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Äspö Hard Rock Laboratory

Manufacturing of bentonite buffer for the Prototype Repository

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March 2002

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Keywords: Prototype Repository, mixing of bentonite, compaction of bentonite blocks, pellets of bentonite

Abstract

The bentonite buffer around the canisters in the *Prototype Repository* is planned to consist of highly compacted bentonite blocks. The slot between the compacted bentonite and the rock surface in a deposition hole will be filled with bentonite pellets. This report describes the production of the bentonite blocks and the pellets for the *Prototype Repository*. The following activities are described:

- The delivery control of the bentonite
- The mixing of the bentonite to a water content of about 17,5%.
- The compaction of the bentonite blocks
- The investigation of the compacted blocks.
- The production of bentonite pellets.
- The investigation of the produced pellets.

Sammanfattning

Bufferten runt kapslarna i *Prototype Repository* ska bestå av högkompakterad bentonit i form av stora block. Spalten mellan bentonitblocken och ett deponeringshåls vägg ska fyllas med bentonit pellets. Denna rapport beskriver produktionen av såväl blocken som pelletsen i *Prototype Repository*. Följande delmoment är beskrivna:

- Leveranskontroll av bentoniten
- Blandningen av bentoniten till en vattenkvot på ca 17,5%.
- Kompakteringen av bentonitblocken
- Kontroll av de tillverkade blocken
- Produktion av pellets
- Kontroll av pellets.

Table of contents

1 Background

The bentonite buffer around the canisters in the *Prototype Repository* is planned to consist of highly compacted bentonite blocks. The slot between the compacted bentonite and the rock surface in a deposition hole will be filled with bentonite pellets. This report describes the production of the bentonite blocks and the pellets.

A form has been constructed and manufactured where ring-shaped and cylindrical blocks can be compacted with a maximum diameter of 1650 mm. The form has been used for production of the blocks for the *Prototype Repository*. A schematic drawing of a deposition hole with bentonite blocks is shown in Figure 1-1. The figure shows that the total amount of blocks needed for one deposition hole is 10 ring-shaped blocks and 4 cylindrical blocks. The total weight of the bentonite blocks needed for one deposition hole is about 22 tons. The volume of the slot between the blocks and the wall of the deposition hole is about 2,1 m^3. The weight of the pellets used for each deposition hole is estimated to about 2,7 tons.

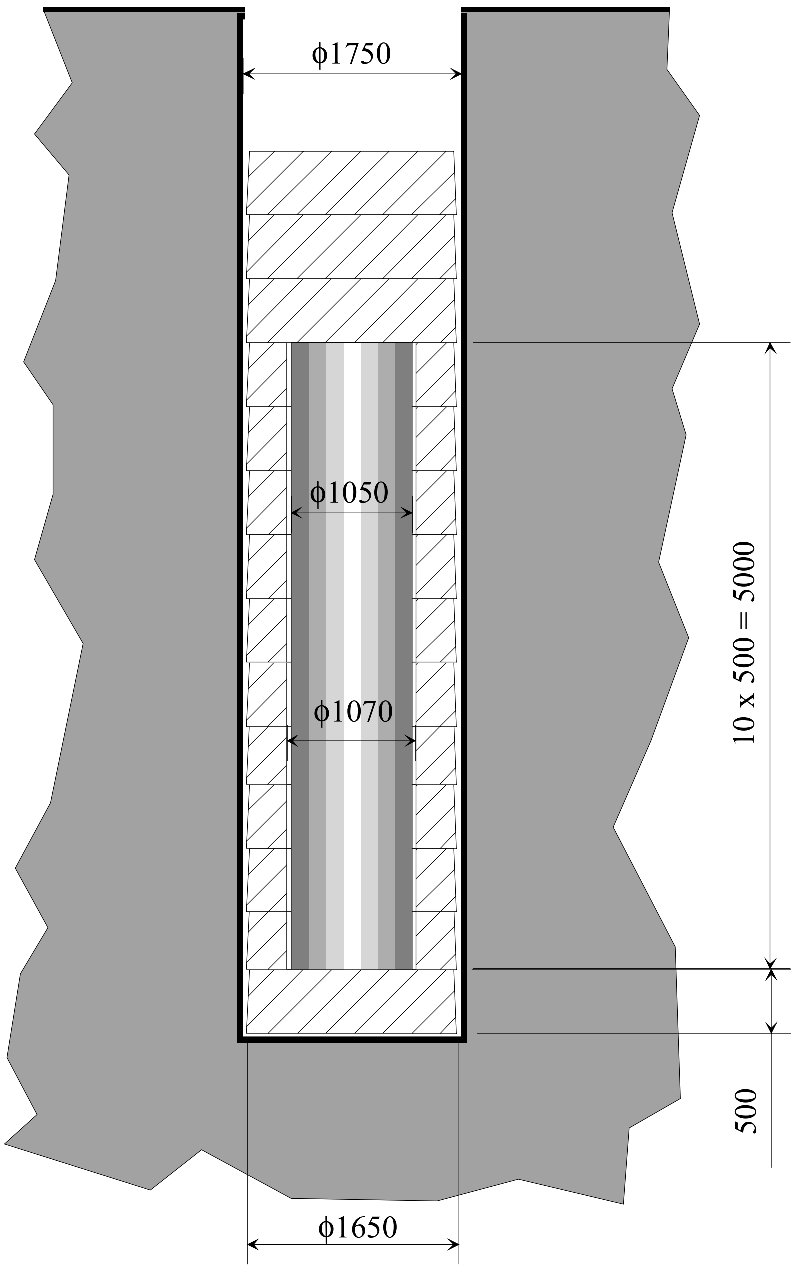

Figure 1-1. *A schematic drawing of a canister hole with bentonite blocks.*

2 Description of the activities

The performed activities for the manufacturing of the buffer are listed in Table 2-1. The activities are listed in the order they were executed. In the following section are the activities described in detail.

Table 2-1. A list over performed activities.

Activity	Description
Control of delivered bentonite	Samples from every delivered Big-Bags of bentonite are taken and investigated with laboratory tests.
Mixing of bentonite	Water is added to the bentonite to yeld the right water ratio
Compaction of bentonite	Bentonite powder is compacted to blocks with a maximum compaction pressure of 100 MPa.
Investigation of the compacted blocks	A visual inspection of the compacted blocks is made. The weight and the dimensions of the blocks are measured.
Production of pellets	Bentonite powder is compacted to small pellets.
Control of the produced pellets	A visual inspection of the pellets is made. The water ratio and the density of the bentonite are determined.

2.1 Delivery control of the bentonite material

The bentonite for both the blocks and the pellets was tested in the laboratory before it was used. The delivery control of the bentonite is described in a quality plan with the title *Acceptance control of bentonite material* (QP TD S63-99-064).

The control consisted of the following parts:

1. When the bentonite was delivered, the Big-Bags were marked and weighted.
2. A sample from each Big Bag was taken and marked and later investigated with respect to the following "parameters"; water ratio, normalized free swelling volume, liquid limit and grain size distribution. (thegrain size distribution was not determined for the bentonite used for the pellets)

The results from the tests are shown in APPENDIX I.

The water content of the delivered bentonite varied between 8 and 13%. The water content is very much depending on when the bentonite is filled in Big-Bags. The lowest water content is expected during the winter season when the Relative Humidity in the air outdoors is low. The water content of the bentonite within one delivery is normally very small.

Figure 2.1 shows some results from the determination of the normalized free swelling. In this type of tests 1.1 g bentonite is carefully poured in a 100 ml measuring glass filled with de-ionized water. After 24 h the volume of the swollen sample is determined. The expected value for the bentonite used in the Prototype Repository (MX-80) is 15-20 ml.

The definition of the liquid limit (w_L) of a soil is the water content where the soil is going from a plastic consistency to a semi liquid/liquid state. This parameter is correlated to parameters as swelling pressure and hydraulic conductivity for a bentonite. The liquid limit is determined with the fall-cone method. The method is described in the "Consistency Limits" part of the Laboratory manual series of the Swedish Geotechnical Society (SGF). In Figure 2.2 some results from the determination of the liquid limit are plotted. The expected liquid limit for MX-80 is 450-500 %.

The granule size distribution of the bentonite is determined by sieving the bentonite. Since the bentointe consists of granules of clay particles the sewing itself can affect the result (by crushing the granules). This test is made in order to avoid deliveries with very fine powder which might be hard to both mix and compact.

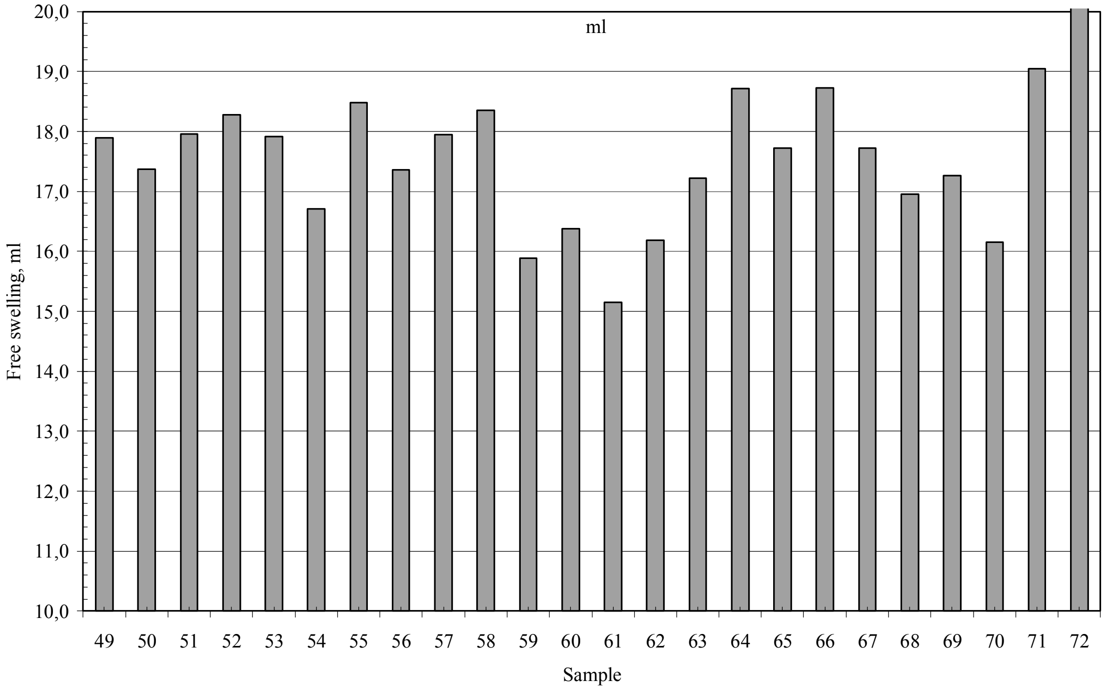

Figure 2-1. *Results from determination of free swelling of one delivery of bentonite.*

