

### LABORATORIUM VOOR TOEGEPASTE GEOLOGIE EN HYDROGEOLOGIE

## RECONNAISSANCE DRILLING NEAR THE BETZ PLANT AT HERENTALS

A . I . B .

TGO 90/32



## RECONNAISSANCE DRILLING NEAR THE BETZ PLANT AT HERENTALS

A.I.B.

### rijksuniversiteit gent

laboratorium voor toegepaste geologie en hydrogeologie

# RECONNAISSANCE DRILLING NEAR THE BETZ PLANT AT HERENTALS



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telefoon 091-22.57.15

A.I.B.

Direction: Prof. Dr. W. DE BREUCK

Report: Lic. I. BOLLE

Research nr.: TGO 90032

Date: September 28th, 1990

#### 1. INTRODUCTION

By order of A.I.B. the Laboratory of Applied Geology and Hydrogeology of the State University of Ghent carried out six reconnaissance drillings near the BETZ PLANT at Herentals.

The reconnaissance consisted of:

- drilling and sampling of six holes near an abandoned tank site
- equipment of the six boreholes as observation wells
- measurement of the groundwater level
- sampling of the groundwater.

The reconnaisance was performed on September 24th and 25th 1990. This report contains an overview of the field work.

#### 2. SITE DESCRIPTION

#### 2.1. Location

The BETZ PLANT is located at the industrial area of Herentals. The area is situated between the highway E313 Antwerp-Hasselt and the Albertanal (fig. 1).

A tank containing "Solveso" was situated near the warehouse of the factory (fig. 2).

#### 2.2. Physiography

The site is located on a small ridge (about 12 m above sealevel\*). The ridge is oriented from west to east and is bordered to the north by the Albertcanal at about +10 and to the south by the "Zelse beek" at approximately +10 (fig. 3).

\* All levels in this report refer to the datum level of the National Geographic Institute (Second General Leveling = TAW)

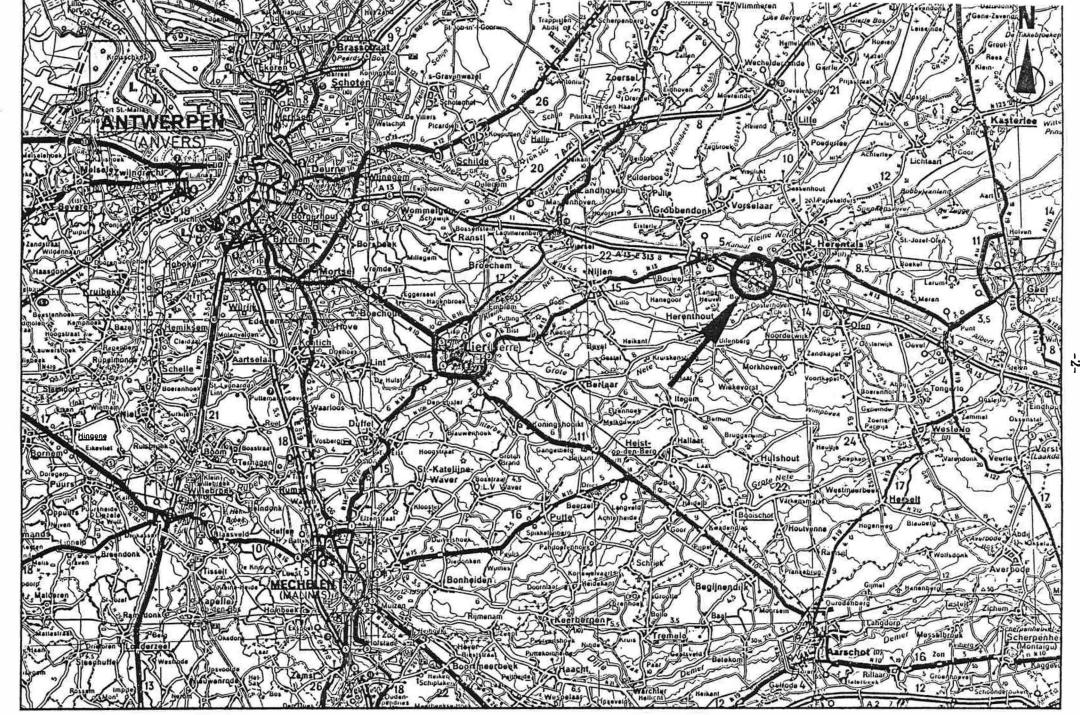


Fig.1 - Situation of the Herentals industrial area (Michelin, 1990, 1/200000)

