

WELL REHAB METHODS AND WELL REPAIR/ RECONSTRUCTION

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MUNICIPAL WELL AND PUMP

ILLINOIS RURAL WATER ASSOCIATION



WHEN TO PERFORM REHABILITATION SIGNS / INDICATORS

- FOLLOWING/DURING MONITORING PRACTICES
- DATA COLLECTION / PLOTTING / TRENDS
- EXCESSIVE RUN TIMES
- PWL OFF / DRAWING SUCTION
- RULE OF THUMB 20% LOSS
- CAN'T KEEP UP WITH DEMANDS
- DON'T FORGET NEW WELL DEVELOPMENT



WHAT REHABILITATION IS BEST FOR YOUR WELL?

- MAKE SURE IT'S NOT THE PUMP OR METER
- SELECT THE APPROPRIATE PROCEDURE FOR THE PROBLEM.
 - BIOLOGICAL OR GEOLOGICAL
 - WRONG SELECTION CAN CREATE MORE PROBLEMS THAN SOLUTIONS.
 - MAKE SURE YOU UNDERSTAND THE PROCEDURE FOR THE REPAIR. GET A USER LIST/CHECK WITH NEIGHBORS



WELL REHABILITATION

- TECHNIQUES FOR REHABILITATION:
 - MECHANICAL BRUSHING
(SCRATCHING)
 - EXPLOSIVES – SHOOTING
 - AIR LIFT SURGING
 - OVERPUMPING, SURGING ALSO
CALLED RAWHIDING
 - JETTING
 - HYDRAULIC
 - AIR
 - *CHEMICAL TREATMENT*
 - *AIR IMPULSE*
 - *AIRSHOCK™*
 - *BOREBLAST*
 - *AIRBURST*



TECHNIQUES

- BRUSHING
 - CASING
 - SCREENS
 - OPEN BED ROCK



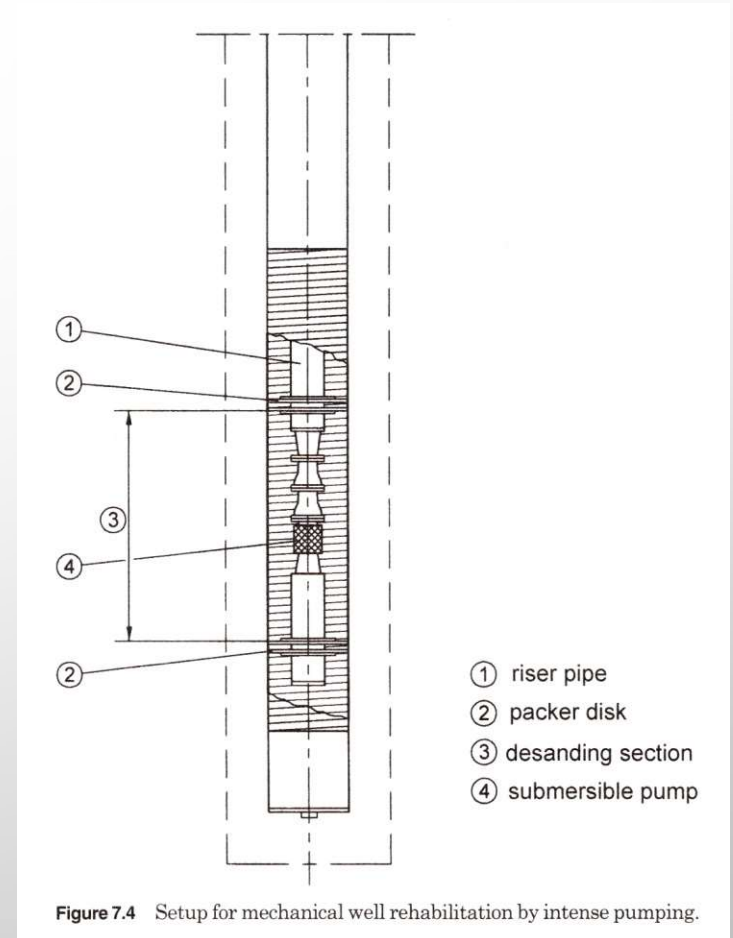
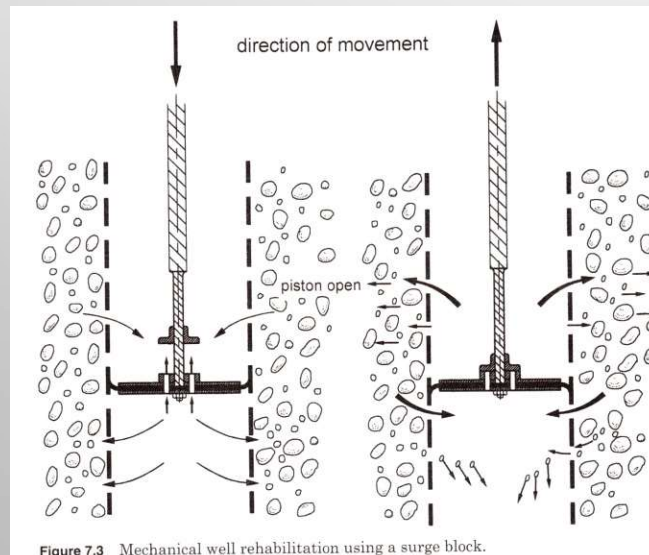
MECHANICAL METHODS

