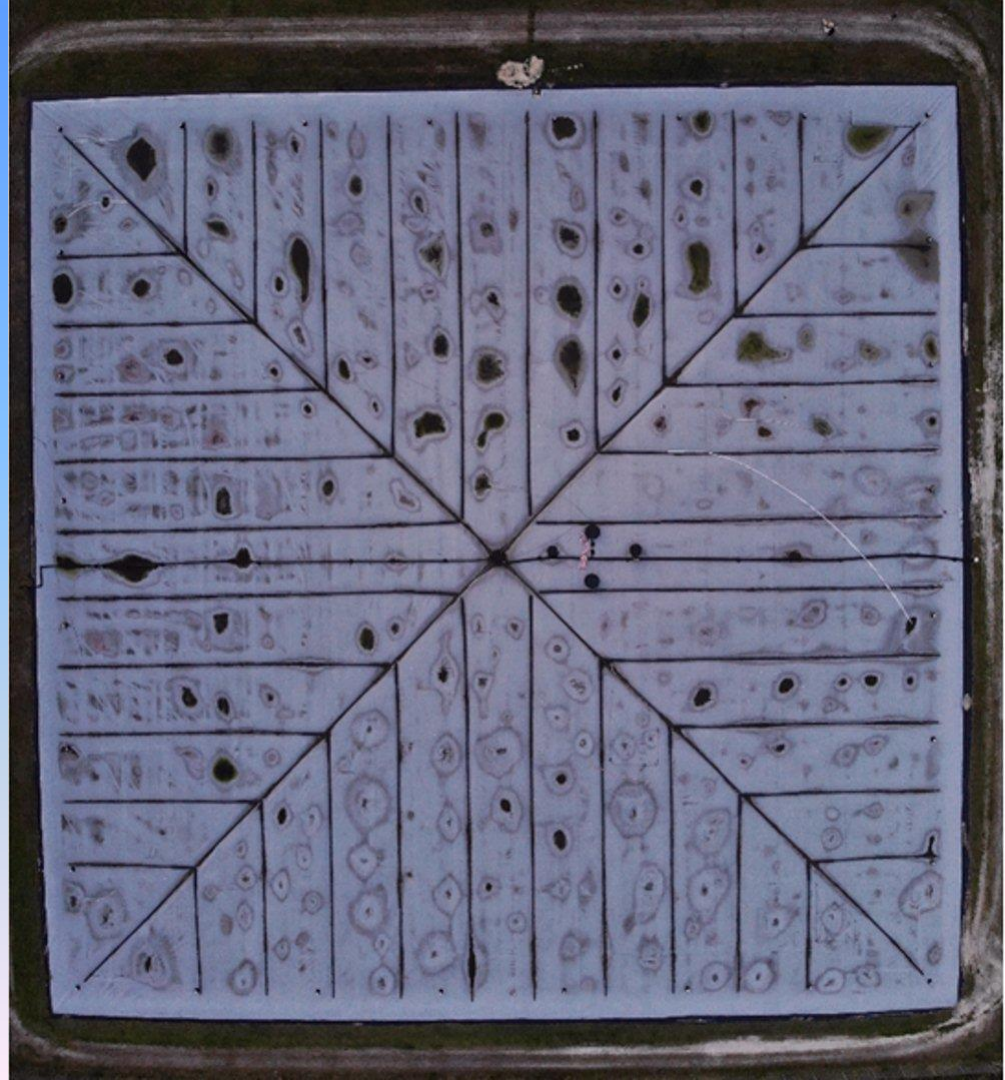
Dronninglund Fjernvarme

Followup meeting #7 on Teams, 28.10.2020

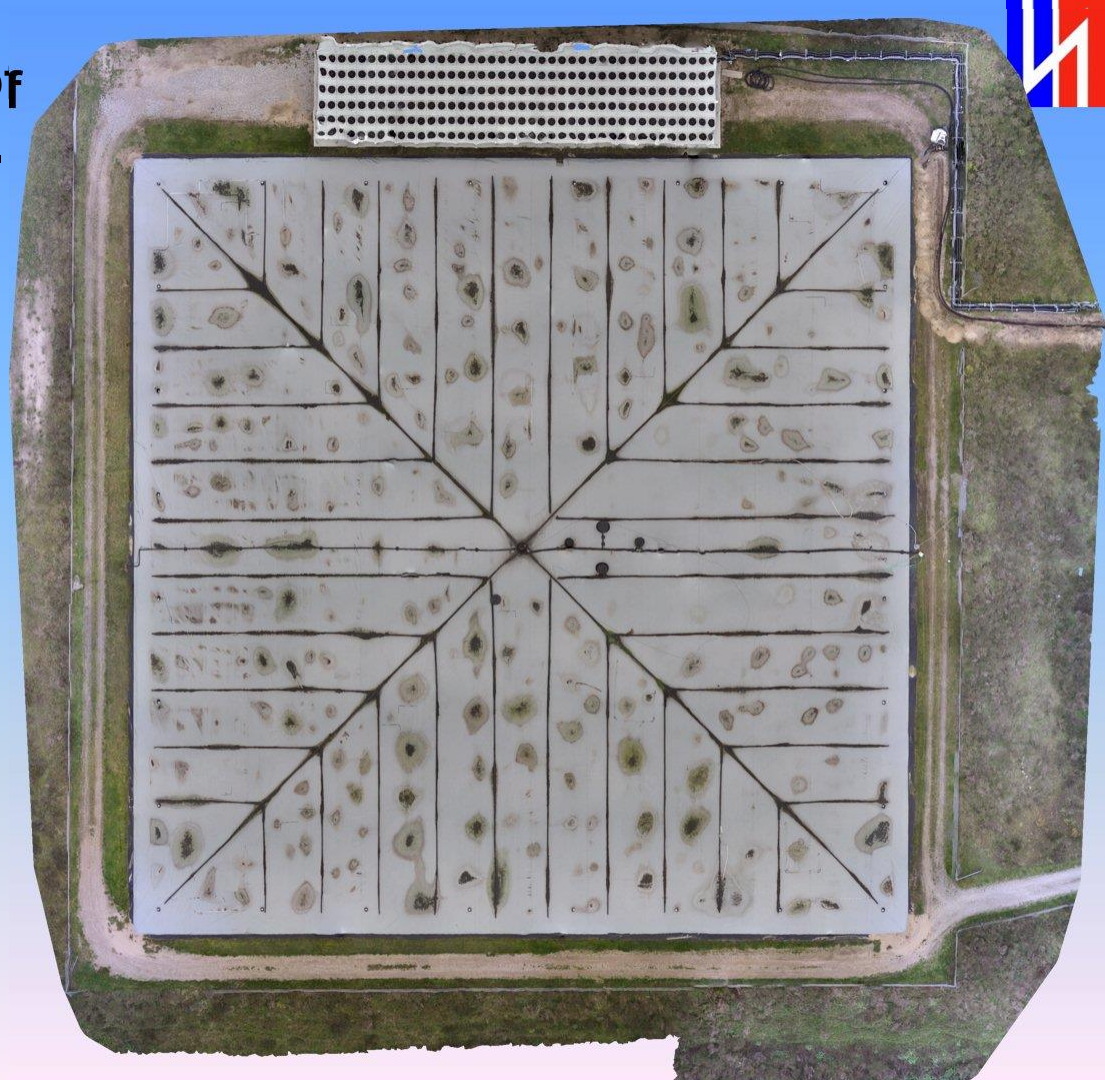
Drone picture from an altitude of 25 meters, taken spring of 2019.

You see many small lakes forming on the top liner.
On this picture we have started to empty the lakes in the South/ East corner

The daily maintenance consist mainly of pumping the water away from the lakes when they have grown to big.
Time consumption app. 2-3 hours a week year around.



Drone picture from an altitude of
25 meters, taken spring of 2020.



Pumping water away from the lakes

Patent Dronninglund ☺

Construction of the lid:

1. Top liner with weight tubes
2. Net for air circulation.
3. 3 x 8 cm isolation. Between the layers of insulation, we placed fixation irons

4. Net for air circulation.
5. Floating liner with weight tubes.

Some of the lakes started to get warm.

We opened the top liner to inspect the insulation and the floating liner.

We found hot water soaking the insulation. It was water from the tank, leaking through a hole in the floating liner.

As a combination of the weight from the lakes and the hot water, the insulation was deformed.
Some of it was reduced to ¼ of the original thickness.