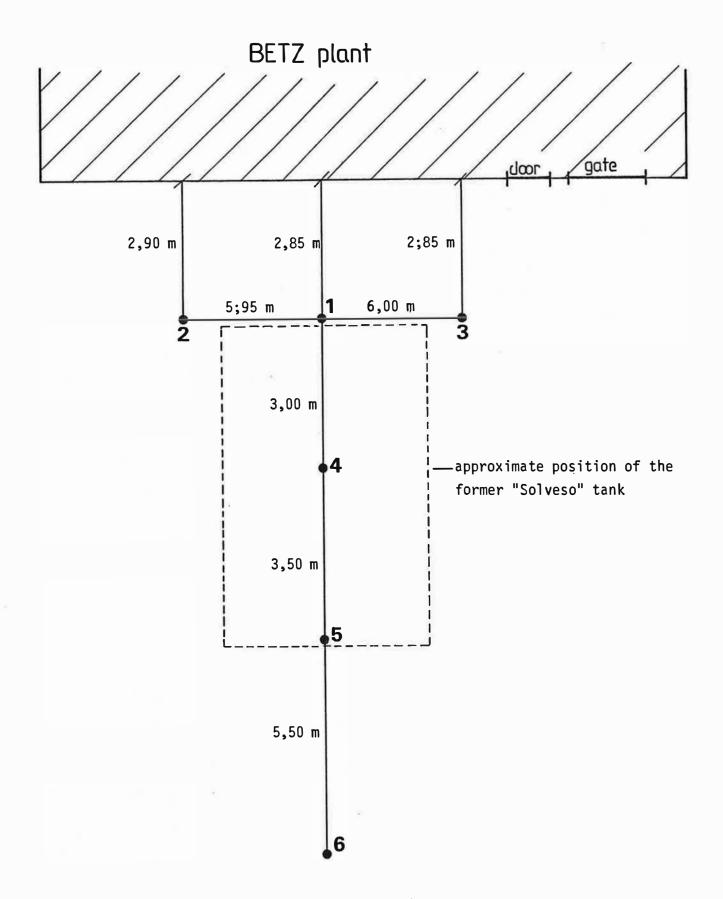


Fig.2 - Performed drilholes ( not to scale ) and position of the former "Solveso" tank.

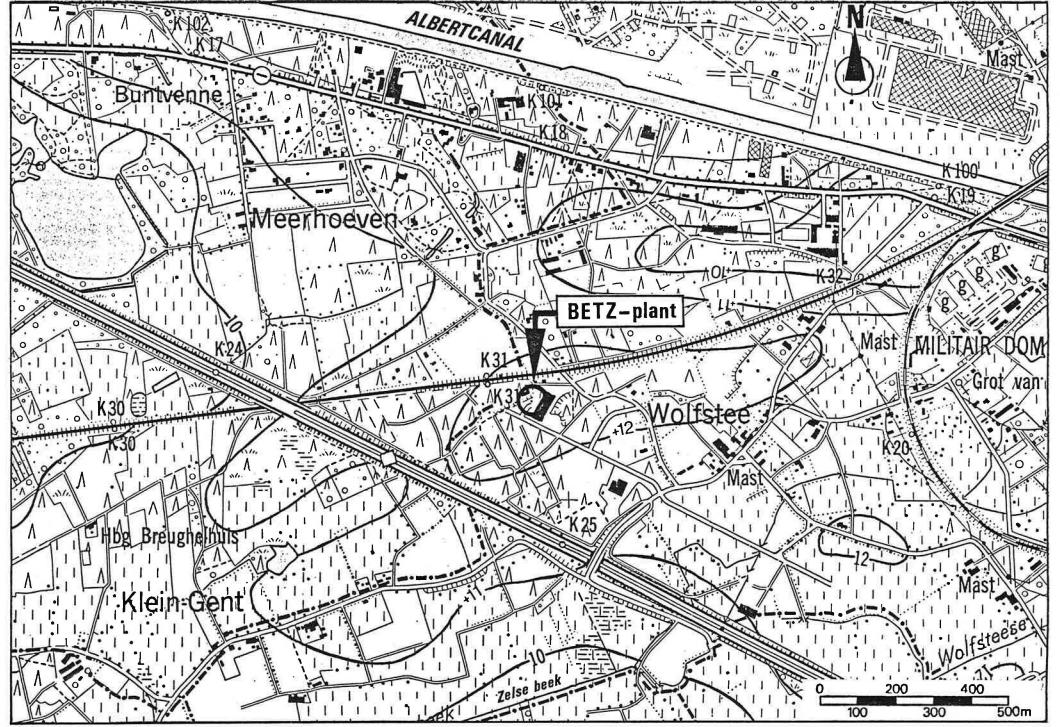


Fig. 3 - Topographic map 16/7 Herentals (NGI). Contourline in terval 1 m.

#### 3. SOILS

The original soils in the area consisted mainly of dry sand. With the build-up of the industrial area the original ground-level was heightened mostly with sandy material.

#### 4. GEOLOGY

At a depth of approximately -65 the Boom clay (Oligocene) is occuring. This layer, which is more than 100 m thick, consists of a stiff clay. The Boom clay is covered by the Berchem Formation (Miocene), consisting of fine green clayey sand with shells and glauconite. The top of the Berchem Formation is at approximately -48.

On top of the Berchem Formation we find the Diest Formation, a green fine sometimes coarse sand with glauconite. The thickness of the Diest Formation is about 55 to 60 m.

The Diest Formation is covered by a thin layer of fine sand of Pleistocene age.

#### 5. HYDROGEOLOGY

The Pleistocene deposits together with the Diest and Berchem Formations form an unconfined aquifer; the Boom clay is acting as an impervious stratum of this unconfined aquifer.

The Diest Formation is an important aquifer in the Antwerp province. The "Provinciale en Intercommunale Drinkwatermaatschappij der Provincie Antwerpen" (PIDPA), a public water supply company extracts groundwater at several places in the Antwerp province from the Diest Formation.

#### 6. DRILLING AND SAMPLING

Six boreholes (fig. 2) were performed. The drilling was made by a hand-auger ( $\emptyset$  60 mm) in the insaturated zone. Beneath the water table drilling was made by the hand-rotary method with normal circulation of clean water. Representative formation samples were taken at a depth of approximately 3,0 m. The description of the lithology was made on the spot (appendix 1).

At the site 1 a strong smell of solveso was noticed. At the other sites (except no. 6) a more weaker smell was encountered. At site no. 6 no smell was noticed.

#### 7. EQUIPMENT OF THE OBSERVATION WELLS

The six boreholes were equiped as observation wells; the construction log is represented on fig. 4. To prevent contamination during the construction:

- no soil withdrawn from the borehole has been used as fill up
- no glue was used to join the PVC pipes.

After the equipment and before the groundwater sampling the observation wells have been developed during 20 to 35 minutes. While developing, the presence of foam in the pumped water from all the wells, except no. 6, was noticed.

#### 8. LEVELING AND WATER-LEVEL MEASUREMENTS

#### 8.1. Leveling

The top of each observation well was leveled. The threshold of the gate of the BETZ PLANT was used as a reference point (R +10). The results of the leveling are collected in table 1.

