14.3 Pumping Test Report for Lots 2 and 4

REPORT FOR PUMPING TEST. (LOT NO. 2 AND LOT NO. 4) GOVERNORATES SANA'A – TAIZ

RURAL WATER SUPPLY FOR COMPONET OF THE STUDY FOR WATER RESOURCES MANAGEMENT AND RURAL WATER SUPPLY IMPROVEMENT IN THE REPUBLIC OF YEMEN

ABDULHALEG M. ALGHOLI



SUBMITTED BY ALI AL-GUNAID

SEPTEMBER 2006

14-224

PUMBING TEST REPORT SHEET

GOVERNORATES OF

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Jarban S-02 New projected deep well 15 34 42.2 44 0.0 11.1 2.842 2005 450 35.31 Alesh S-05 Existing projected deep well 15 01 2.842 48 03 01.1 2.842 49 03 11.1 2.845 1933 300 148.08 Al Lejarm S-05 Existing projected deep well 15 10 41 41 23 2.345 2005 310 148.08 Ball Al Hadrami S-07 New projected deep well 15 10 41 41 23 42 2336 2005 310 143.14 Ruhm S-010 Existing projected deep well 15 10 14 14 14 23 2005 310 143.14 Ruhm S-102 Existing projected deep well 15 11 44 12 24 25 2003 310 134.14 Al Hesn-Al Abyad S-111 New projected	Samta Hamidan So 2 Jachen Jachen So 2 Jachen So 2 Jachen Jachen Jachen So 2 Jachen Jache	Governorate	District	Site Code	Site Namo	Code Code	Target Water Source	Lalih	Latitude N	Fong	Longilude E	Altitude (m)	Const, Year	Depth.	SWL (G.Lm)	Remarks
Santa's Hamden 5-02 Jarban S-02 New projected deep weil 15 N N 2 N<	Same* Hamdan So 02 Jarban S-02 New projected deep well 15 N 4 13 12 2006 450 345.31 Baid Al Rous S-05 Attein S-05 Existing projected deep well 15 14 41 13 12 2006 450 34.31 Sand Al Rous S-05 Attein S-05 Faiting projected deep well 15 14 41 41 2.355 2005 410 131.2 2006 410 132.33 200 141.0 Bany Bankord S-10 Ruhm S-10 Ruhm S-10 Ruhm 14 14 14 14 14 14 14 131.2 2006 410 131.2 Bany Bankord S-10 Ruhm S-10 Ruhm S-10 Ruhm 14 14 14 14 14 14 14 14 14 14 14 14 14 14 14 14 14 16						I	- •		•	"					
Bellad Al Rous S-05 Risting projected deep well 15 04 312 2.006 1966 300 21257 Samina K Bany Bailooi S-06 Al Lojian S-06 Existing projected deep well 15 14 13 312 2.006 1966 300 14103 Samina K Bany Bailooi S-07 Ruhm S-05 Existing projected deep well 15 14 14 13 2.31 2005 310 191.63 Samina K Bany Bailooi S-07 Ruhm S-05 Existing projected deep well 15 14 14 14 14 12 2.33 200 190 13.1 Al Hean S-11 Rusing projected deep well 15 15 16 01 13 14 </th <th>Bellad Al Rous S-05 Ateath S-05 Existing projected deep well 15 04 71 32.7 2.006 198 30.0 1 Samhan X S-07 Balt Al Hadrami S-06 Existing projected deep well 15 14 41 12.35 2.373 2005 410 1 Samhan X S-07 Banty Bankou S-08 Ruhm S-06 Existing projected deep well 15 14 41 73.6 2.373 2005 410 17 Bany Bankou S-08 Ruhm S-017 Existing projected deep well 15 10 41 41 2.362 2003 410 17 Al Hesn S-11 Zwwarg S-017 Existing projected deep well 15 10 41 2.332 2003 410 17 17 19 230 240 130 16 16 131 13 13 200 410 17 14 12 41 213 200 <</th> <th>Sana'a</th> <th>Hamdan</th> <th>S-02</th> <th></th> <th>S-02</th> <th>New projected deep well</th> <th></th> <th>34 49.2</th> <th></th> <th></th> <th>2,642</th> <th>2005</th> <th>450</th> <th>345.31</th> <th>Constanst discharge & recovery test only</th>	Bellad Al Rous S-05 Ateath S-05 Existing projected deep well 15 04 71 32.7 2.006 198 30.0 1 Samhan X S-07 Balt Al Hadrami S-06 Existing projected deep well 15 14 41 12.35 2.373 2005 410 1 Samhan X S-07 Banty Bankou S-08 Ruhm S-06 Existing projected deep well 15 14 41 73.6 2.373 2005 410 17 Bany Bankou S-08 Ruhm S-017 Existing projected deep well 15 10 41 41 2.362 2003 410 17 Al Hesn S-11 Zwwarg S-017 Existing projected deep well 15 10 41 2.332 2003 410 17 17 19 230 240 130 16 16 131 13 13 200 410 17 14 12 41 213 200 <	Sana'a	Hamdan	S-02		S-02	New projected deep well		34 49.2			2,642	2005	450	345.31	Constanst discharge & recovery test only
Santan & Bany Balnot S.06 Al Lejarm S-06 Existing projected deep well 15 16 17 2.5 2.73 2005 140 18 16 17 2.5 2.73 2005 140 18 13	Sandari & Bany Balliool S.06 Al Lelarm S-06 Exating projected deep well 15 16 41 21 32.7 2,435 1933 300 410 11 215 2,436 1931 2,005 410 11 215 2,745 1050 410 11 215 2,745 2050 410 11 215 2,745 2,935 2003 470 11 217 2,755 2,737 2005 430 11 217 2,755 2,731 2,935 430 310 11 2,755 2,733 2,905 430 431 2,733 2,836 430 41 2,71 2,836 430 44 2,743 2,305 350 350 350 141<		Belad Al Rous	S-05	Afesh	S-05	Existing projected deep well		04 23.5	<u> </u>	13 31.2		1996	ğ	212.97	
Bany Bahlook 5-07 Bail Al Hadrami S-07 New projected deep well 15 14 44 17 23.5 2.37.4 2005 410 193.22 Au Hesrn S-08 Ruhm S-09 New projected deep well 15 11 04.1 41 2 15 2.35 2.03 470 191.85 Au Hesrn S-10 Tawa'er S-10/1 Existing projected deep well 15 0 111.4 2 15 2 2 2 2 2 2 141.4 14.1 14 2 14.2 2 14.2 14.1	Bany Bahloot 5-07 Beal / Hadrami S-07 New projected deep well 15 14 44 17 23.5 2.3.74 2.005 410 Al Hesin S-09 Ruhm S-09 New projected deep well 15 01 14 14 14 14 24 28 2.03 470 Al Hesin S-10 Terwaiar S-10X1 Exsting projected deep well 15 0 13.1 44 21 24 2.30 299 200 370 Al Hesin S-11 New projected deep well 15 0 13.3 44 21 2.30 1994 280 300 Jehane S-14 Risting projected deep well 15 0 13.3 44 21 12.9 2.005 300		e Print Prin	S-06		S-06	Existing projected deep well		16 56.6		21 38.7		_	300	148.09	
	S-06 Ruhm S-08 New projected deep well 15 11 04.1 44 14 34.0 2.395 2003 470 AI Hestn S-10 Tewelar S-101 Existing projected deep well 15 01 18 14 2 18 2 230 1994 280 AI Hestn S-11 Al Hestn-A Abyad S-111/1 New projected deep well 15 01 13 47 29 2.30 190 130 Jehana S-13 Anadh S-11/1 New projected deep well 15 10 17 21 200 330 130 Jehana S-13 Anadh S-14 Existing projected deep well 15 14 27 49 2.30 180 130 126 100 316 140 127 117 1180 126 126 126 205 300 130 126 126 126 126 126 126 126 126 126 126 <td></td> <td>Bany Bahlool</td> <td>S-07</td> <td>Bait Al Hadrami</td> <td>S-07</td> <td>New projected deep well</td> <td></td> <td>14 44.0</td> <td></td> <td>17 23.6</td> <td></td> <td><u> </u></td> <td>410</td> <td>193.22</td> <td></td>		Bany Bahlool	S-07	Bait Al Hadrami	S-07	New projected deep well		14 44.0		17 23.6		<u> </u>	410	193.22	
At Hearn 5-10 Tawa'ar S-10/1 Existing projected deep well 15 03 14,1 25 12,0 134,74 At Hearn 5-11 At Hearn-At Abyad 5-11/1 New projected deep well 15 01 14 2 14,4 2 14,4 2 200 310 14,4/7 Behana 5-11 At Hearn-At Abyad 5-11/1 New projected deep well 15 11 33 4 27 49 2.300 130 14,4/7 Behana 5-12 Mandah 5-11 New projected deep well 15 01 41 27 49 2.300 130 137.17 Mehna 5-14 At String projected deep well 15 31 44 27 41 217 147.74 Mewha 5-14 At String projected deep well 13 32 44 217 145 73 147.75 Mewha 5-10 At Mewha 5-10 33 32 44	At Hesn S-10 Texetar S-10/14 Existing projected deep well 15 03 14 22 220 1994 280 Hesn S-11 At Hesn-At Abyad S-10/2 Existing projected deep well 15 01 14 25 16.2 2.230 1994 280 Hehana S-11 At Hesn-At Abyad S-11/11 New projected deep well 15 11 33 44 27 49.2 2.300 1900 130 Hehana S-12 Mandah S-11 New projected deep well 15 11 44 27 44 2.10 2.000 330 Mehm S-14 Katsing projected deep well 15 14 21 44 21 41 2117 1985 165 2005 350 Mehm S-14 Mandyten T-01 New projected deep well 15 21 22 41 21 22 21 22 23 20 23 20 23			S-09		S-09	New projected deep well		11 04.1		14 34.0			470	191.85	
	Image: Mark Series S-10/2 Existing projected deep well 15 10 13 3 41 28 54.4 2.255 2004 310 Jehana S-11 Al Hesn-AI Abyad S-11/1 New projected deep well 15 11 3.3 44 27 49.8 2.310 2005 350 Nehm S-14 Al Hesn-AI Abyad S-11/1 New projected deep well 15 16 17 3.3 44 27 44.9 2.300 1990 180 Nehm S-14 Al Machen T-01 New projected deep well 15 30 46 4 27 44 2.315 2005 350 Nehm S-14 Al Machen T-01 Nuw projected deep well 13 33 25 41 21 135 201 136 201 231 231 230 136 230 136 230 136 130 231 231 231 231 231 231		A Hesn	S-10	Tawa'ar	S-10/1	Existing projected deep well		03 19.1		29 18.2			280	134.78	
Behana S-11 New projected deep well 15 11 33.3 44 27 49.2 2.310 2.005 350 152.82 Jehana S-12 New projected deep well 15 11 43.1 44 27 44.9 2.300 1800 180 S-12 Nehm S-12 New projected deep well 15 94 27 44 27 44 27 44 27 45 73 55 57.78 Nehm S-14 Alchail S-12 New projected deep well 15 39 46.4 42 21 145 73 50 57.78 Nehm S-14 Alchail S-14 Existing projected deep well 13 23 56 129 23 50 177 185 139.17 T-02 Bari Al Nuror T-02 Bir 1 Existing projected deep well 13 23 56 1,27 105 205 107 17.62 17.72 <	Jehana S-11 Al Hesn-AI Abyad S-11/1 New projected deep well 15 11 33.3 44 27 49.8 2,310 2005 350 Jehana S-12 Mahdah S-14/2 Existing projected deep well 15 11 43.1 44 27 44.9 2,310 2005 350 Nehm S-14 Altabrian S-14 Existing projected deep well 15 0 66.7 44 27 44.9 2,315 2005 350 Nehm S-14 Alking projected deep well 15 0 66.7 44 29 21.4 21.17 1995 145 Nehm S-14 Nuevyeeb T-01 New projected deep well 13 22 14 21 12.91 2005 300 Mawiyah T-022 Bari Al Surcor T-0214 Bir 1 Alwopiocted deep well 13 22 13 22 13 22 14 21 22 12 12 13			;		S-10/2	Existing projected deep well	ļ .	00 13.5	1	28 54.4	ł		310	144.74	
Jehana 5-14/2 Existing projected deep well 15 11 4.1 2.7 44.9 2.300 180 160 Nehm 5-12 Nahdah 5-12 Naw projected deep well 15 08 06.7 44.2 2.315 2005 350 57.78 Nehm 5-14 Al Ghali 5-14 Existing projected deep well 15 38 46.4 42 29 17 1985 73.06 73.06 Nehm 5-14 Al Maryteeb T-01 New projected deep well 15 38 46.4 42 29 17 1982 200 139.16 Mawiyah T-01 Al Maryteeb T-01 New projected deep well 13 22 51 41 20 201 2316 117.62 Mawiyah T-022 Bir 3 Existing projected deep well 13 22 55.6 1.209 2001 2316 117.62 Al Maraler T-03 Sheb Humran 13 23	Jehana S-11/2 S-41/2 Existing projected deep well 15 11 41 27 44 2 300 1800 180 170 844 42 21 42 21 180 180 180 180 180 180 180 180 180 180 180 180 180 180 170 180 170 180 170 180 180 130 23 25 43 25 120 120 230 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200 200			5.1	Al Hesn-Al Abuad	S-11/1	New projected deep well		11 33.0					350	152.82	
S-12 Mandah S-12 Naw projected deep well 15 09 06.7 41 28 16.0 2315 2005 350 57.78 Taiz S-14 Aldhali S-14 Existing projected deep well 15 38 46.4 44 29 21.4 2117 1985 73.26 Taiz T-01 Al wayteeb T-01 New projected deep well 13 39 32.5 41 13 12.6 12.91 2005 300 139.17 Taiz T-02 Bani Al Surcor T-01 New projected deep well 13 22 51.6 43 56 20.7 12.71 1982 200 134.92 Al Ma'aler T-02 Bani Al Surcor T-02/4 Bir A New projected deep well 13 23 52.6 43 56 20.7 12.71 134.92 201 134.92 Al Ma'aler T-03 Bir A New projected deep well 13 23 52.6 43 0 10	Faiz S-12 Mandah S-12 New fragecied deep well 15 09 06.7 44 2315 2005 350 350 Taiz S-14 Aldhali S-14 Existing projected deep well 15 38 46.4 47 29 21.4 2.117 1985 146 Taiz Toil Almayteb Toil Almayteb Toil New projected deep well 13 33 35.6 43 13 126 1291 2005 300 Mawyach Tool Almayteeb Tool New projected deep well 13 23 55.6 43 13 126 1291 2005 230 250 400 271 1326 1992 2001 251 257 2005 300 250 400 271 251 2005 2005 250 400 271 272 2005 400 272 2005 400 272 2102 400 1308 252 1257 </td <td>-</td> <td>Jehana</td> <td>;</td> <td></td> <td>S-44/2</td> <td>Existing projected deep w</td> <td>15</td> <td>11 43.1</td> <td><u> </u></td> <td>27 44.9</td> <td>1</td> <td><u></u></td> <td>180</td> <td></td> <td>Canceled (test equipments can not be setted)</td>	-	Jehana	;		S-44/2	Existing projected deep w	15	11 43.1	<u> </u>	27 44.9	1	<u></u>	180		Canceled (test equipments can not be setted)
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T-03 Sheb Humran T-03/1 Al Jah (1) New projected deep well 13 20 50.1 44 02 55.2 1,257 2005 400 22.22 T-04 Yatoq Bani Hamad T-03/4 Al Meashaar(4) Existing proj.deep well 13 23 54.8 44 01 07.0 1,366 1998 260 24.19 T-04 Yatoq Bani Hamad T-04 Existing projected deep well 13 18 46.5 44 01 07.0 1,366 129.8 260 24.19 en T-05 Maidata Alhomary(1) Existing proj.deep well 13 13 34.5 44 02 17.8 1,307 1985 120 82.0 Rep f T-06 Wadi Masan (3) Existing proj.deep well 13 12 44.0 02 17.8 1,307 160 27.0 82.0 Rep f T-06 Ai Adai Masan (3) Existing proj.deep well 13 12 44.0 02 17.6 17.0 17.0 17.0 <td>T-03 Sheb Humran T-03/1 Al Jah (1) New projected deep well 13 20 50.1 44 02 55.2 1,257 2005 400 et T-04 Yatoq Bani Hamad T-03/4 Al Meashaar(4) Existing proj.deep well 13 23 54.8 44 01 07.0 1,366 1998 260 et T-04 Existing projected deep well 13 18 46.5 44 01 07.0 1,366 1998 260 valen T-05 Handata Alhomary(1) Existing proj.deep well 13 14 02 17.8 1,381 1982 220 valen T-05 Wadi Masan (3) Existing proj.deep well 13 12 44 02 17.8 1,307 1985 120 ah T-06 Nadi Masan (3) Existing proj.deep well 13 12 44 02 17.8 1,307 1985 160 ah T-06 Nadi Masan (3) Existing proj.deep well 13 12 44 02 1</td> <td></td> <td>Ai Ma'afer</td> <td></td> <td></td> <td>T-02/4</td> <td>Bir 4 New projected deep well</td> <td>13</td> <td></td> <td>i T</td> <td>58 24.2</td> <td>[</td> <td><u> </u></td> <td>ļ</td> <td>134.92</td> <td></td>	T-03 Sheb Humran T-03/1 Al Jah (1) New projected deep well 13 20 50.1 44 02 55.2 1,257 2005 400 et T-04 Yatoq Bani Hamad T-03/4 Al Meashaar(4) Existing proj.deep well 13 23 54.8 44 01 07.0 1,366 1998 260 et T-04 Existing projected deep well 13 18 46.5 44 01 07.0 1,366 1998 260 valen T-05 Handata Alhomary(1) Existing proj.deep well 13 14 02 17.8 1,381 1982 220 valen T-05 Wadi Masan (3) Existing proj.deep well 13 12 44 02 17.8 1,307 1985 120 ah T-06 Nadi Masan (3) Existing proj.deep well 13 12 44 02 17.8 1,307 1985 160 ah T-06 Nadi Masan (3) Existing proj.deep well 13 12 44 02 1		Ai Ma'afer			T-02/4	Bir 4 New projected deep well	13		i T	58 24.2	[<u> </u>	ļ	134.92	
T-04 T-03/4 Al Meashaar(4) Existing proj.deep well 13 23 54.8 44 01 07.0 1,366 1998 260 24.19 1 T-04 Yatoq Bani Hamad T-04 Existing projected deep well 13 18 46.5 44 05 46.8 1,381 1982 220 124.10 1 en T-05 Al Azaez T-05/1 Marda'a Alhomary(1) Existing proj.deep well 13 13 34.5 44 02 17.8 1307 1985 120 8.20 Rep en T-05 Al Azaez T-06/13 Wadi Masan (3) Existing proj.deep well 13 12 44 02 17.6 1307 160 Can 1<0	ef T-04 AI Meashaar(4) Existing proj.deep well 13 23 54.8 44 01 07.0 1,366 1998 260 ef T-04 Yatoq Bani Hamad T-04 Existing projected deep well 13 13 14 05 46.8 1,381 1982 220 yaten T-05 AI Azaez T-05/1 Marda'a Alhomary(1) Existing proj.deep well 13 13 34.5 44 02 17.8 1305 120 yaten T-05 AI Azaez T-06/13 Wadi Masan (3) Existing proj.deep well 13 12 44.0 02 17.8 1,377 1967 160 ah T-06 New projected deep well 13 12 44.0 44 02 13667 160 ah T-06 New projected deep well 13 12 44.0 45 03.9 539 2004 200			T-03		T-03/1	Al Jah (1) New projected	13							22.22	
T-04 T-04 Existing projected deep well 13 18 46.5 44 05 46.8 7,381 1982 220 124.10 en T-05 T-05/1 Mardata Alhomary(1) Existing proj deep well 13 13 34.5 44 02 17.8 1,377 1985 120 8.20 en T-05 A Azaez T-05/1 Mardata Alhomary(1) Existing proj deep well 13 13 34.5 44 02 17.8 1,305 160 8.20 T-05 A Existing proj deep well 13 12 44.0 44 02 140 460	et T-04 Yafoq Bani Hamad T-04 Existing projected deep well 13 18 46.5 44 05 46.8 1,381 1982 220 valen T-05 Al Azaez T-05/1 Marda'a Alhomary(1) Existing proj deep well 13 13 34.5 44 02 17.8 1,377 1985 120 valen T-05 Wadd Masan (3) Existing proj deep well 13 12 44.0 02 17.8 1,377 1985 150 ah T-06 New projected deep well 13 12 44.0 44 02 38.0 1,465 160 ah T-06 New projected deep well 13 06 21.0 43 45 03.9 539 2004 200					T-03/4	Al Meashaar(4) Existing proj.deep well	13	23 54.1	L	01 02.0	1			24.19	
T-05 AI Azaez T-05/1 Mardata Alhomary(1) Existing proj. deep well 13 13 14 02 17 1985 120 8.20 T-06 AI Khunha T-06 New projected deep well 13 12 44.0 44 02 1365 160 T-06 AI Khunha T-06 New projected deep well 13 05 21.0 43 02 38.0 1,468 19967 160	value T-05 Al Azaez T-05/1 Mardata Alhomary(1) Existing proj. deep well 13 13 14.5 44 02 17.8 1.377 1985 120 ah T-06 Al Khunha T-06 New projected deep well 13 12 44.0 44 02 38.0 1.468 19967 160 ah T-06 New projected deep well 13 06 21.0 43 45 03.9 539 2004 200 160		Al Mawaset	T-04	Yafoq Bani Hamad	T-04	Existing projected deep well	13			05 46.8		1982		124.10	
T-06 Al Khunha T-06 New projected deep well 13 12 44.0 44 02 38.0 1.468 19967 160 T-06 Al Khunha T-06 New projected deep well 13 06 21.0 43 45 03.9 539 2004 200	T-06 AI Khunha T-06/3 Wadi Masan (3) Existing proj. deep well 13 12 44.0 44 02 38.0 1.468 19967 160 ah T-06 AI Khunha T-06 New projected deep well 13 06 21.0 43 45 03.9 2004 200 200 2004 200 2004 200 2004 200 2004 200 2004 200 <		Al Shamayaten		Al Azaez	T-05/1	Marda'a Alhomary(1) Existing proj.deep well	13	13 34.		02 17.8				8.20	Replace T-05/3
T-06 Al Khunha T-06 New projected deep well 13 06 21.0 43 45 03.9 539 2004 200	ah 17-06 Ai Khunha T-06 New projected deep well 13 06 21.0 43 45 03.9 539 2004 200					7-06/3	Wadl Masan (3) Existing proj. deep well	13	12 44.1		02 38.0		_		1	Canceled (few water)
			A Wazieyah	99 -	Al Khunha	T-06	New projected deep well	13	06 21.				_		-0.53	

