



DRILLING INNOVATION LLC

www.diddt.com

Water Shutoff Agent PBC

An Innovative Material
To Cure Lost Circulation

Physical and chemical properties of Water Shutoff Agent



- ✓ **finely dispersed** material with bulk density 68.67 – 81.16 lbm/cu.ft;
- ✓ **pumped in mixture** with any organic fluid and salty water through motor and bit;
- ✓ **polymerized** in the lost circulation zone in contact with water
- ✓ **polymerization time** is about 1 hour and can be easily regulated (from 15 to 120 minutes);
- ✓ **increased in volume** of up to 20 times during polymerization;
- ✓ **high adhesion** to the rocks surface;
- ✓ **resistant** to hostile environment after polymerization;
- ✓ **does not react** with oil in formation

Result of mixing Water Shutoff Agent with fresh water

PBC composition



Volume of PBC to water



3 min after mixing



5 min after mixing



15 min after mixing



20 min after mixing



30 min after mixing



45 min after mixing

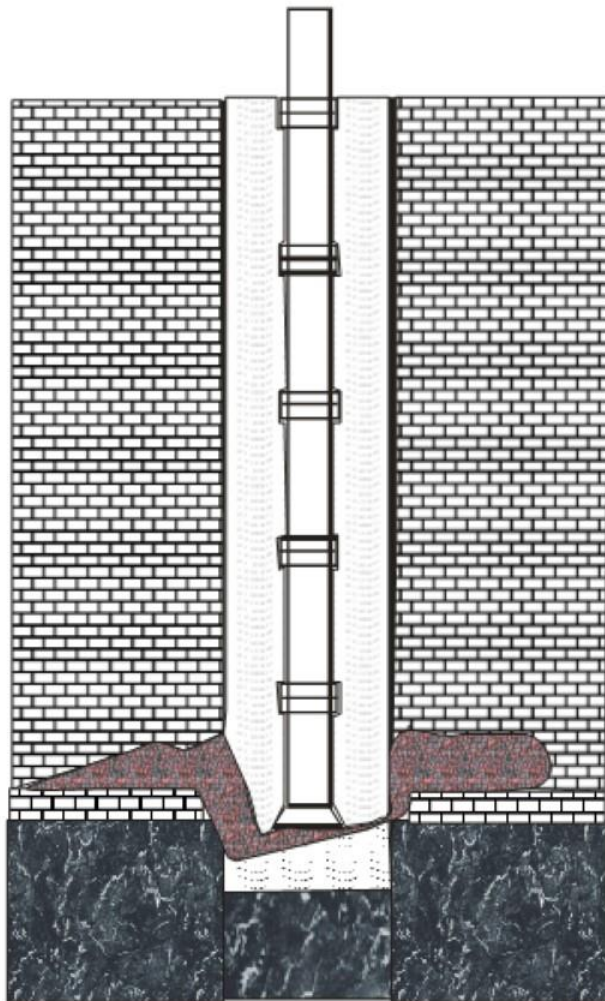




Advantages

- Curing all kind of losses;
- Elimination of behind-the-casing flows;
- Isolation of water-bearing formations;
- Selective isolation of water in well;
- Limitations of injectivity in injection wells;
- For temporary blocking of formations;
- To install the "polymer" packers;
- It forms a bound system after polymerization not washed out by water;
- Can be pumped in mixture with water or with organic liquid (diesel, oil & etc.);
- A wide range of application.

Requirements to the well



■ A selected well must meet the following geological and technological requirements:

■ - temperature in a lost circulation zone should not be more than +130 C.

-intake capacity in a lost circulation zone should be no less than 669 bbl /day at a pressure of 440 psi.

Material Safety Data Sheet



Toxicological Data:	Non toxic
Odor Threshold Value:	N/A
Safety equipment:	Not required
Stability:	Stable
Flammable:	Sensitive to open flame
Hazardous decamps product:	None
Hazardous Polymerization:	None
Conditions to be avoided:	Contact with water and humid environment



Toxicity & Environment Impact

- No concern to health is observed (non-toxic).
- Water Shutoff agent PBC is aquifer friendly in accordance with requirement applied to protection of underground water.
- On spilling it is necessary completely to remove the dry water - shutoff reagent PBS and pour in undamaged packaging. Wet product is processed with sand or with other filler and clean off from the place of reagent spillage. Minor remnants of reagent is washed with strong running water.