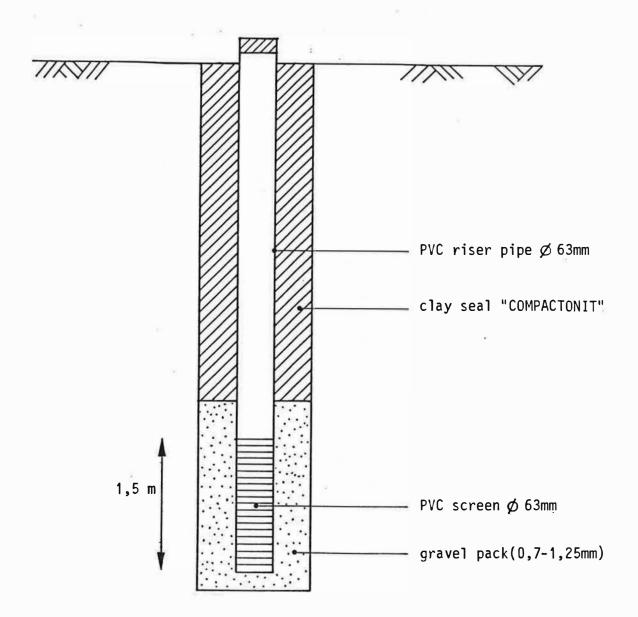


Fig.4 - Construction log of an observation well.

Table 1 - Levels of the observation wells

Well number	Relative level
1	R +9,839
2	R +9,613
3	R +9,711
4	R +9,646
5	R +9,328
6	R +9,708

#### 8.2. Groundwater level measurement

On September 25th 1990 the groundwater level in all the observation wells was measured. The results are given in table 2.

Table 2 - Groundwatermeasurements

Well number	Relative level
1	R +5,553
2	R +5,543
3	R +5,546
4	R +5,556
5	R +5,563
6	R +5,558

#### 9. GENERAL GROUNDWATER FLOW

Due to the short distance between the observation wells no direction of the groundwater flow can be determined from the groundwatermeasurements listed in table 2.

From the topographic map at scale 1:10.000 (fig. 3) however, one can determine approximately the general groundwater flow direction in the unconfined aquifer. This however supposes the absence of

any anthropogenic influence such as i.e. groundwater extraction or infiltration in the close vicinity of the BETZ PLANT.

The general groundwater flow will probably be directed towards the W and NW. More precision concerning the direction and the gradient requires at least two supplementary observation wells at a larger distance.

#### 10. GROUNDWATER SAMPLING

After development of the observation wells groundwater samples were taken on September 25th 1990. Before taking the samples the well volume was pumped several times. The sampling was performed with a hand teflon bailer.

#### 11. SAMPLE ANALYSIS

The formation samples and the groundwater samples will be analysed by A.I.B.

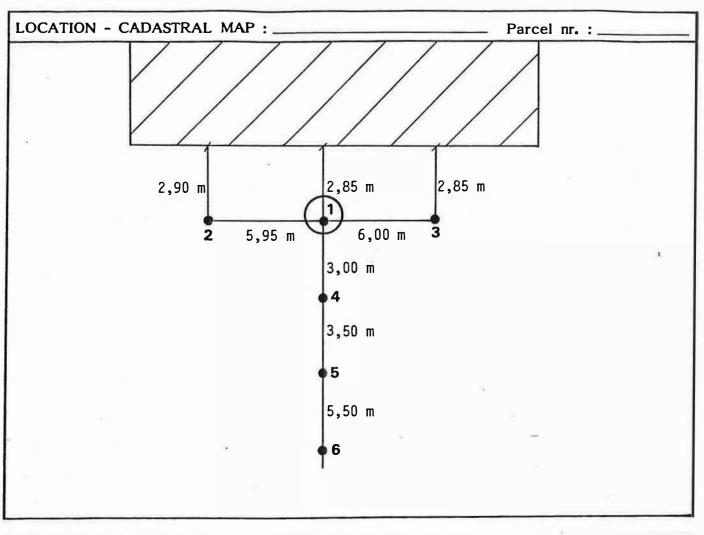
September 28th, 1990.

