

## Kontraktbilag 1C

Requirements for execution of the project - DCPT

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Central Denmark Region

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April 2015

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DANISH CENTER FOR PARTICLE  
THERAPY – DCPT, DNU

**Final Tender**

Requirements for Execution of the Project

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**PROJECT**

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Danish Center For Particle Therapy  
Requirements for Execution of the Project  
Central Denmark Region

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## 8 REQUIREMENTS FOR EXECUTION OF THE PROJECT

### 8.1 Cooperation

Generally the demands for the organization and cooperation is described in annex 4.9

#### 8.1.1 Vision and intentions

The purpose of describing the vision for the cooperation is to create ownership to the project amongst all the project participants regardless of their status/role. It is also an opportunity to clarify the importance that cooperation is the primary driving force to ensure any project's success, and that there should be an additional focus on the key personnel's cooperative skills and also that the project organisation supports this vision. To achieve a good cooperative environment it requires trust.

To achieve and maintain a trusting and professional relationship it is important to maintain a high level of communication and involvement between the parties, and have a clear mind set of how the communication is performed written as verbally.

The intentions of DCPT are to create the framework that supports the vision, and to continuously push this message throughout the project organisation. DCPT intends to enter into agreements that are competitive, but fair and reasonable to the contracting parties.

In order to ensure the possibility of optimal cooperation, sufficient and fast opportunity for the sharing of information, the Client provides the tool 4 projects available for the project. 4Projects is described such by the supplier:

*Web-based interface extends the technological platform and eliminates the need for installing software on local machines. It opens up much greater potential sharing of information without costly and frustrating experiences of the users.*

*Mobile access allows project teams with information on the go, integrated BIM viewer allows all and interact with building models directly in a browser*

### 8.2 Meetings

Official meetings will in general consist of the following categories/levels:

- Management (executive level) (quarterly/semi-annually)
- Project Management (quarterly/monthly/biweekly)
- Site Management (monthly/biweekly/weekly)
- Design (monthly to daily, dynamic nature)

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During all phases the Turnkey Contractor is expected to participate in all requested meetings to the extent deemed reasonable. The Turnkey Contractor is also expected to participate in any potential seminars, workshops, teambuilding courses etc. The frequency in the different categories above is only an example of what could be expected, and shall not be considered final scope in any sense.

The Turnkey Contractor must expect a number of meetings with the future users of the facility. The topic on these meetings will as described in chapter 5 regarding the User Process 3.

Considering that the individuals participating in the different meetings resides globally, which subsequently ties up many resources for travelling, some of the meetings may be held by video conference if agreed by the participants. If video conference sessions are accepted by the parties, DCPT only requests that the equipment used can accommodate high quality video and audio, in a room that is equipped/furnished to support this purpose. The equipment must also accommodate reviewing/ revising of drawings/documents by the participants while communication via video and audio. If this request is not meet to DCPT's satisfaction, DCPT reserves the right to request the physical presence of the participants instead.

All meetings will when relevant be minuted by DCPT or the summoning party. All planned meetings must be prepared with the issue of an agenda included any appendixes preferably more than 5 working days in advance, or a minimum of 3.

### **8.3 ICT Demands**

The project is implemented under the ICT regulation (Regulation 118). Contractors, subcontractors, consultants, sub-consultants, suppliers and equipment suppliers are required to comply with the project's ICT specifications, including the use of digital building models, project web, classification and digital delivery of O & M data. Contractors and suppliers are also required to participate in ICT coordination meetings with the client, the client consultant, operator and other partners. It is expected a meeting monthly.

For more specific see annex 8.1: ICT Specifications.

#### **8.3.1 Common tools supporting processes**

Projectweb: 4projects

- BIM viewer (ifc)
- Surveillance Tool
- Lack Reviewing
- Offer and tender platform

Requirement database: dRofus

- Room function- and equipment planning

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Updated project material is published once a week for 4 projects and dRofus, as it is the client's desire to communicate from the most updated project material. It will not be used as a control tool, and should only be seen as a process supporting tool that facilitates communication and improves quality.

Refer to the following ICT technical specifications:

- 8.1.00 IKT Ydelsesspecifikation incl. annexes.

