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ANNEX – Additional information requested by SEAC

Questions on the AoA and SP

Analysis of Alternatives (AoA):

1. Please clarify whether or not any of the short-listed alternatives fulfils all criteria of a 'suitable alternative'; meaning it is safer, technically feasible, economically feasible and available for the use applied for.

   Please note that technical and economic feasibility does not refer to feasibility 'in abstracto' or in laboratory conditions or under conditions that are of exceptional nature. Also note that availability refers to availability from the perspective of production capacities of alternative substances, or from the perspective of feasibility of the alternative technology, and in light of the legal and factual requirements for putting them into circulation. For further information, see ECHA'supdated Guidance on the preparation of an application for authorisation and guidefor How to apply for authorisation).

As demonstrated in the SEA_AOA, to date there are no alternatives that fulfil all criteria of "suitable alternative" of sodium dichromate as an anticorrosion agent of the carbon steel in sealed circuit of gas absorption appliances up to 1.05% w/w (corresponding to 0.42% w/w as Cr6+) in the refrigerant solution.
Following the ECHA Guidance on the preparation of an application for authorisation and guide for How to apply for authorisation, a summary table is shown which analyzes the 3 alternatives taken into consideration by comparing their technical, economic feasibility and availability with the substance object of AfA, sodium dichromate.

N.	alternative	Technical feasibility	Economic feasibility	Availability	Reduction of overall risk
1	*Eliminating the corrosion inhibitor inside the sealed circuits.*				
2.1	*Isoxazolidine derivatives namely 5-(benzo[d][1,3]dioxol-5-ylmethyl)-2-tetradecyl isoxazolidine (BDMTI) and 5-(4-hydroxy-3-methoxybenzyl)-2-tetradecyl isoxazolidine (HMBTI)*				
2.2	*Glycerin-Grafted Starch as Corrosion Inhibitor of C-Mn Steel in 1 M HCl solution*				
2.3	*Molybdates*				
2.4	*Acids by three different novel Semicarbazones as inhibitors - Synthesis of r-2, c-6-diphenylpiperidin-4-one semicarbazone - Synthesis of r-2, c-6-diphenyl-t-3-ethylpiperidin-4-one semicarbazone - Synthesis of r-2, c-6-diphenyl-t-3-isopropylpiperidin-4-one semicarbazone*				
2.5	*Cerium Nitrate*				
2.6	*Sodium nitrite*				
2.7	*Strong alkaline solutions*				
2.8	*Inhibitor 7*				
3	*Metallurgical alternatives for the construction of sealed circuits which are currently subject to corrosion.*				

Legend:

suitable	Suitable 'in abstracto' or in laboratory conditions or under conditions that are of exceptional nature.	Suitable, but not recommended	Not suitable	No data available/ Not applicable

2. Please clarify whether or not according to the applicant's knowledge any of the short-listed alternative substances or technologies is already used by other actors in the EU for the use applied for.

According to ROBUR's knowledge, none of the short-listed alternatives (substances or technologies) are already used by the other actors in the EU for the use applied for.

3. It was decided that you will not investigate sodium nitrite as an alternative inhibitor further. Why is it then on the list of possible substitutes?

Sodium nitrate is in the list of possible alternatives because Robur, based on the anticorrosive capacity of Sodium Nitrite on carbon steel, as reported in scientific literature for the use in cooling towers, has evaluated it among the possible candidates for further tests.
However, since this substance has a technical feasibility 'in abstracto' or in laboratory conditions or under conditions that are of exceptional nature, Robur has decided to consider it as an alternative but currently has not allocated economic resources to continue investigating it.
In the next 4 years, as reported in Phase 1 of the Substitution Plan, ROBUR will evaluate whether to resume operational tests to evaluate its technical performance in the GAHPs.

Substitution Plan (SP):

4. In the substitution plan there is the same schedule of activities for all 3 alternatives (see response to question 20 from the 1st round), despite the fact that they are very different. Substitution of one inhibitor with another doesn't alter the production process much. On the contrary, the replacement of the construction material (Alternative 3) would cause major changes in the production line. Why is the program of activities the same, despite very different activities necessary? Can you clarify that?