 Wells to be tested
 20

 Cancelled wels
 2

 Total wells tested
 18

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Pumping Te	Pumping Tests Informations									Step I	Step Drawdown	UMC		Const	ant dict	narge &	Constant dicharge & Recovery Test	Test
Governorate	District	Site	Site Name	Vell Code	Targel Waler Source	Depth.	SWL SWL	Pump depth	Ğ	Step scharg	Step Drawdown discharge rate (I/sec))wn (l/sec)		(B)	L.W.L	2 5	Expect discharge rate	Constant discharge rate
			:			,,		(G.Lm)	1st	2nd	3rd	4 lh 5	5th		()	(E)	(l/sec)	(l/sec)
Sana'a	Hamdan	S-02	S-02 Jarban	S-02	New projected deep well	450	345.31	370				 1	34	346.04 34	346.10	0.06	1	0.3
	Belad Al Rous	S-05	S-05 Afesh	S-05	Existing projected deep well	300	212.97	270	0.7	1.4	2.1	2.8 3.	5	213.69 2:	231 93	18.24	4.0	- 6 0-3
		S-06	S-06 AI Lejam	S-06	Existing projected deep well	300	148.09	265	1.3	2.6	3.9	5.2 6.	ري.	148.67 1	150.17	1.50	5.2	342.5
	Sannan & Bany Bahlool	S-07	S-07 Bait Al Hadrami	S-07	New projected deep well	410	193.22	162	1.9	3.8	5.7	7.6 9	9.5 19	193.80 19	197.70	3.90	4.0	33.5
		S-09	S-09 Ruhm	S-09	S-09 New projected deep well	470	191.85	291	1.0	2.0	3.0	4.0 5	5.0 19	193.10 2:	228.55	35.45	8.6	0.5°
	Al Heso	S-10	S-10 Tawa'ar	S-10/1	S-10/1 Existing projected deep well	280	134.78	220	0.9	1.8	2.7	3.6 4	4.5 13	135.40 11	181.24	45.84	2.7	500 N
		2		S-10/2	S-10/2 Existing projected deep well	310	144.74	220	1.7	3.4	5,1	6.8 8	8.5 14	145.36 1	156.49	11.13	4.1	同語
	lehana	S-11	S-11 AI Hesn-Al Abyad	S-11/1	S-11/1 New projected deep well	350	152.82	248	1.2	2.4	3.6	4.8 6	6.0 15	154.78 2	219.79	65.01	4.8	10 Mar
		S-12	S-12 Mahdah	S-12	New projected deep well	350	57.78	246	1.3	2.6	6 E	5.2 8	6.5 58	60	77.34	18.74	2.8	第1 73章
Taiz	Mawiyah	T-01	T-01 Al Muayteeb	T-01	T-01 New projected deep well	300	139.17	213	1.0	2.0	3.0	4.0	5.0	1	1	1	<5.0	「市地ない
				T-02/1	T-02/1 Bir 1 Existing projected deep well	230	183.88	200	1.6	3.2	4.8	6.5	- 18	84.20 1	186.74	2.54	64	网际
		T-02	T-02 Bani Al Suror	T-02/3	T-02/3 Bir 3 Existing projected deep well	251	117.62	178	1.6	3.2	4.8	6.4 E	8.0 11	118.93 1	140.04	21.11	3.2	142.6 3
	Al Ma'afer			T-02/4	T-02/4 Bir 4 New projected deep well	190	134.92	154	1.7	3.4	5.1	6.8 6	8.5 13	137.91	140.16	2.25	6.8	國和憲
		T-03	T-03 Sheb Humran	T-03/1	T-03/1 AI Jah (1) New projected deep well	400	22.22	284	2.2	3.6	5.1	6.6 8	8.0 22.	81	45.10	22.29	4.9	UUXXX
				T-03/4	T-03/4 AI Meashaar(4) Existing proj.deep well	260	24.19	184	2.2	3.3	4.4	5.5 6	6.6 24.	95	28.99	4.04	5.3	<u>'</u> 48
	Al Mawaset	T-04	Yafoq Bani Hamad	T-04	T-04 Existing projected deep well	220	124.10	156	1.2	2.4	3.6	4.8 <u></u> E	6.0 12	25.30 1	127.21	1.91	3.6	10022
	Al Shamayaten	1-05	T-05 Al Azaez	T-05/1	T-05/1 Marda'a Alhomary(1) Existing proj deep well	120	8.20	94	1.0	1.5	2.0	2.5 3	3.0 B	8.99 5	54.18	45.19	2.5	0.633
	Al Wazieyah	T-06	T-06 AI Khunha	T-06	T-06 New projected deep well	200	-0.53	142	2.2	4.4	6.6	8.8 1	11.0 0	0.68	6.35	5.67	8.8	8.8 %
															1	1		

14-227

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DATA FOR SANA'A

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Pumping Test Report Sheet

Well code: S-02	Site code:	S-02 Site nam	ne:	Jarban
	amdan		norate:	Sana'a
				~
Target water source:	Vew projected de	eep well	Well depth: _	450 m
Contractor:	Abdulkhaleg N	I. AL- Goli		
Hydrogeologist in charge:	Ali Abdulla	ah Nagi AL- Gounaid		
Operator:	Mohmmed	Azeen		
Date of start of the test:	18/8/2006	Date of end	d of the test:	19/8/2006
Pump type: Submer	rsible pump	Engine:		37kW
Pump installation depth:	370 m	Datum leve	el: <u>0.73 m</u>	S.W.L.: <u>G.L363.31 m</u>
Step drawdown test				
Date/hour started:		Date/hour finished		Total hours:
Yield (l/sec): 1 st step	2 nd step	3 rd step	4 th step	5 th step
Water level before start the te	st (G.Lm):			
Water level after end of 5th ste	эр (G.Lm):			
Water level after recovery (G.	Lm):		Recovery hours	s:
Constant discharge test				
Date/hour started:	-2006-1:30pm	Date/hour finished	: <u>19-8-2006-3:</u>	50pm Total hours: 27:20
Yield (I/sec):2.00				
Water level before start of the tes	st (G.Lm):	345.31		
Water level after end of test (C	G.Lm):	345.37		
Water level after recovery (G.I	Lm):	345.31	Recovery hours	s: <u>3:20</u>
Drawdown (m): 0.06	_			
	—			
			•	
			N	
Revised by:				
Name ;	· · · · · · · · · · · · · · · · · · ·			· .
Date:				

Constant Discharge & Recorery Test (1/2)

Well Code:	<u>S-02</u>	Site code:	S-02
Site name:	Jarban		
District:	Hamdan		
Governorate:	Sana'a		

 Pump on date/hour:
 18-8-2006-1:30pm

 Pump off date/hour:
 13/8/2006 2:00pm

 End of recovery hour:
 19-8-2006-3:50pm

S.W.L (m):	346.04
D.W.L (m):	346.10
Yield (l/sec):	2.0

Contractor: <u>Abdulkhaleg M. AL- Goli</u> Hydrogeologist: <u>Ali Abdullah Nagi AL- Gounaid</u> Operator: <u>Mohmmed Azeen</u>