PBC Storage Controls

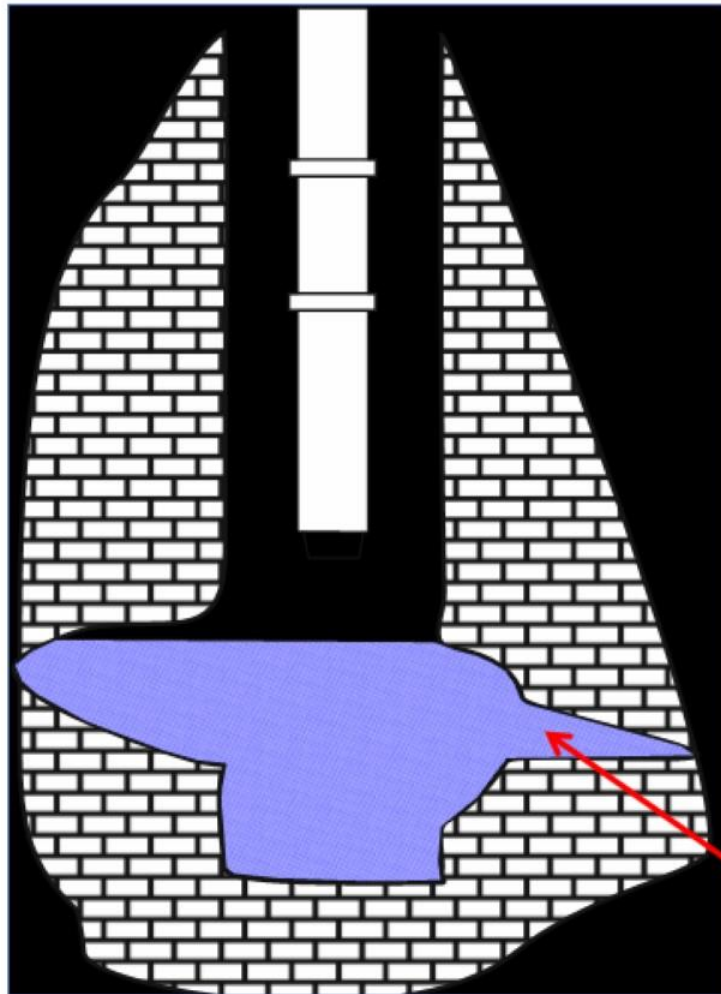
- Water shutoff agent PBC is moisture sensitive material. Water shutoff agent PBC must be kept dry in order to retain its quality. Water shutoff agent PBC bags should be kept in a dry area and stored on pallets whenever possible.

Equipment Requirements

- Cementing unit;
- Blender tank for preparation 25 - 75 bbl suspension.

For pumping the mud pumps can be used the normal rig equipment.

Losses curing job. Complete loss. Well BB-882 (ADCO, UAE)



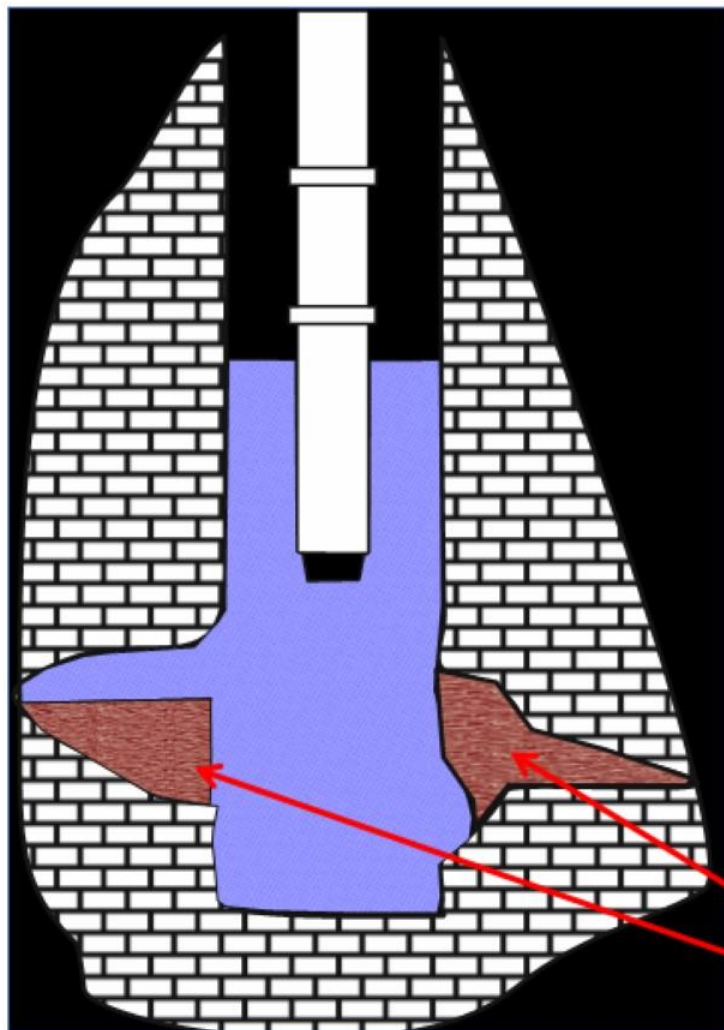
While 12- $\frac{1}{4}$ " drilling on 306-326 ft interval the losses was encountered. On 700 bbl/hr flow rate the circulation was no return and no static fluid level.

