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9ROXPH ,VVXH SS

<http://doi.org/10.56958/jesi.2019.4.3.313>

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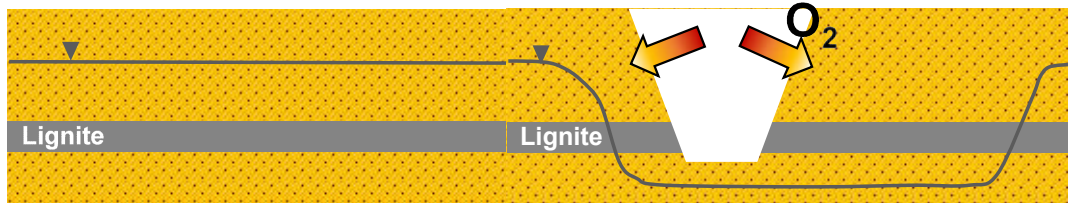
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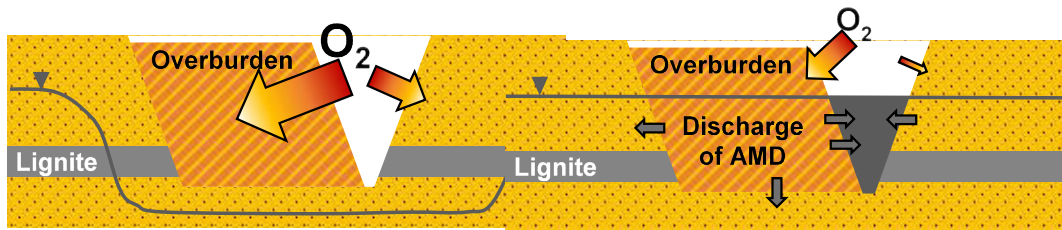
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a) Initial stage

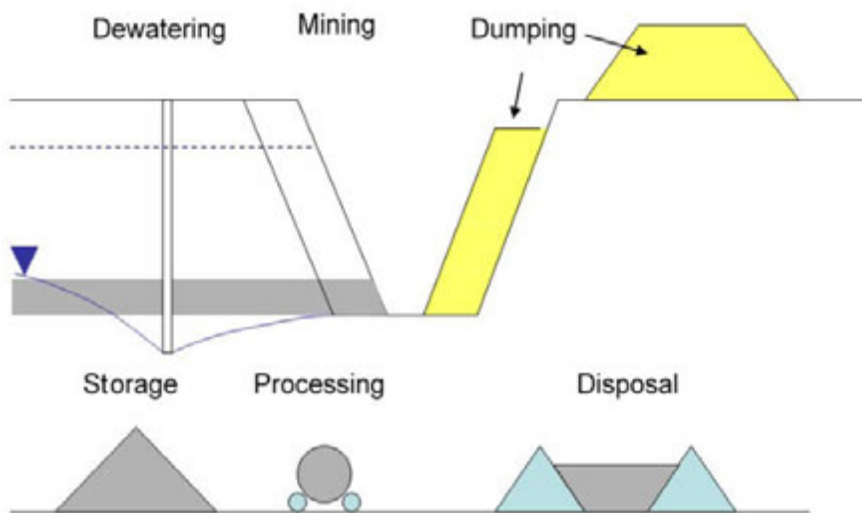
b) Groundwater lowering and air-oxygen access to excavation benches



c) Oxidation of the overburden on excavation benches and on/in overburden dumps

d) Uncontrolled discharge of AMD into ground- and surface water

)LJ 6WDJHV D WR G RI \$0' LQ D VXUIDFH PLQH



)LJ 6RXUFHV RI \$0'

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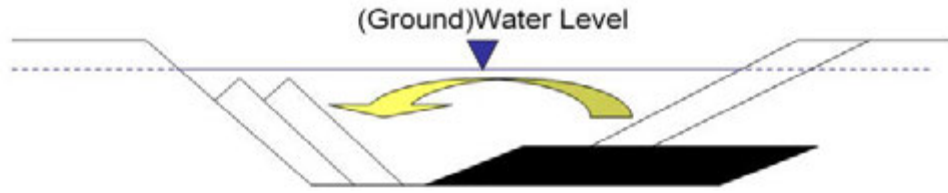
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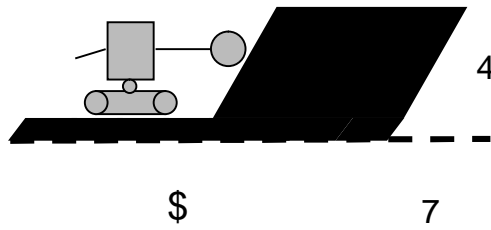
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GHQVHO\ SRSXODWHG KXPLG FOLPDWHV RQ WKH RWKHU
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RSHUDWLRQV

