WTS activities.

- WTS main business is powder burners. Multi-fuel burners for powder, oil, gas.
- WTS carries out calculations and engineering for upgrading of boilers and dryer systems for upgrading to wood powder combustion.
- WTS also provide consulting work in the energy sector with focus on bio fuel.

WTS Powder Burners

- WTS has delivered ~50 powder burners.
- Smallest delivered burner size: 150 kW
- Largest delivered burner size: 28 MW
- Largest plant installation: 4x25 MW=100MW
- Maximum burner size WTS offer today : 50 MW
- Our customers are found within the board industry, pellet plants, pulp & paper and in district heating plants.

WTS Powder burner system

- WTS builds multi-fuel burners for
  -Powder: Wood; Peat; Bark; Coal;
  -Oil: HFO & Diesel
  -Gas. Natural Gas; Propane; Process gas
- These fuels can be combined in different ways, but the usually the burners are built for two fuel types, Powder/Oil or Powder/Gas.
- We can also provide burners for 3 fuel types and in certain cases combinations for 5 fuel types with the possibility to use 3 at the same time.

Industrial applications

WTS AB
POWDER BURNERS

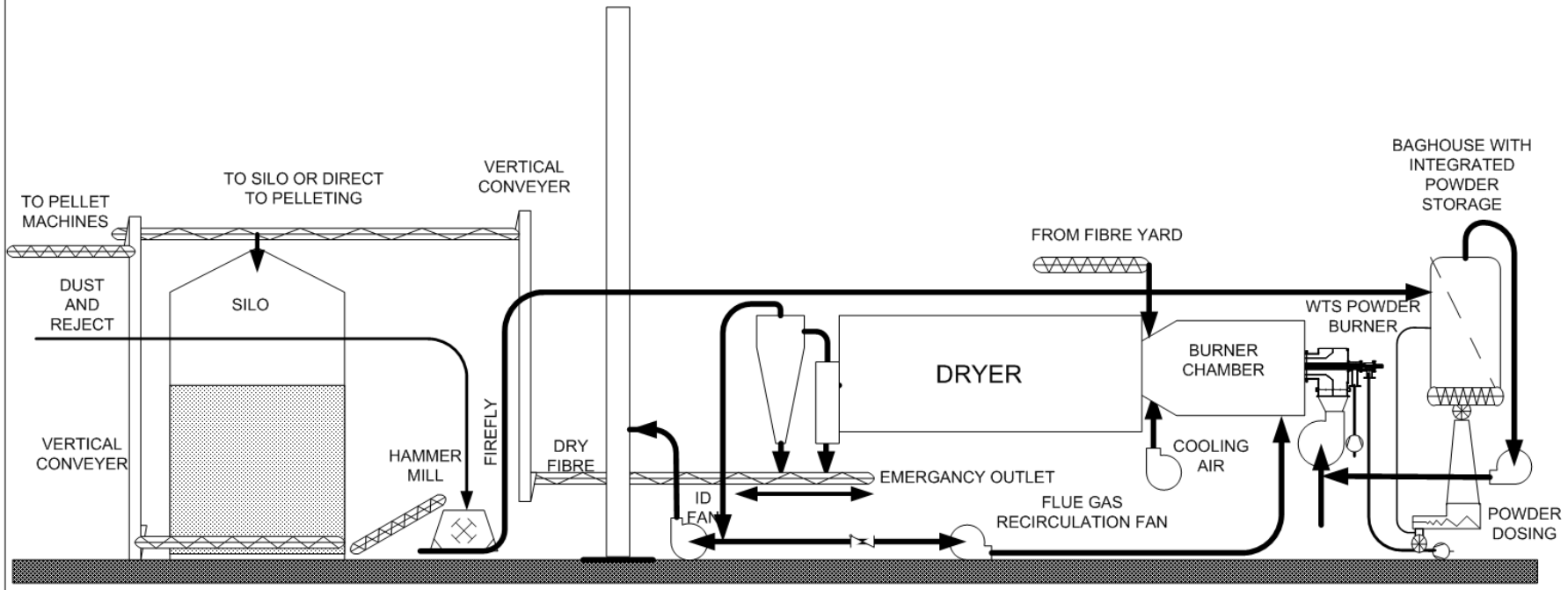
Powder burner 15 MW

Customer: Pacific Bioenergy, Prince George B.C.