- PHYSICAL AGITATION - BRUSHING
 - CASING
 - BOREHOLE
 - SCREEN



MECHANICAL METHODS

- HYDRAULIC
 - SURGE BLOCK
 - INTENSE PUMPING
 - JETTING
 - MULTI-CHAMBER PUMPING
 - HIGH VELOCITY CIRCULATION



TECHNIQUES

- JETTING
 - HYDRAULIC VS. AIR
 - EQUIPMENT
 - SCREENS, PHOSPHATING
 - OPEN BED ROCK
 - DON'T PUSH YOUR PROBLEM BACK INTO THE FORMATION





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JET MASTER VIDEO



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TECHNIQUES

- SHOOTING
 - BED ROCK VS. SCREEN



Madison – Well 31
August, 2014





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BUCYRUS
CABLE



Madison – Well 31
August, 2014

Madison – Well 31
Cleanout after Shooting
August, 2014



Madison – Well 31
Results of Cleanout
August, 2014

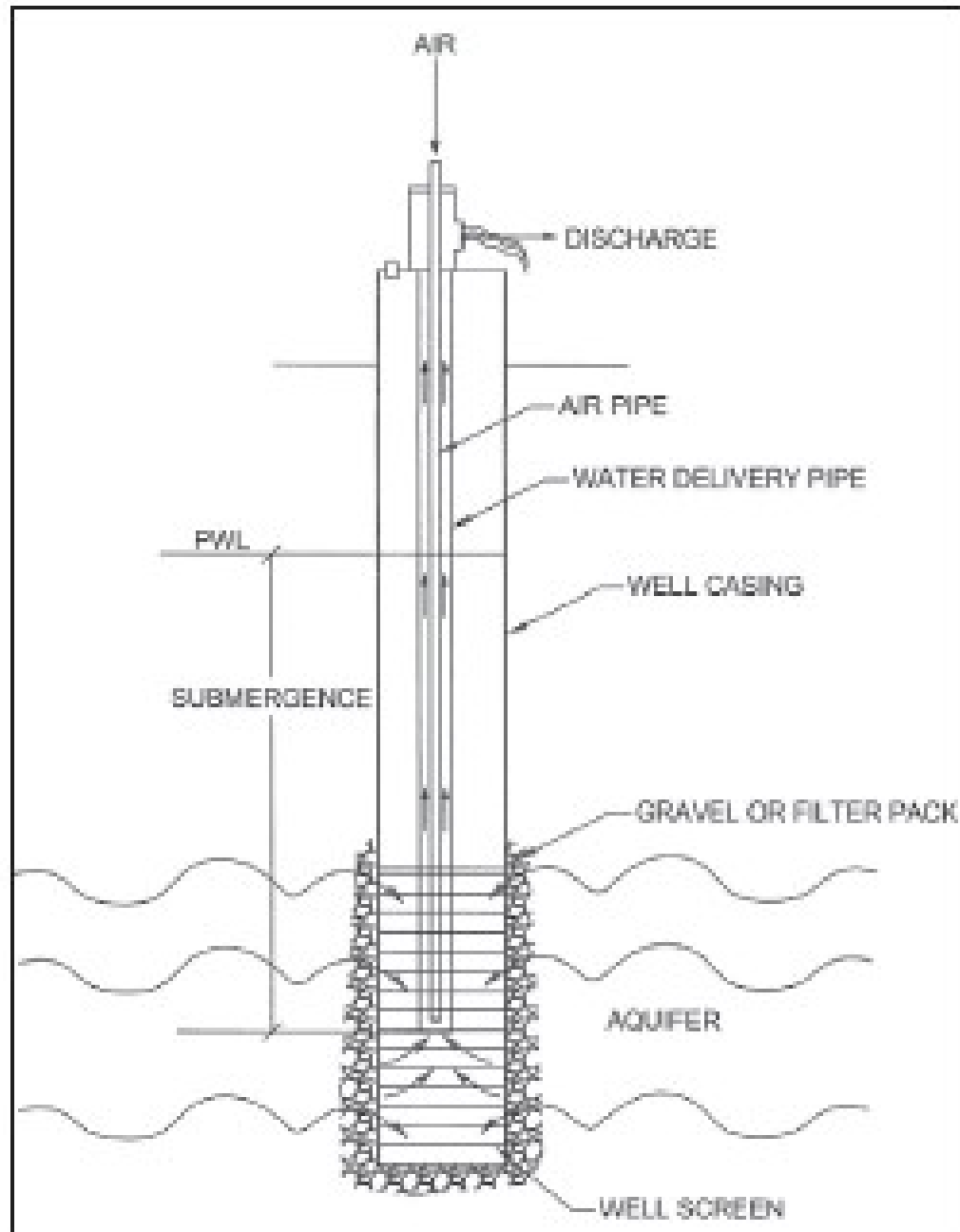


TECHNIQUES

- AIR LIFTING



TYPICAL AIRLIFT SYSTEM



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AIR LIFT VIDEO – VERONA, WI



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CASING ISSUES

- WHAT TO DO WHEN THE WELL INFRASTRUCTURE IS DAMAGED OR FAILS
- IMPORTANCE OF TELEVISIONING



CASING FAILURE



CASING FAILURE



CASING ISSUES



CASING ISSUES



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SOLUTIONS - LINER INSTALLATION

- EFFECTIVE
- DRAWBACKS – REDUCED CASING DIAMETER/ LIMITS PUMP INSTALLATION



SOLUTIONS – PATCHING SLEEVES



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CLINTON WELL #10 IA AMERICAN
LH19-604
MAR 1 19



25.32 ft



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SLEEVE INSTALLATION VIDEO



Lake Vostok Update



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Russian's Drill 2.5-miles!!!

World

On Syria, EU pulls out stops; Russia steps in

The European Union will impose harsher sanctions on Syria, a senior EU official said Wednesday, as Russia tried to broker talks to calm violence. Activists reported at least 50 killed in the regime's siege of the restive city of Homs.

After blocking a Western and Arab attempt to bring United Nations pressure on President Bashar Assad to step down, Russia has launched a bid to show it can resolve the turmoil.

