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| **ّBNPP-2 Project / ПРОЕКТ БАЭС-2****Principal Covering Letter No.** 007/UKS-07/09/00224 dated 31.05.2019 | **Title/ Заглавие:***Quality Assurance Program on activity of JSC “HMS Livgidromash” during the Development and Manufacture of pumping equipment for BNPP-2 project (QAP (DE&M))* |
| **Document Number/ № документа:** *BU2.1036.0.0.QM.QA0001***Revision:** *В01* | **Section/Раздел:-**  **Volume/Том: -****Book/Книга:-** |

**Reviewer’s Name/ Имя Рецензента: JSC “HMS Livgidromash”**

| **No.** | Subsection | **The Principal’s Comments** | **Contractor’s reply** | **Principal's Response to Comments Removing** | **JSC “HMS Livgidromash” Comments** | **Principal's Response to comments removing** |
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| **1** | **2** | **3** | **4** | **5** | **6** |  |
|  | General | * List of Russian standards regarding design and manufacturing of Positive Displacement, reciprocating Pumps including triplex plunger crank-type pumps shall be introduced.
 | * The list of Russian standards regarding design and manufacturing of pumps, the normative and standard for vibration tests are indicated within the text and in Appendix 1 of QAP (De&M);
 | ***Accepted;*** |  | ***Accepted;*** |
| * The normative and standard for vibration test and its permissible limit shall be defined based on Russian or other valid standards.
 | * All the documents which are referenced within the text of QAP (De&M) are listed in Appendix 7;
 | ***Accepted***; |  | ***Accepted;*** |
| * The list of Software which is used during the design and manufacturing of equipment and not included in the contract shall be defined and provided as an attachment.
 | * The list of Software is given in Appendix 10 QAP (De&M); Imperative statements within the whole text of QAP (De&M) have been changed for indicative sentences (present tense). Terms have been corrected.
 | ***Accepted***; |  | ***Accepted;*** |
| * Imperative statements or words (such as "shall", "must") shall be replaced with indicative sentences or words in present tense.
 | -- | ***Accepted***; |  | ***Accepted;*** |
| * Editorial corrections shall be put into consideration (such as numbering of the subsections in section 3 "planning", …)
 | -- | ***Accepted***; |  | ***Accepted;*** |
| * In page 15 "private QAP" shall be replaced with correct and specified term of "individual QAPs".
 | -- | ***Accepted***; |  | ***Accepted;*** |
| * Revision No. of document shall be corrected from 0 to B01.
 | -- | ***Accepted***; |  | ***Accepted;*** |
| * All documents, which are referred to them in text of QAP, shall be listed in Appendix 4 "List of Management document".
 | -- | ***Not Accepted:***For example RISM 35 is not included in item 7.1, moreover name of procedures shall be corrected in Appendix 7 for example name of procedure BU2.0903.0.0.QM.QA0006 shall be corrected to Consideration and approval of the subcontractor's management system documents. | ***The said comments have been resolved.*** | ***Accepted*** |
|  | Management system Policy | * The Management System Policy shall cover Safety (Industrial Safety, Radiation Safety …), Quality and Security (for information) fields.
 | QAP (De&M) covers 5 Policies which are effective for “ВNPP-2 projects”. | ***Accepted***; |  | ***Accepted;*** |
|  | * Management system Policy shall be developed for BNPP-2 Project.
 | -- | ***Accepted***; |  | ***Accepted;*** |
|  | * Commitment and supporting of management system by General Manger and periodic review of the Management System Policy shall be mentioned.
 | -- | ***Not Accepted;*** | ***The said comments have been answered.*** | ***Accepted*** |
|  | * While the title of policy is "Management Policy Statement", but there are 4 times reminded as "Quality Policy".
 | -- | Periodic review of the management system policies shall be considered; | ***The said comments have been answered.****The provisions concerning periodic review of the management system policies have been entered into the QAP, Item “Management System Policy”, in succession to all listed Policies.*  | ***Accepted*** |
|  | * There shall be also stated that safety has the first priority during performance of the activities of BNPP-2 Project.