In the supplied "DNU CAD manual" and DNU codes manual, a number of applicable standards are stated of various issues, such as the insertion point and so on. On this basis structure, the ICT coordinator at the Turnkey Contractor is to make their own BIM manual.

### 8.3.2 *Supplier design*

(applies to the interface section of the Varian "Proton therapy accelerator" and Pneumatic Post)

Supplier design must be based on the guidelines described in the ICT services specification.

Regarding supplier design, the supplier must ensure that there will be implemented and led evidence of digital consistency checks. The supplier must also provide a 3D building model, in the neutral format IFC2X3 to the Turnkey Contractor for quality assurance. The model must be supplied with any working drawings / manufacturing drawings for control. The supplier shall also make IFC models available for the client and documentation of the checks carried out. The supplier must ensure, that the discipline models prepared in connection with supplier-design are classified according to DNU project specific SFB classifications, so that the total complete material delivered to the client is in a uniform structure, including the capture of O & M documentation. See the ICT technical delivery specification.

Turnkey Contractors will be supplied with 3D building models in the format .rvt (Revit) of adjacent buildings to the north, so they will be able to model toward existing buildings. These models are supplied in a purified version without views and sheets. It should be noted that the models contain only the building geometry. Works / geometry of terrain outside the building, will be delivered in .dwg format (AutoCad).

In relation to the preparation of "as built" documentation, it is the Turnkey Contractor's responsibility to ensure, that supplier-developed models and drawings are provided. Project material "as built" is performed to level 3. Refer to Performance Description of "as built", February 2000 (Danske Ark og FRI)

### 8.3.3 *Operation & Maintenance (O&M) documentation*

The submission of documentation will be done digitally to a web-based system the client provides.

D & V documentation must be submitted no later than 15 working days prior to handover. It is a condition for payment of the final fee that D & V documentation

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is submitted and approved by the client or his advisor.

If the contractor is not able to implement the digital submission can help to carry out the work purchased by a consultant.

Delivery of O & M documentation described in the following must be anticipated and included in the bid:

The extent of documentation for the building elements to be handed over, the O & M documentation will be described by a letter, where A is the least information and D is the most documentation, as shown in the a tables at th end of this section.

"0" indicates that the building element is not relevant to D & V, and that the Turnkey Contractor is not to supply D & V documentation for the element. Building elements will not have a building elements card created if they are marked witha "0"..

See ICT annex 8.1: 05 IKT teknisk afleverings specifikation.

## **8.4 Design**

### **8.4.1 Scope of the design**

The turnkey contract includes all design services, project materials and documentation for the execution of the contract including any necessary regulatory processes in relation to the Building Authorities.

The design services includes a complete design of engineering and architectural project work including a main project, project follow-up and producing as built material as described in the Service descriptions for Building and Planning, FRI and Danske ARK, 2012 see annex 8.2

General Conditions for Consulting Services – ABR 89 see annex 8.3 is valid for all design services.

### **8.4.2 Design process**

As a starting point the project is regarded as divided into two buildings:

- Bunker section
- Clinic section

The design phase, in general, must follow the design process which is described in the Service descriptions for Building and Planning, FRI and Danske ARK as shown below.

1. Outline proposal
2. Project proposal
3. Preliminary proposal (regulatory project)
4. Main project

For the bunker part, the Client expects the phases 1, 2 and 3 as one, and 4 as one in order to secure the optimal design- and approval phase within the availa-



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ble time before starting at the site. For the Clinic section, the client expects all the phases 1, 2, 3 and 4 with the proper time for approval in the clients organization.

Each of the above mentioned proposals has to be approved by the Client and by the supplier of the Proton Therapy Equipment (Varian). Not before final approval by the client the next stage in the design phase can start up.

For each approval, the Turnkey Contractor must deliver what is described in the ICT specifications see annex 8.1: IKT Bilag 01 Leverancespecifikationer. In this relation it is pointed out that all quality assurance within the Turnkey Contractors team must have been made before review and approval by the client.

#### **8.4.3 Approval process**

The Client and his consultants are to be involved throughout the design phase by participating in design meetings and a regular review of the project material. It is a general requirement that the Turnkey Contractor's advisors have a continuous day to day dialogue with the client and his consultants regarding design questions.

