

Toward the practical system application

The CO₂ monitoring system was provided to the SaskPower's Boundary Dam integrated CCS Project

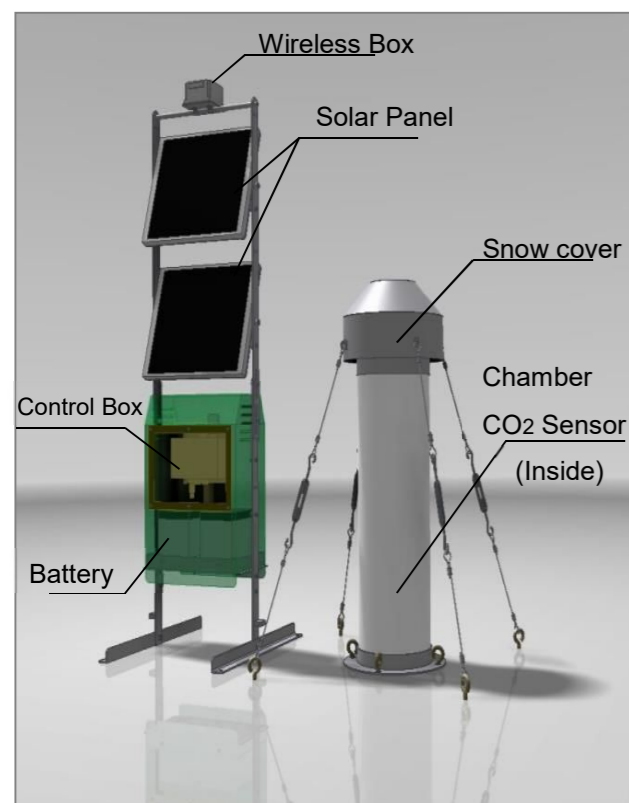
SaskPower and the Federal Government of Canada have invested \$1.35 billion CAD to retrofit the Boundary Dam Power Station Unit#3 for integration with the newly constructed Carbon Capture Facility. This facility will capture approximately 1,000,000 tons of CO₂ emissions per year. Approximately 100,000 tons of the captured CO₂ will be injected into a saline aquifer with the rest being sold to Cenovus Energy, Canadian oil company, for Enhanced Oil recovery. This project will be the world's largest integrated CCS project at a coal-fired power station. It's expected that the effectivity and economic efficiency of CCS will be verified by this project.

To promote public acceptance of CCS, SaskPower, Chugai Technos, and K-Coal are collaboratively conducting CO₂ monitoring in the CCS project. We will also validate the obtained data and are planning to disclose the data to the public. Prototypes of CO₂ ground monitoring system have already installed at several locations on the project site in September. 2014 by Chugai Technos and been measuring the CO₂ concentrations since. After the joint verification testing, the monitoring system will be commercialized from 2015 on a trial basis. In addition, this system is not used only for industrial purpose but also for living environment.



Boundary dam coal-fired power station

Product specification (SaskPower prototype)



Model name	CEEMS-CMP-002
Observing station size	H1320×φ460mm
Observing station weight	40Kg
Power generation/source unit size	H2100×W540×D280mm
Power generation/source unit weight	45Kg
Temperature measuring	-30 ~ 50℃
Humidity measuring	0~95%RH
CO ₂ Concentration	0~20% (0 ~ 200000ppm) ±0.5%F.S
CO ₂ measuring method	Non-dispersive infrared
Operational temperature	-30℃ ~55℃
Radio communication frequency / strength	902-928MHz/24dBm (250mW)
Outdoor communication range	6.5km and under (prospect)
Indoor communication range	305m and under
Max. output of power source unit	52W