 | -- | ***Accepted;*** |  |  |
|  | Terms and definitions | * Terms and definition shall be corrected in accordance with QAP(G) for example "Quality Policy", "Contract", "Inspection", "Subcontractor", "Supplier",…..
 | -- | ***Accepted;*** |  |  |
|  | * Term "Customer and Principal" shall be defined separately.
 | Terms and definitions have been corrected in compliance with QAP (G). | ***Not Accepted;*** customer is not defined, ref: item 1.1.4 3rd bullet (in this QAP we have 2 type of contract once between NPPD and JSC ASE and second between JSC ASE and HMS this issue is not considered in text of document). | ***The said comments have been answered.****Within the framework of the Contract №643/00217975/49095/7717Б2/180277 placed between JSC ASE and JSC “HMS Livgidromash” the enterprise JSC ASE is regarded as the Customer, but under terms of the Contract № NPP/4100/5500-2,3 dated 11.11.2014 the JSC ASE is the General Contractor, as it is stated in the Item “Terms and definitions” of the QAP.* | ***Accepted*** |
|  | * Terms/ abbreviations such as “FBPS”, IPD, B Specs, CED, CN, Cert., are defined but are not used in the document.
 | -- | ***Not Accepted;***"B Specs" Abbreviation is not used in text of document. | ***The said comments have been resolved.****The above mentioned abbreviation has been removed.* | ***Accepted*** |
|  | 2.1 | * Quality Assurance work "shall be corrected to "All activities related to BNPP-2 Project".
 | * The item has been corrected in conformity with the comments made.
 | ***Accepted***; |  | ***Accepted;*** |
| * "QAP Project" shall be corrected to "QAP for BNPP-2 Project".
 | * The requirement on review and correction of QAP (De&M) has been added.
 | ***Partially Accepted;***see item 2.1.3 paragraph 3 | ***The said comments have been resolved.*** | ***Accepted*** |
| * Last paragraph of this item for Approval and Acceptance of QAPs, shall be corrected with consideration of QAP(G) and Appendix R requirements.
 | * The management procedure BU2.0903.0.0.QM.QA0006 is examined in the said Item.
 | ***Not Accepted;***QAP submitted to the Contractor for approval and submitted to the Principal for acceptance (2.1.3 paragraph 3). | ***The said comments have been resolved.*** | ***Not*** Accepted; please consider that QAP(HMS) submitted to the Contractor (JSC ASE) for review and Approval. |
| * Following requirement shall be added to this item:

"This document reviewed every year and revised, if necessary, but in any case, they should be reviewed no later than every 36 months in order to assess the actuality of the revision." |  | ***Accepted***; |  | ***Accepted***; |
| * The Management Procedure “Consideration and approval of the subcontractor’s management system documents” "BU2.0903.0.0.QM.QA0006" shall be considered in this section.
 |  | ***Partially Accepted;***"The General Contractor activities in obtaining…" corrected to "The requirement of the Contractor for obtaining…" | ***The said comments have been resolved.*** | ***Accepted*** |
|  | 2.3 | All types of Working documents (including instructions) shall be defined in hierarchy of IMS document management system. | All types of working documents have been defined in hierarchy of the documentation, which is shown in Item 2.2 of QAP (DE&M). | ***Not Accepted;***Scheme of hierarchy of document is not compliance with description for example instruction in text, assigned to level 2 but in scheme assigned in level 3. | ***The said comments have been resolved.****The text and scheme of hierarchy of the documents have been corrected (see Item 2.2.3 of* QAP (DE&M)) | ***Accepted*** |
|  | 2.4 | This item shall be completed in accordance with corresponding requirement of QAP(G). | The said Item has been completed as per QAP (DE&M) | ***Partially Accepted;*** Item 2.4.6 of QAP (G) included in this section. | ***The said comments have been answered.****See Item 2.4 of* QAP (DE&M). | ***Not Accepted;*** item 2.4.6 of QAP(G) shall be added in this section. |
|  | 4.2 | Responsibilities and authorities shall be presented for key personnel in BNPP-2 Project; in this regard the Authorities shall be described more comprehensively. | The provisions on responsibilities and authorities for the key personnel and subdivisions involved in work for BNPP-2 projects have been described more comprehensively in the said Item. | ***Not Accepted;***Authorities shall be described clearly; referring to other document for describing authorities and responsibilities is not acceptable (4.2.3). | ***The said comments have been answered.****See Item 4.2.3 of* QAP (DE&M).*)* | ***Not Accepted;*** the QAP shall clearly describe authorities of key personnel in BNPP-2 Project, referring to "employment position instructions" is not acceptable. |
|  | 4.4 | Procedure for staffing and qualification of personnel shall be addressed in this item. | * The reference for the corresponding standard of the enterprise has been added in the said Item.