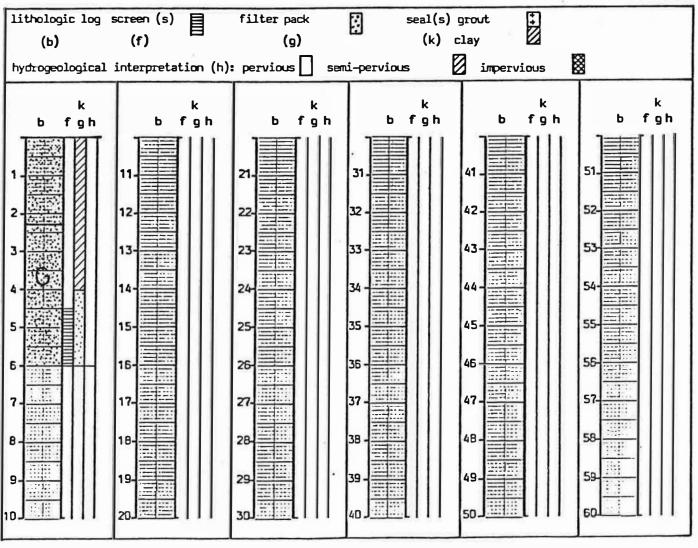
# APPENDIX 1 DRILLING LOGS OF THE OBSERVATION WELLS

Rijksuniversiteit Gent			_	. Res	search nr	. •	Well nr.: 1
Laboratorium voor Toegepaste Laboratory of Applied Geolog	Geologie y and Hyd	en Hydi rogeolog	aa Soogeoloi		0032	• •	wen m 1
Prof. Dr. W. De Breuck							
RESEARCH: Reconnaiss at Herenta		lling n	ear th	e BETZ P	LANT	OWNER	: A.I.B.
- DATE: 24 September	r 1990						
- DRILLING CY. : _RU	G - LŢC						
- DRILLING CY.: RU - DRILLING RIG	y hand	BY:	IB	_ DRILL	ER :R	В	
- MAP N.G.I. Nr. : 16/	7		GE	OL./PEDO	L. MAP	Nr. :	45W
- MAP N.G.I. Nr. : 16/ - MUNICIPALITY : Her - X = Y (LAMBERT-COORDINA	entals			71/1/		NIS	-CODE :
(LAMBERT-COORDINA	= TES)			ZMV = ZMV* =	+14.	5	(m TAW)
(ZMV = ground level (mea	sured);	ZMV*	= grou	ind level (	estimate	d))	,
	Ø	Ι			DEPTH (in	n m)	
DRILLING METHOD	(mm)	from	- to l				1 - to from - to
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Hand-rotary	95	3,3 _					
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	L						
- DRILLING MUD : - BOREHOLE LOG(S) :				C	ONSUMP	TION (I)	:
		OFO I	ZMP	ZMP*	GWDP	L	I ST I P
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F2 1,5		,,,,,,		111,0			
F3							
NR = Number  DFB = Depth to top of screen (m)  DFO = Depth to bottom of screen (m)  ZMP = Level measuring point (m TAW)  ZMP* = Estimated level of mark (m TAW)  GWDP = Groundwater depth below mark  L = Type of aquifer: 1 = phreatic; 2 = non phreatic  ST = Stratigraphy (conform to legend LTG)  P = 1=Piezometer; 2=Observation well; 3=Dugged well; 4=Pumping well							
<ul> <li>Several screens in or</li> <li>Characteristics - rise</li> </ul>	ne boreh er pipes	ole:	x <b>es/n</b> o	PVC (	Ø 63 mm	) 	
- scr	eens	:		PVC (	Ø 63 mm		
- cor	nection	s: no					
- Bottom pipe (m): _							1
- Screen slot openings	- type	: _ Ho	rizont	al slots			
	- size	(mm) :	0.3				
- Centralizer(s) - place - Filter-pack type and	e (m) : . charact	eristic	cs:_8	ravel (0,7			
- Seals-type and chara	- volun	ne (l.)	: <u> </u>	11 ellets " cor	npactoni	11	
- Borehole backfill ma	terial:	_					
- Development - met							
- date	- dura	tion (h	$): \frac{25}{0}$	<u>/09/90</u> 8			25'
- disc - Finishing : PVC plu	g and c	overed	with	ground			

Sample Dr.	Description of the cuttings	Depth (m)					
		from	to				
	yellowish brown fine sand with black spots	0,0	1,5				
	grey fine sand	1,5	2,3				
	yellowish grey fine sand with glauconite	2,3	3,0				
	green fine sand with glauconite	3,0	6,0				
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Geological interpretation and remarks
0,0 - 2,3 : Quaternary (fill up)
2,3 - 6,0 : Tertiary (Diest Formation)