Moscow is calling for a combination of reforms by the regime and negotiations, without calling for Assad to go. The opposition dismisses promises of reform as empty gestures. Russian Prime Minister Vladimir Putin said outside forces should let Syrians settle their conflict "independently."

A senior EU official told the Associated Press the sanctions may include bans on the import of Syrian phosphates, on commercial flights between Syria and Europe, and on financial transactions with the country's central bank. The official spoke on condition of anonymity in keeping with EU rules.

Russian drillers reach Antarctic lake

Opening a scientific frontier miles under the Antarctic ice, Russian experts drilled down and finally reached the surface of a gigantic fresh-water lake, an achievement the mission chief likened to placing a man on the moon.

Lake Vostok could hold living organisms locked in icy darkness for about 20 million years, as well



BY THOMAS H. HARRIS FOR THE ASSOCIATED PRESS

Deaths in Haitian tent city

Ongoing suffering for quake survivors: Haitians sift through rubble after a fire swept through a tent city Wednesday in the capital, Port-au-Prince. The fire claimed at least three lives. Several people remain missing.

as clues to the search for life elsewhere in the solar system. "In the simplest sense, it can transform the way we think about life," NASA's chief scientist, Waleed Abdalati, said Wednesday.

Tibetan man sets self ablaze in protest

Another Tibetan set himself on fire in western China to protest government policies, U.S.-funded Radio Free Asia reported. The report said a man, apparently a monk, set himself on fire in Sichuan province's Aba prefecture and was taken away by soldiers. His condition was not immediately clear. If confirmed, the incident would bring to at least 20 the number of monks, nuns and lay Tibetans who have set themselves on fire in the past year.

The Associated Press

- ▶ It took the Russians more than 20 years to drill into the lake, operating in some of the most brutal weather conditions in the world.



How did they find it?