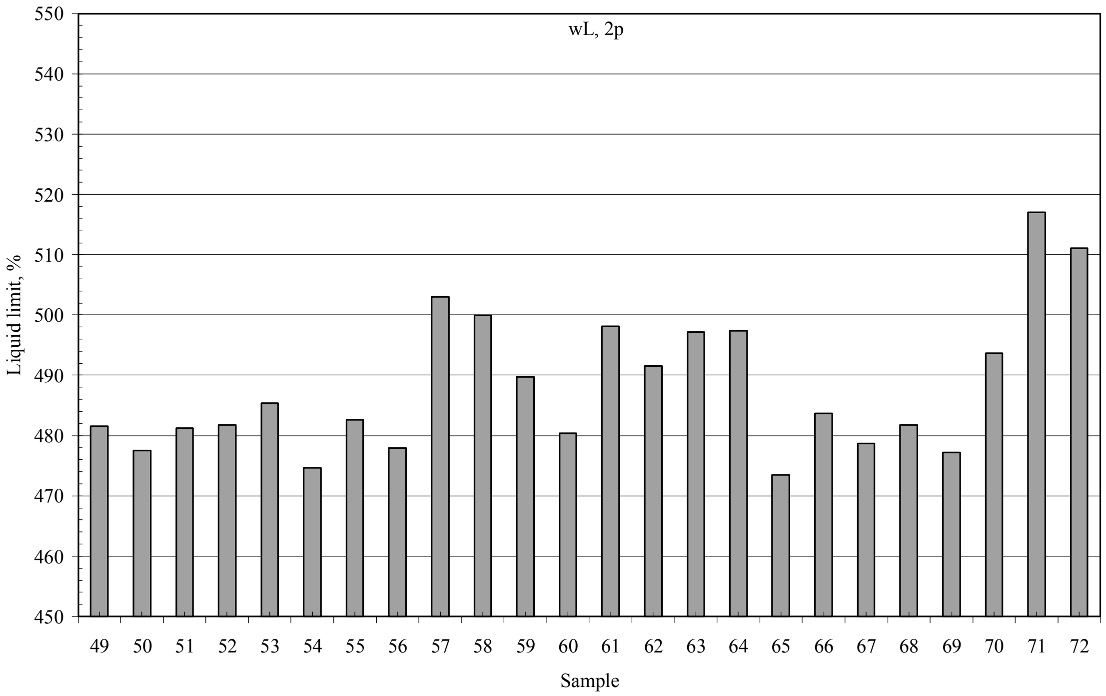

Figure 2-2. *Results from determination of liquid limit (w_L) of one delivery of bentonite.*

2.2 Mixing of bentonite

The bentonite used for the blocks had a water content of about 17.5 %. In order to reach this water content, water was added to the bentonite in a mixer. The mixing of the bentonite was performed at Hackman-Rörstrand AB in Lidköping in a mixer used for mixing clays for porcelain ware. The mixer, see Figure 2-3, is an Erich mixer with a built-in weighing-machine. The maximum batch that can be handled using this mixer is about 1.5 tons.

The bentonite of type MX-80, delivered in Big-Bags, was filled into a silo placed above the mixer and then transported to the mixer. About 1 ton of bentonite was mixed in each batch. A small sample was taken from the bentonite filled into the mixer and the initial water content was determined by weighting a piece of the sample before and after drying in a microwave oven. This water content and the total amount of bentonite were used for calculating the amount of water needed in order to get a final water ratio of 17-17,5%. After mixing, another sample was taken and the final water ratio was determined (also in a microwave oven). A sample from each batch was saved for further investigations of the bentonite. The bentonite was then filled in Big-Bags. All 203 batches were mixed at six occasions. The Big-Bags and the samples taken from the batches were numbered and marked with the date of mixing. The final water ratio of the batches was determined by drying small samples in 105 C for 24 h. The average water ratios for the mixed batches are shown in Table 2-2 below. The clay was stored indoors after mixing.

Table 2-2. Average water ratio and standard deviation for the batches of bentonite mixed for the *Prototype Repository*.

Date at mixing	Number of batches	Average water ratio (%)	STDV water ratio (%)
1999-10-16	30	17,5	0,67
1999-10-23	27	17,2	0,19
2000-11-25	31	17,2	0,41
2001-01-13	30	18,1	0,38
2001-01-20	31	17,3	0,35
2001-10-13	28	17,5	0,32
2001-10-20	26	17,5	0,21

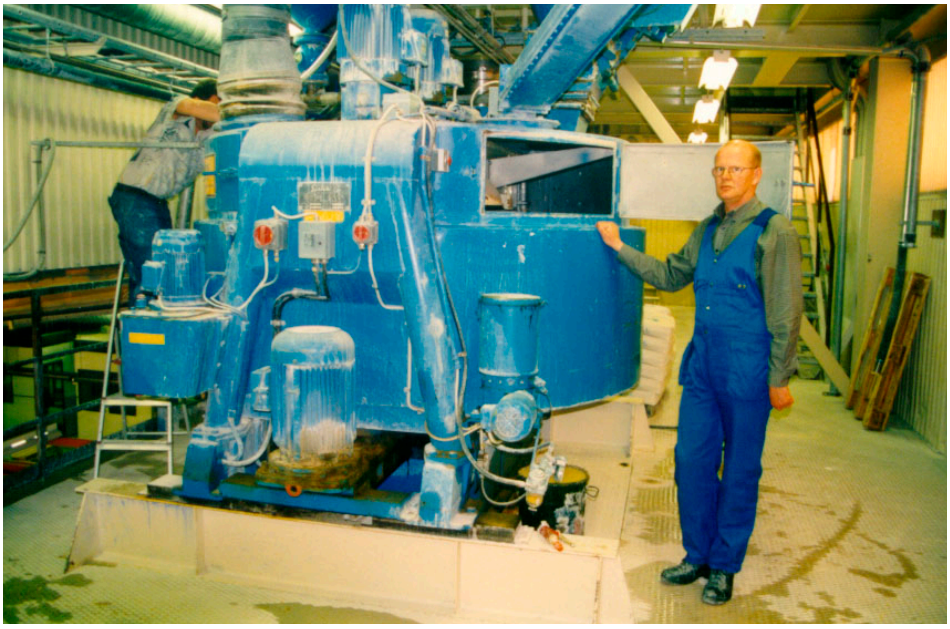

Figure 2-3. *The Eirich mixer used at Hackman-Rörstrand AB.*

2.3 Block compaction

The mixed bentonite was transported in the Big-Bags with a covered lorry to HYDROWELD AB in Ystad for compaction. The compaction was made by personnel at HYDROWELD AB in a press with a maximum capacity of 30.000 tons. The bentonite was filled into a silo, which is a part of the filling equipment. The required amount of bentonite for one block was then filled into the compaction form. The form was placed in the press with a subsequent compaction of the bentonite. After removing the block from the form it was placed on a pallet using specially designed lifting equipment, and a cap was placed over the block in order to prevent the block from drying. The lifting equipment is described in detail by Johannesson (1999).

Table 2-3 shows the program for compacting altogether 88 blocks (including 2 reserve blocks of each type). In order to get a buffer with a homogenous density after saturation, the cylindrical blocks have to be compacted to a lower density than the ring shaped blocks. Hence the cylindrical blocks must be compacted with a lower pressure.

Table 2-3. Program for compacting blocks for the *Prototype Repository* in the Äspö HRL.

Shape	Number of blocks	Comp. Pressure (MPa)	Comp. Load (MN)	Water ratio (%)	Expected density (kg/m^3)
Ring	62	100	121	17	2090
Cylindr.	26	40	84	17	1975

The bulk densities were expected to be 2090 kg/m^3 for the ring shaped blocks and 1975 kg/m^3 for the cylindrical blocks. However, the cylindrical blocks compacted at a compression pressure of 40 MPa had a higher density (see Section 2.4) but it was anyway decided not to compact the blocks at a lower compaction pressure than 40 MPa in order to avoid damages and low strength of the blocks. The blocks combined with pellets filled in the slot between the blocks and the wall of the deposition hole gives for the buffer an average density at saturation of about 2045 kg/m^3, assuming the bulk density of the pellets (without water in the voids) to be 1300 kg/m^3. If the density of the pellets instead is 1000 kg/m^3 the average density of the buffer will be about 2015 kg/m^3.

The compaction was made in the following sequence:

- Material delivered in Big-Bags was filled into the silo which is an integrated part of the filling equipment.
- The form was mounted outside the press and lubricated with MOLYKOTE BR 2 plus®, which is a lubricant for lubricating at high pressure.
- With the built-in weighing machine material was portioned into the form with an accuracy of ±50 kg.
- A sample (about 5 kg) was taken from the bentonite in the form and marked with the same number as the compacted block and the date of compaction. This material will be further investigated with respect to chemical composition and mechanical properties.
- Since the gap in the press is small (se Figure 2-5) the compaction has to be made in three steps by placing small pistons on top of each other after each step. The first piston was placed on top of the bentonite in the form and the form was placed in the press. The tubes from the filters were connected to a vacuum pump and air was evacuated from the bentonite in the form. The evacuation was retained through the whole compaction sequence. The bentonite was then compacted with the press as much as possible. Then the second piston was placed on top of the first piston and the compaction continued. The same procedure was repeated for the third piston. The total time for the compaction was about 10 minutes. The maximum load was then left on the piston for another 10 minutes (hold time 10 minutes).
- The deloading of the block took about 10 minutes. The form with bentonite and the pistons were then lifted with jackets. Steel plates were placed between the form and the bottom plate and the block was pushed out of the form with the press.
- The form and the block were then removed and the ring and pistons lifted off the block. The block was placed on a specially designed pallet with the lifting equipment.

