power supply/security and stability of the grid in Belgium?

Evaluation The answer does not really provide any further information as to what would be projected effects in the supply of electricity in the case that D4T3 startup would

be delayed. The references to previous studies are not providing any clarity, because as it is indicated in the answer the framework conditions have changed in terms of availability of replacement power but also the unitisation profile.

Question/discussion During bilateral in-person consultations, it would be very useful to have a full understanding of the plan to bring the D4T3 units back in operation and possible challenges that might delay the implementation of those plans.

Question 3

Question answered

Question 4

In the absence of a firm agreement with the government, is it correct that a detailed plan for activities to support LTE for D4/T3 has not yet been developed? Since the list of required retrofits is not known at this time, it is difficult to determine the risks associated with a life extension or to assess the project in detail. Is it planned to carry out an EIA procedure again once the retrofits have been bindingly defined - in which the results of the required PSRs must also be included - so that the public concerned can assess the risks associated with an LTE?

Evaluation The answer claims that the EIA developed on the basis of current knowledge/status is an “enveloping” assessment of the potential impact of D4T3 life extension. It is stated that there will be extensive safety upgrades (at least that is what FANC expects; though an answer to a question later-on suggests that there might not be that many safety upgrades needed) Still, even with all LTO measures, the ageing-caused degradation during the remaining 10 years of operation is likely to reduce safety level. This does not seem to have been taken into account in the analysis, in particular that the LTO degradation might be affecting some specific items or SSCs that might be disproportionately relevant for the overall safety level. From the reply to Question 2, it looks that there will be no update of the EIA, and therefore it is not clear where the potential impact of possible LTO related degradation would be assessed.

Question/discussion During bilateral in-person consultations, it would be good to be able to discuss the timeline of all the activities planned, depicting safety upgrades and eventual LTO degradations. The Austrian side would like to know what the safety level achieved at the planned end of life (i.e., 2037) would be, considering safety measures as well as ageing related degradations.

Question 5

A time chart describing the EIA process, the PSR process, the determination of safety improvements based on current safety requirements, and the timeline for implementation of necessary improvements would be welcome - all in the context of the proposed LTE and associated administrative procedures.

Evaluation The time chart is indicated as “integrated” but it was not attached. From the written answer it appears that it is expected that the implementation of all activities would be completed in 3 years’ time. While it is known that Engie has been making studies and other preparation, it is not clear whether the supply chain issues, labour issues, etc. would allow for the plan to be adhered to.

Question/discussion During bilateral in-person consultations, the time schedule that was mentioned in the answer is to be provided. Also, the discussion on possible effects of e.g., supply or labour shortage on the plants would need to be explained.

Question 6

Question answered

Question 7

Question answered

Question 8

Question answered

Question 9

Question answered

Question 10

Question answered

Question 11

According to Belgian legislation, another PSR has to be carried out before the commissioning of the plants can be authorized. What is the planned schedule for the PSR? Has FANC already defined and/or approved the content of the required PSR?

Evaluation The question has been answered as far as the schedule is concerned, but not regarding the content of the PSR. The content of a PSR is expected to be defined in the Belgian regulation. In accordance with the explanation in the EIA, some “subprogrammes” e.g., for the “LTO PSR” are expected to be added. From the answer one could conclude that the whole LTO would be (in terms of licensing) handled as a part of the PSR, which is also the case in some other countries.

Question/discussion During bilateral in-person consultations, we would like to obtain the clarifications as to actual content of the PRS to be undertaken at D4T3 units, considering the mandatory requirement for a PSR as well as any add-ons. Also, a clarification whether the license for extended operation would be issued on the basis of the PSR (to include ageing) or the two processes would be treated separately.

Question 12

Question answered

Question 13

Will the Aging Management Program (AMP) be reviewed during its implementation (i.e., prior to commissioning of D4/T3 and after completion of the required measures), e.g., by IAEA SALTO?

Evaluation The part of the question regarding the SALTO mission has not been answered. The IAEA calendar does not indicate any planned missions to Belgium, though if the planned start-up post-LTO is planned for 2027 there is still time for such.