The insulation is so thin in some places, that the spikes from the fixation irons between the two lower layers is a threat to the floating liner.

That’s why we begin to have holes in our floating liner.

Reparing holes in the floating liner.

- First we cut open the top liner.
- Then removed the insulation
- Taped the hole to stop the water.
- Dried the area around the hole.
- Welded a piece of HPD liner on top of the hole.
- Replaced the insulation that was damaged.

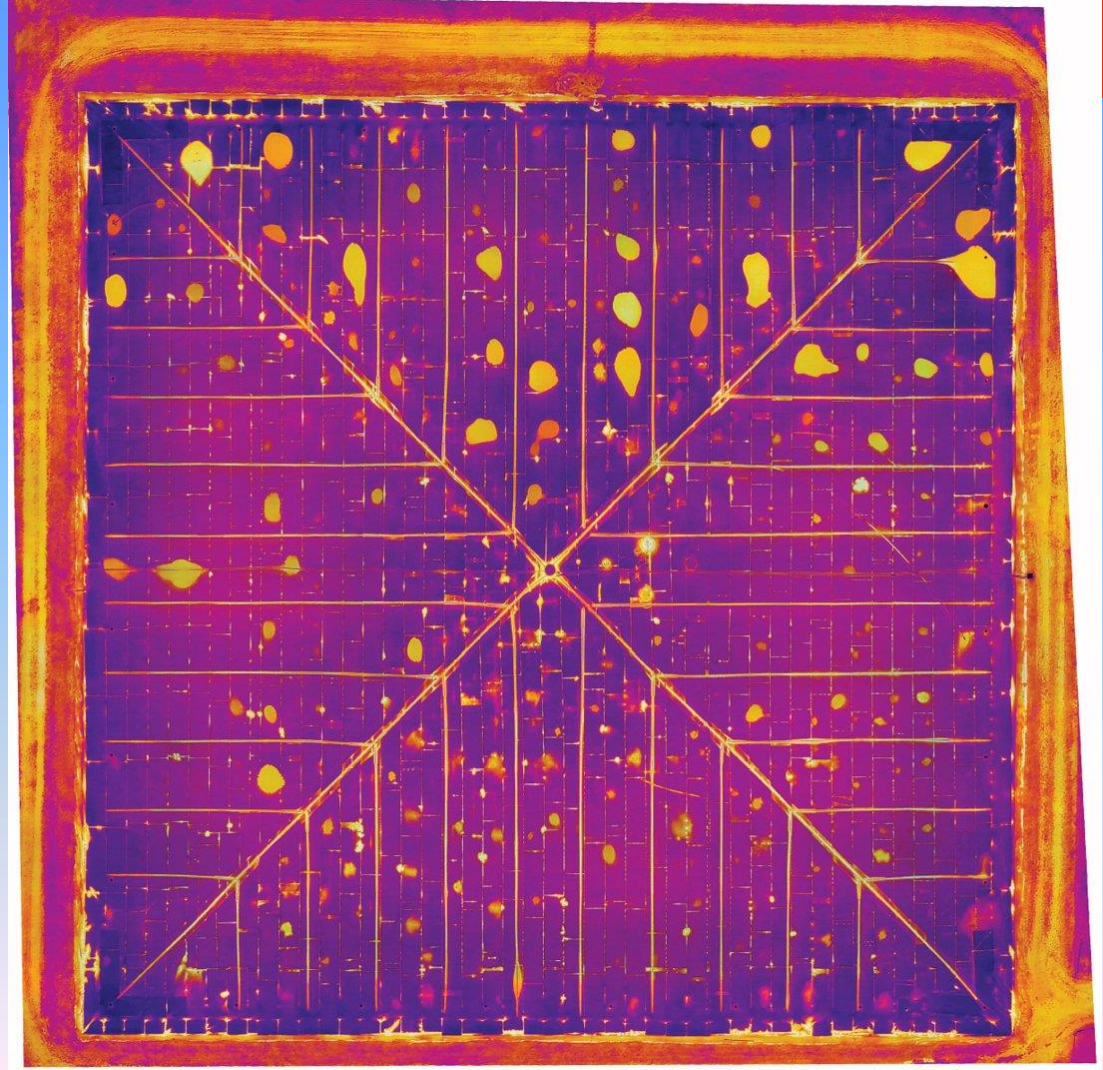
Some places we put an extra layer of insulation to stop lakes forming again.