	Cons	tant Dischrge Te	est	Recove	ery Test	Water Analysis	
Duration - (min)	Water level	Drawdown	Pumping	Water level	Residual	Conductivity	Remarks
(1111)	(m)	(m)	rate (l/sec)	(m)	(m)	()	
0.0	346.04	0.00		346.10	0.06		d.
0.5	346.04	0.00		346.09	0.05		
1.0	346.05	0.01		346.09	0.05		
1.5	346.05	0.01		346.09	0.05		
2.0	346.05	0.01		346.09	0.05		
2.5	346.06	0.02		346.09	0.05		
3.0	346.06	0.02		346.09	0.05		×
3.5	346.06	0.02		346.09	0.05		
4.0	346.06	0.02		346.09	0.05		
4.5	346.07	0.03		346.09	0.05		
5.0	346.07	0.03		346.09	0.05		
6.0	346.07	0.03		346.09	0.05		
7.0	346.08	0.04		346.09	0.05		
8.0	346.08	0.04		346.09	0.05		
9.0	346.08	0.04		346.08	0.04		
10.0	346.09	0.05		346.08	0.04		
12.0	346.09	0.05		346.08	0.04		
14.0	346.10	0.06		346.08	0.04		
16.0	346.10	0.06		346.08	0.04		
18.0	346.10	0.06		346.08	0.04		
20.0	346.10	0.06		346.07	0.03		
25.0	346.10	0.06		346.07	0.03		
30.0	346.10	0.06		346.07	0.03		
35.0	346.10	0.06		346.07	0.03		
40.0	346.10	0.06		346.07	0.03		
45.0	346.10	0.06		346.07	0.03		
50.0	346.10	0.06	I	346.07	0.03		
55.0	346.10	0.06		346.06	0.02		
60.0	346.10	0.06		346.06	0.02		

Constant Discharge & Recorery Test (2/2)

S-02

Well Code: District: <u>S-02</u>

Hamdan

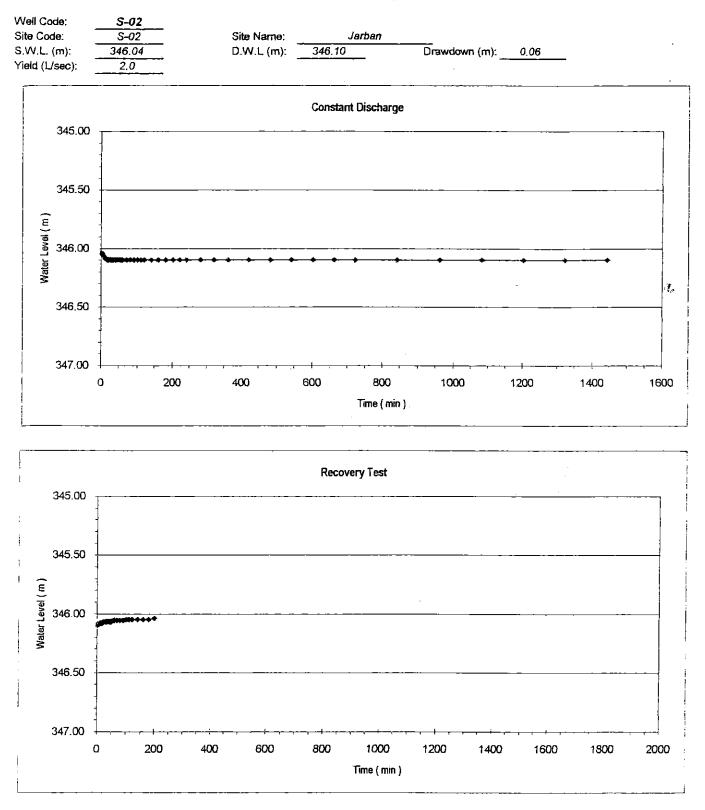
Site code:

Site name: Jarban

Governorate: Sana'a

Duration	Cons	tant Dischrge To	est	Recove	ery Test	Water Analysis	
Duration (min)	Water level (m)	Drawdown (m)	Pumping rate (I/sec)	Water level (m)	Residual (m)	Conductivity (µS/cm)	Remarks
70.0	346.10	0.06		346.06	0.02		
80.0	346.10	0.06		346.06	0.02		
90.0	346.10	0.06		346.06	0.02		
100.0	346.10	0.06		346.05	0.01		
110.0	346.10	0.06		346.05	0.01		
120.0	346.10	0.06		346.05	0.01		-1
140.0	346.10	0.06		346.05	0.01		
160.0	346.10	0.06		346.05	0.01		
180.0	346.10	0.06		346.05	0.01		
200.0	346.10	0.06		346.04	0.00		
220.0	346.10	0.06					
240.0	346.10	0.06					
280.0	346.10	0.06					4
320.0	346.10	0.06		<u></u>			
360.0	346.10	0.06					
420.0	346.10	0.06			<u>.</u>		
480.0	346.10	0.06					
540.0	346.10	0.06					
600.0	346.10	0.06					
660.0	346.10	0.06					
720.0	346.10	0.06					
840.0	346.10	0.06	_				
960.0	346.10	0.06					
1080.0	346.10	0.06					
1200.0	346.10	0.06			-		
1320.0	346.10	0.06					
1440.0	346.10	0.06					
1560.0							<u></u>
1680.0	<u> </u>						
1800.0							<u> </u>
	<u> </u>						
	<u> </u>	••• — •• — —	<u>+</u> †				

Constant Dischrge Test



Pumping Test Report Sheet

Well code:	S-05	Site code:	<u>S-05</u>	s	ite name			Afesh		 .
District:	Be	lad Al Rous			Governo	rate:	·	Sana'a		
Target water	source:	Existing projecte	ed deep	well		Well dep	th:	150 m		
Contractor:		Abdulkhaleg	<u>M. AL</u>	- Goli						
Hydrogeologis Operator:		Ali Abdu Mohmme	-		ounaid					
Date of start of Pump type: Pump installa	Ve			Eng	e of end o ine: um level:	of the test: 	lv	05//08/20 veco aifo S.W.L.:		<u>2.97 m</u>
	rted: <u>3</u> 1 st step <u>1.</u>	<u>-8-2006-8:40am</u> 002 nd step e test (G.Lm):						am Tota 5 th step		23:55
	'ter end of 5 ^h	step (G.Lm):		245.67 212.97		Recovery	hours:	13:55	i	
Constant dis Date/hour sta Yield (l/sec):		= -8-2006-8:40am	Da	ite/hour	finished:	5-8-20	06-8:20	o <u>m</u> Tota	al hours:	36:00
Water level bef		- e test (G.Lm):		212.97						
Water level at	ter end of tes	st (G.Lm):		231.93						
Water level at	-			20.97		Recovery	hours:	12:00)	
Drawdown (m Revised by: Name :	i): <u>18.9</u>	6								

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Provisional Step Drawdown Test

Well Code:	<u></u>	Site code:	S-05
Site name:	Afesh		
District:	Belad Al Rous		
Governorate:	Sana'a		

Pump on date/hour:	2-8-2006-6:20am
Pump off date/hour:	2-8-2006-8:40pm
End of recovery hour:	3-8-2006-4:15am
S.W.L (m):	213.69

Contractor: <u>Abdulkhaleg M. AL- Goli</u> Hydrogeologist: <u>Ali Abdullah Nagi AL- Gounaid</u>

Operator: Mohmmed Azeen

[]	1st S	Step	2nd S	Step	3rd S	Step	4th S	Step	5th S	Step	
Duration (min)	W.L. (m)	Yield (l/sec)	W.L. (m)		W.L. (m) i	Yield (l/sec)	W.L. (m)	Yield (I/sec)	W.L. (m)	Yield (l/sec)	Recovery (m)
0.0	213.69	1.00	221.98	2.00	223.88	3.00	224.71	4.00	225.09	5.00	225.42
0.5	219.85		222.91		224.51		224.75		225.10		219.73
1.0	220.04		223.02		224.51		224.77		225.12		đ.
1.5	220.12		223.16		224.51	<u>.</u>	227.77		225.13		
2.0	220.20		223.22	-	224.51		224.78		225.14		
2.5	220.26		223.26	<u> </u>	224.52		224.79		255.15		
3.0	220.39		223.32		224.53		224.80		255.16		
3.5	220.93		223.36		224.53		224.81		255.16		
4.0	220.71		223.39		224.53		224.82		255.17		
4.5	220.83		223.42		224.54		224.83		255.17		
5.0	221.09		223.44		224.55		224.84		255.18		
6.0	221.11	-	223.46		224.56		224.85		255.20		
7.0	221,12		223.48		224.57		224.86		255.21		
8.0	221.43		223.51		224.58		224.88		255.22		
9.0	221.48		223.58		224.59		224.90		255.23		
10.0	221.51		223.63		224.60		224.91		225.25	·	
12.0	221.63		223.68		224.61		224.93		255.26		217.80
14.0	221.74		223.72		224.62		224.94		225.28		216.82
16.0	221.76		223.74		224.63		224.96	-	255.30		215.76
18.0	221.79		223.76	·	224.64		224.98		255.31		214.72
20.0	221.84		223.78		224.65		225.00		255.33		
22.0	221.90		223.80		224.67		225.02		255.34		
24.0	221.92		223.82		224.68		225.04		255.36		· · · · -
26.0	221.94		223.84		224.69		225.05	_	255.38		
28.0	221,96		223.86		224.70		225.07		255.40		
30.0	221,98		223.88		224.71		225.09		255.42		214.21
4:15am							_ *				213.69
	<u> </u>								····		
									<u>.</u>	<u> </u>	
							. <u>.</u>				
	··· —		i		<u> </u>		i		· · · · · · · · · · · · · · · · · · ·		
	<u>:</u>				<u> </u>	-234	<u>_</u>		<u> </u>		

Pump on date/hour:	3-8-2006-8:40am
Pump off date/hour:	3-8-2006-6:40pm
End of recovery hour:	4-8-2006-8:35am
S.W.L (m):	213.69

Contractor: <u>Abdulkhaleg M. AL- Goli</u> Hydrogeologist: <u>Ali Abdullah Nagi AL- Gounaid</u>

Operator: Mohmmed Azeen

	1st S	Slep	2nd S	Step	3rd S	Step	4th S	Step	5th S	Step	Deserver
Duration (min)	W.L. (m)	Yield (l/sec)	W.L. (m)	Yield (I/sec)	W.L. (m)	Yield (l/sec)	W.L. (m)	Yield (1/sec)	W.L. (m)	Yield (I/sec)	Recovery (m)
0.0	213.69	1.00	219.92	2.00	224.31	3.00	234.59	4.00	237.63	5.00	246.39
0.5	218.50		220.08		224.86		234,71		237.99		239.40
1.0	218.75		220.67		224.88	<u> </u>	234.89		238.00	·	234.42 🦸
1.5	218.81		220.96		225.00		235.02		240.16		231.22
2.0	218.84	1	221.19		225.11		235.21		241.07		229.11
2.5	218.89		221.48		225.60		235.55		241.82		227.03
3.0	218.91		221.79	-	225.81		235.73		242.09		226.17
3.5	218.94		221.88		225.99		235.94		242.56		225.41
4.0	218.97	·	222.00		,226.00		236.16		243.09		224.82
4.5	218.98		222.29		226.07		236.24		243.51		224.41
5.0	218.99		222.41		226.11		236.29		243.62		223.36
6.0	219.00		222.68		226.80	- /-	236.32		243.92		222.43
7.0	219.27		222.91		228.24		236.37		243.93		221.81
8.0	219.40		223.11		228.48		236.54		243.98		221.03
9.0	219,48		223.27		228.55		236.76		244.32		220.64
10.0	219.54		223.58		228.60		236.83		244.60		220.45
12.0	219.60		223.65		229.00		236.83		244.71		220.14
14.0	219,69		223.78		230.69		236.92		244.72		220.04
16.0	219.69		223.91		231.19		236.92		244.75		219.66
18.0	219.74		224.00		231.57		236.95		245.02		219.47
20.0	219.80		224.06		231.61		236.96		245.24	-	219.15
25.0	219.85		224.11		231.97		236.98		245.59		218.84
30.0	219.87		224.13		232.00		237.02		245.94		218.12
35.0	219.89		224.15	-	232,41		237.05		246.22		217.79
40.0	219.90		224.18		232.74		237.11		246.23		217.46
45.0	219.90		224.18		232.96		237.15		246.27		217.23
50.0	219,90		224.18		233.10		237.21		246.29		217.03
55.0	219.90		224.19		233.62		237.26		246.37		216.95
60.0	219.90		224.19		233.85		237.32		246.37		216.81
70.0	219.90		224.20		234.01		237.45		246.37		216.69
80.0	219.90		224.21		234.09		237.56		246.38		216.24
90.0	219.91		224.25		234.17		237.5 9		246.38		216.01
100.0	219,91		224.29		234.26		237.61		246.39		215.96
110.0	219.92		224.31		234.47		237.62		246.39	-	215.79
120.0	219,92		224.31		234.59		237.63		246.39		215.69
695.0	8:35am						1				213.69
						4-2 <u>35</u>			_ T		

Constant Discharge & Recorery Test (1/2)

Well Code:	S-05	Site code:	S-05
Site name:	Afesh		
District:	Belad Al Rous		
Governorate:	Sana'a		

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Contractor: <u>Abdulkhaleg M. AL- Goli</u> Hydrogeologist: <u>Ali Abdullah Nagi AL- Gounaid</u> Operator: <u>Mohmmed Azeen</u>

Pump on date/hour: _	4-8-2006-8:40am
Pump off date/hour:	5-8-2006-8:40am
End of recovery hour:	5-8-2006-8:20pm

S.W.L (m):	213.69	
D.W.L.(m):	231.93	
Yield (1/sec):	3.2	

	Cons	tant Dischrge Te	est	Recove	ry Test	Water Analysis	
Duration (min)	Water level (m)	Drawdown (m)	Pumping rate (l/sec)	Water level (m)	Residual (m)	Conductivity ()	Remarks
0.0	213.69	0.00		231.93	18.24		
0.5	214.50	0.81		228.13	14.44		
1.0	216.82	3.13		222.43	8.74		
1.5	217.11	3.42		221.35	7.66		
2.0	218.99	5.30		220.90	7.21		
2.5	219.85	6.16		219.82	6.13		
3.0	221.18	7.49	1	218.50	4.81		
3.5	222.86	9.17		217.50	3.81		
4.0	223.63	9.94	_	216.48	2.79		
4.5	224.72	11.03		216.27	2.58		
5.0	225.38	11.69		216.23	2.54		
6.0	226.00	12.31		216.06	2.37		
7.0	226.45	12.76		215.95	2.26		
8.0	226.63	12.94		215.46	1.77		
9.0	226.80	13.11		215.13	1.44		
10.0	227.11	13.42	<u> </u>	215.01	1.32		
12.0	227.23	13.54		214.89	1.20		
14.0	227.47	13.78		214.68	0.99		
16.0	227.56	13.87		214.60	0.91		
18.0	227.79	14.10		214.49	0.80		
20.0	227.79	14.10		214.45	0.76		
25.0	227.98	14.29		214.40	0.71		
30.0	228.06	14.37		214.36	0.67		
35.0	228.18	14.49		214.32	0.63		
40.0	228.28	14.59		214.28	0.59		
45.0	228.64	14.95		214.26	0.57		
50.0	229.12	15.43		214.22	0.53		
55.0	229.54	15.85		214.18	0.49		
60.0	230.43	16.74	1	214.14	0.45		