Figure 2-4. *The bentonite filled in the form.*

Figure 2-5. *The form with the first piston placed in the press.*

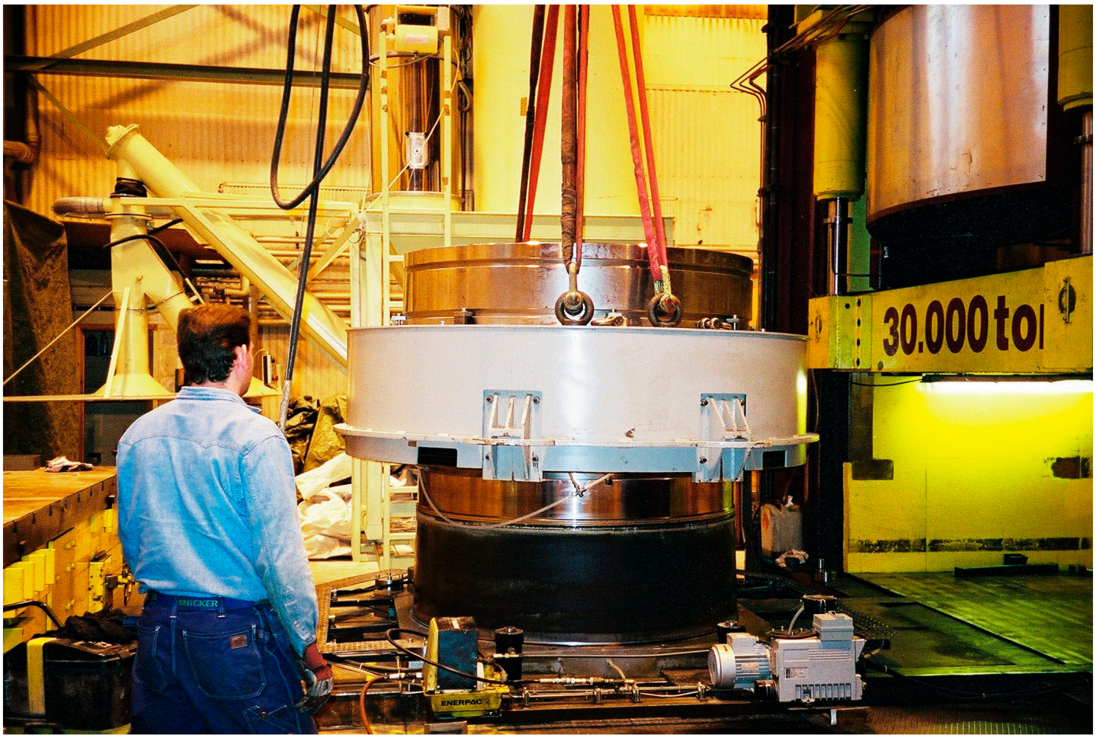

Figure 2-6. *The bentonite block placed on the bottom plate while the form is removed.*

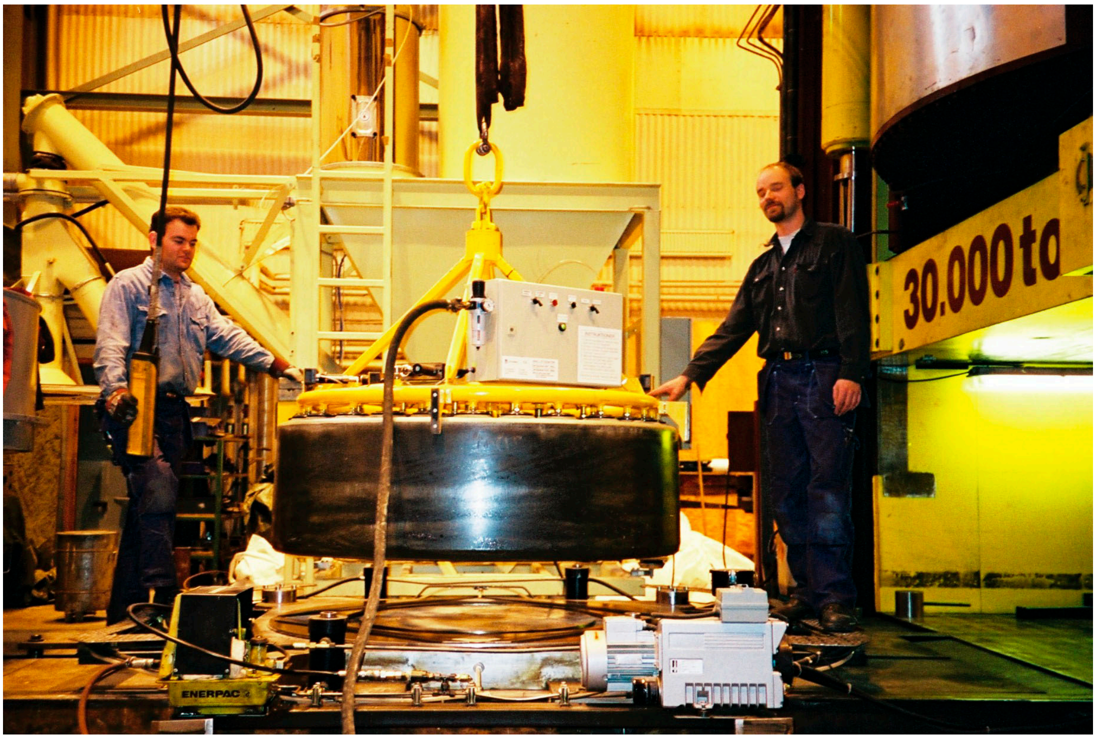

Figure 2-7. *The bentonite block lifted from the bottom plate with the lifting equipment.*

2.4 Investigation of the compacted blocks

The weight of bentonite used for the blocks, the time for compaction, the maximum compaction force, the time at the maximum load (hold time) and the time for reloading where noted in a protocol.

After compaction, the dimensions (height and diameters) of each block were measured. The height of the blocks was measured at 12 locations around the block. The highest measured point of each block was marked on the upper surface. The weight of the blocks was also determined with an accuracy of ±2 kg using a weighing machine hanging from an overhead crane. All these data were filled in the protocol. The blocks were also examined by eye. Any observed damages were noted in the protocol.

The water ratio of the sample taken from each block was determined. Knowing density and water ratio it is possible to calculate the degree of saturation, void ratio and density at saturation. All these data are summarized in APPENDIX 2. In Table 2-3 below the average parameters from the compacted blocks are listed.

Lars-Erik Johannesson, Clay Technology AB is responsible for the investigation of the blocks immediately after compaction.

Figure 2-7. *The height of the bentonite block is measured.*

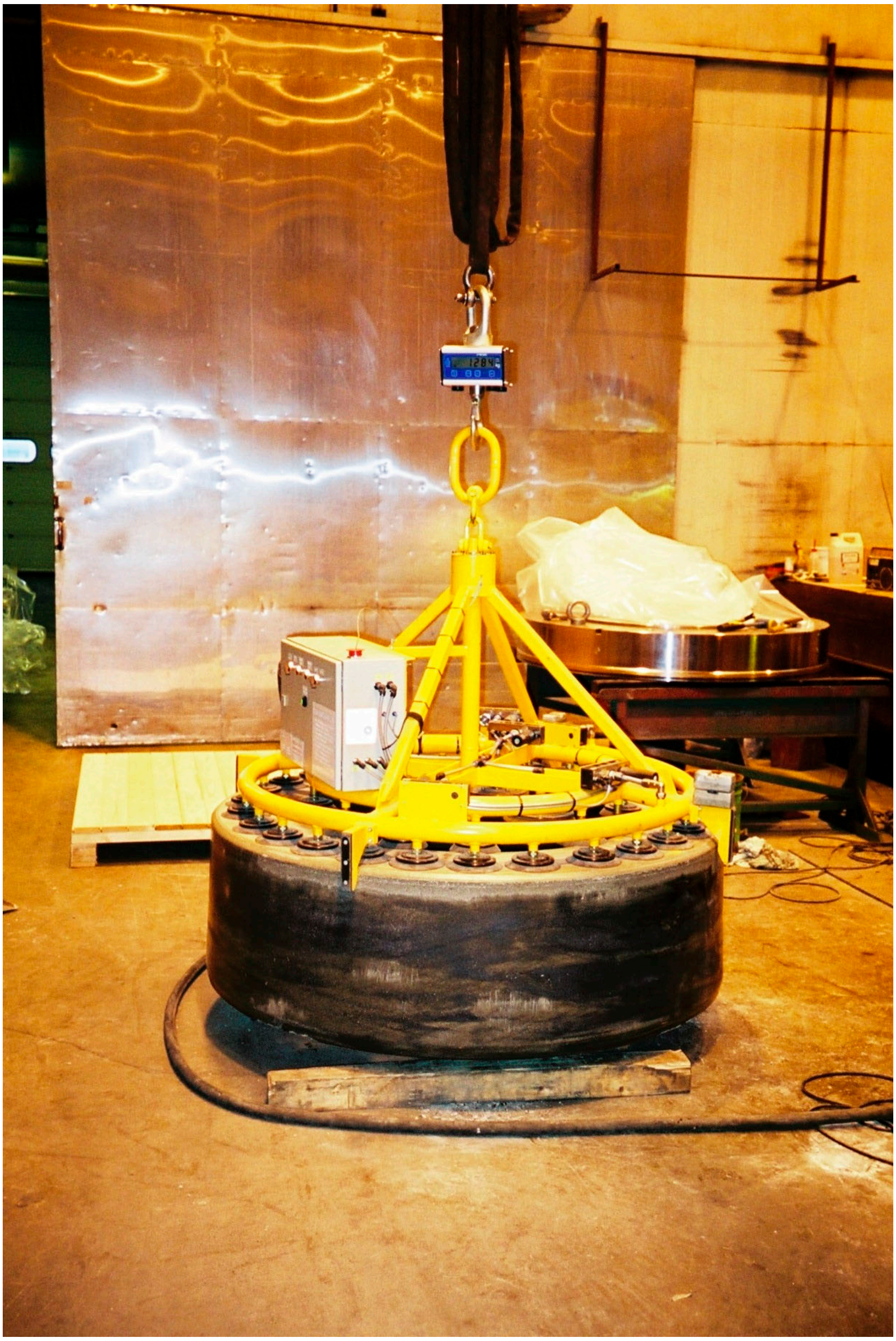

Figure 2-8. *The weight of a bentonite block is determined with a weighting machine hanging from an overhead crane.*

Table 2-4. Average parameters determined on the blocks for the *Prototype Repository*.