Question/discussion During bilateral in-person consultations we would like to know whether D4T3 will be subject to an IAEA SALTO review

Question 14

It was reported that "Doel 4 and Tihange 3 largely meet the new FANC safety requirements that would apply after 2025, but a number of safety improvements are still required." Could you please provide a list of these safety improvements? Have these been considered in the analysis of the confining accident sequences for the EIA radiological impacts?

Evaluation The answer recalls the section 1.2.1.1 of the EIA, where the list of “design improvements” 3 items: improvement to cope with increased temperatures in the environment, a new emergency centre and better cooling of the SNF pools. It is a bit hard to believe that apart from those 3 no other safety improvements would be needed in accordance with FANC’s post 2025 guidelines (which, in our understanding, was developed to apply to new reactors).

Question/discussion During bilateral in-person consultations we would appreciate obtaining information to understand how come that with only those 3 safety measures D4T3 would be able to comply with FANC requirements for the operation post 2025.

Question 15

Question answered

Question 16

It was reported that several actions due from the 1st TPR "were not followed because the plants were scheduled to shut down in 2025." If D4/T3 do not extend their life, are these due? What are they and when are they to be implemented?

Evaluation This question was raised because there was an official statement in the Belgian TPR status report in this respect. The answer however does not indicate which those actions might be, but rather stated that there are no outstanding questions. It also makes reference to the PSR 2012 as well as the LTO for the units D1/2T1 from 2017, which is before the 1st PSR, so it is not clear what is the relevance of this. The answer also indicates is that the LTO for D4T3 will be “comprehensive”. In our view none of this answers the question.

Question/discussion During bilateral in-person consultations we would like to know which actions were meant in the official Belgian statement on the NAcP for the 1st TPR as “not followed”, and whether those are to be implemented now as part of the LTO improvements?

Question 17

Question answered

Question 18

The DEC-B event (the CSBO sequence), which was used as the comprehensive sequence in the analysis of a radioactive material release, was not described in detail, so the description of the accident timing is missing, which is important

because the Source Term is highly dependent on the actual timing of the release. Please describe the sequence of events in detail, including the timing and assumptions on which the analysis was based.

Evaluation The answer indicated that MECOR and STEC codes were used. The question on the description of the sequence was not answered, so we do not have any indication as to what is actually considered to have happened, what would be the timing of the sequence, important assumptions, etc. all of which would be relevant for the source term. The fact that the release from a leaking containment (expected to be estimated at a full containment design pressure) and by releasing via the filtered vent over a period of 10 days is an important additional information. Also that the total release is added up and summarised in a period of 6 hours for the transboundary impact is an important new information (clarification; it is in the EIA report but described in the way that it was not understandable).

Question/discussion During bilateral in-person consultations we would like to obtain (much) more details in relation to the exact accident sequence, relevant assumptions, conditions, timing of various important steps/development, etc.

Question 19

Within the CSBO accident sequence, especially depending on the triggering event, other SSCs in a plant may be affected, making it possible for an unfiltered release to occur simultaneously with a filtered release, e.g., due to contaminated intrusion or damage to an SG pipe.

Evaluation The question was not answered, as the details of the sequence, timing and assumptions were not made available. The fact of the matter is that, depending on the assumption, the CSBO sequence that was used to determine the source term might not be the most conservative one, and thus underestimating the off-site consequences.

Question/discussion During bilateral in-person consultations we would like to obtain deeper understanding in relation to the sequence analysed as well as to why this sequence was assessed as being the most conservative (in terms of the release) to be the enveloping one for all other releases. Also, we would like to see the justification as to why any other possible releases (e.g., SG tube, leaking or failed containment penetrations), especially in the view of the LTO) were excluded as less likely or less important.

Question 20

Question answered

Question 21

Question answered

Question 22

Question answered

Question 23

Question answered

Question 24

Question answered

Question 25

The source term used in the dispersion modelling is not provided in the EIA report. Please provide the source term for the LOCA, the FHA, and for the envelope sequence (CSBO) in terms of

- a. the release into the containment and
- b. the release into the environment.