It was decided to pump the Water Shutoff Agent PBC (WSA) in mixture with salt water (20% NaCl) for two batches (stages) with waiting (soaking) period between them as it was discussed and approved with ADCO company prior the job.

Water (mud) in losses zone



Losses curing job. Complete loss. Well BB-882 (ADCO, UAE). “ Cont’d”

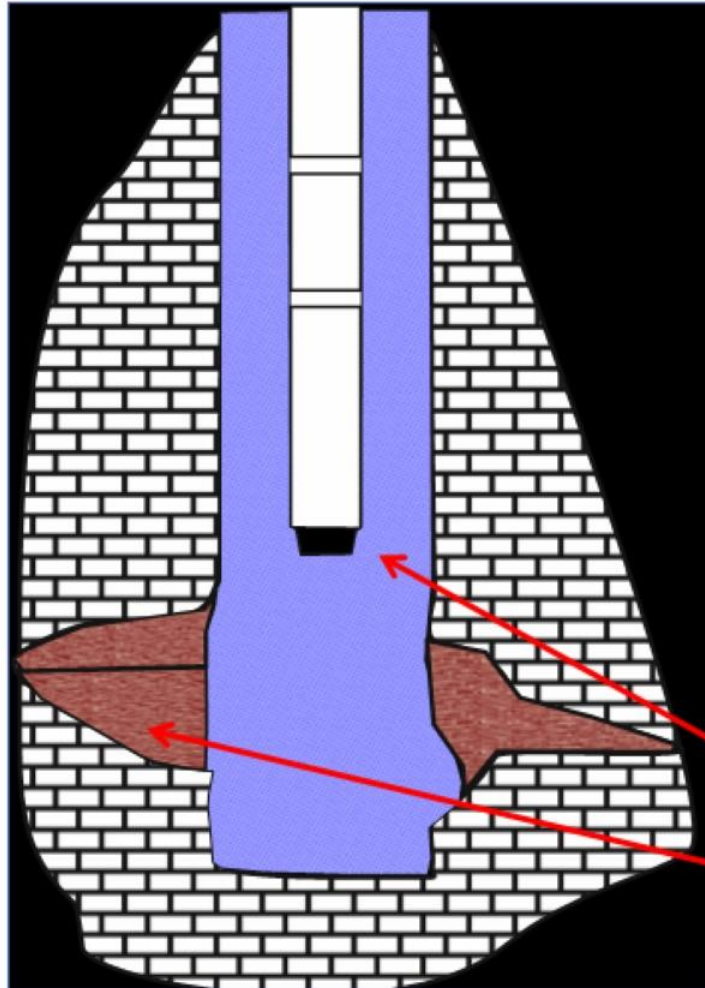


On pumping the first WSA batch in loss zone (770 lb WSA & 42 bbl salt water), almost the entire volume of mixture went to the biggest injection capacity loss zone, and only then to the smaller injection capacity loss zones.

Polymerization went up. Waiting period was 2 hrs. It was received some static fluid level (35 ft from surface) in the well however due to incomplete curing there were still some losses.

WSA suspension

Losses curing job. Complete loss. Well BB-882 (ADCO, UAE). "Cont'd"



On pumping the second WSA batch (770 lb WSA & 42 bbl salt water) it penetrated in the rest of the absorbing places, cured and prevented income of water or mud to losses intervals.

As a result 100 % circulation was gained. Further drilling with full return was proceeded till 550 ft depth.

Full mud circulation

2nd WSA batch



Losses curing job.

Well 1 (Danilovskaya oilfield, Russia)

At a depth of 1637 ft a drilling team met a lost circulation zone. The intensity of loss circulation was 226 bbl per hour. 660 lb of water shutoff agent PBC was pumped. Circulation was restored. Further drilling was continued with partial loss 19 bbl /hour.

However on 1706-1722 ft. depth the drilling team again met a full lost circulation zone. The static level of fluid in well was 236 ft. The pumping of another substance did not give any results. 660 lb of water shutoff agent PBC was pumped.

The further drilling was continued with partial loss 19 bbl /hour. At 1985 ft depth intensity of absorption was 7 bbl per hour, then a lost circulation was ceased.

PBC was successfully applied on more than 200 wells in Russia.



Learn more about our case histories
and Water Shutoff agent PBC
development visiting the news
section in our website
www.diddt.com

Contact us:

Office 43, building # 40/1,
Kuibysheva Str.,
Octyabrsky town,
Republic of
Bashkortostan, Russia

Tel/fax: +7(85592)5-11-10,
e-mail: inburdi@mail.ru