WTS AB
POWDER BURNERS

25 MW wood powder & H.F.O.

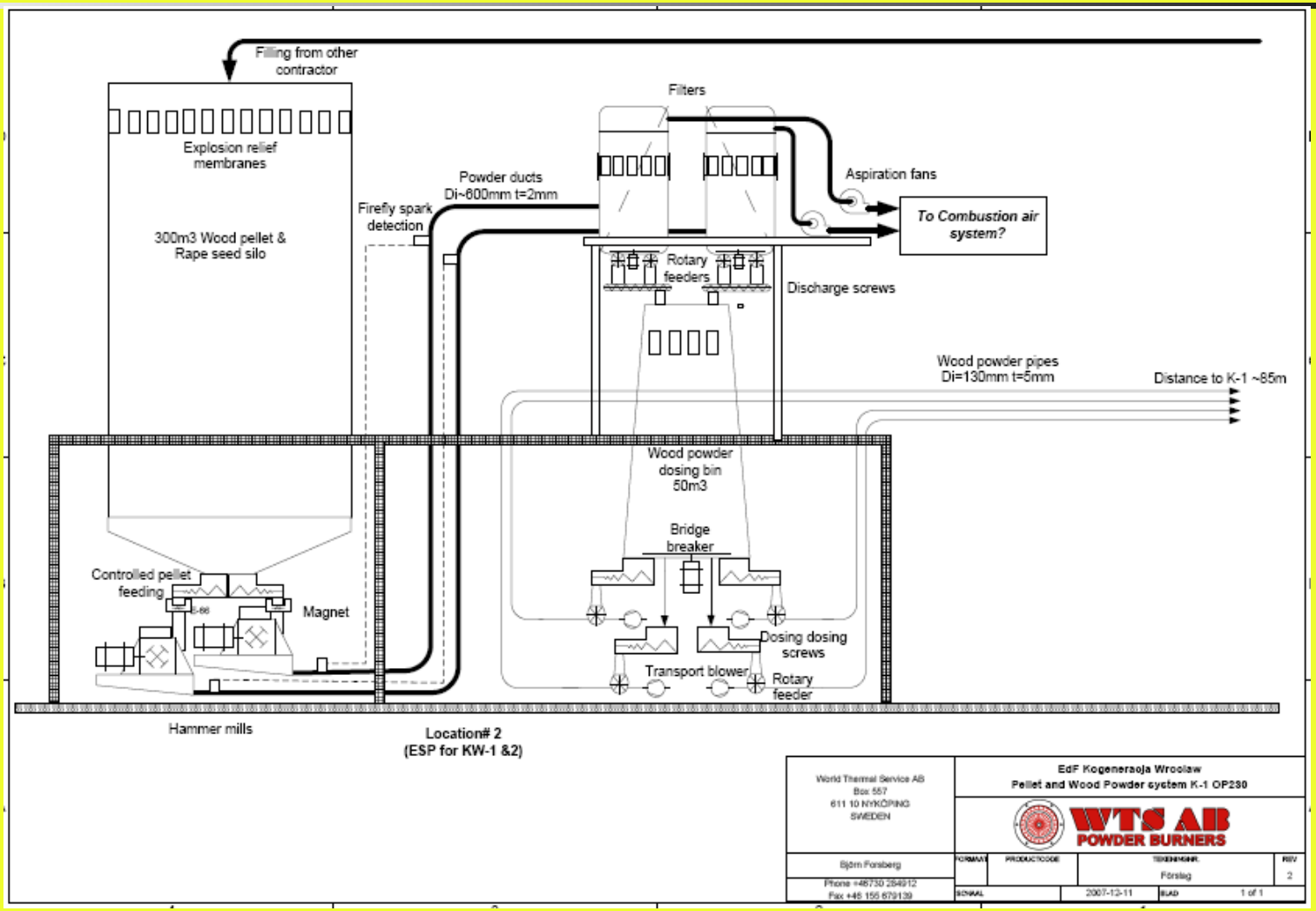
WTS AB
POWDER BURNERS



PRINCIPLE FLOW FOR POWDER COMBUSTION @ A PELLET PLANT

Hammer mill at wood pellet plant B.C. Canada