3ULPDU\ PHDVXUHV

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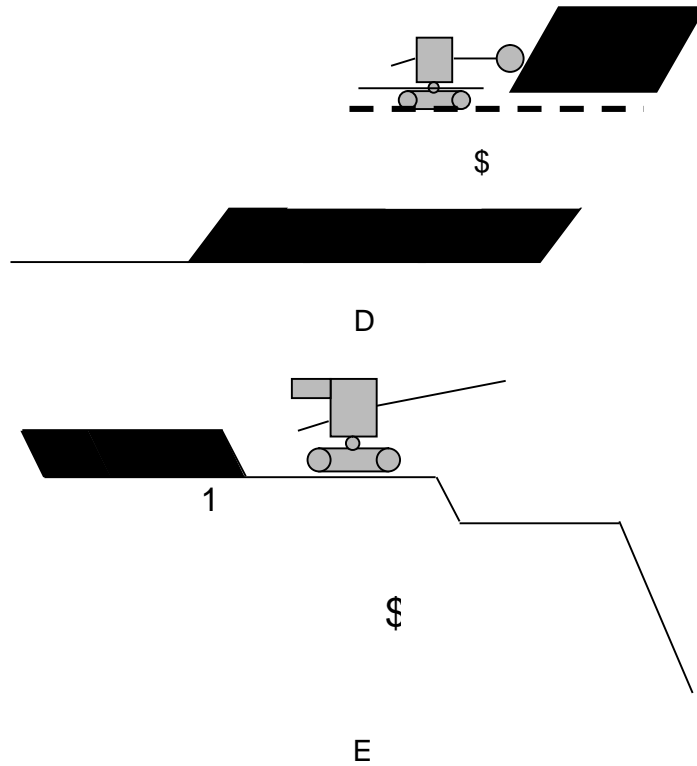
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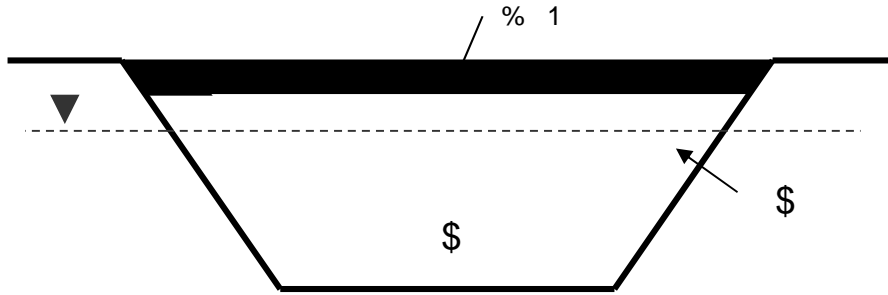
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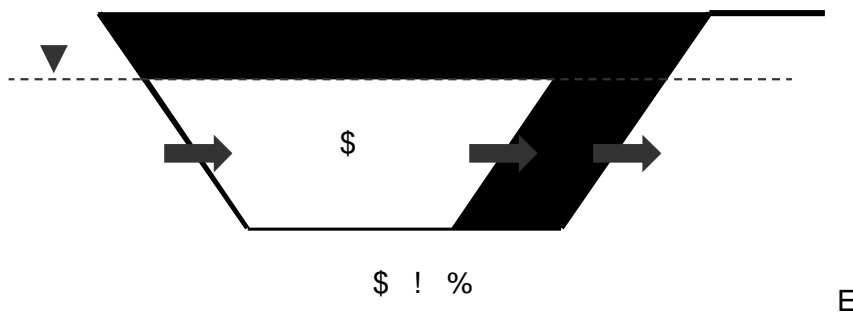
