



CellSense™

Wireless monitoring system

Kennecott Utah Copper Corporation and Outotec have developed a revolutionary electrolytic cell monitoring system, CellSensor™, for metal electrorefining and electrowinning. This new wireless voltage and temperature monitoring technology provides a modern, high-tech solution with new advanced features to improve tank house performance.

The operator and management receive reliable real-time data on electrolytic cell operation and condition, enabling the improvement of operational efficiency, operator safety and more consistent and higher cathode quality.

Outotec has also developed a new system, CellSense™, for processing and accessing enormous volumes of electrorefinery data from CellSensor™ system and other analytical instruments. It provides a user friendly and powerful view to tank house performance, displaying each cell's real-time status and condition history in simple-to-understand format over a web browser.

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Outotec's CellSensor™ device.

Outotec and Kennecott's innovative CellSensor™ system is a powerful data collection system, based on robust wireless communication and powered by the cell bus bar voltage. Because there is no complex hard-wiring, isolators, power supplies or traditional instrumentation, the system not only overcomes many problems associated with maintenance and utilization of traditional hard-wired monitoring systems, but is free from normal maintenance requirements such as calibration and management of corrosion and cables. Also, the installation of the system is simplified.

CellSensor™ system provides unrivalled functionality. Instant cell by cell short circuit detection allows improved current efficiency, production and permanent cathode longevity. Electrolyte temperature monitoring and control of each electrolytic cell enables enhanced cathode quality and plating time, optimized additive consumption and early detection of electrolyte flow-based problems. Advanced self-diagnostic features, such as continuous bus bar contact tap quality monitoring automatically identify faults.

Why choose CellSense™

In copper refining, traditional screening of the short circuits is difficult, ergonomically awkward and involves walking on top of the cells, which can generate cathode quality problems, more short circuits and lead to slips and falls.

Minimizing the unnecessary short screening of normal status cells improves overall work effectiveness and improves operator safety.

The CellSense™ monitoring system provides a real-time overview of an electrorefinery condition by processing measurements of the CellSensor™ system into an easy-to-understand and clear graphic information displayed on a web-based user interface.

The CellSense™ system points out clearly problematic cells enabling operators to streamline and optimize their work by focusing the effort on most critical sections and cells.

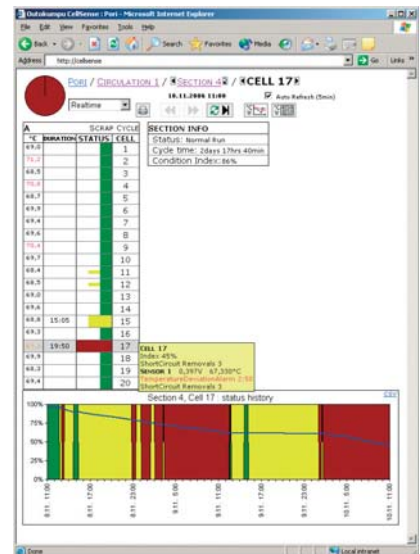
In electrowinning, the short circuits between anodes and cathodes do not present as common problem as in refining. Still, early identification and correction of rarely occurring short circuits is beneficial to protect the process equipment and to minimize the loss of electricity and production. Also, identification of, for instance, too high cell voltages due to dirty bars allows improvement of electrical efficiency.

Electrolyte temperature is an important variable for metal electrorefining and electrowinning. Variations from optimal electrolyte temperature are known to have a significantly degrading effect on the quality of the cathode and on energy and additive consumption.

Therefore, it is crucial to manage the electrolyte temperature properly, in order to avoid evolution of large tank house wide disturbances.

For the first time, CellSensor™ technology makes temperature measurement for each individual electrolytic cell affordable for commercial tankhouses.

Cell voltage, electrolyte temperature and other diagnostic data are collected through the wireless and redundant CellSensor™ network to the CellSense™ Server computer. Redundancy avoids wireless communication being blocked by any crane or other moving objects in the tankhouse.



