

Integrated design and calculation process at WINGAS

European energy provider Wingas relies on Cadison for designing the landing point of the Nord Stream pipeline near Greifswald. About the company's new redundant free and integrated engineering process

writes BERNHARD D. VALNION

To further increase supply security and ensure that Germany's and Western Europe's demand for gas imports is covered in the long-term, OAO Gazprom (Moscow), BASF (Ludwigshafen/Germany), and E.on Ruhrgas (Essen/Germany) signed an agreement in principle in the fall of 2005 for the construction of the so-called Nord Stream pipeline. Covering a distance of

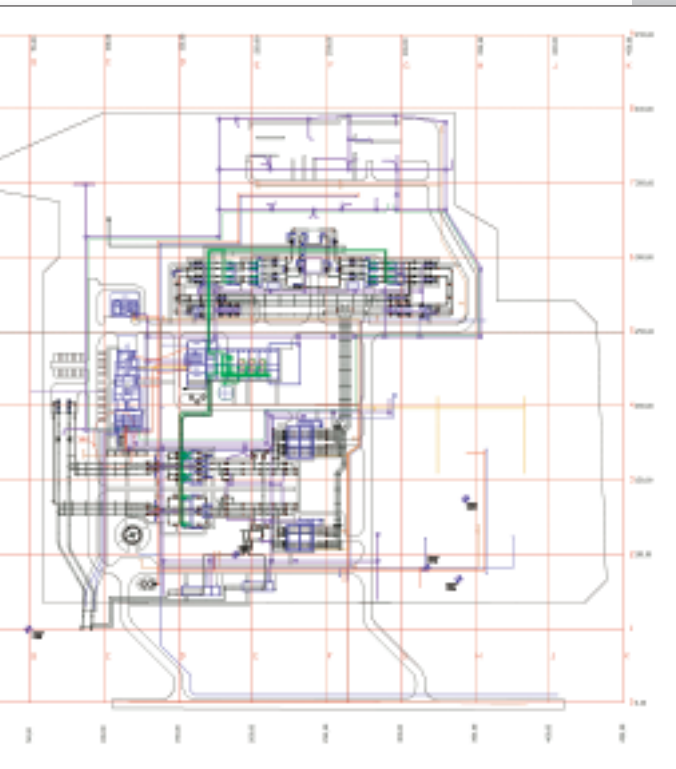
around 1 200 km through the Baltic Sea, the Nord Stream pipeline will be laid from Vyborg (Russia) to the German Baltic coast near Greifswald(1). As early as 2005, European energy provider Wingas (Kassel), a subsidiary of Wintershall Holding (Kassel) and Gazprom export agreed on arrangements for the first supply of gas through this pipeline. Two new onshore pipeline



Christian Manshausen, Wingas

links are to be constructed, starting in Lubmin near Greifswald, where the Nord Stream pipeline comes on shore:

■ OPAL (Ostsee-Pipeline-Anbindungsleitung – Baltic Sea Pipeline Link) will



Top view (top) and 3D model (left) of the landing point at the Lubmin site near Greifswald



Nord Stream (top right) and Wingas infrastructure in Germany (right)



Photos / Source: Valinon / Wingas 2010

transport natural gas 470 km south to the German–Czech border near Olbernhau.

- The 440 km long NEL (Norddeutsche Erdgasleitung – Northern German Gas Link) will terminate at Rehden in Lower Saxony.

OPAL NEL Transport will take on the role of network operator for OPAL and NEL in the future. OPAL is scheduled to come on stream in 2011. The approval processes in Mecklenburg-Western Pomerania and Saxony have already been concluded, and the first pipes were laid there in October 2009. The authorities have given the approval for the construction and building permit for the complete OPAL. NEL is to come on stream in time for the commissioning of the second Nord Stream offshore pipeline in 2012. The planned OPAL and NEL gas pipelines are to be connected to WTKG's long-distance gas pipeline network, among others (see map).

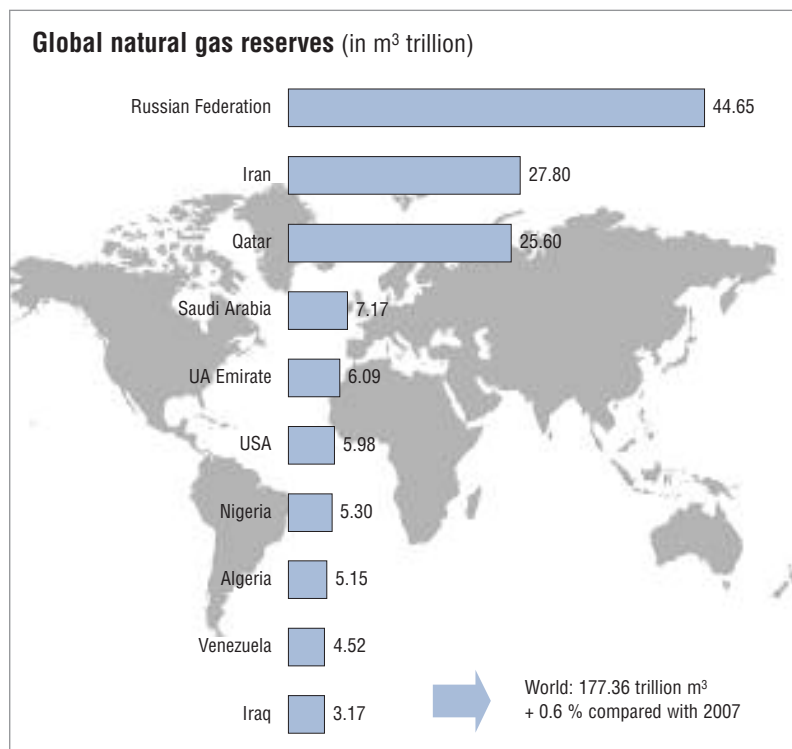
Wingas was formed in 1993 as a joint venture between the world's largest producer of natural gas, Gazprom, and Wintershall, Germany's largest crude oil and natural gas producer. The firm is active in natural gas trading and distri-