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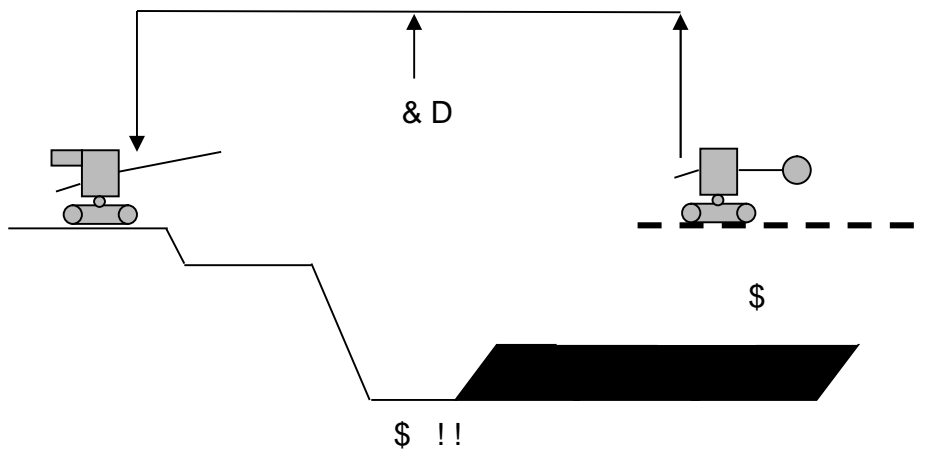
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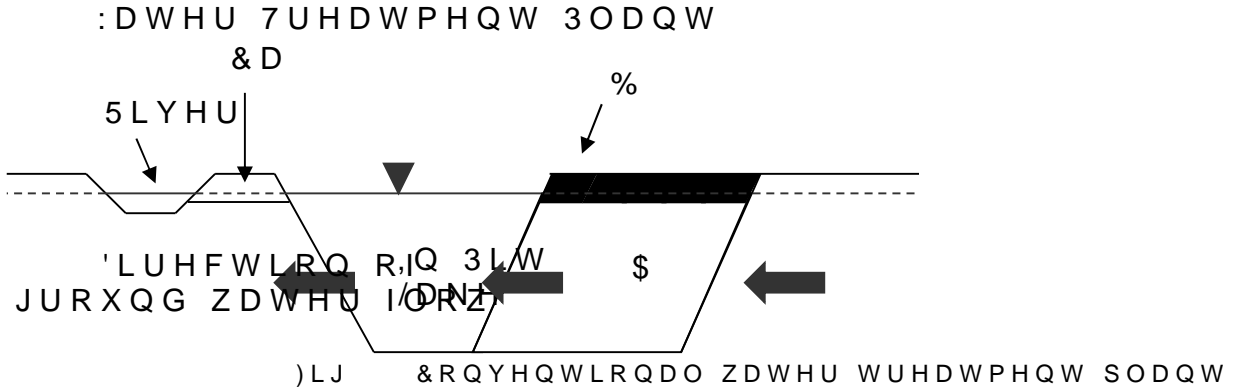
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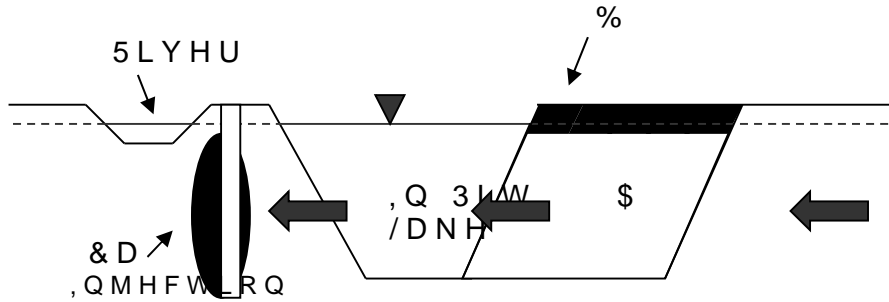
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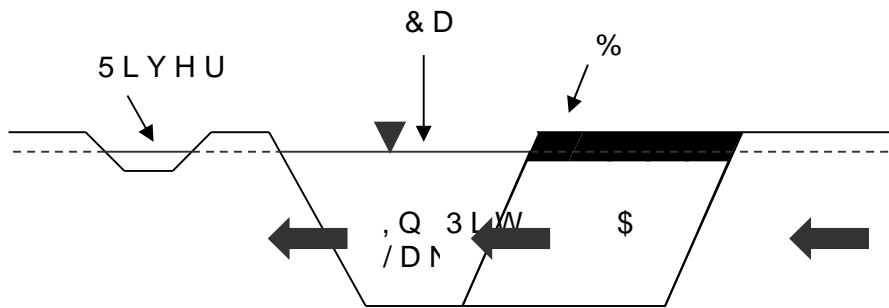


