


| ENGINEERING SERVICES   |   |                    |        |                    |                                  |                                       |       | <br><small>we're in your world</small><br><small>South African Nuclear Energy Corporation SOC Limited</small> |  |
|--|---|--------------------|--------|--------------------|----------------------------------|---------------------------------------|-------|--|--|
| DIAPHRAGM PUMP P1004 SPECIFICATION SHEET   |   |                    |        |                    |                                  |                                       |       |  |  |
| Project  | WOPG Demonstration Facility   |                    |        |                    | Unit Tag Number                  |                                       | P1004 |  |  |
| Datasheet Document No.   | ENS-OWPVR-SPE-25003   |                    |        |                    | Revision                         |                                       | 2     |  |  |
| Description  | Pump P1004 will be used in the Uranium Contaminated Waste Oil Plasma Gasification (WOPG) Demonstration Facility to transfer the contents of the Waste Oil IBC T1008 to the Waste Oil Storage & Feed Tank T1001 <sup>[1]</sup> . |                    |        |                    |                                  |                                       |       |  |  |
| Plant Location   | NECSA, Pelindaba, North-West Province   |                    |        |                    |                                  |                                       |       |  |  |
| Equipment Location   | WOPG Demonstration Facility - Inside the process area of Laboratory 150 Building V-H2.  |                    |        |                    |                                  |                                       |       |  |  |
| Safety Classification  | SC-3(N) & SC-2(C) <sup>[a]</sup>  |                    |        |                    |                                  |                                       |       |  |  |
| Quality Classification   | SC-3(N) & SC-2(C) <sup>[b]</sup>  |                    |        |                    |                                  |                                       |       |  |  |
| FLUID PROPERTIES   |   |                    |        |                    |                                  |                                       |       |  |  |
| Process fluid  | Uranium contaminated waste oil <sup>[e]</sup>   |                    |        |                    |                                  |                                       |       |  |  |
| Solids content   | Uranium-containing solids.  |                    |        |                    |                                  |                                       |       |  |  |
| Corrosive due to   | None.   |                    |        |                    |                                  |                                       |       |  |  |
| PROPERTIES   | UNITS   | MINIMUM            |        | NORMAL             |                                  | MAXIMUM                               |       |  |  |
| Operating temperature  | °C  | 18                 |        | 25                 |                                  | 60                                    |       |  |  |
| Fluid density  | kg/m <sup>3</sup>   | 938,0              |        | 933,1              |                                  | 908,6                                 |       |  |  |
| Viscosity  | Pa.s  | 0,00086            |        | 0,00076            |                                  | 0,00045                               |       |  |  |
| Vapor pressure   | kPa   | 2,065              |        | 3,165              |                                  | 19,946                                |       |  |  |
| HYDRAULIC PROPERTIES   |   |                    |        |                    |                                  |                                       |       |  |  |
| PARAMETERS   | UNITS   | MINIMUM            |        | NORMAL             |                                  | MAXIMUM                               |       |  |  |
| Flow rate  | m <sup>3</sup> /h   | 0,13               |        | 0,42               |                                  | 0,51                                  |       |  |  |
| Pump inlet pressure  | kPa (a)   | 72,00              |        | 62,19              |                                  | 58,12                                 |       |  |  |
| Pump outlet pressure   | kPa (a)   | 93,44              |        | 108,97             |                                  | 117,13                                |       |  |  |
| Differential Pressure  | kPa   | 21,44              |        | 46,78              |                                  | 59,01                                 |       |  |  |
| Required Pump Head   | m   | 2,33               |        | 5,11               |                                  | 6,62                                  |       |  |  |
| NPSH available   | m   | 7,53               |        | 6,45               |                                  | 5,91                                  |       |  |  |
| MECHANICAL PROPERTIES  |   |                    |        |                    |                                  |                                       |       |  |  |
| Pump type  | Air Operated Double Diaphragm Pump <sup>[d]</sup>   |                    |        |                    |                                  |                                       |       |  |  |