Although the proposed alternatives are very different, Robur has established that the "method" for verifying the alternative (inhibitor change or metallurgical change or absence of inhibitor) must always remain the same, i.e., be sure that the production of non-condensable gases is less than 0.01 - 1.5 cc / h (see answer n.15 of 1st round).
The tests will always have the same protocol whatever the 3 alternative way ROBUR will take because they are aimed at verifying the non-condensable production of destructive tests on the internal surface of the circuit to verify the corrosion stage on the piece, etc.)

Question on the SEA

Confidentiality claims:

5. Please provide or confirm non-confidential ranges for the following figures:
    a. Cost of downsizing and closure of the redundant production line (the public range €0.5-5m, described as "avoided relocation cost" in Table 43, does not match the confidential costs associated with decommissioning the closed/downsized area that is given in Table 33 (figure at the top of page 111).

The value reported in table 43 represents the estimated cost of relocation outside EEA: 2.75M€ (see table 30) and includes the cost associated decommissioning/closure activities of current production areas (350k€), while value reported in table 33 represents the estimated costs associated to decommissioning/closure activities.

b. Please clarify the social cost of job losses, as the public range in Table 43 is given as €2-20m, but Table 39 has €4-17m. Similarly, the public ranges for the number of job losses differ on page 116 (50-200), Table 39 (10-200), and the answer to SEAC's question no. 25 (50-300).

Public range of social cost of job losses: 2-20M€
Public range of number of job losses 50-300

Health impacts:

6. To calculate the number of exposed people in the local area around the production site, an area of 1km^2 was used, resulting in an estimated number of 1100 people.
    a. What was the rational for assuming an area of 1km^2?
    b. A default assumption frequently used in EUSES models for local assessment is that a site is located in a standard town, where its releases result in exposure to the local general population counting approximately 10 000 people. Why did you account for less people than would be includedin an assessment based on this frequently used default assumption?

As noted in the EURAR for Cr(VI) substances (European Chemicals Bureau, 2005), "*releases of Cr(VI) from any sources are expected to be reduced to Cr (III) in most situations in the environment (…)"* and "*the impact of Cr(VI) as such is therefore likely to be limited to the area around the source*." Such understanding about the impacts of Cr(VI) being limited to the area around the source has been shared by RAC in previous opinions such as in the opinion on the AFA-O-0000006480-78-01/D (ECHA, 2016). Moreover, taking into account that the MVE local air represents the concentration 100 m from the point source, the majority of local population is exposed to concentrations much lower than the estimated concentration 100m from the point source, because the concentration of Cr(VI) is decreasing with increasing distance from the emission source. However, in the man via environment assessment, all the exposed local population have been assumed to be located only 100m from the emission source, which results in a clear overestimation of impacts.
Given this background, assuming that 10000 local people will be affected in the immediate neighbourhood has been considered by the applicant a considerable overestimate since at explained in pag.56 of the AOA-SEA the production plant of ROBUR is located in an industrial area of Zingonia, far away from big centres and with a low density of population. For this reason, a number of exposed people of 1100 people (figure includes both indirect exposed worker and the local population) was considered more appropriate and realistic than the default value of 10 000.

Impacts related to the non-use scenario:

7. In response to SEAC's question no. 26b, it is explained that the non-EU competitor is expected to take on Robur's market share in the short-term, but that EU competitors can be expected to "recover" market share after modifying their production lines.
    a. Does this mean that eventually the EU competitors would take on Robur's current market share by taking it away from the non-EU competitor, whofirst wins it?

The EU competitors do not have a production similar to Robur one. Therefore, in the short term, the current market share will certainly be entirely covered by the non-EU competitors (China, USA) who have similar items, as already explained in the answer n.36b of the 1st round.

b. How long would it take for the EU competitors to win over Robur's market share after initially being taken on by a non-EU competitor?

It is difficult for Robur to establish how long the modification of production process could take for Robur's competitors to win over its market share.

8. Question no. 27 asked why (from a customer perspective) it is not suitable to use heat pumps that do not require the use of sodium dichromate. Please explain further why customers cannot simply switch to F-gas and ammonia heat pumps. Are there differences in the prices that make them unsuitable for the same use?