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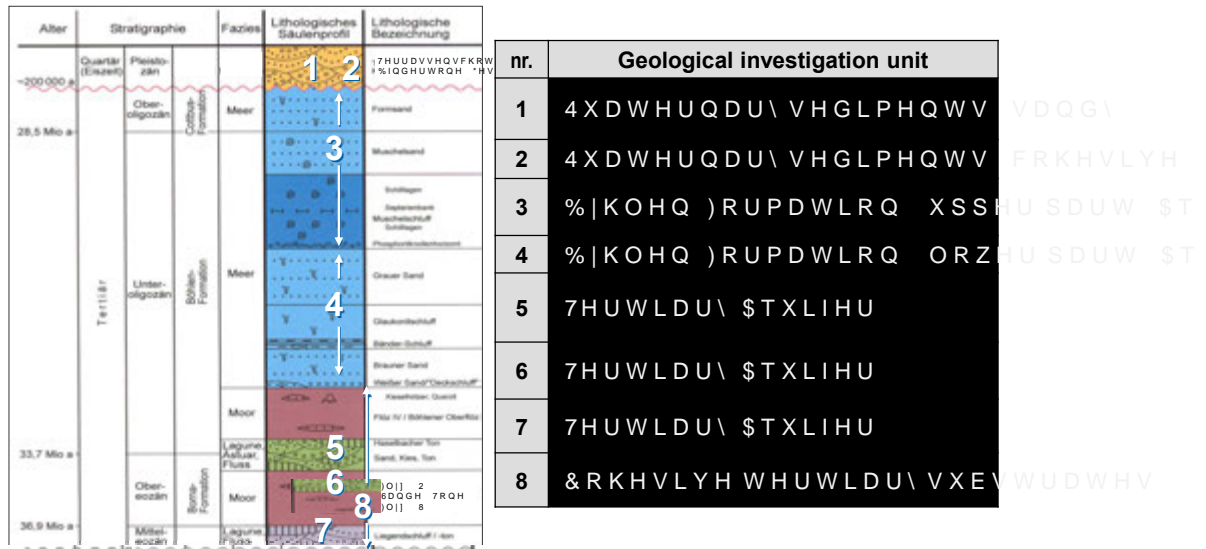
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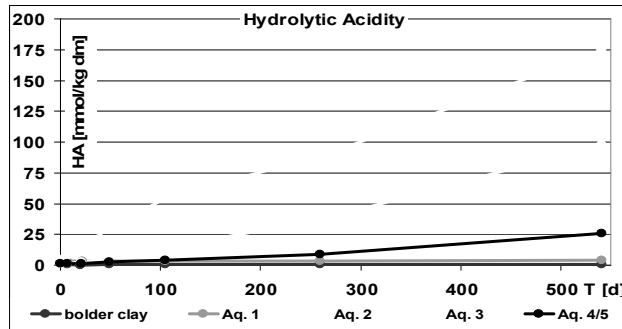
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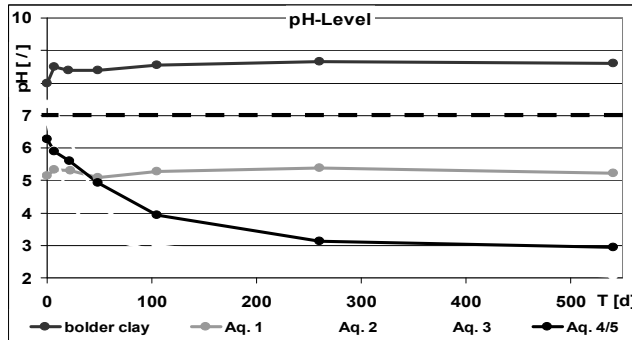
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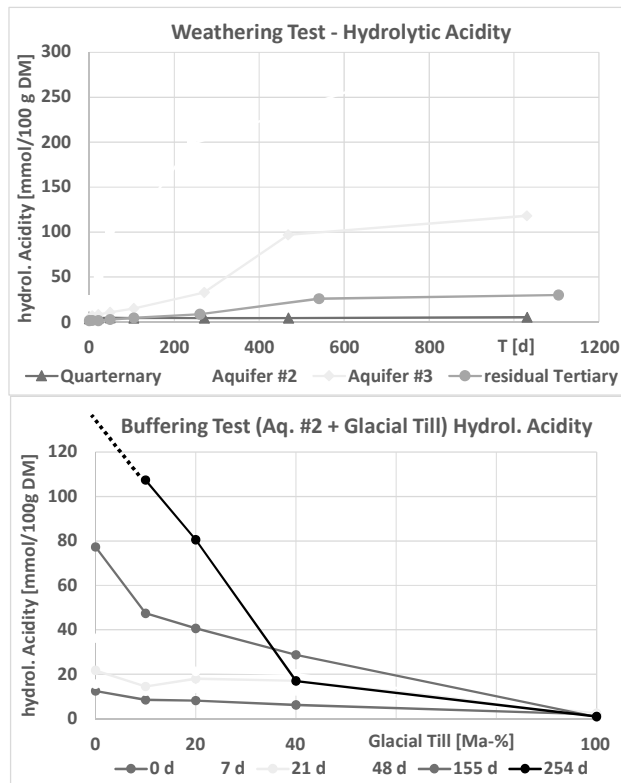