Block Type	Date of compaction	Water ratio	Density (kg/m^3)	Degree of saturation	Void ratio	Density at saturation (kg/m^3)	Weight (kg)	Average height (mm)	Notes
Rings	99-11-02--99-11-12	0,171	2097,3	0,861	0,552	2146,8	1287	508,2	Compacted for CRT
Cylinders	99-11-02--99-11-12	0,173	2001,9	0,763	0,628	2093,2	2111	498,6	Compacted for CRT
Rings	00-12-04—01-02-16	0,171	2105,4	0,870	0,546	2151,1	1278	502,8	Compacted for Section I
Cylinders	00-12-04—01-02-16	0,178	2033,5	0,810	0,610	2105,5	2147	500,0	Compacted for Section I
Rings	01-11-05—01-12-05	0,172	2072,7	0,837	0,572	2132,1	1264	506,1	Compacted for Section II
Cylinders	01-11-05—01-12-05	0,173	2003,5	0,766	0,627	2093,8	2110	498,9	Compacted for Section II

2.5 Production of pellets

The manufacturing of the pellets for the *Prototype Repository* was made by the company Sahut Conreur in France. 20 tons of pellets with the dimensions 16,3x16,3x8,3 mm^3 were made. The pellets were delivered in Big-Bags to Aspö.

2.6 Control of the produced pellets

The density and water ratio of the individual pellets was measured in the laboratory. The density was determined by weighting the pellets in air and while it was dipped in a cup with paraffin oil with known density. Tests of the pellets were made after the delivery at Äspö and at the installation of the pellets in the deposition holes. The average data are shown in the table below.

Table 2-5. Average parameters of separate pellets made for the *Prototype Repository*.

	Number of determinations	w	Density (kg/m^3)	Degree of saturation	Void ratio	Density at Saturation (kg/m^3)
Tests at delivery	22	0,137	1970	0,630	0,605	2109
Deposition hole 1	3	0,130	1985	0,620	0,582	2125
Deposition hole 2	3	0,135	1990	0,639	0,585	2123
Deposition hole 3	3	0,131	1971	0,613	0,595	2116
Deposition hole 4	2	0,128	1995	0,624	0,572	2132

Appendix I

Acceptance control of bentonite

Appendix 1

Acceptance protocol   Date: 1999-04-10   Responsible: LEJ

Blue	data to be introduced	TM	total mass	w	water ratio
Black	data to be calcualted, do not over-write!	S1	test sample 1	Vn	normalised free swelling volume
Green	data to be transferred to delivery protocol	VI	visual inspecion	wL	liquid limit
				GSD	grain size distribution

item	ID, SKB	TM	S1a	VI	w	Vn	wL	GSD	Date	Sign.	Generel	remark
criteria	min	1250	1	y	8	15	500	see gs-dia			yes	
limits	max		1,5		12	25	600	see gs-dia				
unit	-	kg	kg	ok	%	mm	%	ok			ok	
results	*1*	*1130*	*1,0*	*y*	*12,3*	*16,0*	*544*	*y*	*1999-04-10*	*LEJ*	***yes***	
	2	*1000*	*1,0*	*y*	*12,1*	*16,0*	*539*	*y*	*1999-04-10*	*LEJ*	***yes***	
	3	*1005*	*1,0*	*y*	*12,0*	*16,0*	*534*	*y*	*1999-04-10*	*LEJ*	***yes***	
	4	*996*	*1,0*	*y*	*12,0*	*16,0*	*517*	*y*	*1999-04-10*	*LEJ*	***yes***	
	5	*1015*	*1,0*	*y*	*12,1*	*17,0*	*538*	*y*	*1999-04-10*	*LEJ*	***yes***	
	6	*1010*	*1,0*	*y*	*12,0*	*16,0*	*547*	*y*	*1999-04-10*	*LEJ*	***yes***	
	7	*1020*	*1,0*	*y*	*12,0*	*16,0*	*541*	*y*	*1999-04-10*	*LEJ*	***yes***	
	8	*1005*	*1,0*	*y*	*12,0*	*16,0*	*526*	*y*	*1999-04-10*	*LEJ*	***yes***	
	9	*1045*	*1,0*	*y*	*12,1*	*16,0*	*527*	*y*	*1999-04-10*	*LEJ*	***yes***	
	10	*1005*	*1,0*	*y*	*12,1*	*15,0*	*525*	*y*	*1999-04-10*	*LEJ*	***yes***	
	11	*1040*	*1,0*	*y*	*12,1*	*17,0*	*512*	*y*	*1999-04-10*	*LEJ*	***yes***	
	12	*1068*	*1,0*	*y*	*12,1*	*17,0*	*530*	*y*	*1999-04-10*	*LEJ*	***yes***	
	13	*1008*	*1,0*	*y*	*12,1*	*17,0*	*537*	*y*	*1999-04-10*	*LEJ*	***yes***	
	14	*1013*	*1,0*	*y*	*12,2*	*17,0*	*529*	*y*	*1999-04-10*	*LEJ*	***yes***	
	15	*1010*	*1,0*	*y*	*12,2*	*17,0*	*539*	*y*	*1999-04-10*	*LEJ*	***yes***	
	16	*1020*	*1,0*	*y*	*12,3*	*17,5*	*540*	*y*	*1999-04-10*	*LEJ*	***yes***	
	17/2-1.		*1,0*	*y*	*12,3*	*18,0*	*551*	*y*	*1999-04-10*	*LEJ*	***yes***	
	17/2-2.		*1,0*	*y*	*12,2*	*15,5*	*563*	*y*	*1999-04-10*	*LEJ*	***yes***	
	17/2-3.		*1,0*	*y*	*12,2*	*15,5*	*548*	*y*	*1999-04-10*	*LEJ*	***yes***	

Appendix 1

Acceptance protocol Date: 1999-10-16 Responsible: LEJ

Blue	data to be introduced	TM	total mass	w	water ratio
Black	data to be calcualted, do not over-write!	S1	test sample 1	Vn	normalised free swelling volume
Green	data to be transferred to delivery protocol	VI	visual inspecion	wL	liquid limit
				GSD	grain size distribution

criteria	min	1250	1	y	8	15	500	see gs-dia			yes	
limits	max		1,5		12	25	600	see gs-dia				
item	**ID, SKB**	**TM**	**S1a**	**VI**	**w**	**Vn**	**wL**	**GSD**	**Date**	**Sign.**	**Generel**	**remark**
unit	-	kg	kg	ok	%	mm	%	ok			ok	
results	*Big Bag 1*	*1304*	*1,5*	*y*	*10,4*	*16,6*	*535*	*y*	*1999-10-16*	*LEJ*	***yes***	
	Big Bag 2		*1,5*	*y*	*10,3*	*15,0*	*549*	*y*	*1999-10-16*	*LEJ*	***yes***	
	Big Bag 3		*1,5*	*y*	*10,3*	*16,5*	*553*	*y*	*1999-10-16*	*LEJ*	***yes***	
	Big Bag 4		*1,5*	*y*	*10,3*	*16,0*	*538*	*y*	*1999-10-16*	*LEJ*	***yes***	
	Big Bag 5		*1,5*	*y*	*10,5*	*15,6*	*550*	*y*	*1999-10-16*	*LEJ*	***yes***	
	Big Bag 6		*1,5*	*y*	*10,5*	*16,6*	*541*	*y*	*1999-10-16*	*LEJ*	***yes***	
	Big Bag 7		*1,5*	*y*	*10,5*	*15,6*	*551*	*y*	*1999-10-16*	*LEJ*	***yes***	
	Big Bag 8		*1,5*	*y*	*10,4*	*18,1*	*539*	*y*	*1999-10-16*	*LEJ*	***yes***	
	Big Bag 9		*1,5*	*y*	*10,6*	*15,1*	*546*	*y*	*1999-10-16*	*LEJ*	***yes***	
	Big Bag 10		*1,5*	*y*	*10,3*	*15,5*	*540*	*y*	*1999-10-16*	*LEJ*	***yes***	
	Big Bag 11		*1,5*	*y*	*10,2*	*17,0*	*545*	*y*	*1999-10-16*	*LEJ*	***yes***	
	Big Bag 12		*1,5*	*y*	*10,2*	*17,0*	*544*	*y*	*1999-10-16*	*LEJ*	***yes***	
	Big Bag 13		*1,5*	*y*	*10,5*	*17,0*	*547*	*y*	*1999-10-16*	*LEJ*	***yes***	
	Big Bag 14		*1,5*	*y*	*10,1*	*17,0*	*533*	*y*	*1999-10-16*	*LEJ*	***yes***	
	Big Bag 15		*1,5*	*y*	*10,2*	*17,0*	*533*	*y*	*1999-10-16*	*LEJ*	***yes***	
	Big Bag 16		*1,5*	*y*	*10,4*	*17,6*	*543*	*y*	*1999-10-16*	*LEJ*	***yes***	
	Big Bag 17		*1,5*	*y*	*10,4*	*17,1*	*535*	*y*	*1999-10-16*	*LEJ*	***yes***	
	Big Bag 18		*1,5*	*y*	*10,4*	*18,1*	*537*	*y*	*1999-10-16*	*LEJ*	***yes***	
	Big Bag 19		*1,5*	*y*	*10,3*	*19,0*	*534*	*y*	*1999-10-16*	*LEJ*	***yes***	
	Big Bag 20		*1,5*	*y*	*10,1*	*18,0*	*549*	*y*	*1999-10-16*	*LEJ*	***yes***	