Constant Discharge & Recorery Test (2/2)

S-05

Well	Code:
Distr	ict:

S-05

Belad Al Rous

Site code:

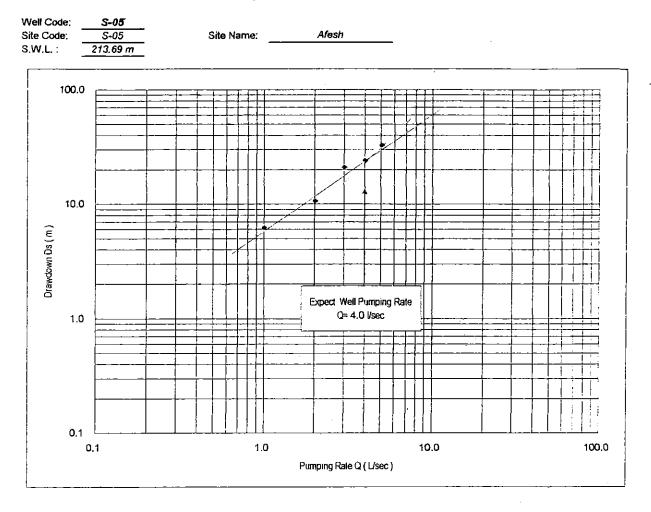
Site name: Afesh

Governorate: Sana'a

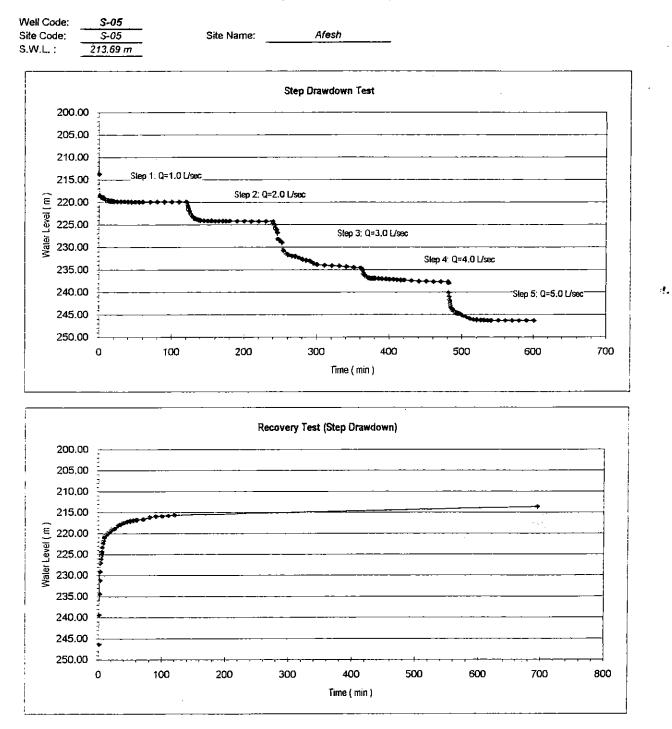
Duretion	Cons	tant Dischrge Te	est	Recove	ery Test	Water Analysis	
Duration (min)	Water level (m)	Drawdown (m)	Pumping rate (I/sec)	Water level (m)	Residual (m)	Conductivity	Remarks
70.0	230.88	17.19		214.06	0.37		
80.0	230.99	17.30		214.00	0.31		
90.0	231.42	17.73		213.94	0.25		
100.0	231.48	17.79		213.88	0.19		
110.0	231.54	17.85		213.82	0.13		
120.0	231.64	17.95		213.76	0.07		
140.0	231.69	18.00		213.76	0.07		
- 160.0	231.69	18.00	-	213.75	0.06		
180.0	231.70	18.01		213.74	0.05		· · · · · ·
200.0	231.73	18.04		213.73	0.04		
220.0	231.73	18.04		213.72	0.03		
240.0	231.73	18.04		213.70	0.01		
280.0	231.75	18.06		213.70	0.01		
320.0	231.76	18.07		213.70	0.01		
360.0	231.78	18.09		213.70	0.01		
420.0	231.78	18.09		213.70	0.01		
480.0	231.79	18.10		213.70	0.01		
540.0	231.81	18.12		213.70	0.01		
600.0	231.85	18.16		213.70	0.01		
660.0	231.88	18.19		213.70	0.01		
720.0	231.89	18.20		213.69	0.00		
840.0	231.91	18.22					
960.0	231.91	18.22					
1080.0	231.91	18.22					
1200.0	231.92	18.23					
1320.0	231.92	18.23					
1440.0	231.93	18.24					
						<u> </u>	

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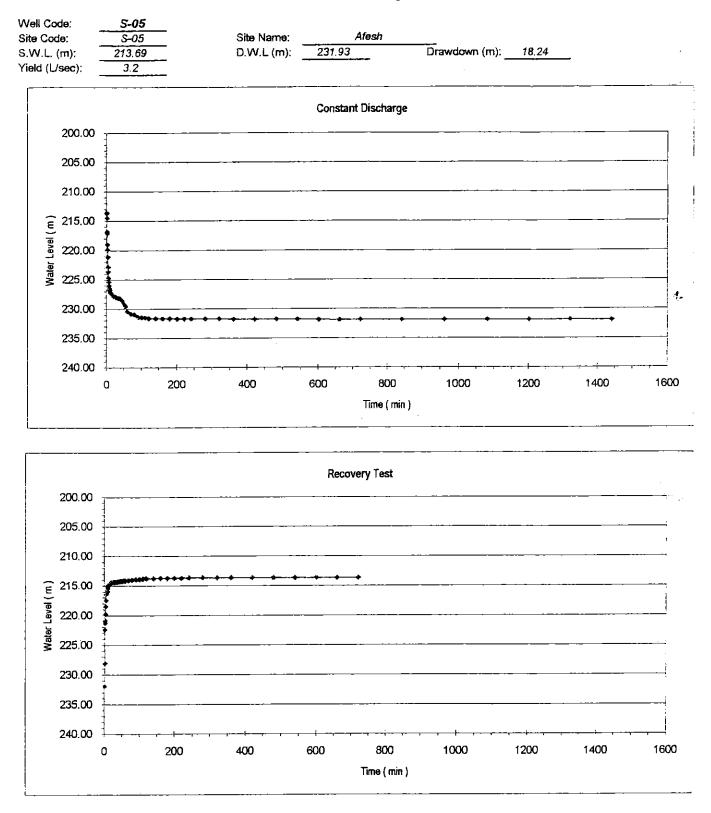
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Slep	Q(1/sec)	D.W.L.(m)	Ds(mi)		
1	1.0	219.92	6,23		
2	2.0	224.31	10.62		
3	3,0	234.59	20.90		
4	4.0	237.63	23.94		
5	5.0	246.39	32,70		



Constant Dischrge Test



 $14 \cdot 240$

Pumping Test Report Sheet

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	0.00			-
Well code: <u>S-06</u> Site code:		::		<u> </u>
District: Sanhan & Bany Bahlool	Governo	orate:	Sana'a	
Target water source:Existing projected	deep well	Well depth:	<u>310 m</u>	
Contractor: Abdulkhaleg M	1. AL- Goli	<u> </u>		
Hydrogeologist in charge: Ali Abdulla	h Nagi AL- Gounaid			
Operator: Mohammed	l Azeen			
				4.
Date of start of the test:21/8/2006	Date of end	of the test:	24/8/2006	_
Pump type: Vertical pump	Engine:		lveco aifo	_
Pump installation depth: 220 m	Datum level:	0.58 m	S.W.L.: <u>G.L1</u>	48.09 m
	•	4 th step <u>5.2</u>	<u>3:48pm</u> Total hours: 20 5 th step <u>6.50</u> urs: <u>0:18</u> 3:00pm_ Total hours:	
Water level after recovery (G.Lm):	148.10	Recovery hou	irs: <u>9:00</u>	
Drawdown (m): <u>1.50</u>				
Revised by: Name : Date:			×	

Provisional Step Drawdown Test

Well Code:	S-06	Site code:	<u>S-06</u>	Pump on date/hour:	21-8-2006-3:50pm
Site name:	Al Lejam		_	Pump off date/hour:	21-8-2006-6:20pm
District:	Sanhan & Bany Ba	ahlool	_	End of recovery hour:	21-8-2006-6:30pm
Governorate:	Sana'a		_	S.W.L (m): _	148.67

Contractor: Abdulkhaleg M. AL- Goli

Hydrogeologist: Ali Abdullah Nagi AL- Gounaid

Operator: Mohammed Azeen

	1st S	Step	2nd	Step	3rd \$	Step	4th	Step	5th S	Step	
Duration (min)	W.L. (m)	Yield (l/sec)	W.L. (m)	Yield (I/sec)	W.L. (m)	Yield (l/sec)	W.L. (m)	Yield (l/sec)	W.L. (m)	Yield (l/sec)	Recovery (m)
0.0	148.67	1.30	148.83	2.60	148.92	3,90	149.43	5.20	149.93	6.50	150.51
0.5	148.74		148.86		149.25		149.81		150.27		148.92
1.0	148.76		148.89		149.41		149.85		150.38		148.87
1.5	148.77		148.91		149.42		149.88		150.44		148,81
2.0	148.77		148.92		149.42		149.92		150.45		148.77
2.5	148.79		148.92		149.42		149.93		150.47		148.71
3.0	148.79		148.92		149.43		149.93		150.51		148.69
3.5	148.79		148.92	. .	149.43		149.93		150.51		148.68
4.0	148.80		148.92		149.43		149.93		150.51		148.68
4.5	148.80		148,92		149.43		149.93		1 5 0.51		148.68
5.0	148.81		148.92		149.43		149.93		150.51		148.68
6.0	148.81		148.92		149.43		149.93		150.51		148.67
7.0	148.81		148.92		149.43		149.93		150.51		148.67
8.0	148.81		148.92		149.43		149.93		150.51		148.67
9.0	148.82		148.92	-	149.43		149.93		150.51		148.67
10.0	148.82		148.92		149.43		149.93		150.51		148.67
12.0	148.83	-	148.92		149.43		149.93		150.51	-	
14.0	148.83		148.92		149.43		149.93		150.51		
16.0	148.83		148.92		149.43		149.93		150.51		
18.0	148.83		148.92		149.43		149.93		150.51		
20.0	148.83	_	148.92		149.43		149.93		150.51		
22.0	148.83		148.92		149,43		149.93		150.51	-	
24.0	148.83		148.92		149.43		149.93		150.51		
26.0	148.83		148.92		149.43		149.93		150.51		
28.0	148.83		148.92		149.43		149.93		150.51		
30.0	148.83		148.92		149.43		149.93		150.51		
35.0											
40.0											
45,0											
50.0											
60.0											<u> </u>
70.0											
80.0											
90.0									<u>.</u>		
110.0			·								
120.0											
240.0											
300.0											
360.0							;		· · · · ·		
420.0							· · · · ·				

Site code:	S-06
Bahlool	
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Pump on date/hour:	22-8-2006-10:30am
Pump off date/hour:	22-8-2006-8:30pm
End of recovery hour:	22-8-2006-8:48рт
S.W.L (m):	148.67

Contractor: <u>Abdulkhaleg M. AL- Goli</u> Hydrogeologist: Ali Abdullah Nagi AL- Gounaid_____

Operator: Mohammed Azeen

	1st S	Step	2nd	Step	3rd S	Step	4th	Step	5th S	Step	Decour -
Duration (min)	W.L. (m)	Yield (l/sec)	W.L. (m)	Yield (l/sec)	W.L. (m)	Yield (l/sec)	W.L. (m)	Yield (l/sec)	W.L. (m)	Yield (l/sec)	Recovery (m)
0.0	148.67	1.30	148.81	2.60	149.24	3.90	149.74	5.20	150.23	6.50	150.53
0.5	148.74		149.18	· · · · · · · · · · · · · · · · · · ·	149.54		150.12		150.34		148.95
1.0	148.76		149.19		149.65		150.20		150.37		148.87
1.5	148.77		149.20		149,67		150.21		150.39		148.83
2.0	148.78		149.21		149.67		150.21		150.40		148.78
2.5	148.78		149.21		149.68		150.21		150.43		148.75
3.0	148.79		149.22		149.68		150.21		150.43		148.71
3.5	148.79		149.22		149.70		150.22		150.43		148.69
4.0	148.80		149.22		149.70		150.22		150.44		148.69
4.5	148.81		149.22		149.70		150.22		150.44		148.69
5.0	148.81		149.22		149.70		150.22		150.44		148.69
6.0	148.81		149.22		149.70		150.22	1	150.44		148.68
7.0	148.81		149.22		149.70		150.22		150.45		148.68
8.0	148.81		149.22		149.70		150.23		150.45		148.67
9.0	148.81		149.23		149.70		150.23		150.45		148.67
10.0	148.81		149.23		149.70	-	150.23		150.45		148.67
12.0	148.81		149.23		149.70		150.23		150.45		148.67
14.0	148.81		149.23		149.70		150.23		150.46	1	148.67
16.0	148.81		149.23		149.71		150.23		150.46		148.67
18.0	148.81		149.23		149.71		150.23		150.47		148.67
20.0	148.81		149.23		149.71		150.23		150.48		
25.0	148.81		149.23		149.71		150.23		150.48		<u> </u>
30.0	148.81		149.23		149.72		150.23	1	150.48		
35.0	148.81		149.23		149.72		150.23		150.48		
40.0	148.81		149.23		149.72	ŀ	150.23		150.48	ľ	
45.0	148.81		149.23		149.72	1	150.23		150.49		
50.0	148.81		149.23		149.72		150.23		150.50		
55.0	148.81		149.23		149.72		150.23		150.51		
60.0	148.81	1	149.23		149.72		150.23		150.51		
70.0	148.81		149.23		149.72		150.23		150.52		
80.0	148.81		149.23		149.73		150.23		150.52		
90.0	148.81		149.24		149.73		150.23		150.52		
100.0	148.81		149.24		149.74		150.23		150.52		
110.0	148.81		149.24		149.74		150.23		150.53		
120.0	148.81		149.24		149.74		150.23		150.53		

Constant Discharge & Recorery Test (1/2)