E

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 ,Q WKH RSHQ FDVW PLQH D PDQXDO KRUL]RQWDO GULO
 VDPSOHV GHPRQVUDWHG VLJQLILFDQW FRUOHODWLRQV
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 RSHQ SLW HGJHV DUH RSHQ IRU D ORQJHU SHULRG WKH
 DQG WKH FRQGXFWLYLW\ LV ULVLQJ DV D PHDVXUH RI W
 DSSOLHV IRU S+ YDOXH DV ZLWK LQFUHDVLRQ H[SRVXU
 YDOXH GURS GXH WR WKH ZHDWKHULQJ RI JHRJHQLF S\U
 DWPRVSKHULF R[\JHQ LQWR WKH KDQG KROH YDULHV G
 ZHDWKHULQJ GXUDWLRQ 7KHUH KDYH EHHQ SHQHWUDWL
 ORQJ H[SRVHG VXUIDFH PLQH HGJHV
 ,Q D WKLUG VWHS EOHQLQJ DFFRUGLQJ WKH SODQQHG
 EXIIHULQJ PDUO VROLG FDUERQDWH FRQWHQWV ZLWK V
 ORZHU SDUW DQG LQ YDULRXV UDWLRV ZDV SHUIR
 LPSOHPHQWHG IRU QRUPDO RSHUDWLRQ WLPHV)LJXUH
 ZHDWKHULQJ WLPH a GD\ D PDVV DGGLWLRQ RI WR
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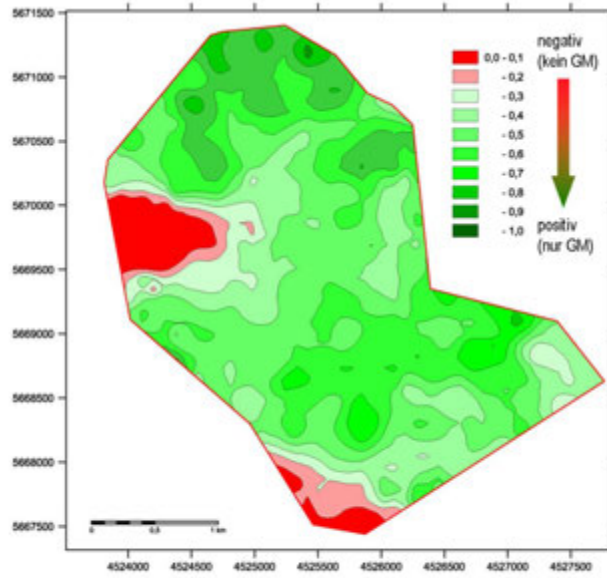