- ▶ 1964 expedition to log thickness of the ice sheet
- ▶ Size of Lake Ontario
- ▶ Was lake formed before ice age 15-million years ago?
- ▶ Solid core-12,400-feet thick!
- ▶ Drill fluid: Oil based kerosene-65-tons worth!
- ▶ Environmentalists: Hot water, not necessarily
 - ▶ More on that idea later

February 5, 2012 stopped 100 meters from top of lake



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Lake Vostok aerial View



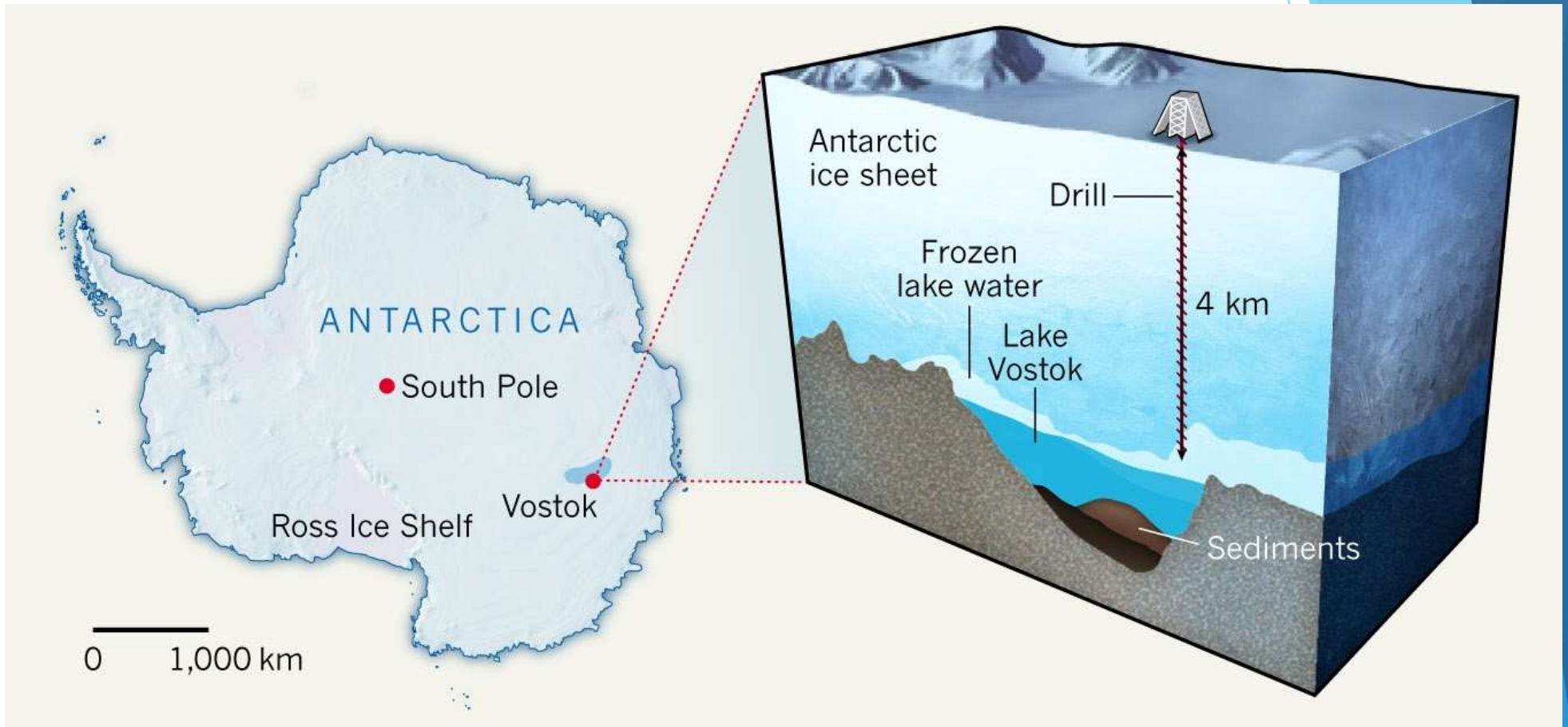
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Lake Vostok