Appendix 1

Acceptance protocol Date: *1999-10-23* Responsible: LEJ

Blue	data to be introduced	TM	total mass	w	water ratio
Black	data to be calcualted, do not over-write!	S1	test sample 1	Vn	normalised free swelling volume
Green	data to be transferred to delivery protocol	VI	visual inspecion	wL	liquid limit
				GSD	grain size distribution

criteria	min	1250	1	y	8	15	500	see gs-dia			yes	
limits	max		1,5		12	25	600	see gs-dia				
item	**ID, SKB**	**TM**	**S1a**	**VI**	**w**	**Vn**	**wL**	**GSD**	**Date**	**Sign.**	**Generel**	**remark**
unit	-	kg	kg	ok	%	mm	%	ok			ok	
results	*Big Bag23*	*962*	*1,5*	*y*	*10,3*	*15,5*	*561*	*y*	*1999-10-23*	*LEJ*	***yes***	
	Big Bag24	*956*	*1,5*	*y*	*10,6*	*17,1*	*528*	*y*	*1999-10-23*	*LEJ*	***yes***	
	Big Bag25	*1068*	*1,5*	*y*	*10,1*	*17,5*	*523*	*y*	*1999-10-23*	*LEJ*	***yes***	
	Big Bag26	*981*	*1,5*	*y*	*10,3*	*17,1*	*519*	*y*	*1999-10-23*	*LEJ*	***yes***	
	Big Bag27	*927*	*1,5*	*y*	*10,3*	*17,0*	*514*	*y*	*1999-10-23*	*LEJ*	***yes***	
	Big Bag28	*941*	*1,5*	*y*	*10,8*	*17,1*	*541*	*y*	*1999-10-23*	*LEJ*	***yes***	
	Big Bag29	*940*	*1,5*	*y*	*10,3*	*17,5*	*532*	*y*	*1999-10-23*	*LEJ*	***yes***	
	Big Bag30	*1015*	*1,5*	*y*	*10,4*	*17,6*	*529*	*y*	*1999-10-23*	*LEJ*	***yes***	
	Big Bag31	*1237*	*1,5*	*y*	*10,4*	*17,1*	*534*	*y*	*1999-10-23*	*LEJ*	***yes***	
	Big Bag32	*933*	*1,5*	*y*	*10,2*	*17,0*	*536*	*y*	*1999-10-23*	*LEJ*	***yes***	
	Big Bag33	*812*	*1,5*	*y*	*10,2*	*17,5*	*519*	*y*	*1999-10-23*	*LEJ*	***yes***	
	Big Bag34	*988*	*1,5*	*y*	*10,1*	*18,0*	*524*	*y*	*1999-10-23*	*LEJ*	***yes***	
	Big Bag35	*1018*	*1,5*	*y*	*10,0*	*17,5*	*525*	*y*	*1999-10-23*	*LEJ*	***yes***	
	Big Bag36	*1029*	*1,5*	*y*	*10,1*	*17,0*	*516*	*y*	*1999-10-23*	*LEJ*	***yes***	
	Big Bag37	*922*	*1,5*	*y*	*10,3*	*17,5*	*542*	*y*	*1999-10-23*	*LEJ*	***yes***	
	Big Bag38	*972*	*1,5*	*y*	*10,3*	*17,1*	*521*	*y*	*1999-10-23*	*LEJ*	***yes***	
	Big Bag39	*1162*	*1,5*	*y*	*10,3*	*17,5*	*535*	*y*	*1999-10-23*	*LEJ*	***yes***	
	Big Bag40	*1022*	*1,5*	*y*	*10,0*	*18,0*	*518*	*y*	*1999-10-23*	*LEJ*	***yes***	
	Big Bag41	*984*	*1,5*	*y*	*10,5*	*16,6*	*559*	*y*	*1999-10-23*	*LEJ*	***yes***	
	Big Bag42	*886*	*1,5*	*y*	*10,0*	*18,0*	*516*	*y*	*1999-10-23*	*LEJ*	***yes***	
	Big Bag43	*1004*	*1,5*	*y*	*9,9*	*18,0*	*530*	*y*	*1999-10-23*	*LEJ*	***yes***	
	Big Bag44	*1087*	*1,5*	*y*	*10,1*	*18,0*	*520*	*y*	*1999-10-23*	*LEJ*	***yes***	

Appendix 1

Acceptance protocol Date: 2000-11-25 Responsible: LEJ

Blue	data to be introduced	TM	total mass	w	water ratio
Black	data to be calcualted, do not over-write!	S1	test sample 1	Vn	normalised free swelling volume
Green	data to be transferred to delivery protocol	VI	visual inspecion	wL	liquid limit
				GSD	grain size distribution

item	ID, SKB	TM	S1a	VI	w	Vn	wL	GSD	Date	Sign.	Generel	remark
criteria	min	1250	1	y	8	15	500	see gs-dia			yes	
limits	max		1,5		12	25	600	see gs-dia				
unit	-	kg	kg	ok	%	mm	%	ok			ok	
results	*1*	*972*	*2,0*	*y*	*11,1*	*19,2*	*476*	*y*	*2000-11-25*	*LEJ*	***yes***	
	2	*1001*	*2,0*	*y*	*11,1*	*18,7*	*486*	*y*	*2000-11-25*	*LEJ*	***yes***	
	3	*992*	*2,0*	*y*	*10,7*	*18,6*	*481*	*y*	*2000-11-25*	*LEJ*	***yes***	
	4	*975*	*2,0*	*y*	*11,0*	*19,2*	*478*	*y*	*2000-11-25*	*LEJ*	***yes***	
	5	*990*	*2,0*	*y*	*11,0*	*18,7*	*475*	*y*	*2000-11-25*	*LEJ*	***yes***	
	6	*995*	*2,0*	*y*	*11,1*	*18,7*	*468*	*y*	*2000-11-25*	*LEJ*	***yes***	
	7	*1000*	*2,0*	*y*	*11,1*	*17,2*	*488*	*y*	*2000-11-25*	*LEJ*	***yes***	
	8	*990*	*2,0*	*y*	*11,0*	*18,2*	*502*	*y*	*2000-11-25*	*LEJ*	***yes***	
	9	*1055*	*2,0*	*y*	*11,1*	*18,7*	*488*	*y*	*2000-11-25*	*LEJ*	***yes***	
	10	*1005*	*2,0*	*y*	*10,9*	*18,1*	*498*	*y*	*2000-11-25*	*LEJ*	***yes***	
	11	*1002*	*2,0*	*y*	*10,9*	*18,1*	*497*	*y*	*2000-11-25*	*LEJ*	***yes***	
	12	*1002*	*2,0*	*y*	*11,1*	*17,7*	*496*	*y*	*2000-11-25*	*LEJ*	***yes***	
	13	*1000*	*2,0*	*y*	*11,0*	*18,7*	*492*	*y*	*2000-11-25*	*LEJ*	***yes***	
	14	*1004*	*2,0*	*y*	*10,9*	*18,7*	*491*	*y*	*2000-11-25*	*LEJ*	***yes***	
	15	*998*	*2,0*	*y*	*11,1*	*18,7*	*445*	*y*	*2000-11-25*	*LEJ*	***yes***	
	16	*1005*	*2,0*	*y*	*10,9*	*19,1*	*506*	*y*	*2000-11-25*	*LEJ*	***yes***	
	17	*1002*	*2,0*	*y*	*10,9*	*18,1*	*478*	*y*	*2000-11-25*	*LEJ*	***yes***	
	18	*1002*	*2,0*	*y*	*10,8*	*18,6*	*496*	*y*	*2000-11-25*	*LEJ*	***yes***	
	19	*997*	*2,0*	*y*	*11,0*	*18,6*	*495*	*y*	*2000-11-25*	*LEJ*	***yes***	

Appendix 1

Acceptance protocol Date: 2000-11-25 Responsible: LEJ

Blue	data to be introduced	TM	total mass	w	water ratio
Black	data to be calcualted, do not over-write!	S1	test sample 1	Vn	normalised free swelling volume
Green	data to be transferred to delivery protocol	VI	visual inspecion	wL	liquid limit
				GSD	grain size distribution

item	ID, SKB	TM	S1a	VI	w	Vn	wL	GSD	Date	Sign.	Generel	remark
criteria	min	1250	1	y	8	15	500	see gs-dia			yes	
limits	max		1,5		12	25	600	see gs-dia				
unit	-	kg	kg	ok	%	mm	%	ok			ok	
	20	*1004*	*2,0*	*y*	*11,0*	*17,6*	*494*	*y*	*2000-11-25*	*LEJ*	***yes***	
	21	*1145*	*2,0*	*y*	*10,9*	*18,1*	*496*	*y*	*2000-11-25*	*LEJ*	***yes***	
	22	*1002*	*2,0*	*y*	*11,0*	*17,6*	*489*	*y*	*2000-11-25*	*LEJ*	***yes***	
	23	*1045*	*2,0*	*y*	*10,6*	*18,0*	*493*	*y*	*2000-11-25*	*LEJ*	***yes***	
	24	*995*	*2,0*	*y*	*10,8*	*18,6*	*509*	*y*	*2000-11-25*	*LEJ*	***yes***	

Appendix 1

Acceptance protocol		Date:	2000-12-20			Responsible:		LEJ					
Blue	data to be introduced					TM	total mass		w		water ratio		
Black	data to be calcualted, do not over-write!					S1	test sample 1		Vn		normalised free swelling volume		
Green	data to be transferred to delivery protocol					VI	visual inspecion		wL		liquid limit		
									GSD		grain size distribution		
criteria	min	1250	1	y	8	15	500	see gs-dia				yes	
limits	max		1,5		12	25	600	see gs-dia					
item	**ID, SKB**	**TM**	**S1a**	**VI**	**w**	**Vn**	**wL**	**GSD**	**Date**	**Sign.**	**Generel**	**remark**	
unit	-	kg	kg	ok	%	mm	%	ok			ok		
results	*25*	*993*	*2,0*	*y*	*12,6*	*17,4*	*490*	*y*	*2000-12-20*	*LEJ*	***yes***		
	26	*994*	*2,0*	*y*	*12,4*	*16,3*	*498*	*y*	*2000-12-20*	*LEJ*	***yes***		
	27	*1025*	*2,0*	*y*	*12,3*	*17,9*	*505*	*y*	*2000-12-20*	*LEJ*	***yes***		
	28	*998*	*2,0*	*y*	*12,4*	*17,4*	*494*	*y*	*2000-12-20*	*LEJ*	***yes***		
	29	*1005*	*2,0*	*y*	*12,0*	*17,3*	*483*	*y*	*2000-12-20*	*LEJ*	***yes***		
	30	*1003*	*2,0*	*y*	*11,1*	*18,7*	*496*	*y*	*2000-12-20*	*LEJ*	***yes***		
	31	*989*	*2,0*	*y*	*11,0*	*19,2*	*504*	*y*	*2000-12-20*	*LEJ*	***yes***		
	32	*1015*	*2,0*	*y*	*12,1*	*18,3*	*490*	*y*	*2000-12-20*	*LEJ*	***yes***		
	33	*989*	*2,0*	*y*	*10,6*	*19,1*	*497*	*y*	*2000-12-20*	*LEJ*	***yes***		
	34	*1012*	*2,0*	*y*	*10,5*	*19,1*	*500*	*y*	*2000-12-20*	*LEJ*	***yes***		
	35	*1009*	*2,0*	*y*	*10,5*	*18,6*	*495*	*y*	*2000-12-20*	*LEJ*	***yes***		
	36	*1077*	*2,0*	*y*	*10,4*	*19,1*	*498*	*y*	*2000-12-20*	*LEJ*	***yes***		
	37	*1066*	*2,0*	*y*	*10,4*	*18,1*	*503*	*y*	*2000-12-20*	*LEJ*	***yes***		
	38	*981*	*2,0*	*y*	*10,6*	*18,6*	*502*	*y*	*2000-12-20*	*LEJ*	***yes***		
	39	*1037*	*2,0*	*y*	*11,0*	*19,2*	*502*	*y*	*2000-12-20*	*LEJ*	***yes***		
	40	*1014*	*2,0*	*y*	*11,0*	*19,2*	*546*	*y*	*2000-12-20*	*LEJ*	***yes***		
	41	*980*	*2,0*	*y*	*10,9*	*18,1*	*481*	*y*	*2000-12-20*	*LEJ*	***yes***		
	42	*993*	*2,0*	*y*	*11,0*	*18,2*	*482*	*y*	*2000-12-20*	*LEJ*	***yes***		
	43	*1030*	*2,0*	*y*	*11,0*	*17,7*	*477*	*y*	*2000-12-20*	*LEJ*	***yes***		
	44	*1006*	*2,0*	*y*	*10,9*	*18,1*	*471*	*y*	*2000-12-20*	*LEJ*	***yes***		