A real-time view provided by CellSense™ system to the status of cells in a section equipped with CellSensor™ devices at a commercial tankhouse.

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How does CellSense™ work?

Each CellSensor™ device on an electrolytic cell is normally powered by cell bus bars. This innovation makes the devices truly wireless, having wireless data transmission and avoiding the need for wiring from an external power supply. In addition, the measurement quality is superior since each device is electrically floating (isolated) between the cell bus bars. The system installation is very clean and simple and greatly reduces maintenance requirements in the tank house's harsh environment. A small rechargeable battery installed on each device guarantees continuous operation over section shut-down periods (e.g. during cathode harvest) providing back-up power. The battery is recharged during normal production.

The high volume of collected data from the CellSensor™ devices is stored on the database of the CellSense™ Server computer. CellSense™, a data processing system developed by Outotec for copper refinery, processes the cell voltage, temperature, section current and other analytical data into a simple-to-understand, real-time and graphical cell status information, presented over a web interface.

In this way users can easily view the tank house status, for instance from their offices or control rooms. CellSense™ can also process and store the history of each cell status during a full production cycle, presenting different views of tank house status by section, circulation system or operating crew.



CellSensor™ installed at a refinery.

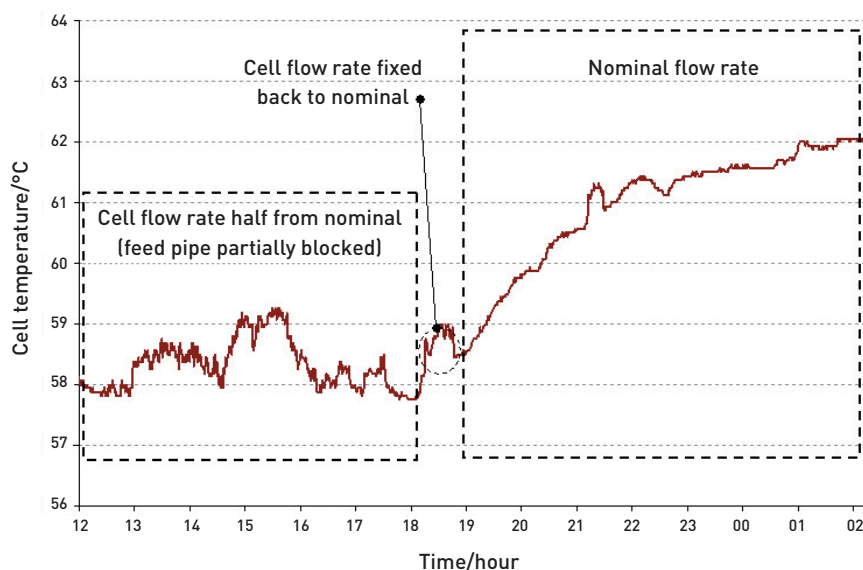
This provides powerful tools for the tank house's operation and management.

The data can also be directed to a Wi-Fi system, enabling the use of hand-held devices or tablet PC's by field operators roving the plant floor.

The combination of the innovative CellSensor™ and CellSense™ system provides an outstanding solution and unmatched performance for modern tank houses.

Benefits

- Increased and more uniform cathode quality
- Improved health and safety
- Increased current efficiency
- Improved plating time
- Decreased scrap percentage and more uniform scrap weight
- Decreased maintenance costs



Temperature trend of an electrolytic cell measured by a CellSensor™ device indicates a poor flow condition due to blocked feed pipe (58°C). Correction of the flow problem returns the cell temperature back to accepted level (63°C).

Outotec is a worldwide technology leader providing innovative and environmentally sound solutions for a wide variety of customers in minerals and metals processing as well as related process industries. Outotec Oyj is listed on the OMX Nordic Exchange Helsinki.

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