Well Code:	<u>S-06</u>	Site code:	S-06
Site name:	Al Lejam	<u> </u>	
District:	Sanhan & Bany Bahlool		
Governorate:	Sana'a		

Contractor: <u>Abdulkhaleg M. AL- Goli</u> Hydrogeologist: <u>Ali Abdullah Nagi AL- Gounaid</u> Operator: <u>Mohammed Azeen</u>

Pump on date/hour:	23-8-2006-6:00am
Pump off date/hour:	24-8-2006-6:00am
End of recovery hour:	24-8-2006-3:00pm

S.W.L (m):	148.67	
D.W.L (m):	150.17	
Yield (l/sec):	4.2	

Duration	Constant Dischrg		: Dischrge Test		ry Test	Water Analysis	
(min) Water level Drav	Drawdown (m)	Pumping rate (l/sec)	Water level (m)	Residual (m)	Conductivity ()	Remarks	
0.0	148.67	0.00		150.17	1.50		<u>₹</u> _
0.5	149.58	0.91		149.62	0.95		
1.0	149.73	1.06		149.24	0.57		
1.5	149.77	1.10	·	149.12	0.45		
2.0	149.80	1.13	1	148.96	0.29		
2.5	149.81	1.14		148.84	0.17		
3.0	149.81	1.14		148.78	0.11		
3.5	149.82	1.15		148.78	0.11		
4.0	149.83	1.16		148.78	0.11		
4.5	149.83	1.16		148.77	0.10		
5.0	149.83	1,16		148.77	0.10		<u>_</u> _
6.0	149.83	1.16		148.76	0.09		
7.0	149.83	1.16		148.76	0.09	T	
8.0	149.83	1.16		148.76	0.09		
9.0	149.83	1.16		148.76	0.09		
10.0	149.83	1.16		148.76	0.09		
12.0	149.84	1.17		148.74	0.07		
14.0	149.84	1.17		148.74	0.07		
16.0	149.84	1.17		148.73	0.06		
18.0	149.84	1.17		148.74	0.07		
20.0	149.84	1.17		148.71	0.04		
25.0	149.84	1.17		148.69	0.02		
30.0	149.84	1.17		148.69	0.02		
35.0	149.84	1.17		148.69	0.02		
40.0	149.84	1.17		148.69	0.02		
45.0	149.84	1.17		148.69	0.02		
50.0	149.84	1.17	·	148.69	0.02		
55.0	149.84	1.17		148.69	0.02		
60.0	149.84	1.17		148.69	0.02		

Constant Discharge & Recorery Test (2/2)

S-06

Well	Code:
Distri	ict:

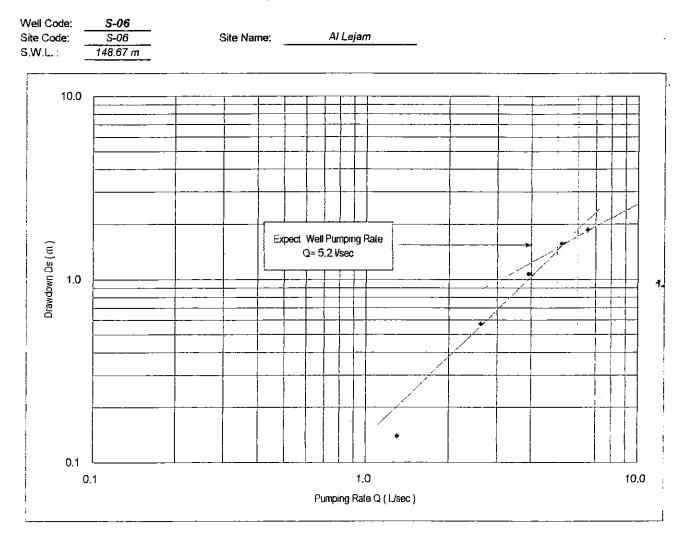
S-06 Site code:

Sanhan & Bany Bahlool

Site name: Al Lejam

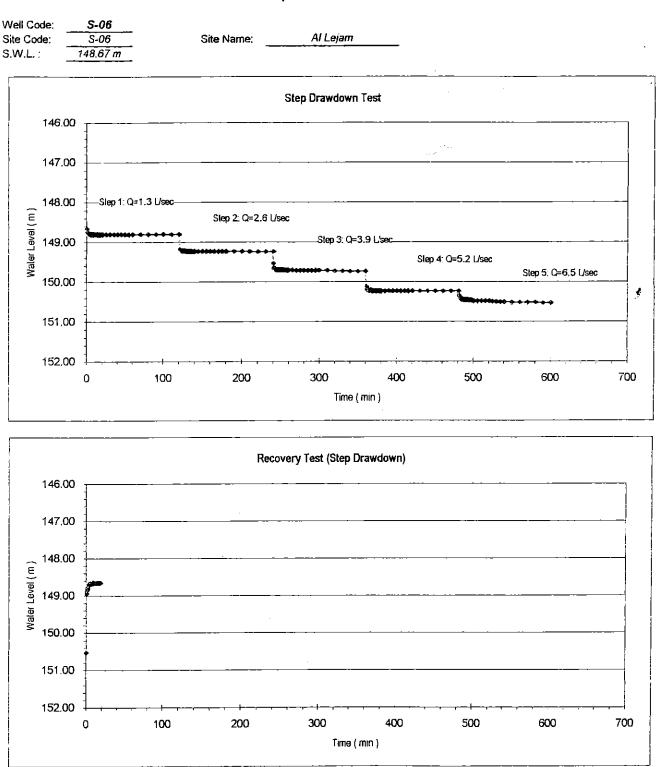
Governorate: Sana'a

	Constant Dischrge Test		est	Recove	ery Test	Water Analysis	
Duration (min)	Water level (m)	Drawdown (m)	Pumping rate (I/sec)	Water level (m)	Residual (m)	Conductivity ()	Remarks
70.0	149.84	1.17		148.69	0.02		
80.0	149.84	1.17		148.69	0.02		
90.0	149.85	1.18		148.69	0.02		
100.0	149.85	1.18		148.69	0.02		
110.0	149.85	1.18		148.69	0,02		
120.0	149.86	1.19		148.69	0.02		1_
140.0	149.86	1.19		148.69	0.02		
160.0	149.87	1.20		148.69	0.02		
180.0	149.87	1.20		148.68	0.01		
200.0	149.88	1.21		148.68	0.01		
220.0	149.88	1.21		148.68	0.01		
240.0	149.89	1.22		148.68	0.01		<u>, _</u> _
280.0	149.89	1.22		148.68	0.01		
320.0	149.90	1.23		148.68	0.01		
360.0	149.91	1.24		148.68	0.01		
420.0	149.95	1.28		148.68	0.01		
480.0	149.93	1.26		148.68	0.01		
540.0	149.93	1.26		148.68	0.01		
600.0	149.93	1.26					
660.0	149.95	1.28					_
720.0	149.95	1.28					
840.0	150.09	1.42					
960.0	150.09	1.42					
1080.0	150.12	1.45					
1200.0	150.13	1.46					
1320.0	150.16	1.49					
1440.0	150.17	1.50					
		<u></u>					
							

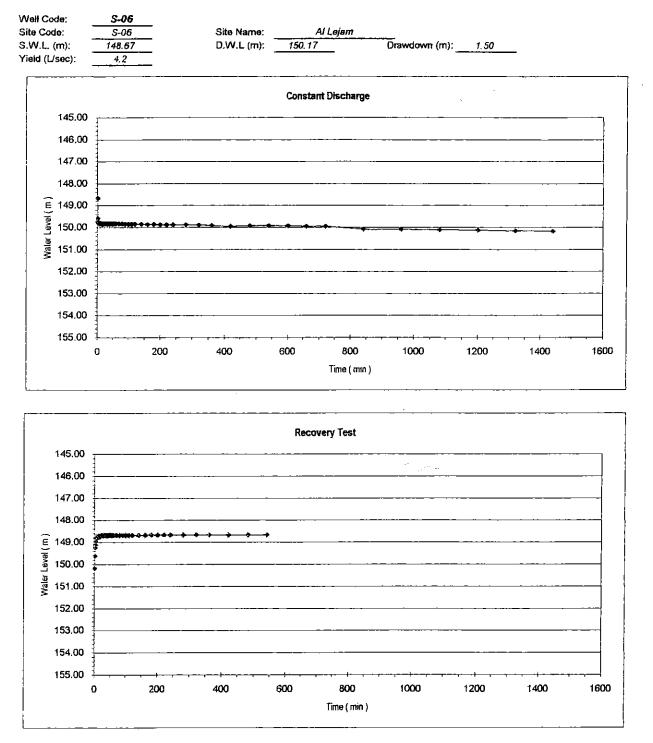


Step	Q (1/sec)	D.W.L.(m)	Ds(m)
1	1.3	148.81	0.14
2	2.6	149.24	0.57
3	3,9	149.74	1.07
4	5.2	150.23	1.56
5	6.5	150,53	1.86

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Constant Dischrge Test

Pumping Test Report Sheet

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Well code:	S-07	Site code:	S-07	Site name	e: 1	Bait Al Hadram	ni
District:		& Bany Bahlool		Governe		Sana'a	
Target water	r source:l	Existing projecte	d deep w	ell	Well depth:	410 m	
Contractor:		Abdulkhaleg	<u>M. AL- G</u>	oli			
Hydrogeologi	ist in charge:	Ali Abdu	llah Nagi	AL- Gounaid			
Operator:	<u> </u>	Bu	lul	·			
Date of start	of the test:	31/07/2000	ô	Date of end	of the test:	04/08/20	006
Pump type:	Ve	rtical pump		Engine:	<u> </u>	lveco aifo	
		291 m_		Datum level:	0.58 m	S.W.L.:	G.L193.22 m
Step drawd	own test						
Date/hour sta	arted: <u>1-</u>	8-2006-9:55pm	_ Date/	hour finished:	2-8-2006-2	2:55pmTot	al hours: <u>17:00</u>
Yield (l/sec):	1 st step	02 nd step	3 <i>.80</i> _3 rd	step <u>5.70</u>	_4 th step	60 5 th step	9.50
Water level b	efore start the	test (G.Lm):		3.22			
Water level a	fter end of 5 th .	step (G.Lm):	2(0.27			
Water level a	fter recovery (G.Lm):	19	3.22	Recovery ho	urs: <u>7:00</u>	
Constant di	scharge test_						
Date/hour sta	arted: 2-8	3-2006-10:40pm	Date/	hour finished:	4-8-2006-3	<u>.:40am</u> Tota	al hours: _ 29:00
Yield (l/sec):	3.20						
Water level be	fore start of the	test (G.Lm):	19	3.22			
Water level a	fter end of test	: (G.Lm):	20	0.29			
Water level a	fter recovery (G.Lm):	19	3.22	Recovery ho	urs: <u>5:00</u>	
Drawdown (n	n): <u>7.07</u>						
Revised by:							
	.,	· · · · · · · · · · · · · · · · · · · _ · · _ · · · _ = ~ - ~ - ~ - ~ - ~ - ~ - ~ - ~ - ~ - ~					
Name :							

Date:

Provisional Step Drawdown Test

Well Code:	<u>S-07</u>	Site code:	<u> </u>
Site name:	Bait Al Hadrami		
District:	Sanhan & Bany Bahloo	· · · · · ·	
Governorate:	Sana'a		
Governorate:	Sana'a		

Pump on date/hour:	31-7-2006-11:00pm
Pump off date/hour:	31-7-2006-1:30am
End of recovery hour:	1-8-2006-8:15am
S.W.L (m):	193.80

Contractor: Abdulkhaleg M. AL- Goli

Hydrogeologist: <u>Ali Abdullah Nagi AL- Gounaid</u>

Operator: Bulul

-	1st S	Step	2nd	Step	3rd S	Step	4th	Step	5th S	Step	
Duration (min)	W.L.	Yield	W.L.	Yield	W.L.	Yield	W.L.	Yield	W.L.	Yield	Recovery (m)
	(m)	(I/sec)	(m)	(l/sec)		(I/sec)	(m)	(I/sec)	(m)	(l/sec)	
0.0	193.80	1.90	198.10	3.80	198.89	5.70	199.60		200.14	9.50	200.85
0.5	197.15		198.45		199.21		199.86		200.42	_	198.22
1.0	197.72		198.61		199.33		199.91		200.52		197.11
1.5	197.86		198.73		199.41		199.99		200.62		196.02
2.0	197.93		198.76		199.42		200.05		200.73		195.07
2.5	198.00		198.80		199.46		200.08	·	200.75		194.53
3.0	198.00		198.80		199.48		200.08		200.76		193.51
3.5	198.00		198.80	<u></u>	199.48		200.08		200.78		193.49
4.0	198.00		198.80		199.48		200.08		200.78		193.32
4.5	198.00		198.80		199.48		200.08		200.79		193.07
5.0	198.00		198.80		199.48		200.08		200.80		194.06
6.0	198.00		198.80		199.89		200.10		200.81		194.06
7.0	198.00		198.80		199.50		200.11		200.82		194.05
8.0	198.01		198.82		199.51		200.12		200.82		194.05
9.0	198.02		198.84		199.53		200.12		200.82		194.04
10.0	198.03		198.86		199.55		200.12		200.83		194.04
12.0	198.04		198.88		199.56		200.12		200.83		194.04
14.0	198.06		198.88		199.56		200.13		200.83		194.03
16.0	198.07		198.88		199.56		200.13		200.84		194.03
18.0	198.08		198.88		199.57		200.13		200.84		194.03
20.0	198.09		198.88		199.57		200.13		200.84		194.03
22.0	198.10		198.88		199.58		200.14		200.84		194.02
24.0	198.10		198.88		199.58		200.14		200.84		194.01
26.0	198.10		198.88		199.58		200.14		200,85		194.00
28.0	198.10		198.89		199.59		200.14		200.85		193.99
30.0	198.10		198.89		199.60		200.14		200.85		193.99
35.0			<u> </u>								193.98
40.0											193.97
45.0					. !						193.95
50,0											193.94
60.0											193.94
70.0											193.93
80.0											193.93
90,0											193.93
110.0]							193.88
120.0							<u> </u>				193.85
240.0			1					. =			193.81
300.0											193.80
360.0											193.80
420.0			!		1						193.80

Well Code:	<u> </u>	Site code:	<u>S-07</u>
Site name:	Bait Al Hadrami		
District:	Sanhan & Bany Bahloo		
Governorate:	Sana'a		

Pump on date/hour:	1-8-2006-9:55pm
Pump off date/hour:	2-8-2006-7:55am
End of recovery hour:	2-8-2006-2:55pm
S.W.L (m):	193.80