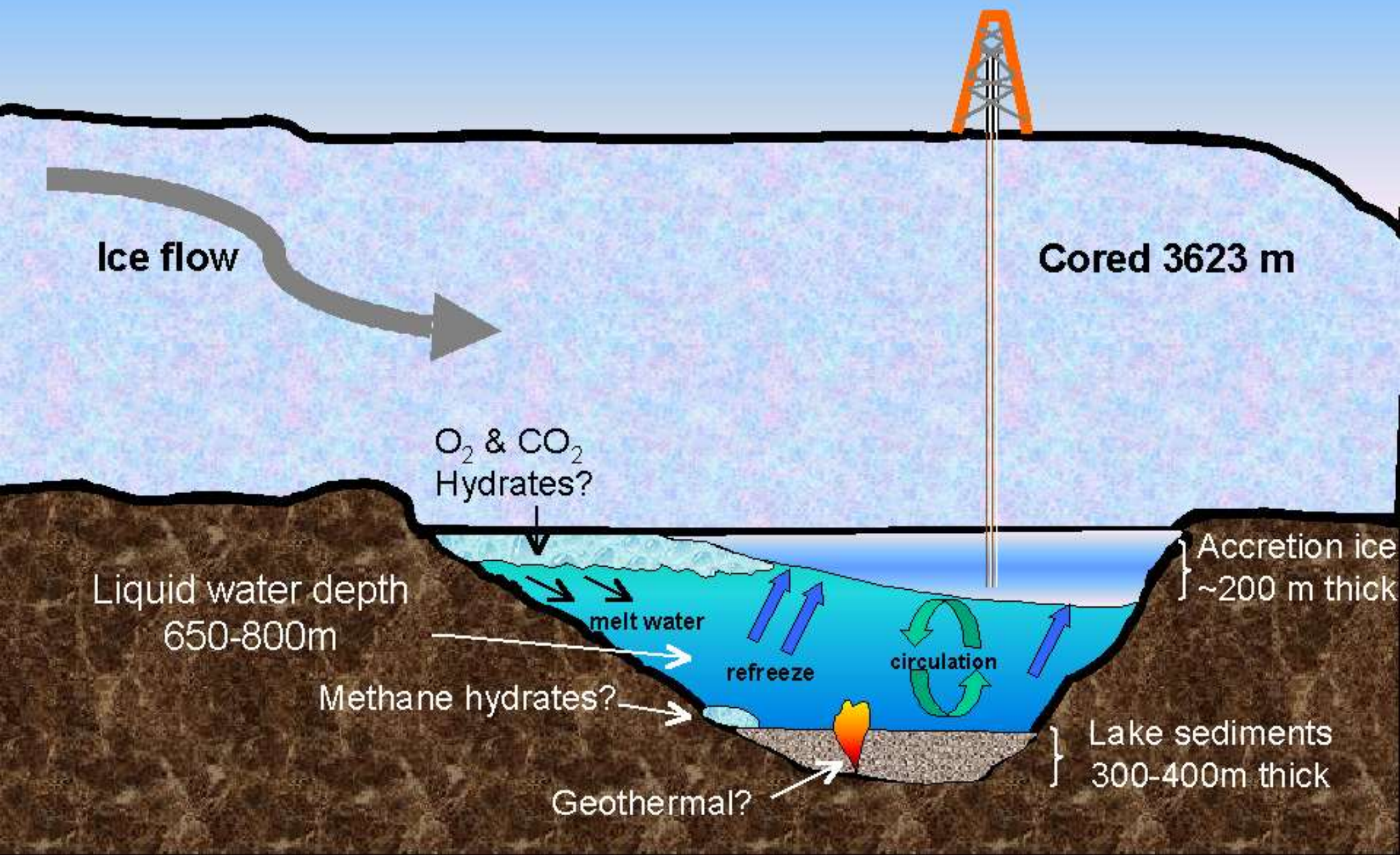
More fun factoids:

- ▶ Core shows signs of micro-organisms
 - ▶ Hydrogenophilus -thermoluteolus
- ▶ Possible drill fluid contamination??
 - ▶ Only real way is to get a sample
- ▶ Need a new technology-NASA
- ▶ When Nasa sent Galileo probe to Jupiter, one moon was covered in ice. Actually ice over water
- ▶ NASA using Lake Vostok as trial for Jupiter
- ▶ Take a science lab and fit it into diameter of water bottle
- ▶ Heat hole ahead, melt its way down and freeze behind and disinfect before entering Lake Vostok-that's all! Oh and have a robot on-board too.



LAKE VOSTOK

Vostok Station



Ice flow

Cored 3623 m

O₂ & CO₂
Hydrates?

Liquid water depth
650-800m

Accretion ice
~200 m thick

melt water

refreeze

circulation

Methane hydrates?