* The procedure for staffing and qualification of the personnel is completely presented.
 | ***Accepted;*** |  | ***Accepted;*** |
|  | 5 | Safety policy for BNPP-2 Project shall be considered and addressed in this section. | Safety policy for BNPP-2 projects has been considered and addressed in this section. | ***Partially Accepted;***Code of document shall be added in item 5.7. | ***The said comments have been answered.****See Item 5.7 of QAP (DE&M).* | ***Accepted*** |
|  | 6 | * The entire Project documents including Working Design documents, Design documents, Manufacturer’s documents (including QPs), procedures, reports, specifications, and etc. shall be coded on the basis of coding system introduced in "BU2.0120.0.0.QM. DC0003".
* Following requirement shall be added in this section;

Management of documents in BNPP-2 Project is carried out based on "BU2.0120.0.0.QM.DC0001 and "BU2.0120.0.0.QM.DC0003". | The section 6 of QAP (De&M) states that management of documents in the course of project work is carried out in conformity with relevant IMS documented procedures and on the basis of the following management procedures BU2.0120.0.0.QM.DC0003 and BU2.0120.0.0.QM.DC0001 | ***Not Accepted;***Descriptions shall be presented completely moreover title of documents shall be presented in these items. | ***The said comments have been answered.****See Item 6 of QAP (DE&M).* | ***Accepted*** |
|  | 7.3 | QA1-QA3 shall be defined (in page.53). | The quality assurance categories QA1-QA3 have been removed as not suitable for the said Project. | ***Accepted;*** |  | ***Accepted;*** |
|  | 8 | MP for "Identification and Traceability of Items" shall be presented for BNPP-2 Project. | Procedure of Identification and Traceability has been described for BNPP-2 projects. | ***Accepted;*** |  | ***Accepted;*** |
|  | 9 | 1. The activities of design process and design control shall be described in the following stages:
* input data;
* output data;
* design verification and validation;
* design review;
* design approval and acceptance;
* design change;
* design interface;

In this regard the process and sub-process of equipment design shall be determined.1. The activities of production and manufacturing process and production and manufacturing control in following stages shall be defined:
* Technological Process chart/ procedures
* Manufacturing process such as:
	+ Casting;
	+ Stamping;
	+ Blanking;
	+ Machining;
	+ Welding;
	+ Heat Treatment;
	+ Metal Forming;
	+ Assembling;
	+ Coating.
1. The production, manufacturing and procurement of main components including Cylinders, Plungers, valves, the stuffing box, connections and etc. shall be explained.
2. The process of "Out-sourcing" shall be described in this section 9.
 | The said Section 9 QAP (De&M) has been described in conformity with QAP (G) and expert judgment. | ***Partially Accepted;***1. For some other stage which is not explained such as "design change", "Design Interface" a description shall be provided.
2. Accepted;
3. The production, manufacturing and procurement of main components including Cylinders, Impeller, shaft, Plungers, valves, the stuffing box, connections and etc. shall be explained.
4. Accepted;

More over:* i. 9.3.3 and everywhere: "Notice" shall be corrected to Notification.