Wood powder milling &dosing



Dosing equipment for WTS AB installation for a 10 MW wood powder installation Bintulu, Sarawak, Malaysia.

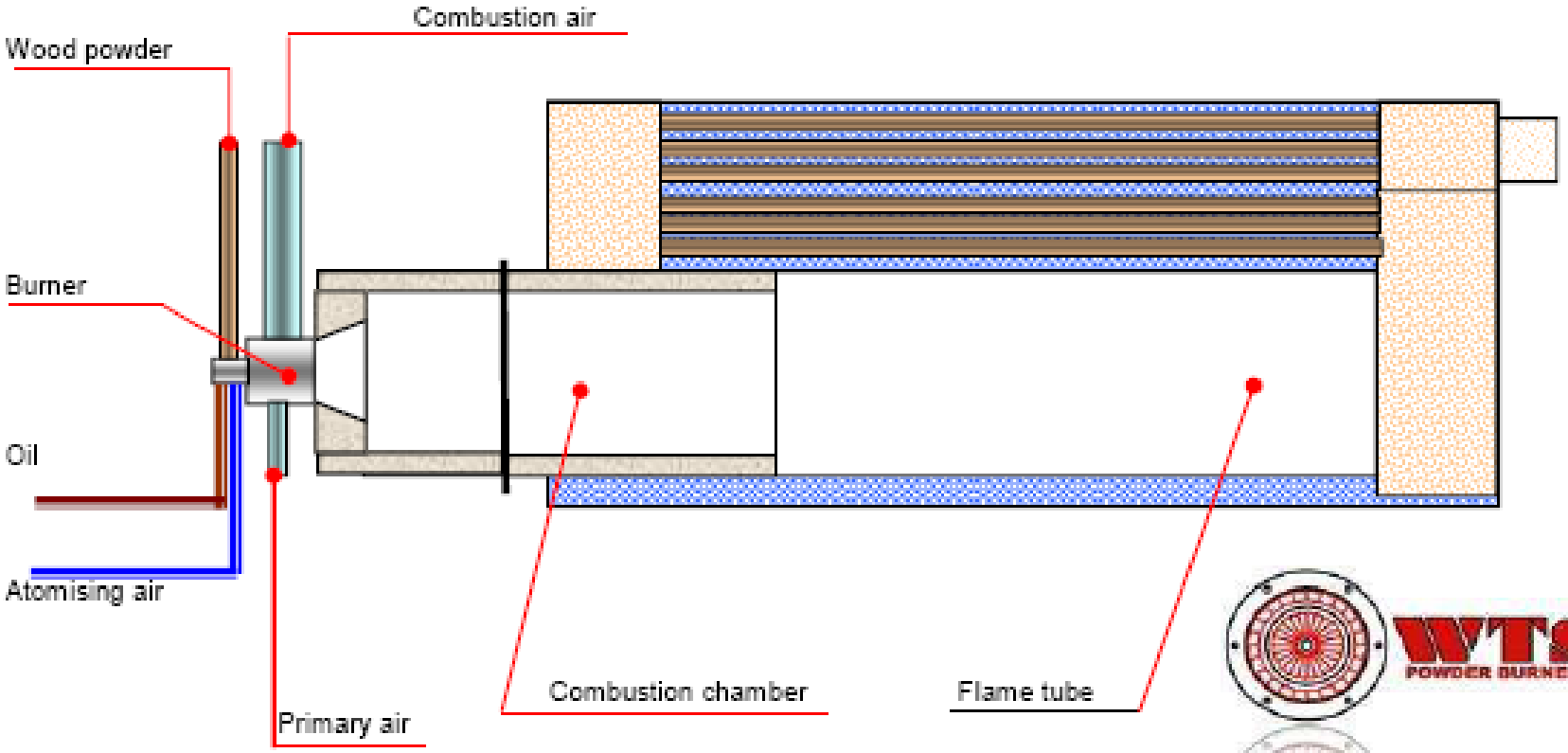
- Wood powder silo 200 m3 with filter on top.