Drone infrared picture from an altitude of 25 meters.
Taken spring of 2019.

We see that:

Pumping the water away from the lakes does reduce the loss of heat.

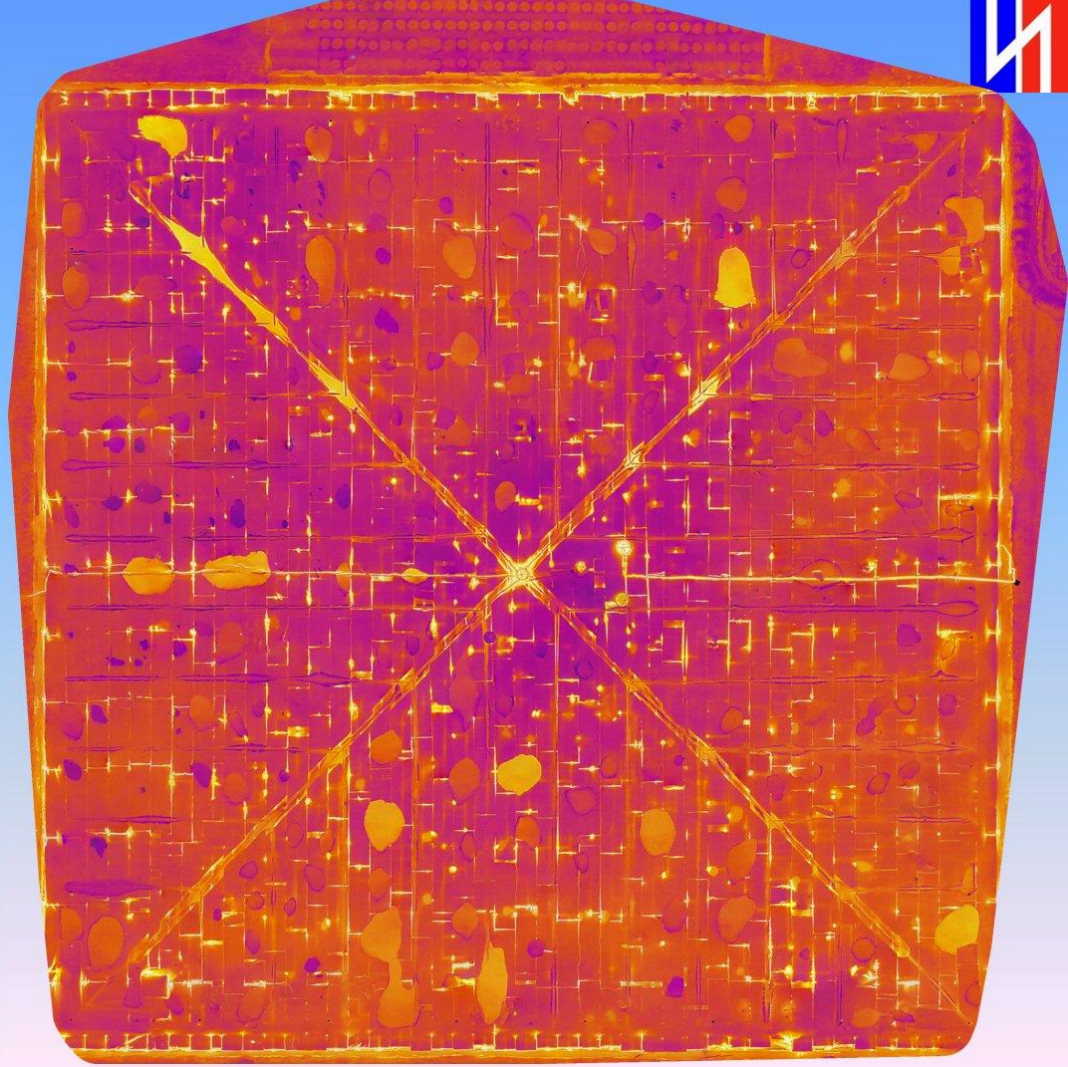
There is a considerable loss of heat from the side of the pit storage.