Lake sediments
300-400m thick

Geothermal?

Colder than a well diggers _ _ _!

- How cold is cold: -128-degrees F coldest recorded
- Lake temp: 27-degrees F, does not freeze
- Why?
- Pressure!! How much?
- 5,150psi.
- Life can exist without light, use H₂S as food source
- It is called chemo-synthesis.





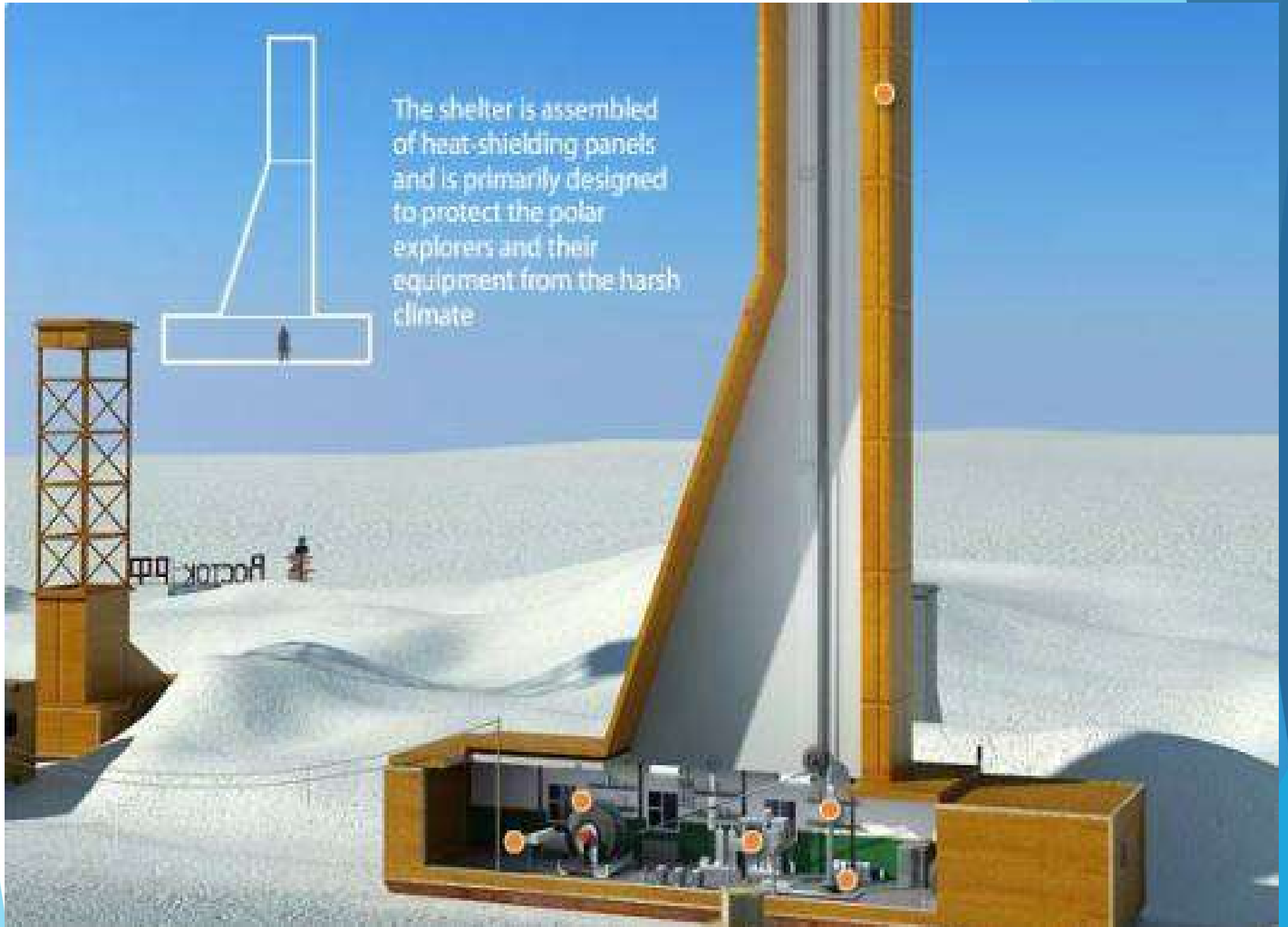
Where's the Rig?



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The shelter is assembled of heat-shielding panels and is primarily designed to protect the polar explorers and their equipment from the harsh climate



The Coolest thing we do!



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QUESTIONS?