Appendix 1

Acceptance protocol Date: 2000-12-20 Responsible: LEJ

Blue	data to be introduced	TM	total mass	w	water ratio
Black	data to be calcualted, do not over-write!	S1	test sample 1	Vn	normalised free swelling volume
Green	data to be transferred to delivery protocol	VI	visual inspecion	wL	liquid limit
				GSD	grain size distribution

item	ID, SKB	TM	S1a	VI	w	Vn	wL	GSD	Date	Sign.	Generel	remark
criteria	min	1250	1	y	8	15	500	see gs-dia			yes	
limits	max		1,5		12	25	600	see gs-dia				
unit	-	kg	kg	ok	%	mm	%	ok			ok	
results	*45*	*1138*	*2,0*	*y*	*10,8*	*17,6*	*459*	*y*	*2000-12-20*	*LEJ*	***yes***	
	46	*1015*	*2,0*	*y*	*10,8*	*18,1*	*500*	*y*	*2000-12-20*	*LEJ*	***yes***	
	47	*1020*	*2,0*	*y*	*10,9*	*17,1*	*480*	*y*	*2000-12-20*	*LEJ*	***yes***	
	48	*1013*	*2,0*	*y*	*10,9*	*15,1*	*475*	*y*	*2000-12-20*	*LEJ*	***yes***	

Appendix 1

Acceptance protocol Date: *2001-01-20* Responsible: LEJ

Blue	data to be introduced	TM	total mass	w	water ratio
Black	data to be calcualted, do not over-write!	S1	test sample 1	Vn	normalised free swelling volume
Green	data to be transferred to delivery protocol	VI	visual inspecion	wL	liquid limit
				GSD	grain size distribution

item	ID, SKB	TM	S1a	VI	w	Vn	wL	GSD	Date	Sign.	Generel	remark
criteria	min	1250	1	y	8	15	500	see gs-dia			yes	
limits	max		1,5		12	25	600	see gs-dia				
unit	-	kg	kg	ok	%	mm	%	ok			ok	
results	*49*	*1012*	*2,0*	*y*	*12,5*	*17,9*	*482*	*y*	*2001-01-20*	*LEJ*	***yes***	
	50	*1050*	*2,0*	*y*	*12,4*	*17,4*	*478*	*y*	*2001-01-20*	*LEJ*	***yes***	
	51	*1023*	*2,0*	*y*	*12,9*	*18,0*	*481*	*y*	*2001-01-20*	*LEJ*	***yes***	
	52	*1150*	*2,0*	*y*	*11,7*	*18,3*	*482*	*y*	*2001-01-20*	*LEJ*	***yes***	
	53	*1092*	*2,0*	*y*	*12,6*	*17,9*	*485*	*y*	*2001-01-20*	*LEJ*	***yes***	
	54	*980*	*2,0*	*y*	*11,4*	*16,7*	*475*	*y*	*2001-01-20*	*LEJ*	***yes***	
	55	*1000*	*2,0*	*y*	*12,9*	*18,5*	*483*	*y*	*2001-01-20*	*LEJ*	***yes***	
	56	*1028*	*2,0*	*y*	*12,4*	*17,4*	*478*	*y*	*2001-01-20*	*LEJ*	***yes***	
	57	*998*	*2,0*	*y*	*12,8*	*17,9*	*503*	*y*	*2001-01-20*	*LEJ*	***yes***	
	58	*980*	*2,0*	*y*	*12,2*	*18,4*	*500*	*y*	*2001-01-20*	*LEJ*	***yes***	
	59	*1041*	*2,0*	*y*	*12,7*	*15,9*	*490*	*y*	*2001-01-20*	*LEJ*	***yes***	
	60	*1055*	*2,0*	*y*	*12,6*	*16,4*	*480*	*y*	*2001-01-20*	*LEJ*	***yes***	
	61	*1103*	*2,0*	*y*	*11,1*	*15,2*	*498*	*y*	*2001-01-20*	*LEJ*	***yes***	
	62	*1030*	*2,0*	*y*	*11,2*	*16,2*	*492*	*y*	*2001-01-20*	*LEJ*	***yes***	
	63	*1064*	*2,0*	*y*	*11,4*	*17,2*	*497*	*y*	*2001-01-20*	*LEJ*	***yes***	
	64	*1020*	*2,0*	*y*	*11,3*	*18,7*	*497*	*y*	*2001-01-20*	*LEJ*	***yes***	
	65	*1076*	*2,0*	*y*	*11,4*	*17,7*	*473*	*y*	*2001-01-20*	*LEJ*	***yes***	
	66	*1000*	*2,0*	*y*	*11,3*	*18,7*	*484*	*y*	*2001-01-20*	*LEJ*	***yes***	
	67	*1070*	*2,0*	*y*	*11,4*	*17,7*	*479*	*y*	*2001-01-20*	*LEJ*	***yes***	
	68	*1049*	*2,0*	*y*	*11,7*	*17,0*	*482*	*y*	*2001-01-20*	*LEJ*	***yes***	

Appendix 1

Acceptance protocol   Date: *2001-01-20*   Responsible: LEJ

Blue	data to be introduced	TM	total mass	w	water ratio
Black	data to be calcualted, do not over-write!	S1	test sample 1	Vn	normalised free swelling volume
Green	data to be transferred to delivery protocol	VI	visual inspecion	wL	liquid limit
				GSD	grain size distribution

item	**ID, SKB**	**TM**	**S1a**	**VI**	**w**	**Vn**	**wL**	**GSD**	**Date**	**Sign.**	**Generel**	**remark**
criteria	min	1250	1	y	8	15	500	see gs-dia			yes	
limits	max		1,5		12	25	600	see gs-dia				
unit	-	kg	kg	ok	%	mm	%	ok			ok	
results	*69*	*1085*	*2,0*	*y*	*11,7*	*17,3*	*477*	*y*	*2001-01-20*	*LEJ*	***yes***	
	70	*1043*	*2,0*	*y*	*11,0*	*16,1*	*494*	*y*	*2001-01-20*	*LEJ*	***yes***	
	71	*1007*	*2,0*	*y*	*10,3*	*19,0*	*517*	*y*	*2001-01-20*	*LEJ*	***yes***	
	72	*1080*	*2,0*	*y*	*10,0*	*21,0*	*511*	*y*	*2001-01-20*	*LEJ*	***yes***	

Appendix 1

Acceptance protocol Date: *2001-10-12* Responsible: LEJ

Blue	data to be introduced	TM	total mass	w	water ratio
Black	data to be calcualted, do not over-write!	S1	test sample 1	Vn	normalised free swelling volume
Green	data to be transferred to delivery protocol	VI	visual inspecion	wL	liquid limit
				GSD	grain size distribution

item	ID, SKB	TM	S1a	VI	w	Vn	wL	GSD	Date	Sign.	Generel	remark
criteria	min	1250	1	y	8	15	500	see gs-dia			yes	
limits	max		1,5		12	25	600	see gs-dia				
unit	-	kg	kg	ok	%	mm	%	ok			ok	
results	2	*1013*	*2,0*	*y*	*9,2*	*17,4*	*449*	*y*	*2001-10-12*	*LEJ*	***yes***	*Prototype Section II*
	4	*1141*	*2,0*	*y*	*9,6*	*17,4*	*472*	*y*	*2001-10-12*	*LEJ*	***yes***	*Prototype Section II*
	5	*1013*	*2,0*	*y*	*9,5*	*17,4*	*504*	*y*	*2001-10-12*	*LEJ*	***yes***	*Prototype Section II*
	6	*999*	*2,0*	*y*	*9,0*	*18,3*	*471*	*y*	*2001-10-12*	*LEJ*	***yes***	*Prototype Section II*
	8	*1017*	*2,0*	*y*	*8,8*	*17,8*	*440*	*y*	*2001-10-12*	*LEJ*	***yes***	*Prototype Section II*
	9	*1018*	*2,0*	*y*	*8,8*	*16,8*	*464*	*y*	*2001-10-12*	*LEJ*	***yes***	*Prototype Section II*
	11	*1030*	*2,0*	*y*	*9,0*	*16,8*	*445*	*y*	*2001-10-12*	*LEJ*	***yes***	*Prototype Section II*
	14	*1011*	*2,0*	*y*	*8,9*	*16,3*	*437*	*y*	*2001-10-12*	*LEJ*	***yes***	*Prototype Section II*
	15	*1004*	*2,0*	*y*	*8,8*	*16,3*	*451*	*y*	*2001-10-12*	*LEJ*	***yes***	*Prototype Section II*
	16	*1011*	*2,0*	*y*	*8,8*	*16,8*	*422*	*y*	*2001-10-12*	*LEJ*	***yes***	*Prototype Section II*
	17	*1014*	*2,0*	*y*	*8,7*	*16,3*	*445*	*y*	*2001-10-12*	*LEJ*	***yes***	*Prototype Section II*
	18	*1013*	*2,0*	*y*	*8,8*	*16,3*	*457*	*y*	*2001-10-12*	*LEJ*	***yes***	*Prototype Section II*
	19	*1012*	*2,0*	*y*	*8,9*	*16,3*	*496*	*y*	*2001-10-12*	*LEJ*	***yes***	*Prototype Section II*
	20	*1013*	*2,0*	*y*	*8,8*	*16,3*	*450*	*y*	*2001-10-12*	*LEJ*	***yes***	*Prototype Section II*
	21	*1001*	*2,0*	*y*	*8,6*	*17,8*	*449*	*y*	*2001-10-12*	*LEJ*	***yes***	*Prototype Section II*
	22	*1013*	*2,0*	*y*	*8,8*	*17,8*	*446*	*y*	*2001-10-12*	*LEJ*	***yes***	*Prototype Section II*
	23	*1013*	*2,0*	*y*	*8,8*	*18,3*	*447*	*y*	*2001-10-12*	*LEJ*	***yes***	*Prototype Section II*
	24	*1011*	*2,0*	*y*	*8,8*	*18,8*	*468*	*y*	*2001-10-12*	*LEJ*	***yes***	*Prototype Section II*
	25	*1018*	*2,0*	*y*	*8,7*	*18,3*	*469*	*y*	*2001-10-12*	*LEJ*	***yes***	*Prototype Section II*
	26	*1011*	*2,0*	*y*	*8,7*	*18,3*	*464*	*y*	*2001-10-12*	*LEJ*	***yes***	*Prototype Section II*