* The process of "Out-sourcing" shall be described in this section.
 | ***The said comments have been answered.****As applied to design and manufacturing of the pump unit the corresponding interaction (interworking relationship) is described within the text of Item 9 of QAP (DE&M). The flow of operations during change of documentation is also stated within the text of the said Item of QAP (DE&M), as well as the relevant references to other Items of the QAP (DE&M) are given in which the additional description of work on introduction of changes into any kind of documentation is presented.* *-* ***The said comments have been resolved.******See Item 9.3.5 of*** *QAP (DE&M).**The parts mentioned in your Comments are not used in the production of the pump unit to be supplied under terms of our Contract. The parts being members of the pump unit delivered under the Contract together with the Quality Plan are fabricated according to the technological process of production while observing requirements of the documented procedures, and specifically those ones of the ISM documented procedures and management procedure as well. It is not reasonable to describe fabrication technology of the pump unit components within the text of the QAP (DE&M).****-****The said comments have been resolved.****-*** The process of "Out-sourcing" is not applied during fabrication of the equipment to be delivered to “Bushehr-2” NPP, *(see Item 9.3.6.* | ***Partially accepted;***- As per submitted documents for registration by HMS, metrological supporting is performed by outsourcing |
|  | Section 10  | The inspection and test process activities shall be defined in following sections:* General
	+ Personnel Qualification;
	+ Development and acceptance of QP;
	+ NDT;
	+ Laboratory tests (DT) ;
	+ Calibration and metrological Support ;
* Incoming inspection;
* In-process (during) of manufacturing inspection;
	+ Test of manufactured products;
* Final acceptance inspection

For each division in the organization related to BNPP-2 activities the processes of Planning, Execution and Control shall be explained. | The inspection and test process activities have been defined in the corresponding sections. | ***Partially Accepted;**** i. 10.1.2.2, 10.1.2.4, 10.1.5.4:

Since there is not Appendix to the Contract as “Quality management”, the terms are not cleared for Principal;* i. 10.1.2.4, 10.1.2.6: "agree" shall be corrected to "accept";
* i. 10.1.2.8: Equipment is accepted according to NP-071 and GOST R 50.06.01.2017 requirements and standard GOST 15.309 applies for Test (typical & periodic);
 | ***The said comments have been answered.****- The term “Quality plan” was additionally introduced into the Item of QAP (DE&M)* *“Terms and definitions”; the remaining terms which are used within the text are present in the said Item of QAP (DE&M) “Terms and definitions”**- the appropriate correction has been done.**- the reference to the document NP-071 was inserted into the Item 10.1.2.8. The document GOST R 50.06.01-2017 was brought into effect on 01.02.2018 and is not to be applied within the framework of the present Contract.* | ***Partially accepted;**** 10.1.2.4: "approval" shall be corrected to "acceptance";
* Since there is not Appendix to the Contract as “Quality management”, the terms are not cleared for Principal and shall be replaced by recognized documents through of QAP
* All of editorial comments shall be removed in QAP by reviewing of QAP
 |
|  | Before starting the process of production of materials and parts for LMCE, the *JSC “HMS”* shall submit the Quality Plans for acceptance of semi-finished items (blanks) to the Contractor/ Principal. | The said Principal’s comment has been taken into consideration | ***Not Accepted;***It's not applied; | ***The said comments have been resolved.****See Items 10.1.2.2 and 10.1.2.4 of QAP (DE&M).* | ***Accepted;*** |
|  | The following item shall be added:In case of unsatisfactorily of Acceptance Inspection:* A Non-Conformance Report is developed in accordance with section 11 and Corrective Action is in accordance with section 12
* JSC “HMS” eliminates detected non-conformities remarks during acceptance inspection
* It will be agreed with the new date of repeated Acceptance Inspection.

