ANZAIKANTETSU CO,LTD

mcs section

Reductionof Sludge-Lake Hyōko–Japan

ProjectOverview

LakeHyōko(瓢湖)is a 281-hectare(690-acre)reservoir areain the city of Agano,Niigata, Japan.(Extracts taken from longer report)

Coordinates:37°50′18″N139°14′14″
Built:1639
Surfacearea:8 ha (20 acres)
Max.Depth:1.2 m (3ft 11 in)

The reservoir was created in 1639 during the Edoperiod of Japanesehistory. It is noted for its abundant and diverse bird life, and is an important overwintering grounds for Whooper swans and Tundra swans.

The area received protection from the Japanese government as a wildlife refuge in 2005, and in October 30, 2008, it was registered as a United Nation's Ramsar Wetland site, which means that any activity on the lake has to be sensitive not to interfere with or damage the local environment or its wildlife.

According to the Agano City's Lake Management office, the results of previous water quality surveys, in both Spring and Autumn, showed that the general standard of water quality was deteriorating, largely due to rotting plant matter and the depositing of food and faeces when the birds gather in the winter.

In 2011, Anzai Kantetsu's technology was invited to address this situation by setting up a trial to decompose the sludge/sediment at the bottom of the lake using its Nanobubble technology, which was considered to be the best and most environmentally friendly solution.

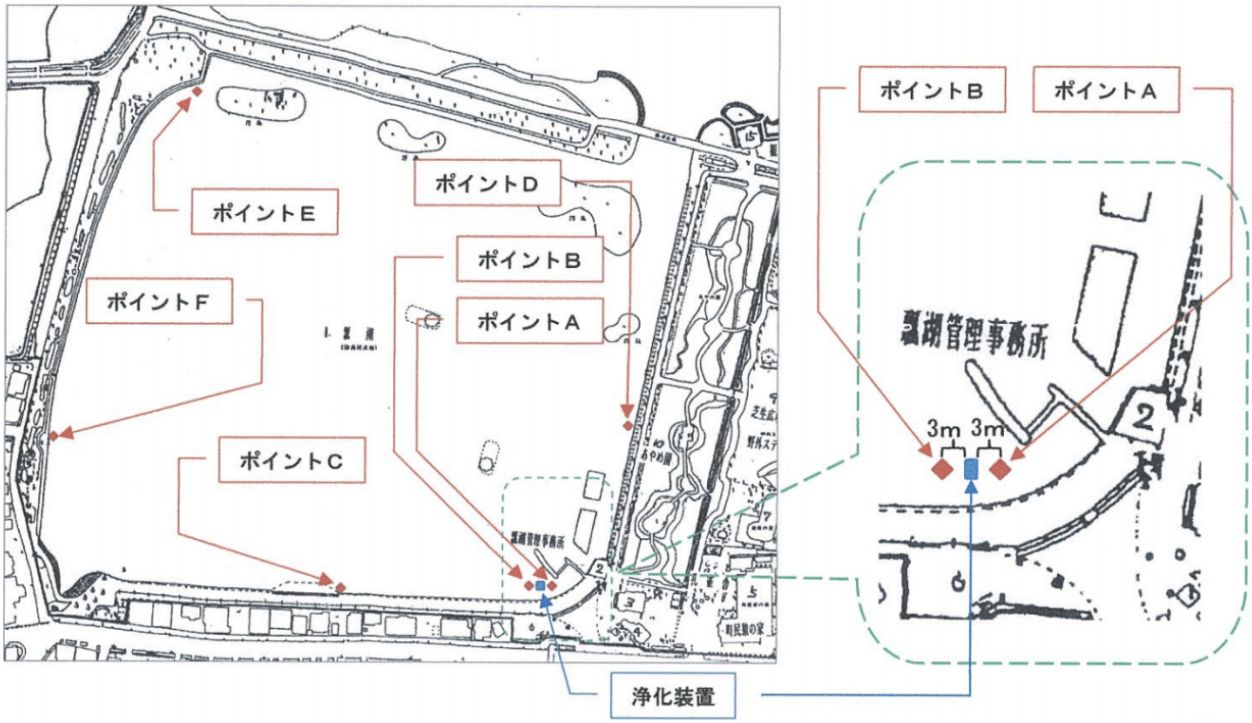
■ For this location, one Solar powered Rotary Nanobubble generator (equivalent to 50 A/S unit), was installed. It was anticipated that the trial would cover an area of 20m radius. e.g. 20 m x 20 m x 3.14 = **1,256㎡**

Over a three-month period, the average sediment/sludge reduction measurement was 4.25 cm (0.0425m). Therefore, during this three-month operation period, 1x 50 A/S equivalent Rotary Nanobubble unit can be expected to reduce⇒ **53.38㎥** of sludge/sediment (1,256m × 0.0425 m).

■ However, the 4.25 cm average sludge/sediment reduction was found not only in the target area, but across the whole lake. This results in 4.25 cm× about 80,000㎡ (the total volume of lake Hyoko) about **3,400㎥** of sediment purification by volume.

■ Result

A decrease of lake sediment/increase of water depth was shown at more than 90% of all measurement points. The average sludge reduction height of 4.25 cm shows a clear improvement, indicating that purification by activation of the terrestrial bacteria is promoted by the Oxygen Ultrafine/Nanobubbles Bubbles.



Sampleswere taken from all over the lake.

A Lossof Ignition Test was undertaken to measure where the organic matter has reduced the most. Thisprovedto be atpoints A and B on the above map, which were the nearest points to the Nanobubbleunit in the path of the water flow.

Asthe operation progressed,the research scientists admitted that even just by walking in the shallow area of the lake, they could feel physical evidence of improvement because underfoot, there was more feeling of the gravel and clay layer at the bottom of the lake and much less sludge. Also, at the beginning of the operation, there were malodours, such as methane gas,rising from the sludge with every step they took. Asthe Nanobubble treatment progressedthey confirmed that these malodours were drasticallyreduced.

4 月 14 日：ヘドロ状の堆積物。臭気も強く感じる。

Thesludgebecame more‘sandy’(above left) asthe organic matter was reduced.

Shellfish started to return astheenvironmental balancewasrestored.

Useof Nanobubbles also revealed new information about the lake. Previously it has been assumedthat the main water flow in the lake camefrom the intake port, and travelled directly ahead and that there was also another current coming towards the main pier, where the Nanobubble device was set.

However,by following the movement and spread of Nanobubbles and the ensuing purification process,we learntthat the intake water proceededalmost straight towards the pier and then returned backto the intake port, and thatthe flow of water in the lake changesdueto conditions suchasdirection ofwind and water temperature.