Brine challenge – responses to questions – September 2020

ID	Question	Response
01	Is the brine suitable for OSEC?	We believe that due to the risk of contaminants within the brine waste this will not be suitable for use with onsite hypochlorite Generation plant.
02	What exit temperatures is the waste brine discharge at?	This will be within an ambient temperature range. Make up water is from borehole supply at 8 - 12°C. Storage within building that may increase temp slightly but realistically between 8 - 20°C.
03	The technical details section states that "*current modelling suggests that the brine waste will have the approximate concentrations*…". This is a bit confusing, as the challenge is about an existing brine waste from the Blandford area – so actual concentrations should be available. Is the modelling for future applications / scenarios?	This is based on an empirical model for the ion exchange using average measured values within the raw water being treated. As the source is from a combination of 3 boreholes, there will be both seasonal and water quality variance between the boreholes that will effect the actual concentrations in the final brine waste. The values given will reflect a typical range but accept there will be variances to this. Subject to agreement to progressing further, additional sampling can be arranged. In the meantime, we have included sampling data available to date for brine waste for the site in the Blandford area and one other in the region. See separate file.
04	The type and concentrations of the various ions provided by Wessex suggest a complex and very concentrated brine (TDS~12%) – rather uncommon for an ion exchange. In order to consider properly its management an understanding of its nature is critical. Can you provide a comprehensive process flow diagram, to understand the brine make out, including the individual flows and concentrations of the upstream discharges?	Process adopted for this site is the 'Advanced Nitrasep' by Ovivo. This is a high recovery system designed to minimise the quantity of brine waste generated. See link https://d15l97oqcgwsnl.cloudfront.net/wp-content/uploads/2015/06/Nitrasep-Brochure-0118_WEB2.pdf?x37568
05	Has Wessex or the STP (sewage treatment plant) set specific concentration limits for the brine discharge in order to be acceptable?	3000mg/l but this covers all inflow
06	Is brine treatment part of the Wessex *Option#1: "On-site salinity reduction"* ?	Yes

07	Have you considered upstream solutions, apart from the 'end-of'pipe' solution of the final brine make up (in correspondence with point 04). For example focusing on treating of amending an upstream part of the brine make up?	We are open to options
08	What is the cost of electrical power (kwh) for the Blandford site?	Assume 14p/kWh
09	What is the current disposal method for the IX waste brine? Would that method accept a smaller volume of more concentrated, nitrate rich brine?	Mixture of disposal to local STW and tankering to larger STW as trade waste. Higher nitrate may preclude local works
10	Could you confirm that you have some further water analysis including Ca, Ba, Sr, PO4, F, pH and temperature range	Current information is limited. We have included sampling data available to date for brine waste for the site in the Blandford area and another in the region. See separate file.
11	What is the total dissolved solids of the spent brine?	This is not a measure that we routinely make; using historic data from two sites where Wessex Water operate ion exchange processes, some estimates have been made - see separate files (Word file, with source data in Excel file). Note significant variation in both data sets (some outliers have been omitted to ensure that the anions / cations balance within 10% and some assumptions where data is missing)
12	The STP that receives the brine through discharge in the sewers struggles treating it. Is the struggle due to deterioration of the biological processes (caused by high salinity), or due to the fact that the brine may cause violation of its discharge consent (e.g. nitrogen limit)?	Combination of both. It should be noted there are other trade discharges into this catchment that impact on incoming salinity. Agreement is a cap of 20m^3/day with cap of 3000mg/l at the STW (This inhibits brine discharge from works)
13	XXXXXXXXXXXX come with both high CAPEX and high OPEX, but the evaluation of them should be done on a cost-benefit basis. You mention that you would consider a capital investment of £1m. I presume the operational expense of a solution is a different aspect and should be smaller than the current one (tankering, external management etc). So, what is an acceptable OPEX for a solution?	The review will be based on an assessment of the whole life cost taking into account both the OPEX and CAPEX. By definition, a higher CAPEX value will hopefully generate a proportionate OPEX reduction. For guidance, our current tankering costs are in the order of £50k per annum.