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CEEMS series

- Chugai Environmental Effect Monitoring System -

CO₂ Ground Monitoring System

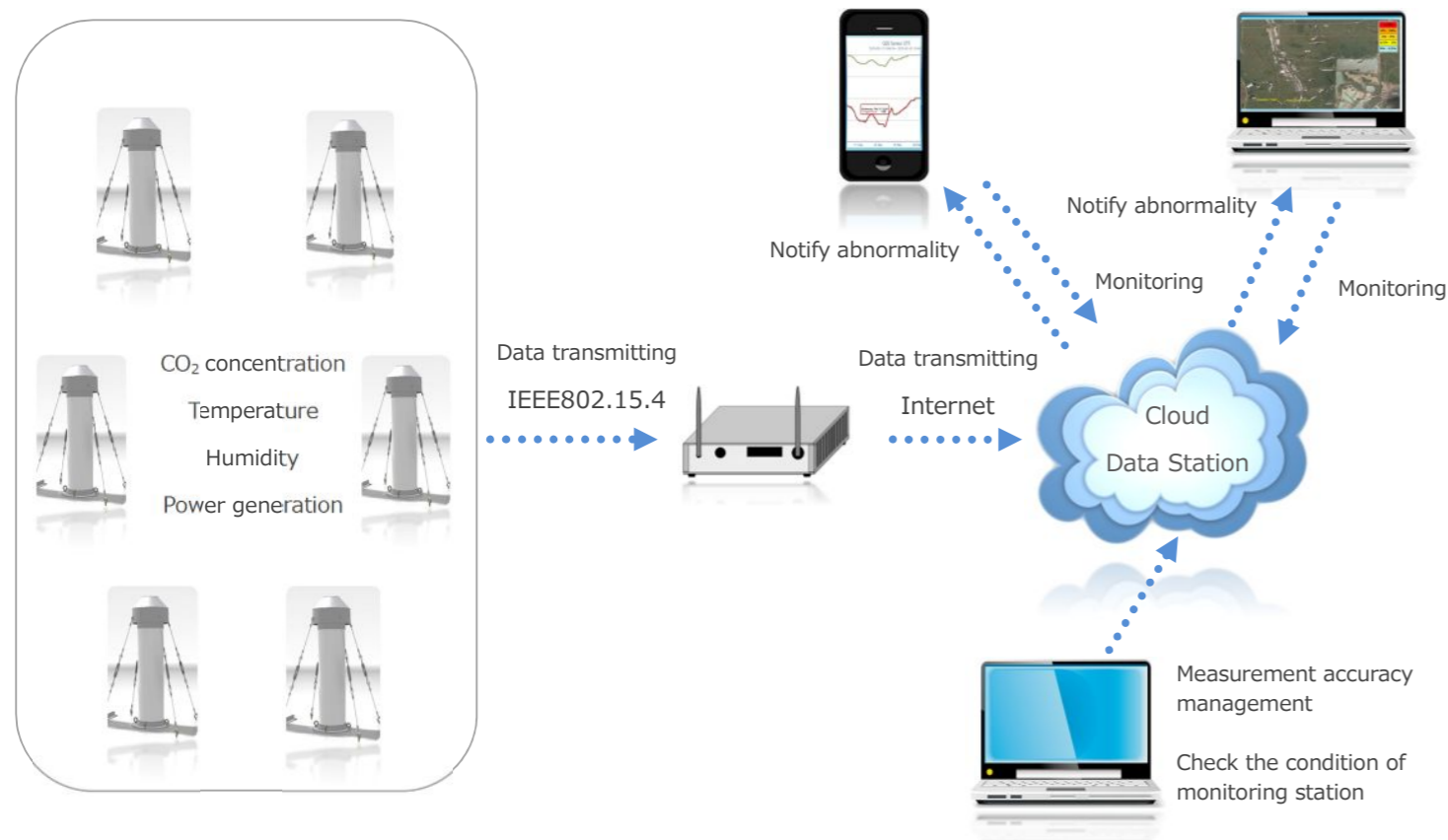
Outline

The CO₂ ground monitoring system, which is one of Chugai Environmental Effect Monitoring System (CEEMS) series, monitors CO₂ discharged from the ground into the air in real time. The system is used for site soundness assessment of Carbon Capture & Storage (CCS) and CO₂ Enhanced Oil Recovery (CO₂EOR) projects in large scale and extensive area in addition to the instant correspondence in case of abnormal event on such project fields. The monitoring data are easily managed by any kinds of information terminal.