Contractor: Abdulkhaleg M. AL-Goli

Hydrogeologist: Ali Abdullah Nagi AL- Gounaid

Operator: Bulul

D	1st S	Step	2nd :	Step	3rd S	Step	4th \$	Step	5th S	Step	Dessus
Duration (min)	W.L.	Yield	W.L.	Yield	W.L.	Yield	W.L.	Yield	W.L.	Yield	Recovery
(11111)	(m)	(l/sec)	(m) ⁻	(l/sec)	(m)	(l/sec)	(m)	(I/sec)	(m)	(I/sec)	(11)
0.0	193.80	1.90	197.24	3.80	198.03	5.70	199.21	7.60	200.16	9.50	200.87
0.5	195.33		197.62		198.35		199.65		200.25		198.25
1.0	196.50		197.85		198.71		200.00		200.35		197.26
1.5	196.20	<u> </u>	198.00		198.89		200.00		200.43		196.83
2.0	196.21		198.00		198.91		200.00		200.47		196.35
2.5	196.23		198.00		198.99		200.00		200.50		196.02
3.0	196.26		198.00		199.00		200.00		200.53		195.85
3.5	196.31		198.00		199.00		200.00		200,57		195.23
4.0	196.37		198.00		199.00		200.00		200.59		195.00
4.5	196.42		198.00	•	199.00		200.01		200.63		194.72
5.0	196.48		198.01		199.00		200.01		200.65		194.71
6.0	196.55		198.01		199.00		200.01		200.65		194.70
7.0	196.61		198.01		199.01		200.02		200.65		194.55
8.0	196.66		198.01		199.01		200.02		200.65		194,47
9.0	196.72		198.01		199 <i>.</i> 01		200.03		200.65		194.40
10,0	196.77		198.01		199.01		200.04		200.65		194.36
12.0	196.80		198.01		199.02		200.05		200.65		194.35
14.0	196.92		198.01		199.03		200.06		200.65		194.29
16.0	196.95		198.01	Ĩ	199.05		200.07		200.67	·	194.28
18.0	196.98		198.02		199.07		200.08		200.73		194.25
20.0	197.00		198.02		199.07		200.10		200.79		194.19
25.0	197.05		198.02		199.08		200.12		200.85		194.19
30.0	197.07		198.02		199.09		200.13		200.87		194.17
35.0	197.14		198.03		199.10		200.14		200.87		194.17
40.0	197.18		198.03		199.11		200.15		200.87		194.17
45.0	197.20		198.03		199.12		200.15		200.87		194.16
50.0	197.21		198.03		199.13		200.16		200.87		194.15
55.0	197.21		198.03		199.14		200.16		200.87		194.14
60.0	197.22		198.03		199.15		200.16		200.87		194.13
70.0	197.23		198.03		199.17		200.16		200.87		194.10
80.0	197.23		198.03		199.19		200.16		200.87		194.07
90.0	197.23		198.03		199.21	E E	200.16		200.87		194.05
100.0	197.24	ĺ	198.03		199.21		200.16		200.87		194.04
110.0	197.24		198.03		199.21		200.16		200.87		194.02
120.0	197.24		198.03		199.21		200.16		200.87		193.97
180.0	<u> </u>										193.88
240.0			1								193.85
300.0	•		i		_						193.83
420.0											193.80

Constant Discharge & Recorery Test (1/2)

Well Code:	<u>S-07</u>	Site code:	<u>S-07</u>
Site name:	Bait Al Hadrami		
District:	Sanhan & Bany Bahlool		
Governorate:	Sana'a		

Abdulkhaleg M. AL- Goli Contractor: Hydrogeologist: Ali Abdullah Nagi AL- Gounaid Bulul

Operator:

Pump on date/hour:	2-8-2006-10:40pm
Pump off date/hour:	3-8-2006-10:40pm
End of recovery hour:	4-8-2006-3:40am

S.W.L (m):	193.80
D.W.L.(m):	197.70
Yield (l/sec):	3.2

Duranti au	Cons	tant Dischrge T	est	Recove	ry Test	Water Analysis	
Duration (min)	Water level (m)	Drawdown (m)	Pumping rate (I/sec)	Water level (m)	Residual (m)	Conductivity ()	Remarks
0.0	193.80	0.00		197.70	3.90		
0.5	196.23	2.43		196.78	2.98		
1.0	197.07	3.27	1	196.33	2.53		
1.5	197.21	3.41		195.88	2.08		
2.0	197.33	3.53		195.33	1.53		
2.5	197.41	3.61		195.08	1.28		
3.0	197.50	3.70		194.99	1.19		
3.5	197.51	3.71		194.91	1.11		
4.0	197.52	3.72		194.82	1.02		
4.5	197.52	3.72		194.73	0.93		
5.0	197.53	3.73		194.66	0.86		
6.0	197.53	3.73		194.58	0.78		
7.0	197.54	3.74		194.51	0.71		
8.0	197.54	3.74		194.23	0.43		
9.0	197.54	3.74		194.12	0.32		
10.0	197.55	3.75		194.05	0.25		
12.0	197.55	3.75		194.02	0.22		
14.0	197.55	3.75		193.99	0.19		
16.0	197.55	3.75		193.98	0.18		
18.0	197.55	3.75		193.97	0.17		
20.0	197.55	3.75		193.96	0,16		
25.0	197.55	3.75		193.94	0.14		
30.0	197.55	3.75		193.92	0.12		
35.0	197.55	3.75		193.91	0.11		
40.0	197.55	3.75		193.90	0.10		
45.0	197.55	3.75		193.88	0.08		
50.0	197.55	3.75		193.87	0.07		
55.0	197.55	3.75		193.86	0.06		
60.0	197.55	3.75		193.85	0.05		

Constant Discharge & Recorery Test (2/2)

S-07

Well	Code:
Distr	ict:

S-07 Site code:

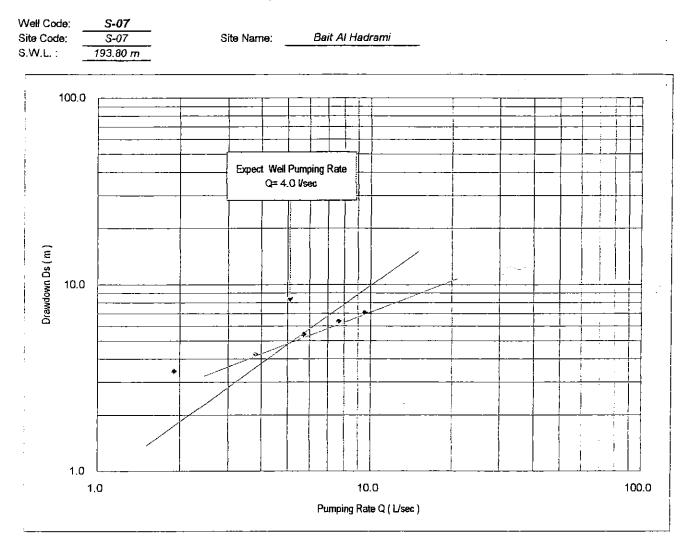
Site name: Bait Al Hadrami

Sanhan & Bany Bahlool

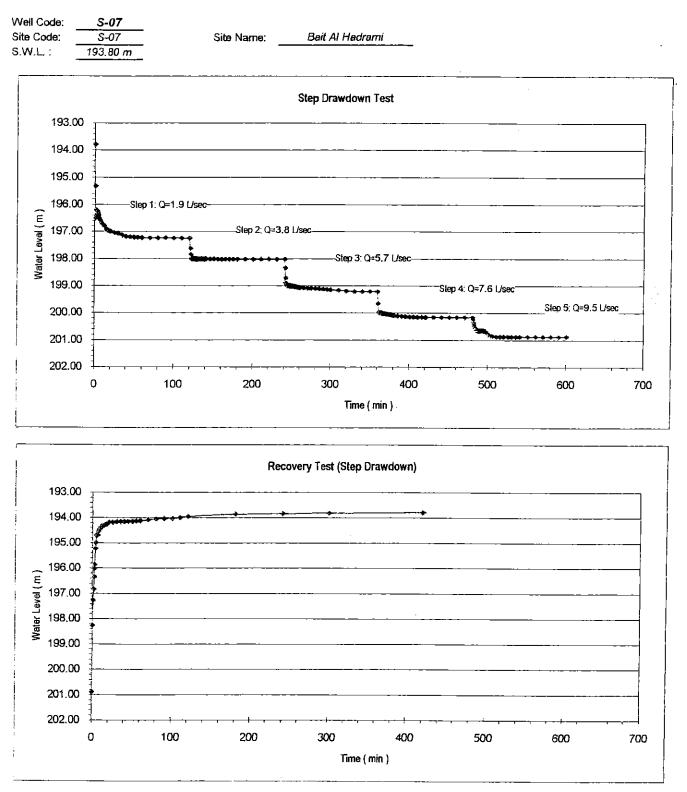
Governorate: Sana'a

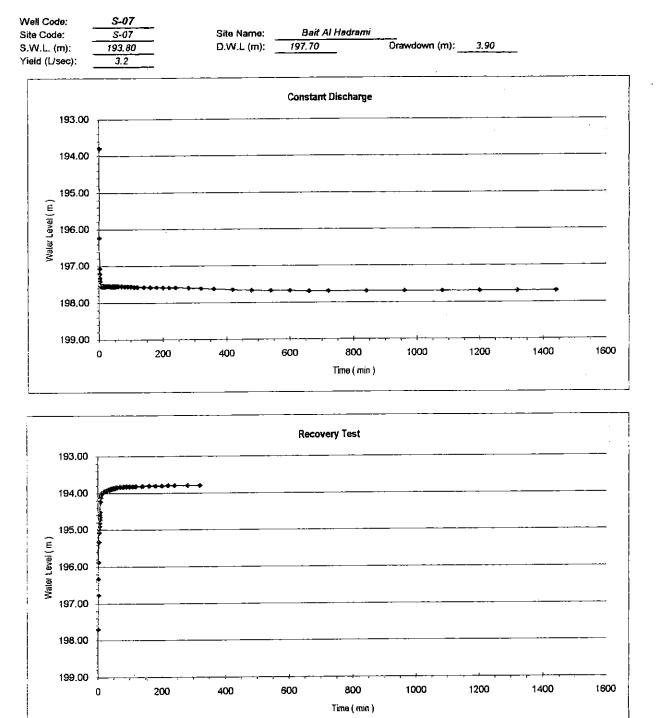
Duration -	Cons	tant Dischrge Te	est	Recove	ery Test	Water Analysis	
(min)	Water level (m)	Drawdown (m)	Pumping rate (l/sec)	Water level (m)	Residual (m)	Conductivity	Remarks
70.0	197 55	3.75		193.84	0.04		
80.0	197.56	3.76		193.84	0.04		
90.0	197.56	3.76		193.83	0.03		
100.0	197.56	3.76		193.83	0.03		
110.0	197.57	3.77		193.83	0.03		
120.0	197.57	3.77		193.82	0.02		
140.0	197.57	3.77		193.82	0.02		
160.0	197.58	3.78		193.81	0.01		
180.0	197.58	3.78		193.81	0.01		
200.0	197.59	3.79		193.81	0.01		
220.0	197.59	3.79		193.80	0.00		
240.0	197.59	3.79		193.80	0.00		
280.0	197.60	3.80		193.80	0.00		
320.0	197.62	3.82	-	193.80	0.00		
360.0	197.63	3.83					
420.0	197.65	3.85					
480.0	197.67	3.87					
540.0	197.68	3.88		<u> </u>			
600.0	197.68	3.88					
660.0	197.70	3.90					
720.0	197.70	3.90					
840.0	197.70	3.90					
960,0	197.70	3.90					
1080.0	197.70	3.90					-
1200.0	197.70	3.90					
1320.0	197.70	3.90					
14-40.0	197.70	3.90					

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Step	Q(I/sec) D.W.L.(m		Ds(m)
1	1.9	197.24	3.44
2	3.8	198.03	4.23
3	5.7	199.21	5,41
4	7.6	200.16	6.36
5	9.5	200,87	7.07





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Constant Dischrge Test

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Pumping Test Report Sheet

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Well code:	S-09	Site code:	S-09	Site name		Ruhm	<u> </u>
District:	Sanhan	& Bany Bahlool		Governo	orate:	Sana'a	
Target water	r source:	New projected	deep well	. <u></u>	Well depth:	470 m	
Contractor:		Abdulkhaleg	M. AL- G	oli			
Hydrogeologi	st in charge:	Ali Abdu	llah Nagi /	AL- Gounaid			
Operator:		Mohmme	d Azeen				
	Ve	21/8/2006 rtical pump		Date of end of Engine:		23/8/20	
Pump installa	ition depth:	290 m	<u> </u>	Datum level:	0.65 M	5.VV.L	G.L192.45 m
Step drawdo	own test						
		-8-2006-7:30pm					al hours: <u>17:30</u>
Yield (l/sec):	1 st step	0 2 nd step 2	2.00 3 rd	step <u>3.00</u>	_4 th step4.(<u>00</u> 5 th step	5.00
Water level b	efore start the	test (G.Lm):	19	2.45			
Water level a	fter end of 5 th :	step (G.Lm):	25	3.58			
Water level a	fter recovery (G.Lm):	19	2.45	Recovery hor	urs: <u>7:30</u>	<u> </u>
	scharge test	9 2006 2:05cm	Data#	our finished:	22 8 2006 1	0:05pm Tot	al hours: 31:00
Date/hour sta		-8-2006-3:05pm			23-0-2000-1	0.0000000000000000000000000000000000000	1110013. <u>01.00</u>
Yield (l/sec):	3.00 fore start of the	test (G L -m):	19	2.45			
	fter end of test			7.90			
	fter recovery (-	·	2.45	Recovery hou	urs: 7:00	
Drawdown (m					,	- <u>-</u>	
Revised by:	,,, <u> </u>						
- Name :						2.	