Appendix 1

Acceptance protocol Date: *2001-10-12* Responsible: LEJ

Blue	data to be introduced	TM	total mass	w	water ratio
Black	data to be calcualted, do not over-write!	S1	test sample 1	Vn	normalised free swelling volume
Green	data to be transferred to delivery protocol	VI	visual inspecion	wL	liquid limit
				GSD	grain size distribution

item	ID, SKB	TM	S1a	VI	w	Vn	wL	GSD	Date	Sign.	Generel	remark
criteria	min	1250	1	y	8	15	500	see gs-dia			yes	
limits	max		1,5		12	25	600	see gs-dia				
unit	-	kg	kg	ok	%	mm	%	ok			ok	
	27	*1021*	*2,0*	*y*	*8,9*	*18,3*	*463*	*y*	*2001-10-12*	*LEJ*	***yes***	*Prototype Section II*
	28	*997*	*2,0*	*y*	*8,8*	*17,8*	*471*	*y*	*2001-10-12*	*LEJ*	***yes***	*Prototype Section II*
	29	*1013*	*2,0*	*y*	*9,0*	*17,8*	*467*	*y*	*2001-10-12*	*LEJ*	***yes***	*Prototype Section II*
	30	*1013*	*2,0*	*y*	*9,0*	*17,3*	*459*	*y*	*2001-10-12*	*LEJ*	***yes***	*Prototype Section II*
	31	*1006*	*2,0*	*y*	*9,0*	*17,3*	*449*	*y*	*2001-10-12*	*LEJ*	***yes***	*Prototype Section II*
	32	*974*	*2,0*	*y*	*8,9*	*17,3*	*458*	*y*	*2001-10-12*	*LEJ*	***yes***	*Prototype Section II*
	33	*1012*	*2,0*	*y*	*8,8*	*17,3*	*448*	*y*	*2001-10-12*	*LEJ*	***yes***	*Prototype Section II*
	34	*1013*	*2,0*	*y*	*8,7*	*16,8*	*445*	*y*	*2001-10-12*	*LEJ*	***yes***	*Prototype Section II*
	35	*1006*	*2,0*	*y*	*8,8*	*17,8*	*449*	*y*	*2001-10-12*	*LEJ*	***yes***	*Prototype Section II*
	36	*1006*	*2,0*	*y*	*8,7*	*17,3*	*449*	*y*	*2001-10-12*	*LEJ*	***yes***	*Prototype Section II*
	37	*1015*	*2,0*	*y*	*8,7*	*17,8*	*449*	*y*	*2001-10-12*	*LEJ*	***yes***	*Prototype Section II*
	38	*1015*	*2,0*	*y*	*8,6*	*18,3*	*443*	*y*	*2001-10-12*	*LEJ*	***yes***	*Prototype Section II*
	39	*1013*	*2,0*	*y*	*8,8*	*17,8*	*457*	*y*	*2001-10-12*	*LEJ*	***yes***	*Prototype Section II*
	40	*995*	*2,0*	*y*	*8,8*	*17,3*	*458*	*y*	*2001-10-12*	*LEJ*	***yes***	*Prototype Section II*
	41	*1008*	*2,0*	*y*	*9,0*	*17,8*	*463*	*y*	*2001-10-12*	*LEJ*	***yes***	*Prototype Section II*
	42	*978*	*2,0*	*y*	*8,8*	*17,8*	*460*	*y*	*2001-10-12*	*LEJ*	***yes***	*Prototype Section II*
	43	*1009*	*2,0*	*y*	*8,9*	*17,3*	*456*	*y*	*2001-10-12*	*LEJ*	***yes***	*Prototype Section II*
	44	*949*	*2,0*	*y*	*8,9*	*17,3*	*446*	*y*	*2001-10-12*	*LEJ*	***yes***	*Prototype Section II*
	45	*998*	*2,0*	*y*	*9,0*	*17,3*	*474*	*y*	*2001-10-12*	*LEJ*	***yes***	*Prototype Section II*
	46	*1005*	*2,0*	*y*	*9,0*	*17,3*	*450*	*y*	*2001-10-12*	*LEJ*	***yes***	*Prototype Section II*

Appendix 1

Acceptance protocol   Date: *2001-10-12*   Responsible: LEJ

Blue	data to be introduced	TM	total mass	w	water ratio
Black	data to be calcualted, do not over-write!	S1	test sample 1	Vn	normalised free swelling volume
Green	data to be transferred to delivery protocol	VI	visual inspecion	wL	liquid limit
				GSD	grain size distribution

criteria	min	1250	1	y	8	15	500	see gs-dia			yes	
limits	max		1,5		12	25	600	see gs-dia				
item	**ID, SKB**	**TM**	**S1a**	**VI**	**w**	**Vn**	**wL**	**GSD**	**Date**	**Sign.**	**Generel**	**remark**
unit	-	kg	kg	ok	%	mm	%	ok			ok	
	47	*999*	*2,0*	*y*	*9,2*	*17,9*	*471*	*y*	*2001-10-12*	*LEJ*	***yes***	*Prototype Section II*
	48	*1003*	*2,0*	*y*	*9,2*	*16,9*	*455*	*y*	*2001-10-12*	*LEJ*	***yes***	*Prototype Section II*
	49	*1007*	*2,0*	*y*	*9,3*	*16,4*	*470*	*y*	*2001-10-12*	*LEJ*	***yes***	*Prototype Section II*

Appendix 1

Acceptance protocol Date: 2001-04-13 Responsible: LEJ

Blue	data to be introduced	TM	total mass	w	water ratio
Black	data to be calcualted, do not over-write!	S1	test sample 1	Vn	normalised free swelling volume
Green	data to be transferred to delivery protocol	VI	visual inspecion	wL	liquid limit
				GSD	grain size distribution

item	ID, SKB	TM	S1a	VI	w	Vn	wL	GSD	Date	Sign.	Generel	remark
criteria	min	1250	1	y	8	15	500	see gs-dia			yes	
limits	max		1,5		12	25	600	see gs-dia				
unit	-	kg	kg	ok	%	mm	%	ok			ok	
results	*1*		*2,0*		*12,14658*	*17,8415*	*478*		*2001-04-03*	*LEJ*	***yes***	*Pellets Prototype*
	2		*2,0*		*11,89304*	*18,30977*	*496*		*2001-04-03*	*LEJ*	***yes***	*Pellets Prototype*
	3		*2,0*		*11,75766*	*18,28762*	*481*		*2001-04-03*	*LEJ*	***yes***	*Pellets Prototype*
	4		*2,0*		*11,8053*	*18,80362*	*466*		*2001-04-03*	*LEJ*	***yes***	*Pellets Prototype*
	5		*2,0*		*11,76125*	*18,2882*	*479*		*2001-04-03*	*LEJ*	***yes***	*Pellets Prototype*
	6		*2,0*		*11,62222*	*16,74333*	*471*		*2001-04-03*	*LEJ*	***yes***	*Pellets Prototype*
	7		*2,0*		*11,54462*	*17,23871*	*472*		*2001-04-03*	*LEJ*	***yes***	*Pellets Prototype*
	8		*2,0*		*11,72426*	*17,77431*	*470*		*2001-04-03*	*LEJ*	***yes***	*Pellets Prototype*
	9		*2,0*		*11,65054*	*16,24008*	*437*		*2001-04-03*	*LEJ*	***yes***	*Pellets Prototype*
	10		*2,0*		*11,87307*	*17,79799*	*475*		*2001-04-03*	*LEJ*	***yes***	*Pellets Prototype*
	11		*2,0*		*11,83043*	*16,77456*	*473*		*2001-04-04*	*LEJ*	***yes***	*Pellets Prototype*
	12		*2,0*		*11,72737*	*16,75911*	*470*		*2001-04-05*	*LEJ*	***yes***	*Pellets Prototype*
	13		*2,0*		*11,51598*	*17,23429*	*470*		*2001-04-06*	*LEJ*	***yes***	*Pellets Prototype*
	14		*2,0*		*11,64622*	*16,74693*	*476*		*2001-04-07*	*LEJ*	***yes***	*Pellets Prototype*
	15		*2,0*		*12,01853*	*18,83948*	*482*		*2001-04-08*	*LEJ*	***yes***	*Pellets Prototype*
	16		*2,0*		*12,18929*	*19,8881*	*486*		*2001-04-09*	*LEJ*	***yes***	*Pellets Prototype*
	17		*2,0*		*11,93675*	*18,31692*	*487*		*2001-04-10*	*LEJ*	***yes***	*Pellets Prototype*
	18		*2,0*		*12,03764*	*18,84269*	*471*		*2001-04-11*	*LEJ*	***yes***	*Pellets Prototype*
	19		*2,0*		*11,95633*	*17,30234*	*480*		*2001-04-12*	*LEJ*	***yes***	*Pellets Prototype*
	20		*2,0*		*11,96396*	*17,30352*	*479*		*2001-04-13*	*LEJ*	***yes***	*Pellets Prototype*