Re-inspection for Acceptance will be conducted in an order similar to the initial Acceptance Inspection. | The said requirement has been introduced into the Section 10 of QAP (De&M). | ***Accepted;*** |  | ***Accepted;*** |
|  | The following new item shall be added:Each subsequent stage of production (if necessary- the technological operations of production) in accordance with prepared QP could be started only when the inspection and testing of the previous stage is completed, including the development and approval of the report documents issued by the manufacturer. | The said requirement has been added into this section of QAP (De&M). | ***Accepted;*** |  | ***Accepted;*** |
|  | 10 | Manufactured equipment is sent to client only after that all the operations specified in the Quality Plans, Test Programs and Procedures, including the results confirming their compliance with the technical requirements, are completed, and Acceptance Inspection by representative of relevant party is carried out. | The said requirement has been considered and introduced into this section of QAP (De&M). | ***Not Accepted;***It's not applied. | ***The said comments have been resolved.****Descriptive information is presented in Item 10.1.5.6 of QAP (DE&M).* | ***Accepted;*** |
|  | Quality surveillance and acceptance inspections by AO/SC ASE, customer/ INRA do not relieve the *JSC “HMS”* from its responsibility and responsiveness against any non-compliance in quality and quantity of supplied equipment and components. | The said Principal’s comment has been taken into consideration | ***Partially Accepted;***i.10.1.5.5: "and acceptance inspections" shall be added. | ***The said comments have been resolved.****Descriptive information is presented in Item 10.1.5.5 of QAP (DE&M).* | ***Accepted;*** |
|  | Documents to be submitted by the *JSC “HMS”* to the client shall be properly packed and each package of the documents shall contain a packing sheet in 2 copies | The said principal’s comment has been taken into consideration | ***Accepted;*** |  | ***Accepted;*** |
|  | The *JSC “HMS”* shall submit the Quality control program, Quality control tables (TB1, TB2), assembly drawings and general view drawings and Manufacturing time schedule for approval of QP to the Principal. | The said requirement is precisely mentioned in this section of QAP (De&M). | ***Partially Accepted;***i. 10.1.2.5: it shall be included "Quality Control Program". | ***Not accepted.****As the Quality plans are submitted for consideration and approval in a complex with the Quality Control Table (ТБ1), the development of the Quality Control Program is not required.* | ***Not accepted.***As per item 6.2.13 of MP "inspection and test" the "Quality Control Program" shall be submitted to Principal |
|  | During the manufacturing of equipment for BNPP-2, changes in the Quality Plans shall be made in the same sequence as for approval. | The said requirement is precisely mentioned in this section of QAP (De&M). | ***Accepted;*** |  | ***Accepted;*** |
|  | 1. All acceptance tests performed at the Site and in the Company by manufacturer shall be specified and related standard shall be indicated.
2. The type of test for acceptance of equipment shall be at least include the followings:
* Hydrostatic Testing
* Mechanical Run Test
* Performance Test
* Other Tests
* Separate tests of individual components
* Sound-Level Test
* Governor Response and Emergency Over speed Trip Systems
 | This section covers tests which are applicable for the said Project; the references are further given for the corresponding standards and Design Documentation. | ***Not Accepted;***All acceptance tests and type of test for acceptance of equipment (for example Hydrostatic Testing, Mechanical Run Test, Performance Test) shall be explained individually in QAP or presented in MP which shall be developed by HMS. | ***The said comments have been answered.******All the tests which are applicable for the said equipment are specified in detail in the Item 10.1.4.3.****To suit the pump units delivered under the Contract, the document Testing Program and Procedures has been developed at the JSC “HMS Livgidromash” and is also supplied together with the equipment. The said Testing Program and Procedures (ПМ) defines the sequence, amount and methods of trials of the pump units.* | ***Accepted;*** |
|  | 10.2 | After repair of the measuring instruments, regardless of the scheduled tests they shall pass a mandatory test also. | The said requirement is presented in this section of QAP (De&M). | ***Accepted;*** |  | ***Accepted;*** |
|  | 11&12 | Section 11 and 12 can be integrated/ combined. | The said comment was not accepted | ***Accepted;*** |  | ***Accepted;*** |
|  | Table of content and 13 | Item 13 in table of content and appendix 2 shall be corrected in accordance with QAP (G). Since the title used for section 13 shall be the same as QAP (G), therefore "Quality Records" shall be replaced with "Records Control". | The titles of sections of the document QAP (De&M) correspond to the titles designation presented in Item 5, Appendix 2 of QAP (G). | Accepted but "Appendix 10 to the Contract" in Appendix 1 of this QAP is not clear. | *The appropriate clarification is done in the title of the Appendix 1.* | ***Accepted;*** |
|  | 14 | Relevant MP shall be developed and addressed for Assessment. | The references for the corresponding standards of the enterprise have been added into this section of QAP (De&M). | ***Not Accepted;***Refer to related management procedure of QAP(G) as basis for. | ***The said comments have been answered.****See Item 14.3.7 of QAP (DE&M).* | ***Accepted;*** |
|  | 15 | Relevant MP shall be developed and addressed for Improvement. | The references for the corresponding standards of the enterprise have been added into this section of QAP (De&M). | ***Accepted;*** |  | ***Accepted;*** |
|  | Appendices | Appendices No. 1, 2, 7.2, 7.3 stated in QAP (G) which shall be developed, do not exist in this QAP. | All Appendices required by QAP (G) have been elaborated and introduced into the QAP (De&M). | ***Accepted;*** |  | ***Accepted;*** |
|  | Appendix 1 | The list of relevant and reference standards shall be presented in Appendix 1 (in compliance with sub-contractor scope of activities) based on Appendix 2, QAP(G). | The list of standards in accordance with the requirement of QAP (G) has been added into the document QAP (De&M). | ***Accepted;**** IRNA shall be corrected to INRA.