Date:

Provisional Step Drawdown Test

Well Code:	<u>\$-09</u>	Site code:	S-09
Site name:	Ruhm	· · ·	-
District:	Sanhan & Bany E	ahlool	_
Governorate:	Sana'a		_

 Pump on date/hour:
 21-8-2006-9:00am

 Pump off date/hour:
 21-8-2006-11:30am

 End of recovery hour:
 21-8-2006-7:20pm

 S.W.L (m):
 192.50

Contractor: <u>Abdulkhaleg M. AL- Goli</u> Hydrogeologist: <u>Ali Abdullah Nagi AL- Gounaid</u>

Operator: Mohmmed Azeen

[]	1st S	Step	2nd \$	Step	3rd S	Step	4th	Step	5th S	Step	
Duration	W.L.	Yield	W.L.	Yield	W.L.	Yield	W.L.	Yield	W.L.	Yield	Recovery (m)
(min)	(m)	(I/sec)	(m)	(l/sec)	(m)	(1/sec)	(m)	(I/sec)	(m)	(1/sec)	(<i>)</i>
0.0	192.50	1.00	199.68	2.00	202.83	3.00	209.23	4.00	218.34	5.00	233.56
0.5	194.27		199.71		203.09		209.92		218.60		227.09
1.0	195.36		199.79		204.04		210.47		219.06		222.10
1.5	196.27		200.03		204.60		210.66		219.48	-	217.77 🔅
2.0	196.93		200.47		205.08		211.67		220.01		216.13
2.5	197.28		200.68		205.49		211.99		220.63		213.66
3.0	197.94		200.77		205.58		212.12		221.13		212.57
3.5	198.09		200.84		205.81		212.47		221.43		211.01
4.0	198.23		200.86		205.94		212.88		221.74		210.33
4.5	198.36		200.91		206.00		213.17		222.72		209.87
5.0	198.49		200.92		206.18		213.86		223.83		209.42
6.0	198.62		200.93		206.27		214.17		224.23		208.00
7.0	198.73		201.04		206.51		214.23		225.99		207.12
8.0	198.86		201.27		206.77		214.29		226.30		206.11
9.0	198.94		201.45		206.89		214.87		226.81		205.13
10.0	199.16		201.84		207.18		215.07		227.64		203.87
12.0	199.37		202.09		207.29		215.82		228.77		201.37
14.0	199.37		202.38		207.31		216.48		229.69		200.23
16.0	199.37		202.41		207.41		216.97		230.53		199.37
18.0	199.37		202.43		207.52		217.32		231.23		199.02
20.0	199.41		202.44		207.68		217.88		231.79		198.83
22.0	199.52		202.46		208.01		218.09		232.28		198.65
24.0	199.63		202.48		208.61		218.11		232.69		198.27
26.0	199.68		202.51		208.98		218.19		232,98		197.83
28.0	199.68		202.67		209.13		218.27		233.27		197.63
30.0	199.68		202.83		209.23		218.34		233.56		197.42
50.0											197.01
55.0											196.74
60.0											196.13
70.0											195.37
80.0									<u></u>		194,77
90.0							<u> </u>				197.22
100.0											194.07
110.0	·										193.41
120.0								-			193.27
140.0											193.23
160.0											193.20
180.0											193.17
200.0											193.10
220.0	:								i		193.13

Provisional Step Drawdown Test (2/2)

Well Code:	<u> </u>	Site code:	S-09
Site name:	Ruhm	<u>.</u>	
District:	Sanhan & Bany Bahlo	bol	
Governorate:	Sana'a		

Contractor: <u>Abdulkhaleg M. AL- Goli</u>

Hydrogeologist: Ali Abdullah Nagi AL- Gounaid

Operator: Mohmmed Azeen

1st Step		2nd Step		3rd Step		4th Step		5th Step			
Duration ⁻ (min)	W.L. (m)	Yield (l/sec)	W.L. (m)	Yield (l/sec)	W.L. (m)	Yield (l/sec)	W.L. (m)	Yield (l/sec)	W.L. (m)	Yield (I/sec)	Recovery (m)
240.0		· · · · · ·	<u> </u>					-			193.13
260.0											193.12
280.0				•		· · ·					193.12
300.0	·			<u></u>							193,11
320.0	<u> </u>	<u> </u>									193.11
350.0		<u> </u>									193.10
380.0											193.10
410.0									<u>.</u>		193.10
440.0		· · ·				·····					193.10
470.0	····										193.10
				-							
							<u> </u>			·	
										-	
			<u></u>								
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Step Drawdown Test (1/2)

Well Code:	<u>S-09</u>	Site code:	<u> </u>
Site name:	Ruhm		_
District:	Sanhan & Bany E	Bahlool	_
Governorate:	Sana'a		_
			-

Pump on date/hour:	21-8-2006-7:30pm			
Pump off date/hour:	22-8-2006-5:30am			
End of recovery hour:	22-8-2006-3:00pm ·			
S.W.L (m):	193.10			

Contractor:	Abdulkhaleg M. AL- Goli	
Hydrogeologi	st: Ali Abdullah Nagi AL- Gounaid	
Operator:	Mohmmed Azeen	

Operator: <u>Mohmmed Azeen</u>

0	1st S	Step	2nd S	Step	3rd S	Step	4th Step	5th \$	Step	
Duration (min)	W.L. (m)	Yield (1/sec)	W.L. (m)	Yield (l/sec)	W.L. (m)	Yield (l/sec)	W.L. Yield (m) (l/sec)	W.L. (m)	Yield (l/sec)	Recovery (m)
0,0	193.10			2.00	204.11	3.00		226.70	5.00	254.23
0.0	193.10	1.00	199.69 200.43	2.00	204.11	3.00	215.48 4.00 216.10	226.70	- 5,00	254.23
1.0	194.30		200.43		204.83		216.57	227.56		
1.5	195.63		200.04		204.92		217.00	228.47		246.10 241.57
2.0	195.87		200.92		205.25		217.00	229.08		237.11
2.5	196.02		201.04		206.11		217.93	229.42		234.22
3.0	196.15		201.24		206.36		218.32	230.53		231.73
3.5	196.23		201.39		206.84		218.57	230.97		229.03
4.0	196.38		201.48		207.09		219.20	231.48		228.90
4.5	196.49		201.61		207.44		219.68	232.07		228.01
5.0	196.62		201.85		207.62		219.92	232.44		227.29
6.0	196.85	· -·· - · ·	202.27		207.97		220.56	233.48		224.79
7.0	195.99		202.31		208.36		221.00	234.07	···	223.16
8.0	197.17		202.44		208.57		221.64	234.44		221.36
9.0	197.38		202.57		208.72		221.89	234.69	İ	219.47
10.0	197.58		202.63		208.98		222.23	234.70		217.39
12.0	197.69		202.70		209.36		222.77	234.89		214.94
14.0	197.79		202.82		209.97		223.34	235.00		212.41
16.0	197.87		202.84		210.43		223.63	237.03	· · · ·	210.21
18.0	197.92	1	202.93		210.82		223.87	238.16		207.83
20.0	197.98		202.97		211.02		224.02	239.10		206.17
25.0	198.01		203.00		211.29		224.41	241.33		202.21
30.0	198.04		203.12		211.62		224.52	243.12		199.47
35.0	198.06		203.15		211.76		224.60	244.88		198.13
40.0	198.07		203.17		211.97		224.63	244.97		197.27
45.0	198.07		203.18		212.32		224.67	245.09		196.53
50.0	198.07		203.20		212.44		224.71	246.64		196.33
55.0	198.07		203.23		212.63		224.73	247.61		196.05
60.0	198.11		203.27		212.94		224.75	248.69		195.89
70.0	198.37		203.31		213.11	Î	224.78	249.69		195.51
80.0	198.47		203.47		213.23		224.81	250.53		195.13
90.0	198.73		203.74		213.49		224.84	251.37		194.93
100.0	199.47		204.03		213.82		225.38	252.41		194.72
110.0	199.49		204.08		214.74		225.87	253.39		194.55
120.0	199.96		204.11		215.48		226.70	254.23		194.47
130.0										194.17
140.0			:							193.76
150.0	,									193.45
160.0										193.31
170.0				. 1				é .		193.27

Step	Drawdown	Test	(2/2)
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Well Code:	S-	.09	Site co	ode:	S-09	_	Site name:	Ruhm			
District:		an & Bany .				Go	overnorate:	Sana'a			
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	1st	Step	2nd	Step	3rd	Step	4th	Step	5th	Step	
Duration -	W.L. (m)	Yield (I/sec)	W.L. (m)	Yield (I/sec)	W.L. (m)	Yield (l/sec)	W.L. (m)	Yield (l/sec)	W.L. (m)		Recovery (m)
180,0					-				+- <u></u>		193.24
200.0											193.18
220.0				· · ·				-		·	193.16
240.0				·			1				193.15
260.0		··-			· · ·						193.14
280.0			· · · ·					<u> </u>	1		193.13
300.0	<u>.</u> .						1				193.13
320.0							1				193.12
340.0		·		<u> </u>		_					193.12 🧃
360.0						<u></u>			-		193.12
380.0						-		· · · ·			193.11
400.0						· · ·		<u> </u>		·	193.11
430.0								··-			193.11
460.0					<u> </u>		1				193.10
490.0											193.10
520.0		· · · · · · · · · · · · · · · · · · ·									193.10
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Constant Discharge & Recorery Test (1/2)

Well Code:	<u>S-09</u>	Site code:	S-09
Site name:	Ruhm		
District:	Sanhan & Bany Bahlool		
Governorate:	Sana'a		

 Contractor:
 Abdulkhaleg M. AL- Goli

 Hydrogeologist:
 Ali Abdullah Nagi AL- Gounaid

 Operator:
 Mohrnmed Azeen

 Pump on date/hour:
 22-8-2006-3:05pm

 Pump off date/hour:
 23-8-2006-3:05pm

 End of recovery hour:
 23-8-2006-10:05pm

S.W.L (m): _	193.10
D.W.L (m):	228.55
Yield (l/sec):	3.0

Duration Con		Constant Dischrge Test			ry Test	Water Analysis	
(min)	Water level (m)	Drawdown (m)	Pumping rate (l/sec)	Water level (m)	Residual (m)	Conductivity ()	Remarks
0.0	193.10	0.00		228.55	35.45		f
0.5	198.00	4.90		223.61	30.51		
1.0	198.92	5.82		220.56	27.46	·	
1.5	199.51	6.41		218.77	25.67		
2.0	200.27	7.17		217.00	23.90		
2.5	201.36	8.26		215.04	21.94	1	-
3.0	202.29	9.19		214.18	21.08		
3.5	203.04	9.94		213.33	20.23	1	
4.0	203.62	10.52		212.22	19.12		
4.5	204.19	11.09	1 1	211.99	18.89		
5.0	204.73	11.63		211.31	18.21		
6.0	205.51	12.41		211.79	18.69		
7.0	206.41	13.31		210.23	17.13		
8.0	207.38	14.28		210.18	17.08		
9.0	207.99	14.89		209.98	16.88		
10.0	208.67	15.57		209.66	16.56		
12.0	209.88	16.78		209.17	16.07		
14.0	210.67	17.57		208.63	15.53		<u></u>
16.0	211.92	18.82		207.91	14.81		·
18.0	212.09	18.99		206.06	12.96		
20.0	212.70	19.60		205.69	12.59		
25.0	213.59	20.49		204.53	11.43		
30.0	214.01	20.91		203.65	10.55		
35.0	214.55	21.45		203.03	9,93		
40.0	215.06	21.96	· · · · · · · · · · · · · · · · · · ·	202.88	9.78		
45.0	215.54	22.44		201.28	8.18		
50.0	216.07	22.97		200.99	7.89		
55.0	217.03	23.93		199.59	6.49		
60.0	217.43	24.33		198.17	5.07		

Constant Discharge & Recorery Test (2/2)