Appendix II

Date of compaction block

No. at compaction	Date of compaction	No. at installation	Water ratio	Density (kg/m³)	Degree of saturation	Void ratio	Density at saturation (kg/m³)	Weight (kg)	Average height (mm)	Notes
CRTR3	1999-11-02	2-R1*	0,169	2085,8	0,842	0,558	2142,5	1276	506,9	Compacted for CRT**
CRTR4	1999-11-02	2-R2	0,172	2102,9	0,870	0,549	2149,0	1278	503,6	Compacted for CRT
CRTR5	1999-11-03	2-R3	0,171	2093,9	0,858	0,555	2144,8	1298	513,0	Compacted for CRT
CRTR6	1999-11-03	2-R4	0,172	2091,5	0,856	0,557	2142,9	1274	504,5	Compacted for CRT
CRTR9	1999-11-05	2-R5	0,174	2095,9	0,868	0,557	2143,0	1296	512,3	Compacted for CRT
CRTR10	1999-11-05	2-R6	0,172	2105,6	0,874	0,548	2150,1	1290	508,0	Compacted for CRT
CRTR18	1999-11-11	2-R7	0,172	2109,3	0,879	0,545	2151,9	1304	512,0	Compacted for CRT
CRTR19	1999-11-12	2-R8	0,167	2104,1	0,857	0,542	2154,3	1284	505,0	Compacted for CRT
CRTR21	2000-01-10	2-R9	0,172	2095,5	0,863	0,555	2144,5	1294	511,4	Compacted for CRT
CRTR22	2000-01-11	4-R1	0,168	2088,7	0,843	0,555	2144,7	1276	505,0	Compacted for CRT
CRTC3	2000-01-13	2-C2	0,173	2005,2	0,767	0,626	2094,9	2116	499,0	Compacted for CRT
CRTC5	2000-01-14	2-C3	0,177	2008,0	0,780	0,629	2092,8	2096	493,5	Compacted for CRT
CRTC7	2000-01-17	2-C4	0,170	1995,7	0,751	0,630	2092,0	2122	502,7	Compacted for CRT
CRTC8	2000-01-18	4-C2	0,171	1998,7	0,756	0,628	2093,0	2110	499,1	Compacted for CRT
PRR1	2000-12-04	2-R10	0,174	2095,2	0,867	0,557	2142,9	1264	500,4	
PRR2	2000-12-04	3-R5	0,170	2096,3	0,857	0,552	2147,1	1266	500,5	
PRR3	2000-12-05	4-R10	0,169	2110,0	0,870	0,540	2155,5	1264	496,2	
PRR4	2000-12-05	3-R10	0,176	2099,5	0,877	0,557	2143,4	1274	503,7	
PRR5	2000-12-06	1-R10	0,172	2104,8	0,873	0,548	2149,7	1266	498,2	
PRR6	2000-12-06	1-R5	0,174	2109,4	0,883	0,547	2150,7	1266	497,3	
PRR7	2000-12-07	3-R2	0,172	2108,0	0,877	0,546	2151,4	1266	498,3	
PRR8	2000-12-07	3-R1	0,175	2108,7	0,885	0,549	2149,4	1280	503,6	
PRR9	2000-12-08	1-R9	0,173	2097,4	0,866	0,554	2145,3	1276	504,2	
PRR10	2000-12-08	4-R6	0,163	2116,1	0,860	0,528	2164,6	1266	495,3	
PRR11	2000-12-11	1-R4	0,168	2105,9	0,863	0,542	2154,2	1284	504,8	
PRR12	2000-12-11	1-R2	0,174	2095,2	0,867	0,557	2142,9	1290	510,4	
PRR13	2000-12-12		0,173	2106,7	0,878	0,548	2150,1	1274	501,5	For Section II***)
PRR14	2000-12-12	3-R8	0,174	2093,0	0,866	0,560	2141,0	1270	502,7	
PRR15	2000-12-13	1-R1	0,175	2107,2	0,885	0,550	2148,2	1266	498,0	
PRR16	2000-12-13	1-R6	0,175	2087,4	0,862	0,565	2137,1	1288	506,6	

*) Deposition hole 2 Ring No 2 **) The Canisiter Retrival Test ***) Possition in the dep. hole not decided yet

No. at compaction	Date of compaction	No. at installation	Water ratio	Density (kg/m³)	Degree of saturation	Void ratio	Density at saturation (kg/m³)	Weight (kg)	Average height (mm)	Notes
PRR17	2000-12-14	1-R7	0,173	2108,7	0,881	0,547	2150,7	1276	501,5	
PRR18	2000-12-14	1-R8	0,173	2106,6	0,879	0,549	2149,5	1268	498,8	
PRR19	2000-12-15	1-R3	0,172	2109,3	0,877	0,544	2152,6	1270	499,2	
PRR20	2001-01-31	3-R7	0,167	2104,5	0,858	0,542	2154,4	1282	504,4	
PRR21	2001-01-31	3-R4	0,174	2109,5	0,884	0,547	2150,7	1286	505,5	
PRR22	2001-02-01	3-R3	0,168	2109,8	0,866	0,539	2156,6	1278	501,5	
PRR23	2001-02-01	4-R5	0,170	2108,2	0,871	0,543	2153,6	1290	507,3	
PRR24	2001-02-02	4-R3	0,168	2102,7	0,859	0,544	2152,5	1292	508,4	
PRR25	2001-02-02	4-R8	0,171	2105,8	0,870	0,545	2151,8	1284	505,2	
PRR26	2001-02-05	4-R9	0,166	2117,0	0,867	0,530	2163,0	1284	502,8	
PRR27	2001-02-05	3-R6	0,172	2100,5	0,868	0,551	2147,4	1284	506,0	
PRR28	2001-02-06	4-R4	0,168	2115,0	0,872	0,535	2159,7	1284	502,8	
PRR29	2001-02-06	3-R9	0,170	2106,6	0,868	0,544	2153,0	1278	502,4	
PRR30	2001-02-07	4-R7	0,169	2107,8	0,867	0,542	2154,4	1292	507,6	
PRR31	2001-02-07		0,168	2114,0	0,872	0,536	2158,6	1304	510,9	For Section II
PRR32	2001-02-08	4-R2	0,168	2104,5	0,859	0,542	2154,2	1284	505,0	
PRR33	2001-11-05	6-R1	0,172	2067,6	0,832	0,576	2129,1	1264	507,2	
PRR34	2001-11-05		0,171	2067,1	0,828	0,575	2130,1	1264	508,0	For Section II
PRR35	2001-11-06		0,176	2073,2	0,847	0,576	2129,1	1260	504,0	For Section II
PRR36	2001-11-06	6-R5	0,175	2070,0	0,841	0,577	2128,4	1258	504,2	
PRR37	2001-11-07	5-R2	0,174	2075,4	0,844	0,572	2132,1	1266	506,2	
PRR38	2001-11-07	6-R8	0,173	2072,1	0,838	0,574	2131,0	1272	509,4	
PRR39	2001-11-08	5-R8	0,172	2073,9	0,836	0,571	2133,4	1280	512,3	
PRR40	2001-11-08		0,169	2072,9	0,829	0,568	2135,0	1278	511,9	For Section II
PRR41	2001-11-09	5-R5	0,174	2072,9	0,842	0,574	2130,6	1258	504,0	
PRR42	2001-11-09		0,172	2078,2	0,844	0,568	2134,9	1254	500,9	For Section II
PRR43	2001-11-12		0,174	2054,9	0,822	0,588	2120,9	1256	507,1	For Section II
PRR44	2001-11-12	6-R2	0,172	2081,4	0,846	0,566	2137,0	1276	509,2	
PRR45	2001-11-13	6-R9	0,172	2084,7	0,849	0,563	2139,0	1270	505,7	
PRR46	2001-11-13	6-R6	0,172	2077,0	0,842	0,569	2134,3	1256	501,8	

No. at compaction	Date of compaction	No. at installation	Water ratio	Density (kg/m^3)	Degree of saturation	Void ratio	Density at saturation (kg/m^3)	Weight (kg)	Average height (mm)	Notes
PRR47	2001-11-14		0,171	2073,0	0,833	0,570	2133,5	1262	505,3	For Section II
PRR48	2001-11-14	6-R10	0,171	2070,4	0,832	0,573	2131,7	1274	510,8	
PRR49	2001-11-15	5-R10	0,171	2072,2	0,832	0,571	2133,2	1256	503,2	
PRR50	2001-11-15		0,170	2070,4	0,829	0,572	2132,6	1248	500,4	For Section II
PRR51	2001-11-16		0,172	2065,6	0,829	0,578	2128,3	1258	505,6	For Section II
PRR52	2001-11-16		0,171	2072,3	0,833	0,571	2132,8	1264	506,6	For Section II
PRR53	2001-12-06		0,173	2080,9	0,847	0,567	2136,3	1246	497,2	For Section II
PRR54	2001-12-06		0,172	2072,5	0,836	0,572	2132,2	1278	512,1	For Section II
PRC1	2001-02-09	3-C1	0,174	2030,5	0,795	0,607	2107,8	2116	493,2	
PRC2	2001-02-09	1-C4	0,173	2024,5	0,788	0,611	2105,1	2128	497,5	
PRC3	2001-02-09	3-C3	0,174	2030,1	0,796	0,608	2107,2	2146	500,4	
PRC4	2001-02-12	1-C2	0,178	2036,7	0,815	0,608	2106,7	2164	503,1	
PRC5	2001-02-12	3-C4	0,175	2025,1	0,793	0,613	2103,7	2130	498,1	
PRC6	2001-02-13	1-C3	0,179	2033,3	0,813	0,612	2104,4	2166	504,2	
PRC7	2001-02-13	4-C1	0,179	2038,0	0,819	0,609	2106,5	2144	498,3	
PRC8	2001-02-14	1-C1	0,182	2031,9	0,819	0,617	2101,0	2146	500,0	
PRC9	2001-02-14	2-C1	0,179	2040,1	0,820	0,606	2108,1	2154	499,9	
PRC10	2001-02-14	3-C2	0,180	2035,2	0,817	0,612	2104,5	2158	501,9	
PRC11	2001-02-15		0,177	2040,2	0,815	0,604	2109,8	2148	498,4	For Section II
PRC12	2001-02-15	4-C4	0,178	2038,6	0,815	0,606	2108,4	2174	505,1	
PRC13	2001-02-16	4-C3	0,181	2030,5	0,817	0,618	2100,4	2140	498,8	
PRC14	2001-02-16		0,180	2034,6	0,818	0,613	2103,7	2150	500,6	For Section II
PRC15	2001-12-03	6-C3	0,170	2000,2	0,755	0,626	2094,4	2110	499,6	
PRC16	2001-12-03	6-C4	0,174	2005,2	0,770	0,627	2093,9	2136	504,9	
PRC17	2001-12-04		0,175	2005,7	0,773	0,628	2093,3	2070	488,6	For Section II
PRC18	2001-12-04	6-C1	0,173	2004,1	0,766	0,627	2094,3	2128	502,9	
PRC19	2001-12-04	5-C1	0,172	2003,4	0,764	0,627	2094,2	2102	496,9	
PRC20	2001-12-05	5-C4	0,173	2002,4	0,766	0,629	2092,7	2110	499,1	
PRC21	2001-12-05		0,173	2003,2	0,765	0,627	2093,7	2106	497,9	For Section II
PRC22	2001-12-05	5-C3	0,173	2003,9	0,767	0,627	2093,8	2120	501,1	