bution in Germany, Belgium, France, Great Britain, Austria, the Czech Republic and Denmark, and, in the role of an EPC, responsible for the erection of OPAL and NEL. Another notable example of Wingas' construction competence is the largest natural gas storage facility in Western Europe, in Rehden. It represents roughly a fifth of the entire storage capacity in Germany and thus makes a sustainable contribution towards supply security in the country. Key business figures for 2009 are: 7,6 billion Euro Net Sales (-15,8 percent compared to 2008), 392 Million EBIT (± 0 percent), and 382 employees (+4 percent).

All-in-one supplier requested

In a talk with our editor, Christian Manshausen, piping design engineer and

responsible for the CAD-system at company's Kassel-site, spoke about the successful introduction and deployment of Cadison R9 for a redundant free and integrated 2D/3D design process. Before the introduction of the design planning suite in January 2009, a detailed benchmarking has shown up soon that Cadison will be on the short list: "Since we are in close cooperation with architects, one of our main selection criterias was", Mr Manshausen remembers, "that the future tool should run on top of the Autocad platform to avoid interoperability problems." And this in fact is true for Cadison. Furthermore, the system provider, ITandFactory GmbH based in Bad Soden/Germany (ITF), convinced with remarkable short reaction times on any kind of inquiries. "One face to the cus-



For the European Union, Russia is the preferred supplier of natural gas

“...tomer was crucial for us”, Mr Manshausen adds, meaning that Wingas would like to have only one vendor delivering the plant-engineering-IT tools, namely Autocad updates, 2D/3D plant design, and review tools to avoid misunderstandings in responsibilities for the support. In summary the CAD-responsible states: “Most of the special requests ITandFactory could fulfill immediately. In particular, we really appreciate the direct access to vendor’s software development department if something had to be customized”. Now, five seats of Cadison Release 9 are running on top of Autocad 2010 in Kassel. They are used to generate the P&IDs and the detail engineering in 3D (3D-Models, isometrics, reports, etc.). Objects for standard equipment items are defined under the help of the catalogue application Matpipe, non-standard parts are modeled by using special functions of Autocad. All this information is also used creating isometrics. The database of Cadison, a licensed product from Versant, works “fast and absolutely reliable”, as Mr Manshausen assures, preventing the users from data redundancy. Most advantageous of the system architecture is its ability to provide a total integrated 2D/3D design process.

Data exchange to the electrical side of

the design takes place via CSV format (MS Excel). Wingas uses Eplan PPE (2) for the electrical documentation, and Autodesk Navisworks for design review, clash detection and the generation of 3D renderings. But: “Although clash detection can automatically be performed by Navisworks I prefer to trust my own eyes, e.g. analyzing manually below grade intersections of pipings and cable trays”, Mr Manshausen says.

No straightforward design

Due to its large size, the design of the natural gas reception station at the German Baltic Sea shore is not of a straightforward type. The Lubmin site will process more than 55 Billion m³ natural gas annually. There, the gas comes on land and first will be cleaned, then pre-warmed and afterwards reduced in pressure. To meet very high safety standards, all equipment items have to be carefully dimensioned and analyzed already during the planning phase. That was the reason why a few years ago Mr Manshausen has decided to choose the CAE application Rohr2 (3). The CAE application calculates the elasticity of piping for various cases

¹⁾ Vendor of the application Rohr2.

(operating, emergency blow down, etc.).

For Mr Manshausen it was obvious that only an automated data exchange between the plant design tool and the CAE program guarantees the fulfillment of the comprehensive requirements. Hence, the vendor was asked to deliver a powerful interface between both tools. Indeed, under active support by Mr Manshausen and in close cooperation with Sigma¹, ITandFactory programmed an error-free tool-to-tool communication: A remarkably high success rate in between 95 and 99 percent of all data imports to Rohr2 could be realized. This is a fantastic value for an interface proving that the team did a very good job. Within minutes the data import into Rohr2 and the corresponding preprocessing is finished. And by the way, in order to run a calculation process only by pushing a button such a high quality interface is absolutely necessary; otherwise one has to interrupt the process repeatedly and check the results manually.

Close the loop

Progress never stops, and Wingas wants to go further as well. Mr Manshausen has in mind a bidirectional interface between Cadison and Rohr2: “Modifications on the design made within the Rohr2 application should be automatically referenced back to the Cadison database”, Mr Manshausen explains. If this is realized a closed loop between design and calculation will push forward the engineering process onto the next level of efficiency. But at the moment some patience is requested. According to ITF’s managing director, Georg Kremer, this feature will be available in 2011 or in 2012. But Wingas will not have to wait to the brand new 64 bit version of Cadison. It will be presented during the International Cadison Conference 2010, taking place end of September in Darmstadt/Germany, and will be released by the end of this year.

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- (1) Wingas Annual Report 2009: for further details see www.wingas.de
- (2) www.eplan.de
- (3) www.rohr2.de

www.cadison.com