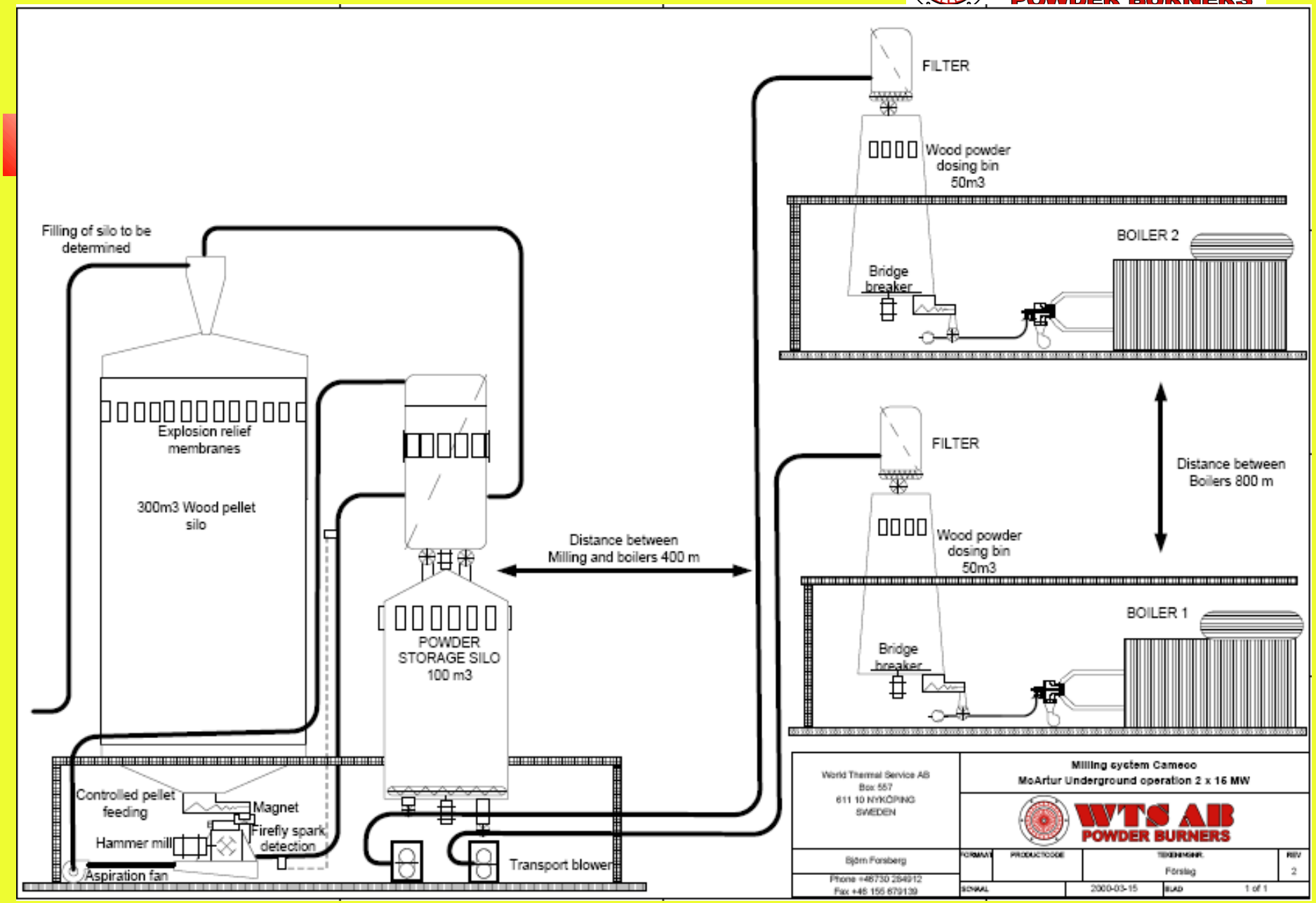
WTS AB
POWDER BURNERS

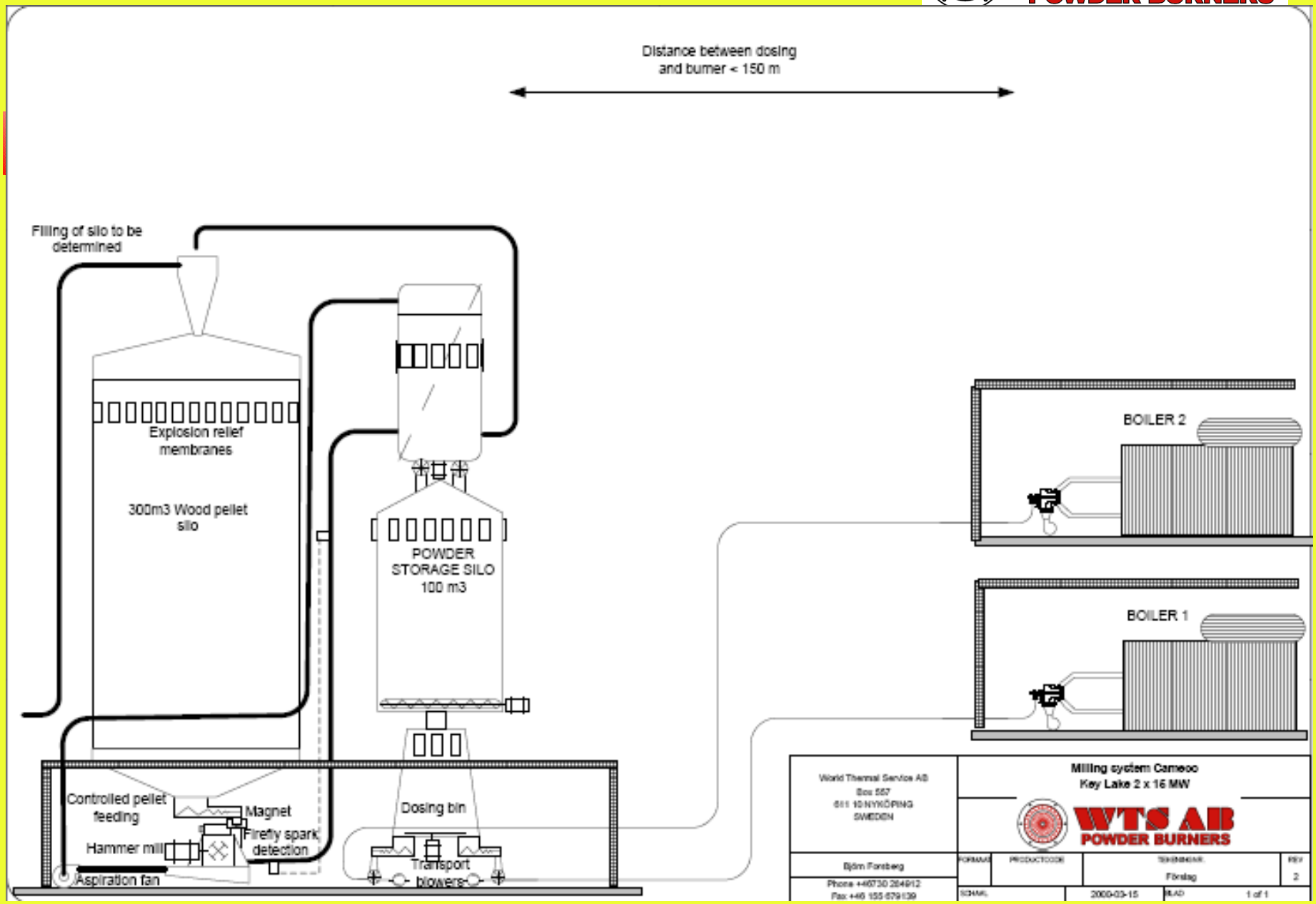
Principle Boiler design

Can be horisontal or vertical located.

With vertical location ash removal is easier.




FILTER
Wood powder dosing bin 50m3
BOILER 2
Bridge breaker
Filling of silo to be determined
Explosion relief membranes
300m3 Wood pellet silo
Distance between Milling and boilers 400 m
POWDER STORAGE SILO 100 m3
FILTER
Distance between Boilers 800 m
Wood powder dosing bin 50m3
BOILER 1
Bridge breaker
Controlled pellet feeding
Magnet
Hammer mill
Firefly spark detection
Aspiration fan
Transport blower
World Thermal Service AB
Box 557
611 10 NYKÖPING
SWEDEN
Björn Forsberg
Phone +46730 284912
Fax +46 155 679139
Milling system Cameco
McArtur Underground operation 2 x 16 MW
WTS AB
POWDER BURNERS
Förslag
2
2000-03-15
1 of 1


Distance between dosing
and burner < 150 m
Filling of silo to be
determined
Explosion relief
membranes
300m3 Wood pellet
silo
POWDER
STORAGE SILO