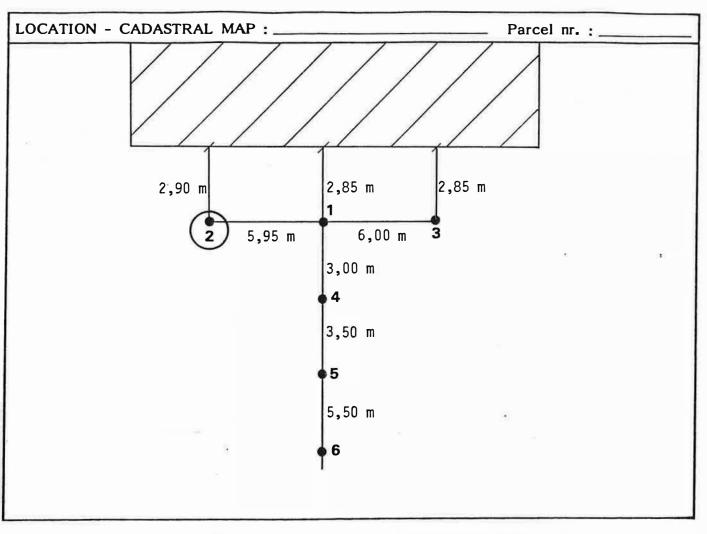


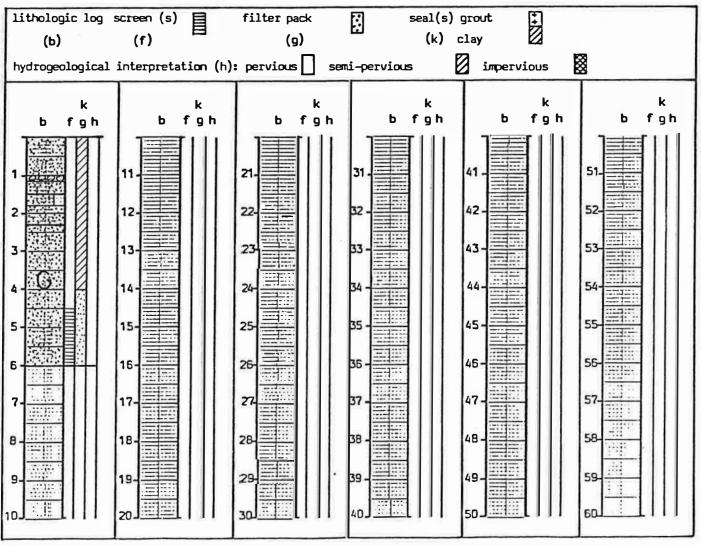


Rijksuniversiteit Gent Laboratorium voor Toegepaste Laboratory of Applied Geolog	Geologie y and Hyd	en Hy rogeol	drogeolo		search nr	. :	Well 1	nr.: 2
Prof. Dr. W. De Breuck  RESEARCH: Reconnaiss			-	e BFT7 P	I ANT	OWNER	. A.I.	.B.
at Herenta								
- DATE: _25 September - DRILLING CY: _RU					F 70 0.00.000			
- DRILLING RIGb - DESCRIPTION OF CU	y hand	BY:	IB	_ DRILL	ER :R			
- MAP N.G.I. Nr. : 16/ - MUNICIPALITY : Her	entals		GI	EOL./PEDC	L. MAP	Nr. : NIS	45W -CODE	· ;
- MUNICIPALITY : Her - X = Y (LAMBERT-COORDINA	= TES)			ZMV = ZMV* =	+14,	5		- (m TAW) - (m TAW)
(ZMV = ground level (mea	sured);	ZMV <sup>3</sup>	= gro	und level (	estimate	d))		
DRILLING METHOD	Ø		- 1		DEPTH (i			
Hand auger	(mm) 60		- to	from - to	from -	to from	- to	from - to
Hand-rotary	95		- 6,0					
		-						
- DRILLING MUD : - BOREHOLE LOG(S)					CONSUMF	PTION (I)	:=	
		OFO	ZMP		GWDP	L	ST	
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F3								
NR = Number  DFB = Depth to top of screen (m)  DFO = Depth to bottom of screen (m)  ZMP = Level measuring point (m TAW)  ZMP* = Estimated level of mark (m TAW)  GWDP = Groundwater depth below mark  L = Type of aquifer: 1 = phreatic; 2 = non phreatic  ST = Stratigraphy (conform to legend LTG)  P = 1=Piezometer; 2=Observation well; 3=Dugged well; 4=Pumping well								well
- Several screens in o - Characteristics - ris	ne boret er pipes	ole : :	<b>xes/</b> nc	PVC	Ø 63 mm			·
- scr	eens	•=		PVC	Ø 63 mm			
- coi	nnections	s :		was used				
- Bottom pipe (m):_		-						
- Screen slot openings	- type	: _ <u> </u>	lorizoni	al slots				
- Centralizer(s) - plac	- open	агеа	(%):_	2				
- Filter-pack type and	charact	terist	ics: —	gravel (0,7				
- Seals-type and chara	cteristic	cs :	clay r	ellets " co	mpactoni	t"		
- Borehole backfill ma - Development - met								
- date	- dura	tion	(h) : $\frac{2}{0}$	5/09/90				35'
- date - disc - Finishing: PVC plu	narge (n ig and c	ny/h)	ed with	ground				

Sample nr.	Description of the cuttings		Depth (m)				
112.0	Description of the cuttings	from	to				
	yellowish brown fine sand	0.0	1,0				
	gravel	1,0	1,1				
	yellowish green fine sand	1,1	1,5				
	brown fine sand with silt	1,5	1,8				
	vellowish brown fine sand	1,8	2,3				
	green fine sand with glauconite	2,3	2,3				
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Geological interpretation and remarks	
0,0 - 2,3 : Quaternary (fill up) 2,3 - 6,0 : Tertiary (Diest Formation)	
2,3 - 6,0 : Tertiary (Diest Formation)	
	11