)LJ +\GURO\WLF \$FLGLW\ LQ :HDWKHULQJ 7HVWV RI GLIIHUHQW
 DQG %XIIHULQJ WHVWV \$TXLIHU *ODFLDO 7LOO ULJKV

7R WKLW WKH WKLFNQHV UHODWLRQV EHWZHHQ WKH JO
 DQG WKH ERXOGHU FOD\ ZDV GHWHUPLQH DQG SORWH

'UHEHQVWHGW & DQG DO ,QQRWDWLYH DSSURDFK WR UHGXI

ZDV VKRZQ IRU H[DPSON LQ ILJXUH IRU ODUJH DUHD
PDWHULDO ,Q VPDOO DUHDV LQ WKH ZHVW DQG VRXWK
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DQG WLOWLQJ \$ PDVV WUDQVSRUW LV QHFHVVDU\



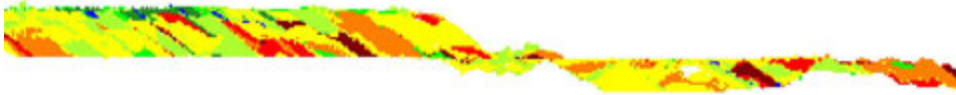
Thickness Glacial Till

Thickness Glacial Till + Aquifer 2 + Aquifer 3

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TXHVWLRQ WR FKDUDFWHUL]H WKH EXIIHULQJ E\ 7,& D
\$WWHQXDWRQ RQ UDGGRPO\ GXPSHG VHGLPHQW PDVVH
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KDG JRRG JHRFKHPLFDO FRQGLWLRQV 6R LQ WKH IXWXU
PL[WXUH RI VHGLPHQW PDVVH 2Q WKH EDVLV RI D JRR
PE+ KDV WKH RSSRUWXQLW\ WR WUDFN DOO VHGLPHQWV
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YLVXDOL]HG VKRZLQJ DQ DSSUR[LPDWH GXPS VWUXFWXU
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VHGLPHQWV ZHUH WXUQH G RYHU LQ ODUJH SDFNDJHV
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-RXUQDO RI (QJLQHULQJ 6FLHQFHV DQG ,QQRYDWLRQ 9F



)LJ 'XPS VHFWRQ JUHHQ \HOORZ EXIIHULQJ PDWHULDO UHG D
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\$ TXDOLILHG PL[LQJ RI JODFLDO WLOO KRUL]RQV LQWR W
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LQ WKH ORZHU SDUW FDXVH RI WKH EDFNJURXQG RI WK
VHGLPHQWV RI WKH DTXLIHU DQG DUH GXPSHG ZLWK
WLOO QRW DV FRPSDFW SDFNDJHV EXW LQ UHODWLYHO\
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WHVWV WKH SRWHQWLDO JHRFKHPLFDO LQLWLDO ZHUH F
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FRPELQDWLRQ RI EORFNLQJ E\ LURQRK\GDUR\LRGHOSUDGMSRLV
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ORZHU GXPS

5HVXOWV

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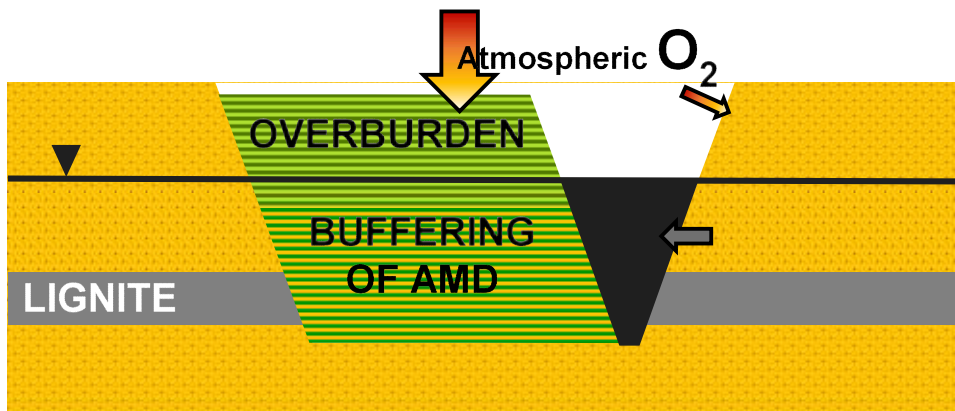
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VXFK DV OLPH RU GRORPLWH



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5HIHUHQFHV

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,6%1 S