It is an essential requirement, that all project material has been quality assured before it is sent to the client for approval, and that the documentation for the carried out quality assurance, is available for the client and his consultants at all times.

The client and Varian need to have 2 weeks to review and comment the complete project material during the different stages. The Turnkey Contractor must incorporate these reviews in their main time schedule.

The approval by the Central Denmark Region, their consultants and Varian does not change the fact that all responsibility lies on the Turnkey Contractor.

### **8.5 User involvement**

See chapter 5 regarding user process 3

### **8.6 Site Management**

Site management is performed by the Turnkey Contractor in accordance to the Service Descriptions for Building and Planning, FRI and Danske ARK, 2012 see annex 8.2

The site management has to continuously cooperate with the other operators on the overall construction site of DNU. In particular, and in relation to the southern area, the site for S3 which lies in immediate connection to the site for DCPT, but also S5 and the upcoming commercial kitchen, which also will be under construction at the same time as DCPT.

Especially there has to be a very close cooperation and coordination to S3.

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## 8.7 Technical supervision

Technical supervision and inspection is performed by the Turnkey Contractor in accordance to the Service Descriptions for Building and Planning, FRI and Danske ARK, 2012 see annex 8.2.

Before any work is started on the construction site, the Turnkey Contractor must provide the client with the plans for supervision and inspections. The plans are to be approved by the client.

The technical supervision plans for the clinic, has to reflect the degree of technical complexity for the function of the building.

The clients expectations for stricter technical supervision plans for the bunker part, are to focus on and secure the procedure for controlling of conduits, their placement and fixation in relation an prior to casting. Furthermore parts to be casted in related to Varian's subsequent tolerances for assembly.

In relation to shielding the focus has to be on the thickness of the walls, straight metal components and securing that nothing penetrate more than half of the shielding barrier and that the conduits and there bending I relation to radiation penetrating.

The technical supervision and inspection must be performed by the Turnkey Contractor and his advisors. The persons involved shall have the needed competences and expert knowledge of each individual discipline.

During execution of the building the Turnkey Contractor must continuously prove that the technical supervision and inspection is made according to the supervision plans by presenting supervision records, notes, photos, control plans, final inspection etc.

Significant hidden building parts must be photographed before casting, sealing etc., as evidence that the work is carried out according to the project.

During the execution of the building the client is entitled to object to the Turnkey Contractor's technical supervision in case the technical supervision does not exit according to the contract.

When carrying out the technical supervision it is required that the technical supervisors use the tools which are available in 4Projects.

## 8.8 Stricter technical supervision

The bunker part of the DCPT facility must be executed under stricter technical supervision, as there are very specific and strict demands to this part of the facility regarding shielding, tolerances, installations etc. (see chapter 7).

Prior to casting the in-situ part of the bunker, the contractor must provide a description of:

- The concrete formula with regards to density, water content (a minimum water content of 5% for the hardened concrete should be obtained) and

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the europium and cobalt content (as specified in chapter 7). Data sheets etc. from the actual concrete supplier must be included.

- How to control and document the heat development in the concrete, both during and after casting.
- A project for the formwork, including details, that show that there will not be permanent holes from clamps all the way through the concrete making sure that the shielding is not compromised. Calculation showing that the formwork can withstand the pressure from the thick concrete walls must also be included.
- The casting process, how the concrete is put into the form with regards to reinforcement, technical installations and embedded part of the wall. Also a description of how the vibration of the concrete will be performed

The descriptions must be approved by the Client before the casting can begin.

During casting the contractor must perform stricter technical supervision, to make sure that the points above are met.

The stricter technical supervision, must also include all the specific requirements in the BID, especially regarding tolerances of concrete and embed plates in this area. Grouting the embed plates must be done with extreme care. Any void underneath floor embed plates may require corrective actions by the Turnkey Contractor.

The stricter technical supervision, must be documented. A plan for the stricter technical supervision, must be presented to the client, and approved before the casting starts. The constructing engineers of the project has to be a part of the stricter technical supervision, to make sure that assumptions are met. Their role has to be well-defined in the presented plans.

Before the casting is carried out, the client must be informed, so that he can make his own technical supervision, if he chooses to. The client has to be notified at least 1 week before each casting.