| Diaphragm type   | Supplier to advise  |                    |        | Diaphragm diameter |                                  | Supplier to advise                    |       |  |  |
| Pressure Rating  | kPa (g)   | 800                |        |                    |                                  |                                       |       |  |  |
| Process Connections  |   |                    |        |                    |                                  |                                       |       |  |  |
| Pipe Suction   | Size  | ½" tubing          | Rating | N/A                | Flange (SW)                      | Screwed female NPT                    |       |  |  |
| Pipe Discharge   | Size  | ½" tubing          | Rating | N/A                | Flange (SW)                      | Screwed female NPT                    |       |  |  |
|  | Vent  | Supplier to advise |        |                    | Drain                            | Supplier to advise                    |       |  |  |
| Seal Fluid   | Supplier to advise  |                    |        |                    |                                  |                                       |       |  |  |
| Material of Construction   | Casing  | Stainless Steel    |        |                    | Diaphragm                        | PTFE with elastomer back-up diaphragm |       |  |  |
|  | Shaft   | Supplier to advise |        |                    | Seal                             | Supplier to advise                    |       |  |  |
|  | Packing   | Supplier to advise |        |                    | Other                            | Supplier to advise                    |       |  |  |
| ELECTRICAL PROPERTIES  |   |                    |        |                    |                                  |                                       |       |  |  |
| Electrical (Y/N)   | N   | Volts              | N/A    | Phase              | N/A                              | Hz                                    | N/A   |  |  |
| VENDOR DATA REQUIRED WITH TENDER   |   |                    |        |                    |                                  |                                       |       |  |  |
| 1 Pump technical data  |   |                    |        |                    | 3 Pump dimensions with baseplate |                                       |       |  |  |
| 2 Utility Requirements   |   |                    |        |                    |                                  |                                       |       |  |  |
| REFERENCE DRAWINGS AND DOCUMENTS   |   |                    |        |                    |                                  |                                       |       |  |  |
| [1] ENS-OWPVR-PID-24002, P&ID – Waste Oil Feed System  |   |                    |        |                    |                                  |                                       |       |  |  |
| [2] ENS-OWPVR-CLC-25001, Positive Displacement Pumps Sizing Calculations for Uranium Contaminated Waste Oil Plasma Gasification (CWOPG) Facility   |   |                    |        |                    |                                  |                                       |       |  |  |
| [3] ENS-OWPVR-REP-25013, Positive displacement pumps sizing report for Uranium Contaminated Waste Oil Plasma Gasification (CWOPG) Facility   |   |                    |        |                    |                                  |                                       |       |  |  |
| NOTES  |   |                    |        |                    |                                  |                                       |       |  |  |
| [a] SC - Safety Class  |   |                    |        |                    |                                  |                                       |       |  |  |
| [b] QC - Quality Class   |   |                    |        |                    |                                  |                                       |       |  |  |
| [c] Supplier to advise on special requirements for installation of pump.   |   |                    |        |                    |                                  |                                       |       |  |  |
| [d] Air supply available at a maximum pressure of 5.2 bar (g), with a minimum air quality standard of ISO 8573-1:2010 [3:4:1].   |   |                    |        |                    |                                  |                                       |       |  |  |
| [e] The composition of waste oil (% mass) is: 3.22% C <sub>7</sub> H <sub>8</sub> , 7.95% C <sub>16</sub> H <sub>34</sub> , 16,61% C <sub>17</sub> H <sub>36</sub> , 18,52% C <sub>18</sub> H <sub>38</sub> , 53,34% C <sub>19</sub> H <sub>40</sub> , 0.11% U, 2.11x10 <sup>-6</sup> S, 0.04% HF and 0.21% HCl. |   |                    |        |                    |                                  |                                       |       |  |  |
| [f] <b>Note to supplier:</b> The air supply pressure regulator, complete with pressure gauge, must be supplied with the pump.  |   |                    |        |                    |                                  |                                       |       |  |  |
| [g] <b>Note to supplier:</b> The moving parts of the pneumatic section of the pump must not need lubrication.  |   |                    |        |                    |                                  |                                       |       |  |  |

|                    | <b>Name</b>                                | <b>Date and Signature</b> |
|--------------------|--|---------------------------|
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