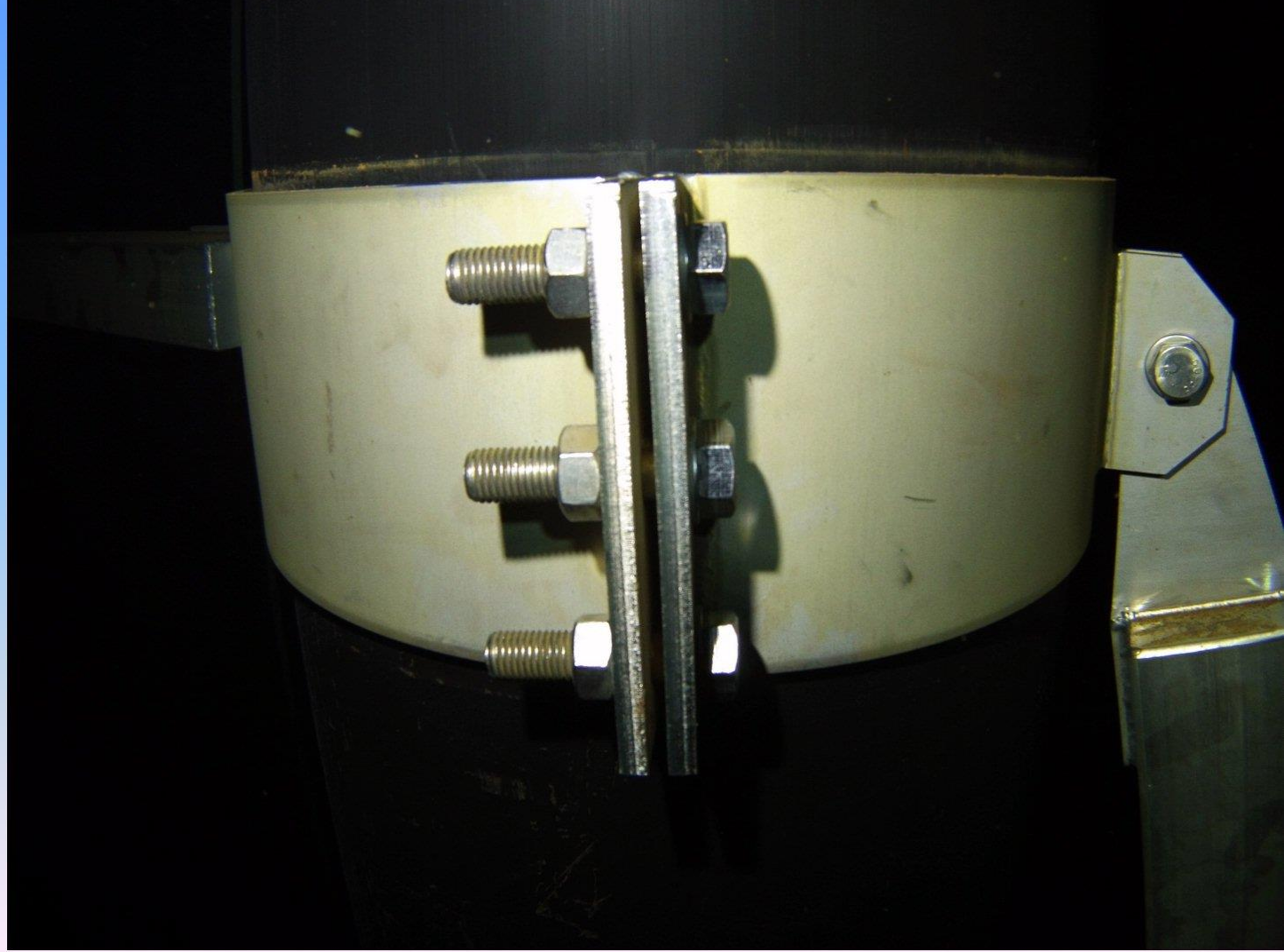
Drone infrared picture from an altitude of 25 meters.
Taken spring of 2020.

More or less the same picture.