There must also be taken out samples of the concrete, delivered on site, for testing. To make sure that the points above are met (density/ water content / europium and cobalt content). The contractor is obliged to have the tests done by an independent third party, which has to be approved by the client before testing. There must be performed tests from a minimum of 10 different deliveries of concrete. All costs regarding the testing must be included in the final offer from the Turnkey Contractor. The final number of tests, and from which delivery they should be taken, will be decided between client and the contractor prior to the execution of the casting.

## **8.9 Quality of the work**

The execution on the building site must be performed as good craftsmanship and follow the specifications which are referred to in chapter 9 Trade Specific Requirements.

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The client and his consultants can as the work proceeds on the construction site discard non contractual work or materials and must at all times have access to the sites where the work is performed and may demand the information necessary to determine the quality of the performed service.

### **8.10 Quality management**

The Turnkey Contractor must within his quality control management system track, monitor and maintain a quality control plan which is adapted to this specific turnkey contract.

The quality control plan must cover all the provided services, all provided parts and all construction activities including temporary structures and equipment, which effects the final product or which has a significant influence on the progress on the construction site.

Throughout the project the client and his consultants must have access to the quality control documents regarding the work of the Turnkey Contractor and his subcontractors and furthermore have the right to review the quality control documentation.

In generally, the Total Contractor has to secure the quality assurance after each design phase, and present the Client with the quality control documentation simultaneously as the design material.

During the construction phase, the Turnkey Contractor has to provide the Client with the quality control documentation on a 2 weeks basis.

Lack of control and / or documentation will be considered as a non-fulfilled part of the turnkey contract.

### **8.11 Hand-over**

The legal hand-over procedure will be carried out by following the principles described in annex 8.4 – Bygherrefoeringens vejledninger vedrørende Ny Afleveringsproces, the principles will also be used regarding the hand-over to Varian at the milestone Ready For Equipment date (RFE).

#### **8.11.1 Addition to ABT93 §28 subsection 1**

At least six weeks before the agreed hand-over date, the client or his consultants summons to a pre-hand-over, which must be held no later than one month before the final hand-over. The Turnkey Contractor must prior to the pre-hand-over prepare the following documents:

- A Progress report, which shows the stage of completion and indicates the critical elements in the remaining time available
- A completion plan, divided up in activities and staff
- A plan for handing-over the operation and maintenance documentation, instruction of the operating personnel etc.

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This material is handed-out to the client at least one week prior to the pre-hand-over. The Turnkey Contractor must participate in the pre-hand-over. The pre-hand-over is considered complete if the above mentioned documents are hand-ed-over and if they are approved by the client and his consultants.

If the pre-hand-over is not carried out, the client summons as soon as possible to another pre-hand-over.

The final hand-over follows the principles described in ABT93 – see annex 4.18

## **8.12 Commissioning**

The Turnkey Contractor must perform a commissioning process, adhering to “DS 3090 The Commissioning Process for Buildings - Installation Services in New Buildings and Major Renovations”

The scope of the commissioning process, must address all technical installations and functional issues with special focus on systems, where multiple subcontractors and / or suppliers are part of the overall system installed. Requirements for installations, indoor climate and energy are described in dRofus and in the descriptions (Chapter 9 in particular).

The Turnkey Contractor is obliged to involve the client’s technical operating department.

### **8.12.1 Organization**

The Turnkey Contractor is to conduct the commissioning process, and is to establish a dedicated commissioning team with responsibility for the process. At the head of the team, the turn key contractor is to appoint a commissioning manager, responsible for the commissioning process. Additionally, the group must comprise consultants, subcontractors and suppliers. Meetings in the commissioning team, are to be held as required, but at least 3 times evenly distributed during the design detailing and 6 times evenly distributed during the construction phase. Minutes are to be taken at these meetings as documentation of the agreements and process.

The client /client consultant must be informed about the group's work by sending minutes of meetings and documents prepared. In addition, the client consultant must be notified of the meetings of the group and have the option to participate.

In addition, an independent adviser (which is not represented on the team) is to be appointed. The independent adviser must have interdisciplinary insight into building technical installations, and proven experience with similar tasks. The tasks for the independent advisor, are described in the following chapters.