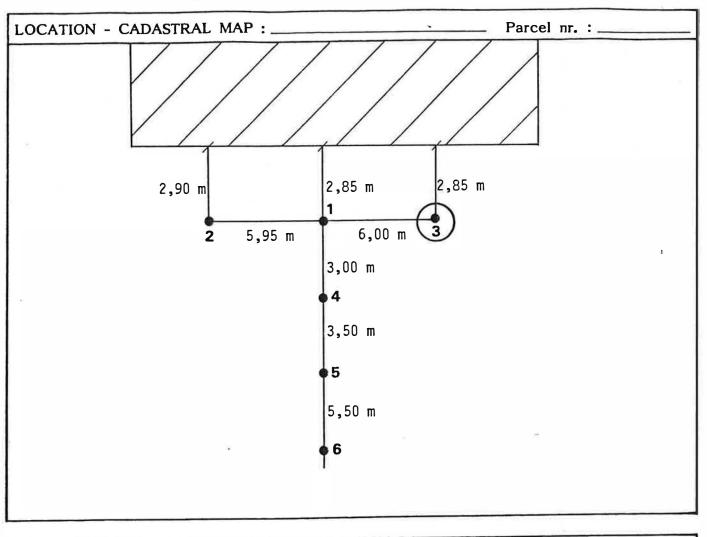


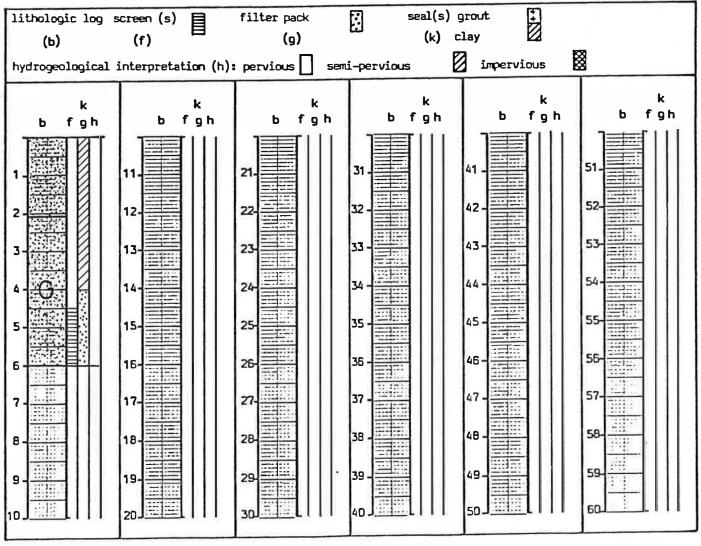


Rijksuniversiteit Gent Laboratorium voor Toegepaste Laboratory of Applied Geolog Prof. Dr. W. De Breuck	Geologie y and Hyd	en Hy rogeol	drogeolo ogy		search nr 1032	• :		Well	nr. :	3							
RESEARCH: Reconnaissance drilling near the BETZ PLANT OWNER: A.I.B.																	
at Herenta																	
- DATE: <u>24 September</u> - DRILLING CY: <u>RU</u>	G - LTC	H															
- DRILLING RIG - DESCRIPTION OF CU - MAP N.G.I. Nr. : 16/	TTINGS 7	BY:		EOL./PEDO	L. MAP	Nr.:		45W									
- MAP N.G.I. Nr. : 16/ - MUNICIPALITY : Hei - X = Y (LAMBERT-COORDINA	entals =			_ ZMV =		^	VIS-	CODE	E: _(m ]	raw)							
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- DRILLING MUD : _ - BOREHOLE LOG(S)	: _ =			C	ONSUMF	PTION	(I)	:									
3333		DFO	ZMP	- All Daniel			-	ST		Р							
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F3							1		+								
NR = Number  DFB = Depth to top of screen (m)  DFO = Depth to bottom of screen (m)  ZMP = Level measuring point (m TAW)  ZMP* = Estimated level of mark (m TAW)  GWDP = Groundwater depth below mark  L = Type of aquifer: 1 = phreatic; 2 = non phreatic  ST = Stratigraphy (conform to legend LTG)  P = 1=Piezometer; 2=Observation well; 3=Dugged well; 4=Pumping well																	
- Several screens in o - Characteristics - ris	ne borel er pipes	hole:	<b>xes/</b> ne	PVC	Ø 63 mm												
- sc	reens	: _		PVC	Ø 63 mm												
- co	nnection	s :		was used													
- Bottom pipe (m): _																	
- Screen slot openings	- size	(mm)	0.3														
- Centralizer(s) - plac - Filter-pack type and	e (m): l charac	terist	ics :	gravel (0,7	7 - 1,25	mm)											
- Seals-type and chara - vo - Borehole backfill ma	acteristic olume (l.	cs : _ .) : _	clay 8	pellets " co	m <u>pactoni</u>	t"											
- Development - me	thod:	peris	staltic	pump			_			5'							
- dat - disc	e - dura	tion n <sup>3</sup> /h)	(h) : $\frac{2}{100}$	5/09/90 0,5													
- rinisning:pin	and C	20 4 61 6	J. 11111	Fround						- discharge (m <sup>3</sup> /h): 0,5  - Finishing: PVC plug and covered with ground							

Sample nr.	Description of the cuttings	Depth (m)				
		from	to			
	yellowish brown fine sand	0,0	1,0_			
	white fine sand	1,0	1,8			
	yeallowish brown fine sand	1,8	1 2,0			
	white fine sand	2,0	2,2			
	yellowish brown fine sand	2,2	2,55			
	dark green fine sand with glauconite	2,55	6,0			
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Geological interpretation and remarks	
0,0 - 2,55 : Quaternary (fill up)	
2,55 - 6,0 : Tertiary (Diest Formation)	
	10.000000000000000000000000000000000000