Evaluation The complete source term was not provided, neither for the release into the containment nor the release outside of the containment. A reference is made to the tables 64 and 99 in the EIA report that provided the “source terms to the environment (most importantly radionuclides)” for Doel 4 and Tihange 3, respectively. The source terms for the LOCA and for the fuel handling accidents are those that have been submitted for the EC assessment within Article 37 of Euratom (in 1981) and the source term for the severe accident DEC B comes from the analysis of the sequences Complete station blackout (CSBO) that leads to a core melt and release by leakage from the containment and through the containment filtered vent system releases.

The question was not really answered as the source term into the containment was not provided (which is relevant for the assumption of the retention function of the containment). The source term to the environment was provided for “most important radionuclide groups”, which is not what is typically provided in other recent EIAs. What is also obvious from the EIA and confirmed in the answer, the analyses have been done some time ago (2014) apparently in the scope of the PSR or post-Fukushima stress test and not repeated for the EIA.

Question/discussion During bilateral in-person consultations we would like to obtain further details on the a) source term of all radionuclides that are being released in the containment and b) into the environment.

Question 26

Question answered

Question 27

The impact assessment will be conducted for a period of 48 hours after the release (starting at the end of the release, which per se is expected to last 6 hours) and will be determined for the areas shown in Fig. 19. While this is obviously the most affected area, it is entirely possible that areas beyond Fig. 19, i.e., up to 1000 km, could be affected. Other recent EIAs on NPP life extension provided information on impacts in areas up to 1000 km from the source and included much more detail on estimated impacts, including deposition of e.g. Cs 137. Other similar EIAs also considered deposition over a longer period of time, for example.

Evaluation The way the EIA is presented it was unclear that the larger “area” in the Fig 19 is the area for which the radiological impact has been calculated. Nevertheless, by deciding to provide only an example for each plant (Fig. 20 and 21) as well as examples of impact (from Doel to France for noble gases; deposition of Cs in Germany), the estimate of an actual impact to e.g., Austria cannot be concluded. In the answer, it is said that the impact of the deposition to Austria could be read from the values for Luxembourg and Germany. This however is not really the case as we have seen from the actual releases of e.g., Chernobyl, where some much more distant areas have been more heavily affected than areas closer by. This in particular might apply to Austria, because due to the prevailing western weather direction, it is the Alps that tend to get more of the rain and with that the deposition from a releases that are coming from north westerly direction. Therefore, estimating the impact of the deposition on Austrian territory from values provided for Luxembourg or Germany is not believed to be leading to correct results.

A chart depicting a total deposition across the areas as depicted in Fig 19 would be highly useful.

Question/discussion During bilateral in-person consultations we would like to obtain further details, in particular access to the chart(s) depicting radiological impact that are indicated to have been prepared for all the geographical area that is indicated in Figure 19 of the EIA.

Question 28

Impairments as a result of severe accidents affect not only the population, but also the agricultural sector. In this respect, the depositions determined by analyses - also at a greater distance from the sites - would have to be considered with regard to the values applicable in neighbouring countries, as well as in Austria. In Austria, for example, it is stipulated that environmental control measures are to be taken if the deposition exceeds **750 Bq/m²**, so that a negative impact above this deposition value is to be regarded as given.

Evaluation The “750 Bq” in question 28 is obviously 750 Bq/m² for the “deposition value “ of Cs 137 (as it was clearly indicated in the question). This value coincides with the trigger for the initial countermeasures (monitoring) in Austria. As indicated in the answer to question 28, the EIA opted for reporting results of the maximum value from the simulation in each country. Such a representation is really not saying much, because only a maximum is reported, but there might be many places where the values might be close to the maximum, which from a single data point per county (this maximum) cannot be seen/understood. Much better reporting is to have a map indicating the values, as some recent EIAs did.

In terms of estimating the ground contamination for Austria, a maximum (single spot) ground deposit in Germany of 5000 Bq/m² and in Luxembourg of 2430 Bq/m² make it impossible to conclude that there would be no place in Austria having ground deposits in excess of 750 Bq/m².

Question/discussion During bilateral in-person consultations we would like to obtain further details on the profile of the deposition for all areas as depicted in Figure 19, and in particular for the pre-Alpine and Alpine areas in Austria.

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