

## Release of “IsolationNavi,” jointly developed software that automatically visualizes the paths of gas or other fluids flowing through piping for facilities

—Improvement of on-site work efficiency and proficiency by the digitization of drawing creation—

Tokyo Electric Power Services Co., Ltd. (Headquarters: Koto-ku, Tokyo; President and Representative Director: Yasuhiro Kubo; hereafter “TEPSCO”), Osaka Gas Co., Ltd. (Headquarters: Chuo-ku, Osaka; President and Representative Director: Masataka Fujiwara; hereafter “Osaka Gas”), and Daigas Gas and Power Solution Co., Ltd. (Headquarters: Chuo-ku, Osaka; President and Representative Director: Nobushige Goto; hereafter “DGPS”) will today release “IsolationNavi,” jointly developed software that automatically visualizes the paths of gas and liquid flowing through piping at production sites, such as gas plants, power plants, and chemical plants. IsolationNavi makes it possible to automate drawing creation, which is conventionally done in analog, thereby improving on-site work efficiency and proficiency.

At production sites, such as gas plants, power plants, and chemical plants, equipment is regularly inspected and engineering works are conducted as needed to ensure safe and stable operation. At that time, it is necessary to safely isolate equipment to be inspected from equipment in operation (isolation operation). Specifically, valves installed within piping systems connecting multiple pieces of equipment must be opened or closed in the correct order to ensure safe fluid flow without leakage or backflow and thereby isolate the equipment to be inspected from the equipment in operation.

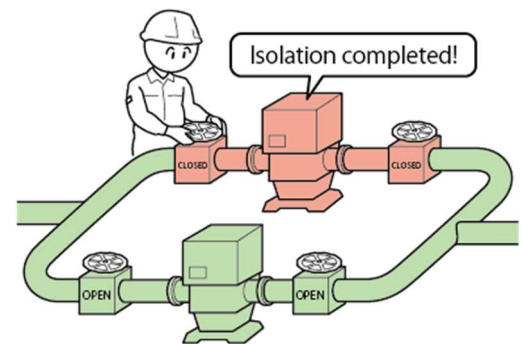


Image of isolation operation

Isolation operation consists of planning, in which the operation procedure is considered based on the drawings of equipment and piping systems, and on-site work, in which equipment is actually operated according to the created plan. Since the path of fluid changes with every opening or closing operation of valves, in conventional planning, drawings (work plan drawings) are created for every step of the isolation procedure by handwriting or using drawing software. In addition, when a wide range of equipment must be operated, it takes considerable time for planners to check multiple drawings. At the stage of on-site work, it also takes considerable time for workers to confirm the operation procedure since there is no means to perform a simulation in advance, and in addition, they need to be familiar with on-site know-how that cannot be communicated through drawings, such as the locations of the relevant valves, which makes it difficult for young or less-experienced workers to perform isolation operation.

To solve these problems, the three companies have developed IsolationNavi, a simulation software that **digitizes** the drawings of plant equipment, such as piping systems and valves (in other words, creates “digital drawings”), and automatically visualizes the fluid path, which changes with the operation of relevant equipment, such as valves.

The following are the features of IsolationNavi.

- ① The product can automatically create digital drawings that indicate the range of fluid flow corresponding to the open/close status of each valve just by operating a PC with a mouse, thereby making it possible to simulate fluid paths within piping systems at sites.
- ② The digital drawings can indicate the open/close status of each valve and the corresponding path and range of fluid flow at each step of the work procedure, and these data can be saved, so users can easily create multiple work plan drawings.
- ③ Since the product can link digital drawings with 3D drawings of existing plant equipment, workers can easily

recognize the status of the site. So, the product can be used as a tool for employee training and the inheritance of experienced workers' know-how.

\* "Navisworks Simulate" by Autodesk Inc. is required to link digital drawings with 3D models.

These functions of IsolationNavi allow users to easily create multiple drawings necessary for isolation operation and recognize the status of the site while checking the status of the fluid path, which changes with the operation of the relevant plant equipment, thereby making it possible to improve on-site work efficiency and proficiency.

Today, the three companies begin offering digital drawing services and selling the software.

We will actively promote IsolationNavi in a wide range of fields where isolation operation is required to contribute to the improvement of on-site work efficiency and proficiency.

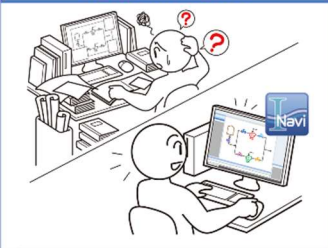


**Tokyo Electric Power Services Co., Ltd.**

### Benefits of Isolation

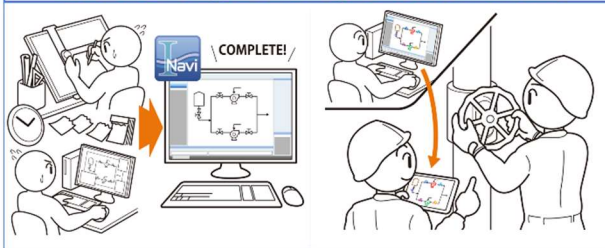
## Improvement of on-site work efficiency and proficiency

The product makes it possible to perform simulations prior to on-site work.



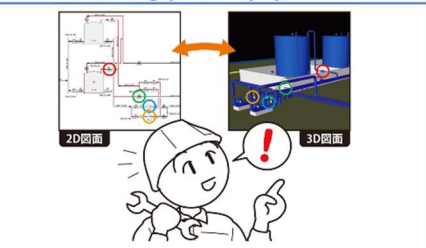
Users can reduce the time for planning operating procedures.

The product makes it possible to display the open/close status of each valve and the corresponding status of fluid flow on digital drawings and save the data.



Users can create work plan drawings easily and quickly, thereby reducing the time for creating drawings.

The product makes it possible to link digital drawings with 3D drawings of existing plant equipment.



Workers can easily recognize the status of the site and perform high-level work regardless of their work experience.

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Established	December 20, 1960
Main business	Comprehensive energy consulting for studies, planning, research, design, analysis, and management related to social infrastructure, including electric power equipment
URL	<a href="http://www.tepsco.co.jp/index.html">http://www.tepsco.co.jp/index.html</a>

#### <Company profile of Osaka Gas Co., Ltd.>

Representative	Masataka Fujiwara, President and Representative Director
Headquarters	1-2 Hiranomachi 4-chome, Chuo-ku, Osaka, Japan
Established	April 10, 1897
Main business	Production, supply and sale of gas; generation and sale of electric power, etc.
URL	<a href="https://www.osakagas.co.jp">https://www.osakagas.co.jp</a>

<Company profile of Daigas Gas and Power Solution Co., Ltd.>

Representative	Nobushige Goto, President and Representative Director
Headquarters	5-11, Doshomachi 3-chome, Chuo-ku, Osaka, Japan
Established	October 1, 2019
Main business	Operation and maintenance of gas plants and power plants; generation and supply of electric power; engineering
URL	<a href="https://www.osakagas.co.jp/company/group/daigasgpsolution/index.html">https://www.osakagas.co.jp/company/group/daigasgpsolution/index.html</a>