### **8.12.2 Commissioning process**

Overall, the commissioning process must be carried out to ensure that the building structures, installations and systems are coordinated, planned, designed, installed and tested so that by handover, all systems meet the functional requirements and possible problems after taking over are eliminated. The commis-

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sioning process must also ensure that the building meets the requirements of the standards used, and documented accordingly.

The commissioning manager is responsible for the overall process and, in this context, ensuring the development and ongoing maintenance of documents according to DS3090 including:

- Commissioning-plan
- Commissioning-log
- Document of acceptance
- Project basis
- Education plan
- Test paradigms
- Test reports
- System manual
- Commissioning report

In the design stage, the group must pay particular attention to:

- Coordination and coherence in the project across the different technical areas focusing on installation projects, but also in relation to the construction project and in relation to client supplies (see chapter 10)
- Preparing, and ensuring follow-up on, a list of critical building, risk aspects and interfaces
- Conducting project reviews in relation to facility operation

In the construction phase, and prior to any hand-over, the group must focus on:

- Preparation of quality assurance plans (QA-plans), supervision and inspection plans and ensuring that these activities take place
- Preparation of material for operation and maintenance
- Ensure proper operation of the interconnected system
- Develop paradigms for testing all different systems/installations

Ensure operating instructions for operating personnel of all technical facilities.

### **Independent consultant**

In the design phase the independent consultant is responsible for the following:

- Ensure that the commissioning group has performed project reviews in relation to facility operation
- Perform own operation reviewing in connection with the main project and ensure that any input is incorporated into the project documentation

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- Ensure that the commissioning group has made coordination and coherence in the project across the different technical areas focusing on installation projects, but also in relation to the construction project and in relation to client supplies
  - Ensure that the commissioning group has prepared a list of critical building, risk aspects and interfaces

In the construction phase and prior to handover, the independent consultant must focus on:

- Ensuring follow-up in the commissioning group on the list of critical building components, risk aspects and interfaces
- Ensuring the preparation of QA-plans, supervision and inspection plans and ensuring the fulfilment of these activities
- Approving test paradigms (before the tests are performed), drawn up by the commissioning group
- Ensuring that the commissioning group has prepared an operation and maintenance material
- Ensuring that instructions for operating staff take place or are planned to do so
- Ensuring proper function of interconnected systems

The scope of the independent adviser must include a minimum of 200 specialist hours. The cost must be included in the tender from the Turnkey Contractor.

### **8.13 As Built**

As built material must be delivered as Level 3, as described in ICT specifications see annex 8.1: IKT Bilag 01 Leverancespecifikationer.

### **8.14 Operation and Maintenance Documentation**

The submission of documentation will be done digitally to a web-based system as the Client makes available.

O&M documentation must be submitted no later than 15 working days before "The Deliver Business". It is a condition for payment of the final fee that O&M documentation is submitted, and approved by the client and his advisor.

If the contractor is not in a position to implement the digital submission, help to carry out the work, can be purchased from a consultant.

For each assigned building component following must be completed in the O&M system

- Photo 1-4 units.
- Location of the building component, room number, façade
- Function of building components unless it is self-explanatory

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- Specification / Free text with the major maintenance items, law-obligation inspection etc.

For each component completed:

- Component Designation
- Supplier Warranty / service charge
- Make / Fabricat
- Type
- Quantity as built
- Implementation year
- Life expectancy
- Name, if the component is included in the BMS system

For each building listed as the related activities:

- Brief description of all maintenance activities in a few words
- Detailed description of the maintenance team and the criteria for this
- Frequency of maintenance activity (f.eks. 1 years, 6 months. Etc.)
- Whether the activity is maintenance (preventive) or replacement (preemptive)
- Importance of the maintenance team (statutory, systematic, etc.)
- Subjects that will perform maintenance team (plumber, electrician, painter, etc.)
- Economic Perspective budget for maintenance
- Recommended start time of the maintenance team

For each building component card, the following is to be uploaded and attached

- Drawings / charts / work instructions
- Maintenance instructions from suppliers for the specific part
- Checklists for use in performing inspections
- Etc. acc. Documentation extent of the building 0, A - D. Does the chart below.

If the same document is to be used on several building components, the document is to be uploaded for each component.