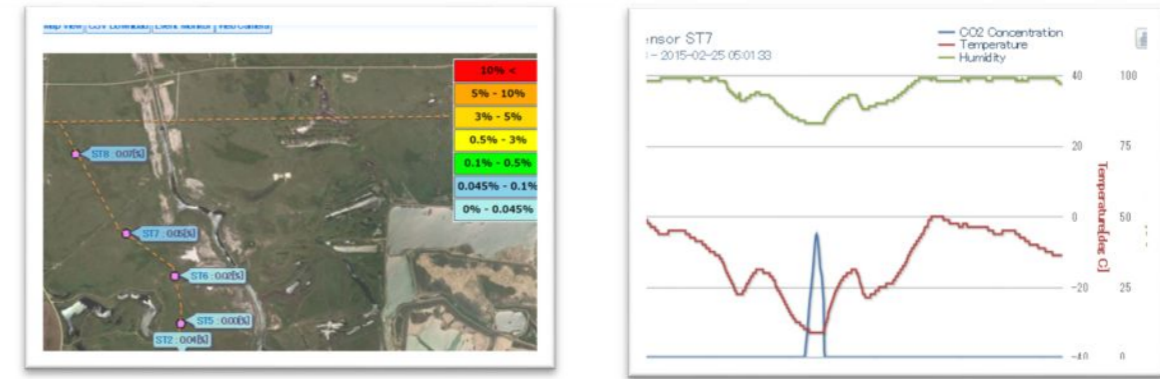
Remote web management for multiple measurement points in extensive area

Each monitoring station has an independent power unit of solar generation and the wiring isn't required because this system uses wireless data communication. With this feature, the system is easily installed. In addition, the monitoring data are effectively transferred between the stations because each station works as a relay station to the others. As the result, this monitoring system can measure multiple points in extensive area of CCS and CO₂EOR project site. When abnormality is found, the information is sent to your PC and Smartphone.



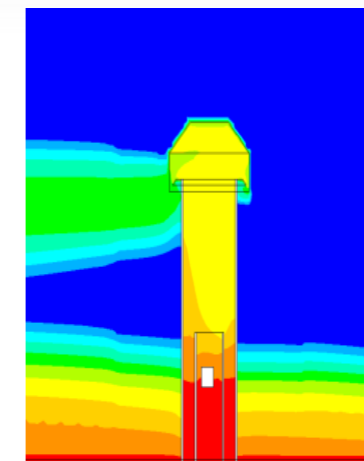
Real-time measurement data accessing

If you are logged in to the dedicated site from your PC or Smartphone, a monitoring map shows you accurate locations of each monitoring station and its real-time CO₂ concentration measured. The CO₂ concentrations are colored by the ranges of different concentration values therefore you can see the distribution at a glance. In addition, you can check the transition of the concentration for each station with the line graph.



Excellent environment resistance performance

The monitoring data will have no influence even with high wind such as over 15m/s because a main measuring unit at the monitoring station is stored in a windproof chamber and it reduces airflow. This system is also used in any inhospitable environment such as -30°C environment.



Simulation at 15m/s wind speed



Verification testing at cold region

A variety of sensing

Our CEEMS series can expand the CO₂ sensing to the others by installing or combining various gas sensors. They are used for air and soil gas monitoring at natural gas fields, LNG plants, and chemical plants.



- Methane (CH₄)
- Ethylene (C₂H₄)
- Ethane (C₂H₆)
- Butane (C₄H₁₀)
- Pentane (C₅H₁₂)
- Hexane (C₆H₁₄)