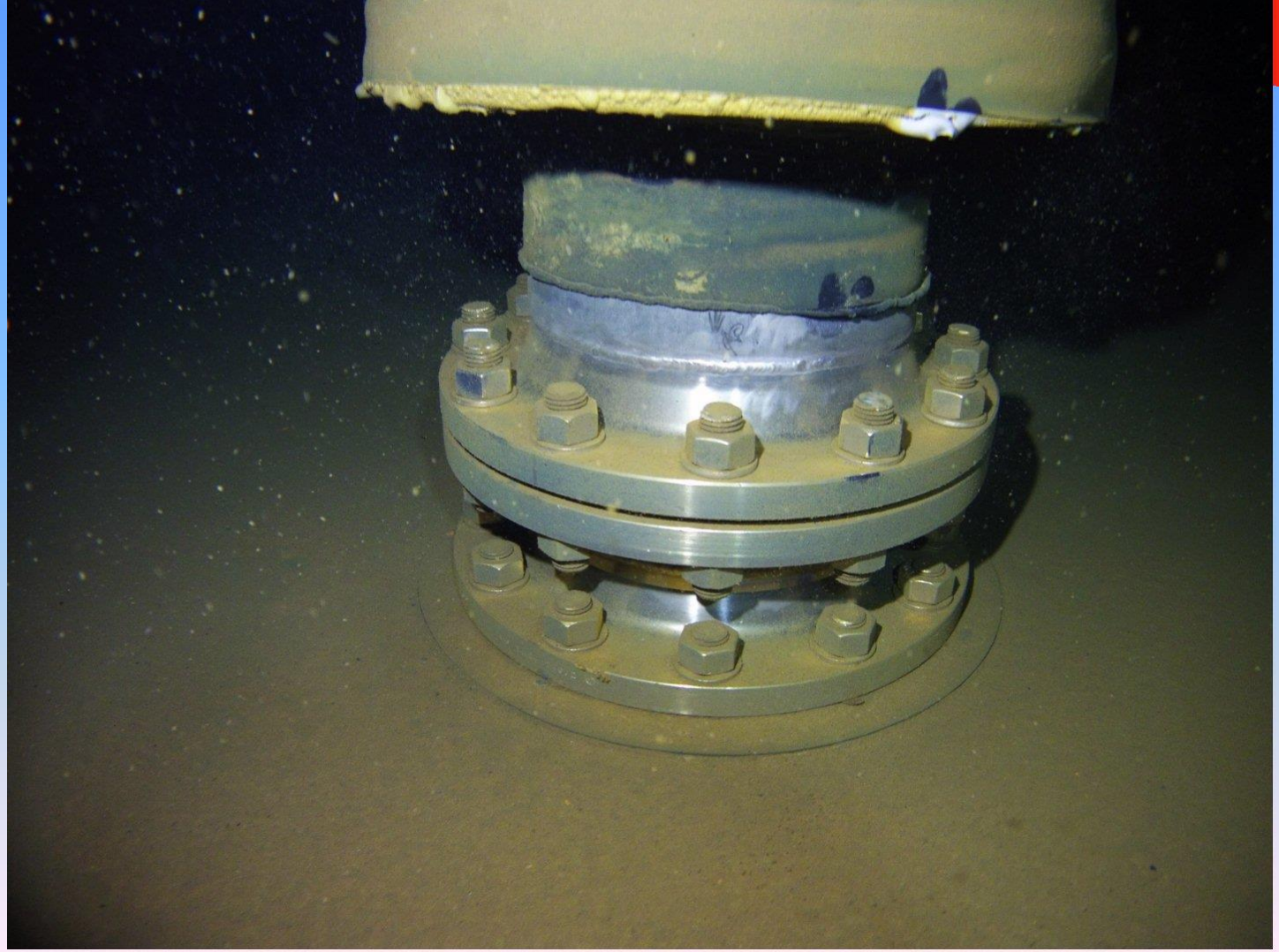
Baybee the heatloss from the gap between the insulatipn has increased?