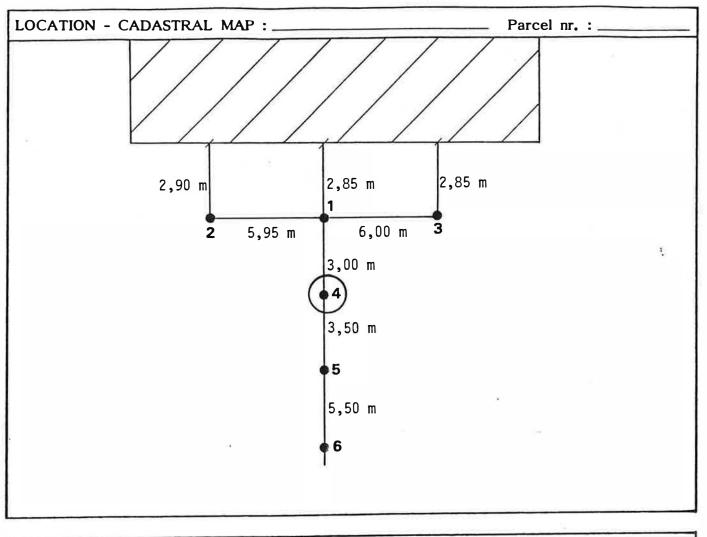


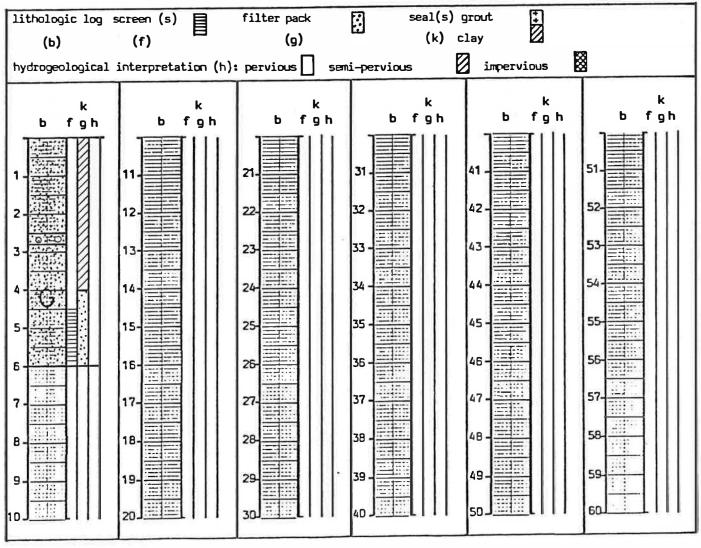


Rijksuniversiteit Gent Laboratorium voor Toegepaste Laboratory of Applied Geolog Prof. Dr. W. De Breuck	Geologie y and Hyd	en Hy rogeol	/drogeolo logy		search nr 0032	r <b>.</b> :		Well	nr.: 4
RESEARCH : Reconnaiss at Herenta		lling	near tl	he BETZ P	LANT	OWN	ER :	: A.	I.B.
- DATE: _24_September - DRILLING CY.: _RU - DRILLING RIGb - DESCRIPTION OF CU - MAP N.G.I. Nr.: _16/ - MUNICIPALITY: _Her - X = Y (LAMBERT-COORDINAL) (ZMV = ground level (means)	G - LTC y hand TTINGS 7 entals = TES)	BY:	IB GI	EOL./PEDC ZMV = ZMV* =	ER : _R DL. MAP =	B Nr. 		45W	E:
	Ø	Ι		Γ	DEPTH (i	in m)			
DRILLING METHOD	(mm)	fron	1 - to	from - to	from -	to	from	- to	from - to
Hand auger	60		- 3,1			-			
Hand-rotary	95	3,1	- 6.0			=			
- DRILLING MUD : _ - BOREHOLE LOG(S)				C	CONSUMI	PTION	(I) N	:-	
		OFO	ZMP		GWDP	-	L ]	ST	
F1 4,5		,0		+14,5	4,090	_	1		11
F3	-					-			
NR = Number  DFB = Depth to top of screen (m)  DFO = Depth to bottom of screen (m)  ZMP = Level measuring point (m TAW)  ZMP* = Estimated level of mark (m TAW)  GWDP = Groundwater depth below mark  L = Type of aquifer: 1 = phreatic; 2 = non phreatic  ST = Stratigraphy (conform to legend LTG)  P = 1=Piezometer; 2=Observation well; 3=Dugged well; 4=Pumping well									
<ul><li>Several screens in o</li><li>Characteristics - ris</li></ul>	ne borel er pipes	ole :	xes/no	PVC	Ø 63 mm	1			
- scr	eens	: _		PVC	Ø 63 mm	1			
- co	nection	s : _n		was used					
- Bottom pipe (m): _							_		
- Screen slot openings	- size	mm)	: _0,3						
<ul><li>Centralizer(s) - plac</li><li>Filter-pack type and</li></ul>	charact	erist	ics:	gravel (0,7	7 - 1,25	mm)			
	cteristic	s:_ ):_	clay 1	pellets " co					
<ul><li>Borehole backfill ma</li><li>Development - met</li></ul>									
<u>-</u>	- dura	ion	(h) · 2	5/09/90					20'
- Finishing: PVC plu	g and c	overe	ed with	ground					

or.	Description of the suttings	Depth (m)		
	Description of the cuttings	from	to	
	yellowish brown fine sand	0,0	1,9	
	brown fine sand	1,9	2,5	
	brown fine sand with stones (concrete, brick)	2,5	2,8	
	dark green fine sand with glauconite	2,8	6,0	
	dark green time saild with gradeomite		0,0	
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ological interpretation and remarks	
0,0 - 2,8 : Quaternary (fill up)	
2,8 - 6,0 : Tertiary (Diest Formation)	
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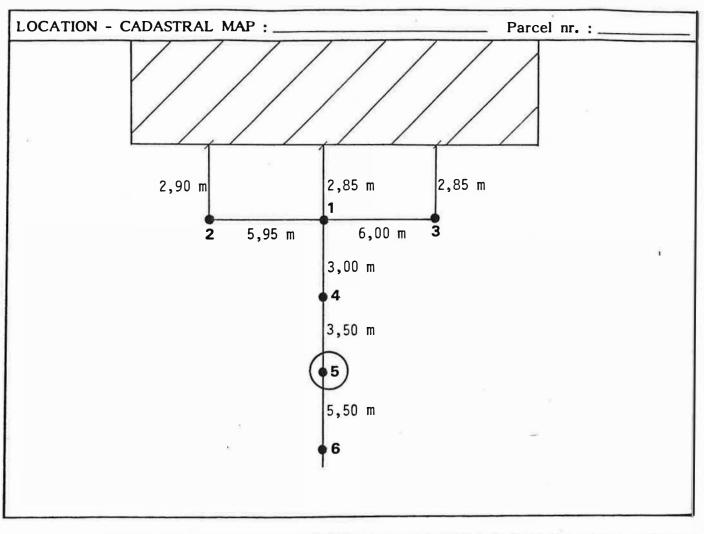