As indicated in the AOA_SEA, ammonia heat pumps are used largely for refrigeration\air conditioning. When used for heating, they have considerable efficiency losses, and they reach water delivery temperatures of no more than 40-45 ° C (typically at most they can only be used for underfloor heating) and therefore they do not allow for optimal performance comparable to GAHP for heating.
For refrigeration, the best performances of ammonia heat pumps are recorded only and exclusively in the construction of ice skating rinks.
Therefore, the use of this technology is used in a specific sector with very high prices.
Concerning the F-gas heat pumps, customers presumably prefer to use GAHPs because they contain natural refrigerants not subject to normal constraints and phase-out like the F-Gases which are ozone depleting gases.

9. In response to SEAC's question no. 32, it is stated that the downsizing of the relevant EU plant will affect the applicant's capability to maintain economic resources allocated to the R&D division for the search of an alternative to sodium dichromate. Please provide a detailed explanation for this impact, showing how the substitution of sodium dichromate will be financed in the baseline scenario andhow it will be financed in the non-use scenario.

The economic resources for the search for the alternative in the baseline scenario are indicated in table 47 of the AOA-SEA and reported in detail in appendix 2 of the dossier, attached hereto.
In the NUS scenario, due to the downsizing of production plant, the financial resources allocated to R&D will be cancelled already in the short term.

10. In the answer to SEAC's question no. 33, it is confirmed that costs of decommissioning related to the production line of substance-dependent products is incurred both in the baseline scenario and the non-use scenario. Moreover, both appears to take place after 9-12 years (compare p. 122 in the AoA-SEA with p.16-17 in the SP). Please either confirm that the impact cancels due to being part of both scenarios, or otherwise provide a calculation of the comparative net-impact showcasing any differences between the two scenarios.

It is confirmed that the impact is included in both scenarios and occurs in both scenarios in the long term period for different reasons:

- in the baseline scenario the old line cannot be decommissioned until the new one guarantees 100% of production
- in the NUS scenario, due to the downsizing, the company will not be able to have the economic resources necessary for decommissioning before the long term

11. Please provide additional clarification and explanation of the confidential figure estimating the avoided loss of residual capital value. The answer given to SEAC's question no. 33 suggests that the reported residual value of capital accounts for investments "not strictly connected to the old production line (e.g. building, equipment, infrastructure etc.) […] that could be lost in [the] non-use scenario". It is unclear what exactly is lost and why in the NUS. To clarify this impact, please name the assets included, their estimated residual value, and the reason why the corresponding value is lost.

The assets considered in the calculation of the residual value and the corresponding estimated lost value are shown in the following table. All these values have been taken into account in the calculation of the residual value as even if not strictly related to the use of the substance, being the NUS most likely scenario the downsizing of the production plant of the company, they will probably be lost.

ASSETS	**Estimated residual value**
industrial patents and intellectual property rights	290K€
concessions, licenses, trademarks and similar rights	360K€
land and buildings	2.6M€
plant and machinery	1.4M€
industrial and commercial equipment	590K€
Equipment and machinery related to R&D	2,2M€
work in progress and semi-finished products	4.8M€

12. In response to SEAC's question no. 35b, it is stated that Robur is unaware of differences in the efficiency of their appliances compared to competitors' products that are assumed to take over the market should Robur not receive an authorisation. Please confirm whether this provides sufficient basis to exclude the monetised benefits of saved CO2 emissions from the quantitative impact analysis, or otherwise present your argument for assuming that emission savings would occur despite the possibility that equivalent emissions could be realised in the use of competitors' products.

In the answer n.35b of the first round we replied that we did not know the real efficiency of the competitors' products because during the preparation of the dossier we had looked for public data on the avoided CO2 emissions of the products sold by our competitors (since we make them public). This research was intended to make a comparative analysis on the actual benefit of the societal impact in terms of avoided CO2 emissions but it was not possible for the above reasons.
Nevertheless, we believe it is prudent to take this benefit into account in table 41 for the following reasons.
The hypothesis that Robur market will be covered by a non-EU competitor is a qualitative hypothesis that does not have a well-defined time frame, therefore it is currently impossible to know the exact timing of this market coverage.
Since there is no time reference and no data are available on the efficiency of the products realized by non-EU competitors, it is not possible to make a comparative analysis about emission savings. However, this does not justify the elimination of the evaluation as a benefit of the avoided CO2 emissions associated to ROBUR products because it is not known if and when they will be able to be equaled to competitors ones.