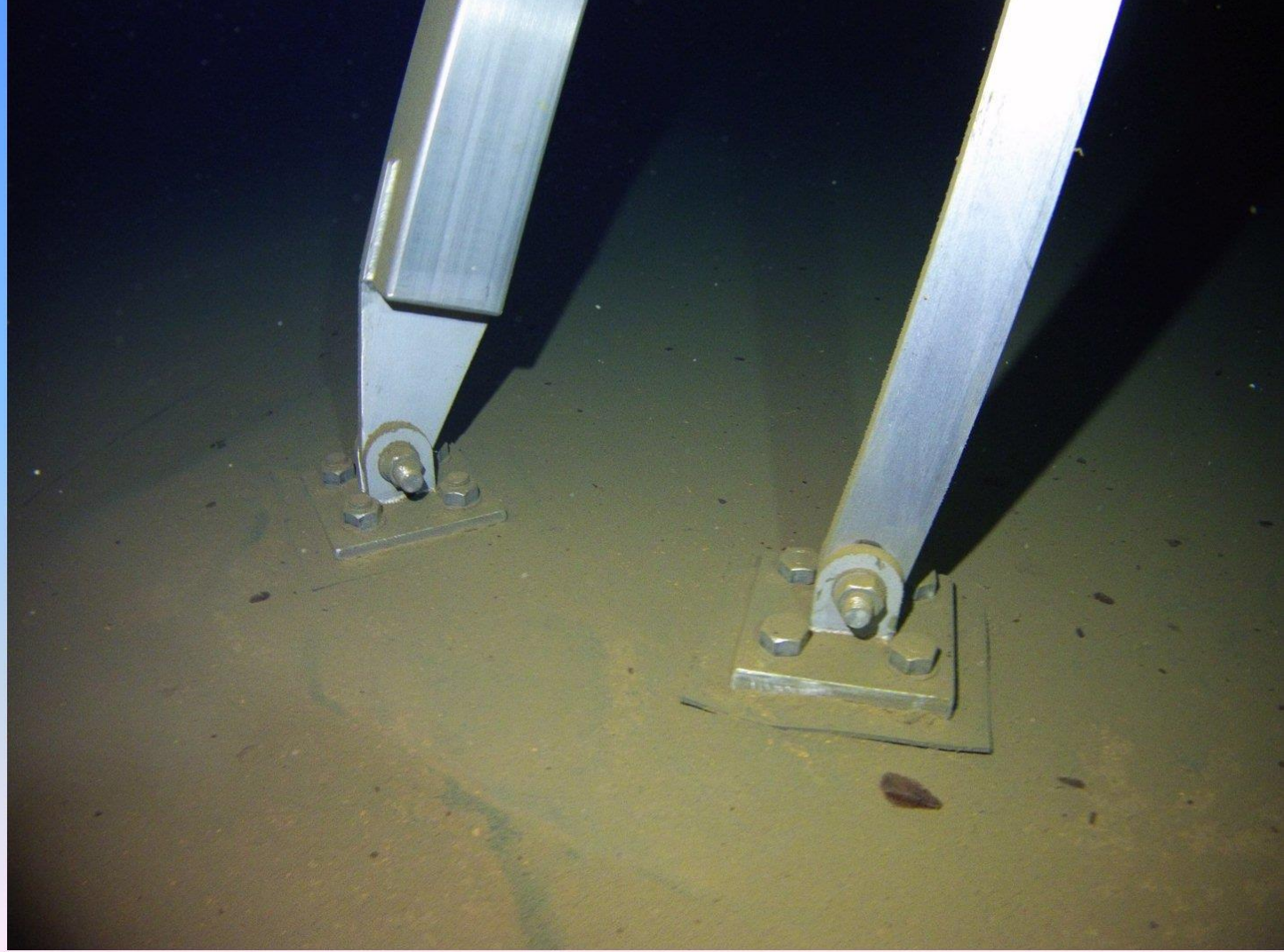
Diver inspection 2020



Diver inspection 2020



Diver inspection 2020



Diver inspection 2020 **Film**

Future plan for maintaining the pit storage lid in Dronninglund.

The forming of lakes is our greatest threat!
- It compresses the insulation so the heat loss rises.
- And causes the fixation irons to penetrate the floating liner.
- Hot water from holes in the floating liner causes the insulation to deteriorate at a faster rate.

So we will:
- Continue to empty the lakes that keeps forming on the lid.
- On a regular basis we will find the lakes that start to get to hot, open the topliner and inspect the insulation and topliner.
    - If we find a hole we will repair it.
    - If the insulation is to thin we will replace it.
    - We will remove any fixation iron we find.

How to find the hot lakes?
An easy way is to inspect the lid in the early morning of a cold day. Steam will rise from the hot lake.

We will also use an infrared camera.