 | ***The proper correction has been done.*** | ***Accepted;*** |
|  | Appendix 2 | Internal interface chart shall be corrected with consideration of following types of interfaces:* + Administrative;
	+ Supervision;
	+ Reporting.
 | The internal interface chart is given in Appendix 5 of QAP (De&M). | ***Not Accepted;***Supervision and reporting interface shall be cleared in this structure. | ***The said comments have been resolved*** | ***Accepted;*** |
|  | Appendix 3 | List of documents shall be corrected as presented in QAP(G) related table, this table shall be consist of at least :* + Code of document;
	+ Name of document;
	+ Item of QAP.
 | The corrected list of management documents is given in Appendix 7 of QAP (De&M). | ***Accepted;*** |  | ***Accepted;*** |
|  | Appendix 4 | List of management system documents shall be presented in 3 sections:* List of Management system procedures;
* List of project management procedures;
* List of working documents;
 | The said requirement has been applied to the Appendix 7 QAP (De&M). | Structure is Acceptable but position of documents in Appendix 7 in accordance with hierarchy of document management system shall be corrected.  |  ***The proper correction has been done.*** | ***Accepted;*** |
|  | Appendix 5 | External interface shall be revised completely based on following points:* The Principal, INRA and AEP, shall be considered;
* Type of interface shall be determined in external interface (Contractual, Supervision, State Control, Technical Control);
* Direction of connection shall be corrected;
* "If necessary" statement shall be deleted.
 | The external interface chart has been revised and is given in Appendix 4 of QAP (De&M). | ***Not Accepted;***Following issues shall be corrected:* What is difference between 2 types of lines for Technical inspection?
* Direction of connection at least for supervision and technical inspection shall be considered
* Authorized organization and Agent "DEZ" shall be considered;
* The supervision/technical inspection by NPPD on HMS subcontractors/ suppliers shall be considered;
* Relation between LMO and HMS is contractual;
* RTN shall be considered;
* "Technical interface" line shall be considered;
* Interface between INRA and manufacturer shall be considered;
* The relation between CC and manufacturer shall be corrected;
 | ***The said comments have been resolved*** | ***Partially Accepted;***- Type of Relation between INRA and NPPD is not Contract /Agreement.***-*** RTN shall be considered; |
|  | Appendix 6 | The Process Map shall be revised completely based on following points:* Management process, core process and supporting process shall be determined
* Design process shall be determined with sub-processes
 | IMS process interface scheme (Process Map) is given in Appendix 6 QAP (De&M). | ***Not Accepted;***Comments are not applied. | ***The said comments have been resolved*** | ***Accepted;*** |
|  | Appendix 7 and section 11 | Management Procedure "Management of non-conformances in the process of equipment manufacturing" No. BU2.0903.0.0.QM.QA0009, shall be Considered in Appendix 7. | The said Procedure has been examined. | ***Accepted;*** |  | ***Accepted;*** |