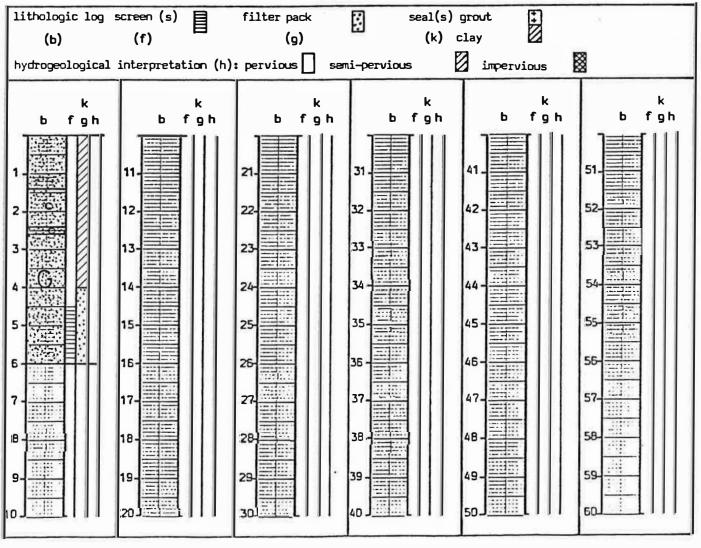


Rijksuniversiteit Gent Laboratorium voor Toegepaste Laboratory of Applied Geolog Prof. Dr. W. De Breuck	Geologie y and Hyd:	en Hy rogeol	drogeolo .ogy		search nr 0032	.:		Well	nr. : 5	
RESEARCH : Reconnaiss at Herenta	ance dri			ne BETZ P	LANT	OWN	ER :	<b>A.</b> ]	I.B.	
- DATE: _24 September   - DRILLING CY.: _RU!   - DRILLING RIG b   - DESCRIPTION OF CUT   - MAP N.G.I. Nr.: _16/   - MUNICIPALITY: _Her   - X = Y   (LAMBERT-COORDINA	G - LTC y hand TTINGS	BY:	IB		ER: R	В				W)
(ZMV = ground level (mea	sured);	ZMV*	= gro	und level (	estimate DEPTH (i	d))				_
DRILLING METHOD	(mm)			from - to				- to	from - 1	to
Hand auger Hand-rotary	95		- 3.1 - 6.0							=
										$\exists$
- DRILLING MUD : - BOREHOLE LOG(S) :	-			C	CONSUMF	OIT	4 (I)	:		_
F1 4,5		oFO ,0	ZMP	ZMP* +14,5	GWDP 3,765	L	1	ST	P 1	$\exists$
F2 F3										= 1
NR = Number DFB = Depth to top of screen (m) DFO = Depth to bottom of screen (m) ZMP = Level measuring point (m TAW) ZMP* = Estimated level of mark (m TAW) GWDP = Groundwater depth below mark L = Type of aquifer: 1 = phreatic; 2 = non phreatic ST = Stratigraphy (conform to legend LTG) P = 1=Piezometer; 2=Observation well; 3=Dugged well; 4=Pumping well										
- Several screens in one borehole: xes/no - Characteristics - riser pipes: PVC Ø 63 mm										
- screens : PVC Ø 63 mm										
- connections : no glue was used  - Bottom pipe (m) :									_	
	- type	. H	lorizont	al slots						
- Screen slot openings - type :Horizontal slots - size (mm) :0,3 - open area (%) :  - Centralizer(s) - place (m) :  - Filter-pack type and characteristics :gravel (0,7 - 1,25 mm) - volume (l.) :11										
- Borehole backfill ma - Development - met	cteristic lume (l.) terial : . hod :	s:_  :_  -   peris	clay p	pump		t"				_
- Development - method :peristaltic pump  - date - duration (h) :25/09/90										

ample nr.	Description of the cuttings	Depth (m)		
	Description of the cuttings	from	to	
	yellowish brown fine sand	0,0	1.4	
	grey fine sand with stones	1,4	. ,	
	grey fine sand with pieces of wood	2,4	2,4 2,6	
	green fine sand with glauconite	2,6	6,0	
	green the band with gladeomic	2,0	0,0	
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Geological interpretation and remarks	
0,0 - 2,6 : Quaternary (fill up)	
2,6 - 6,0 : Tertiary (Diest Formation)	





Rijksuniversiteit Gent Laboratorium voor Toegepaste Laboratory of Applied Geolog Prof. Dr. W. De Breuck	Geologie y and Hyd	en Hy rogeol	drogeolo .ogy		earch nr. 032	.:	Well	nr.: 6
RESEARCH : Reconnaiss at Herenta		lling	near th	ne BETZ Pl	LANT (	OWNER	: A.	I.B.
- DATE:24 September - DRILLING CY.:RU - DRILLING RIGb - DESCRIPTION OF CU: - MAP N.G.I. Nr.:16/ - MUNICIPALITY:Her - X =Y (LAMBERT-COORDINA) (ZMV = ground level (means)	G - LTC y hand TTINGS 7 entals =	BY:	_IB GI	EOL./PEDO  ZMV = ZMV* =	ER :RI	Nr. : NIS	45W	
Ø DEPTH (in m)								
DRILLING METHOD	(mm)	from	- to	from - to	from -	to from	- to	from - to
Hand auger	60		- 3,1					
Hand-rotary	95	3,1	- 6.0					
		_			-	_		
- DRILLING MUD : - BOREHOLE LOG(S)				C	ONSUMP	PTION (I)	:==	
screen nr. NR. D	FB I	OFO	ZMP		GWDP	L	ST	P
F1 4,5	6	,0		+14,5	4,150	1		1
F2   F3								
NR = Number  DFB = Depth to top of screen (m)  DFO = Depth to bottom of screen (m)  ZMP = Level measuring point (m TAW)  ZMP* = Estimated level of mark (m TAW)  GWDP = Groundwater depth below mark  L = Type of aquifer: 1 = phreatic; 2 = non phreatic  ST = Stratigraphy (conform to legend LTG)  P = 1=Piezometer; 2=Observation well; 3=Dugged well; 4=Pumping well								
- Several screens in one borehole : xes/no - Characteristics - riser pipes :								
- scr	eens	:		PVC	Ø 63 mm			
- connections : no glue was used								
- Bottom pipe (m): _			-					
- Screen slot openings - type : Horizontal slots - size (mm) : 0,3 - open area (%) :								
- Centralizer(s) - plac - Filter-pack type and	e (m) : charact	terist	ics :	gravel (0,7	- 1,25	mm)		
•	cteristic lume (l.	cs : _	clay 1	oellets " cor	npactoni	t"		
- Borehole backfill ma - Development - met	terial:	 peris	staltic	pump			-	
- Development - method:peristaltic_pump - date - duration (h):25/09/90							25'	
- Finishing : PVC plu	- discharge (m <sup>3</sup> /h): 1 - Finishing: PVC plug and covered with ground							

Sample nr.		Depth	Depth (m)			
111.	Description of the cuttings	from	to			
1907	yellowish brown fine sand	0,0	1,4			
	grey fine sand	1,4	2,1			
	greyish green fine sand with glauconite	2,1	6,0			
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