100 m3
BOILER 2
BOILER 1
Controlled pellet
feeding
Magnet
Firefly spark
detection
Hammer mill
Aspiration fan
Dosing bin
Transport
blowers
World Thermal Service AB
Box 557
611 10 NYKÖPING
SWEDEN
Milling system Cameco
Key Lake 2 x 16 MW
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POWDER BURNERS
Björn Forsberg
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Förslag
2000-03-15
1 of 1

Benefits with wood powder burning

- Existing boiler and furnaces can be used.
- The original fuel is always available to 100 % and can be used as a back up or for topping up.
- The split between powder/oil or powder/gas can be done independent from 0 –100 %.
- The plant is quickly started and quickly stopped with a turndown ratio of 1:5.
- Start and stop of the burner is handled automatically.
- The availability is very high and maintenance costs are low.

Benefits with wood powder burning

- A conversion can normally be done fast and easy when replacing existing burners.
- Changing the burners can be done at a appropriate time with continued use of the original fuel.
- Powder handling can be completed with the burner in use and a transition can be made when powder is available.
- Distance between fuel storage and burner can be up to 150 m. When a longer distance is needed the powder should be transported closer to the burner.
- No modifications are usually not needed of buildings. New equipment can be optimally placed on the site.
- Incineration of liquids and waste gases can be done within reasonable limits.

Issues when converting to wood powder.

- The particle distribution of the powder is of critical importance.
  100% < 1 mm & 70% < 0,5 mm are used as guidance for powder quality.
- The moisture content of the powder should not exceed 10-12%.
- The ash softening temperature should not be below 1000° C to prevent slagging and fouling on boiler tubes. This is not a combustion problem, the problem arises when the ash cools off and sticks on cold surfaces.