Well	Code:
Distri	ict-

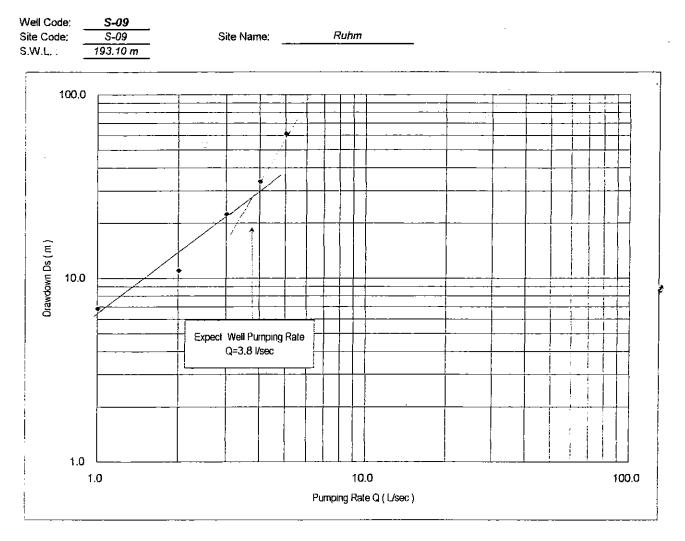
Sanhan & Bany Bahlool

Site code: <u>S-09</u>

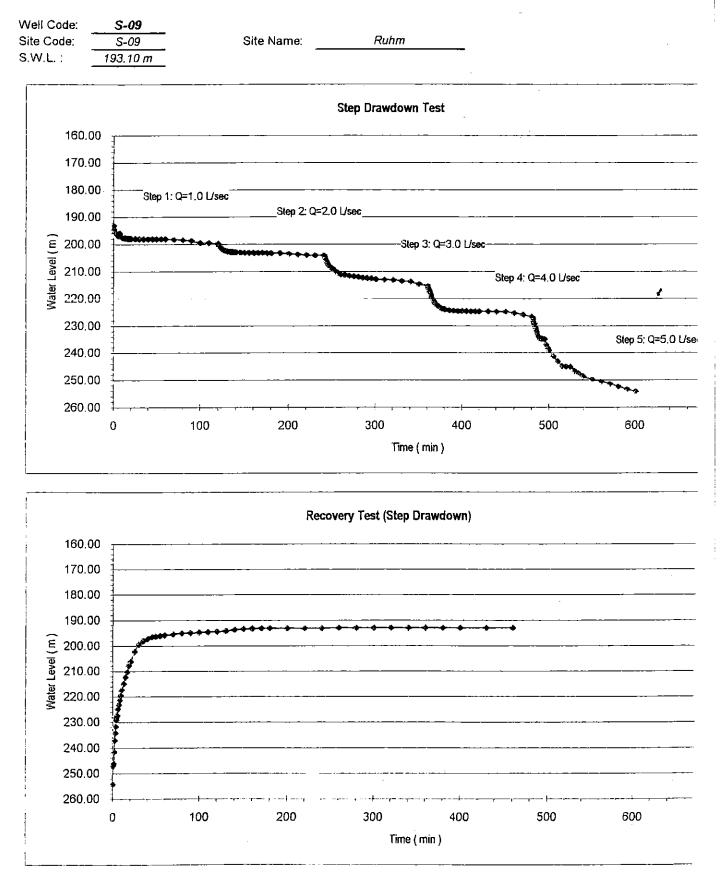
Site name: <u>Ruhm</u>

Governorate: Sana'a

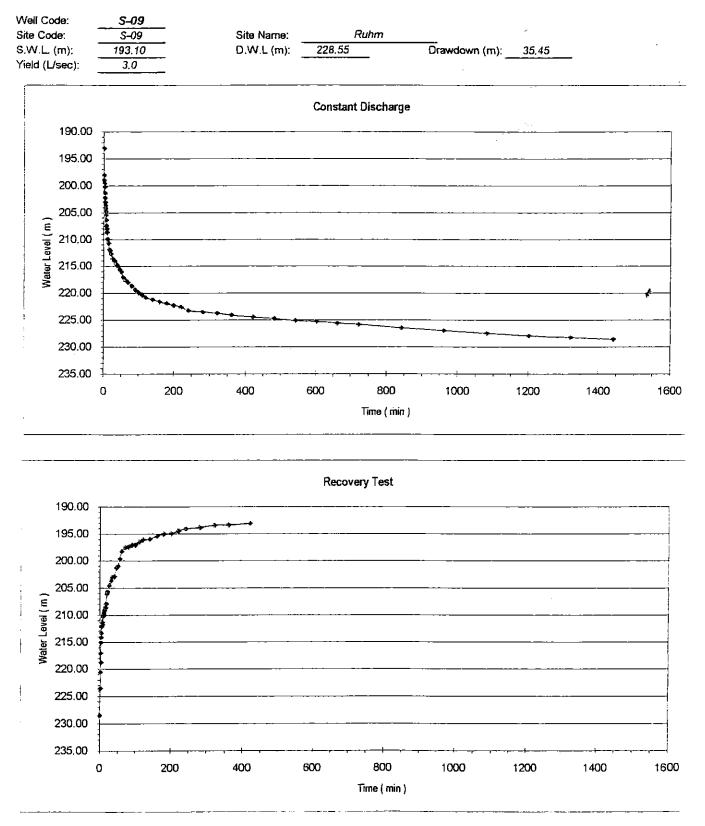
Duration	Constant Dischrg		est	Recove	ery Test	Water Analysis	
Duration (min)	Water level (m)	Drawdown (m)	Pumping rate (l/sec)	Water level (m)	Residual (m)	Conductivity ()	Remarks
70.0	217.93	24.83		197.47	4.37		
80.0	218.67	25.57		197.38	4.28		
90.0	219.39	26.29	· ·	197.01	3.91		
100.0	219.92	26.82		196.98	3.88		
110.0	220.31	27.21		196.40	3.30		<u> </u>
120.0	220.79	27.69		196.03	2.93		
140.0	221.19	28.09		195.99	2.89		
160.0	221.56	28.46		195.41	2.31		
180.0	221.91	28.81		195.05	1.95		
200.0	222.24	29.14		194.98	1.88		
220.0	222.55	29.45		194.45	1.35		
240.0	223.17	30.07		194.08	0.98		
280.0	223.48	30.38	i -	193.88	0.78		
320.0	223.73	30.63		193.46	0.36		
360.0	224.09	30.99		193.37	0.27		
420.0	224.43	31.33		193.10	0.00		
480.0	224.73	31.63					
540.0	225.12	32.02					
600.0	225.30	32.20					
660.0	225.58	32.48					
720.0	225.84	32.74					
840.0	226.46	33.36					
960.0	226.98	33.88					
1080.0	227.45	34.35					
1200.0	227.88	34.78					
1320.0	228.23	35.13					
1440.0	228.55	35.45					
							- —



Step	Q (1/sec)	D.W.L.(m)	Ds(m)
1	1.0	199.96	6.86
2	2.0	204.11	11.01
3	3.0	215.48	22.38
4	4.0	226.70	33.60
5	5.0	254.23	61.13



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Constant Dischrge Test

Pumping Test Report Sheet

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Well code: S-10/1 Site code: S-10 Site name: Tawa'ar
District: <u>Al Hesn</u> Governorate: <u>Sana'a</u>
Target water source: Existing projected deep well Well depth: 280 m
Contractor: Abdulkhaleg M. AL- Goli
Hydrogeologist in charge: Ali Abdullah Nagi AL- Gounaid
Operator: Mohammed Azeen
Date of start of the test: <u>15/8/2006</u> Date of end of the test: <u>18/8/2006</u>
Pump type: Vertical pump Engine: Iveco aifo
Pump installation depth: 220 m Datum level: 0.62 m S.W.L.: G.L134.78 m
Step drawdown test
Date/hour started: <u>16-8-2006-2:00am</u> Date/hour finished: <u>17-8-2006-12:35am</u> Total hours: <u>22:35</u>
Yield (I/sec): 1 st step 0.90 2 nd step 1.80 3 rd step 2.70 4 th step 3.60 5 th step 4.50
Water level before start the test (G.Lm): <u>134.78</u>
Water level after end of 5 th step (G.Lm): <u>201.32</u>
Water level after recovery (G.Lm): <u>134.78</u> Recovery hours: <u>12:35</u>
Constant discharge test
Date/hour started: <u>17-8-2006-12:40am</u> Date/hour finished: <u>18-8-2006-4:40pm</u> Total hours: <u>28:00</u>
Yield (I/sec): <u>3.80</u>
Water level before start of the test (G.Lm): 134.78
Water level after end of test (G.Lm): <u>180.62</u>
Water level after recovery (G.Lm): <u>134.78</u> Recovery hours: <u>4:00</u>
Drawdown (m): 45.84
Revised by:
Name :

Date:

Provisional Step Drawdown Test (1/2)

Well Code:	<u>S-10/1</u>	Site code:	S-10
Site name:	Tawa'ar		
District:	Al Hesn		
Governorate:	Sana'a		

Pump on date/hour:	15-8-2006-3:30pm
Pump off date/hour:	15-8-2006-6:00pm
End of recovery hour:	16-8-2006-1:40am
S.W.L (m):	135.40

 Contractor:
 Abdulkhaleg M. AL- Goli

 Hydrogeologist:
 Ali Abdullah Nagi AL- Gounaid

 Operator:
 Mohammed Azeen

Duran Hin	1st \$	Step	2nd	Step	3rd S	Step	4th S	Step	5th	Step	
Duration (min)	W.L. (m)	Yield (l/sec)	W.L. (m)	Yield (l/sec)	W.L. (m)	Yield (l/sec)	W.L. (m)	Yield (l/sec)	W.L. (m)	Yield (l/sec)	Recovery (m)
0.0	135.40	0.90	141.10	1.80	149.25	2.70	161.91	3.60	175.24	4.50	187.25
0.5	137.41		141.90		150.12		162.53		176.82		182.03
1.0	137.45		142.47		151.14		163.42		176.98	1	178.52
1.5	137.47		142.92		151.67		163.51		177.07		176.78
2.0	137.49		143.14		151.97		163.73		177.05		175.47
2.5	137.52		143.45		152.15		164.21		177.37		174.56
3.0	137.60		143.80		152.44		164.82		177.69		174.27
3.5	137.63		144.07		152.91		165.19		178.07		174.09
4.0	137.71 .		144.29		153.34	Ì	165.52	-	178.24		173.87
4.5	137.75		144.41		153.66		165.70		178.55		173.62
5.0	137.80		144.63		153.98		166.17		179.04		173,31
6.0	138.02		144.92		154.55		166.72		179.45	1	172.73
7.0	138.14		145.21		154.93		167.40		179.79		172.02
8.0	138.35		145.35		155.41		167.96		180.17		171.42
9.0	138.52		145.51		155.99		168.33		180.52	İ	170.81
10.0	138.60		145.73		156.62		168.92		180.93		170.24
12.0	138.87		146.05		157.23		169.55		181.67	P	169.03
14.0	139.07		146.78		158.05		170.60		182.32		167.94
16.0	139.14		147.35		158.51		171.85		183.05		166.92
18.0	139.23		147.80		159.09		172.34		183.64		165.85
20.0	139.29		148.33		159.59		172.88		185.02		164.96
22.0	139.50		148.55		159.87		173.39		185.57		163.22
24.0	139.57		148.64		160.23		173.82	- 1	186.14		163.01
26.0	140.69		148.87		160.92		174.35		186.55		162.50
28.0	140.90		149.02		161.43		174.97		186.97		161.79
30.0	141.10		149.25		161.91		175.24		187.25		161.00
35.0	-										159.21
40.0					•						158.07
45.0			··· · ·								156.72
50.0									·		155.50
60.0											153.23
70.0					•					· · · · · · · · · · · · · · · · · · ·	151.19
80.0											149.78
90.0									· · · · · · · · · · · · · · · · · · ·		148.39
100.0											147.61
120.0							· · ·				146.27
130.0		İ									145.25
140.0			· · · · · · · · · · · · · · · · · · ·					<u> </u> _			144.30
150.0	i						· · · · ·				143.36
170.0			!						•	·	142.44

Provisional Step Drawdown Test (2/2)

Well Code:	<u>S-10/1</u>	Site code:	<u>S-10</u>	Pump on date/hour:	
Site name:	Tawa'ar			Pump off date/hour:	
District:	Al Hesn			End of recovery hour:	
Governorate:	Sana'a			S.W.L (m):	

Contractor: Abdulkhaleg M. AL- Goli

Hydrogeologist: Ali Abdullah Nagi AL- Gounaid

Operator: Mohammed Azeen

	1st	Step	2nd	Step	3rd	Step	4th Step		5th	Step	.
Duration (min)	W.L. (m)	Yield (l/sec)	W.L. (m)	Yield (I/sec)	W.L. (m)	Yield (l/sec)	W.L. (m)	Yield (I/sec)	W.L. (m)	Yield (l/sec)	Recovery (m)
190.0											141.52
210.0			<u></u> -	_		· · .	. <u> </u>				140.72
220.0											139.92
240.0									··		139.14
260.0											137.94
280.0											136.86
300.0											135.94
320.0											135.64
340.0											135.45
360.0											135.40
380.0											135.40
400.0											135.40
420.0											135.40
440.0					· - <u>-</u> -						135.40
460.0					•						135.40
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Step Drawdown Test (1/2)

Well Code:	S-10/1	Site code:	S-10
Site name:	Tawa'ar		
District:	Al Hesn		
Governorate:	Sana'a		

Pump on date/hour:	16-8-2006-2:00am
Pump off date/hour:	16-8-2006-12:00pm
End of recovery hour:	17-8-2006-12:35am
S.W.L (m):	135.40

Contractor:	Abdulkhaleg M. AL- Goli	_
Hydrogeologi	st: Ali Abdullah Nagi AL- Gounaid	_
Operator	Mohammed Azeen	

Operator: <u>Mohammed Azeer</u>

	1st S	Step	2nd \$	Step	3rd \$	Step	4th Step		5th Step		Decourse	
Duration (min)	W.L.	Yield	W.L.	Yield	W.L.	Yield	W.L.	Yield	W.Ĺ.	Yield	Recovery (m)	
	(m)	(I/sec)	(m)	(I/sec)	(m)	(l/sec)	(m)	(l/sec)	(m)	(l/sec)		
0.0	135.40	0.90	146.95	1.80	160.45	2.70	179.40	3.60	190.94	4.50	201.94	
0.5	136.03		148,19		161.77		180.04		191.04		196.01	
1.0	136.73		148.65		162.80		180.08		191.45		193.98	
1.5	136.98		148.95		163.11		180.13		191.85		191.72	
2.0	137.38		149.10		163.52		180.18		191.97		191.09	
2.5	137.51		149.27		163.79		180.22		192.11		190.18	
3.0	137.65		149.49		163.95		180.31		192.45		189.77	
3.5	137.74		149.57		164.27		180.37		192.45		189.65	
4.0	137.82		149.66		164.60		181.14		192.80		189.60	
4.5	137.93		149.75		164.94		181.40		193.14		189.38	
5.0	137.97		149.84		165.22		1 81 .68		193.37		189.26	
6.0	138.03		149.93		165.55		182.03		193.94		189.11	
7.0	138.08		150.17		165.91		182.43	-	194.12		188.55	
8.0	138.09		150.42		166.14		182.75		194.35		188.08	
9.0	138.18		150.52		166.45		182.93		194.81		187.32	
10.0	138.33		150.63		166.76		183.52		194.99		186.93	
12.0	138,67	^	150.95		167.23		183.94		195.44		186.03	
14.0	139.13		151.12		167.55		184.32		195.76		185.12	
16.0	139.35		151.14		167.96		184.80		195.89		184.32	
18.0	139.57		151.37		168.31		185.10		196.34		183.52	
20.0	139.73		151.74		168.56		185.27		196.65		182.77	
25.0	140.03		152.85		169.07		185.73		197.69		180.97	
30.0	140.42		153,12		169.79		186.26		197.98	_	179.22	
35.0	140.67		154.24		171.10		186.95	_	198.14		177.80	
40.0	141.17		155.12		171.63		187.14		198.44		176.39	
45.0	141.55		156.54		172.37		187.23		199.80		175.23	
50.0	141.93		157.04		173.35		187.85		200.24		174.20	
55.0	142.13		157.35		173.94		188.02		200.57		173.17	
60.0	143.07		157.53		174.62		188.43		200.88		172.28	
70.0	145.30		157.92	†	175.26		188.95		201.12		170.72	
80.0	146.30		158.64		176.04		189.03		201.34		169.42	
90.0	146.42		159.43		177.02		189.85		201.40		168.03	
100.0	146,56		159.97	†	177.75		189.92		201.60		166.04	
110.0	146.77		160.42		178.48	†	190.45		201.85		164.80	
120.0	146.95		160.45	[179.40		190.94		201.94		163.39	
140.0						†			<u> </u>		162.24	
160.0			_					····-			161.41	
180.0	~·										160.57	
200.0							-		<u> </u>	†	159.74	
220.0			;					l.			158.92	

Step	Drawdown	Test	(2/2)
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Well Code:			Site code: <u>S-10</u> Site name: <u>Tawa'ar</u>								
District:	<u>Al He</u>	sn	Governorate: Sana'a								
	1st	Step	2nd	Step	3rd Step		4th Step		5th Step		
Duration - (min)	W.L. (m)	Yield (l/sec)	W.L. (m)	Yield (l/sec)	W.L. (m)	Yield (l/sec)	W <u>L</u> (m)	Yield (l/sec)	W.L. (m)	Yield (l/sec)	Recov (m
240.0	<u></u>					_					156.4
260.0	·										154.8
280.0	<u> </u>										153.3
320.0							_				150.2
350.0											148.0
380.0											145.7
410.0											144.9
450.0				_							143.1
505.0									/		139.8
545.0											137.5
585.0											135.7
625.0						<u> </u>	<u> </u>				135.4
665.0				<u>_</u>							135.4
705.0										<u>.</u>	135.4
755.0											135.4
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Constant Discharge & Recorery Test (1/2)

Well Code:	S-10/1	Site code:	S-10
Site name:	Tawa'ar		
District:	Al Hesn		
Governorate:	Sana'a		

Contractor: <u>Abdulkhaleg M. AL- Goli</u> Hydrogeologist: <u>Ali Abdullah Nagi AL- Gounaid</u> Operator: <u>Mohammed Azeen</u>

Pump on date/hour:	17-8-2006-12:40am
Pump off date/hour:	18-8-2006-12:40am
End of recovery hour:	18-8-2006-4:40pm

S.W.L (m):	135.40	
D.W.L (m):	181.24	
Yield (l/sec):	2.2	

Co		tant Dischrge Te	est	Recove	ery Test	Water Analysis		
Duration - (min)	Water level (m)	Drawdown (m)	Pumping rate (I/sec)	Water level (m)	Residual (m)	Conductivity ()	Remarks	
0.0	135.40	0.00		181.24	45.84			
0.5	137.47	2.07		175.33	39.93			
1.0	138.12	2.72		172.93	37.53			
1.5	138.65	3.25		170.53	35.13	· ·		
2.0	138.94	3.54		168.03	32.63			
2.5	139.44	4.04		166.92	31.52			
3.0	139.64	4.24		164.89	29.49			
3.5	140.17	4.77		163.71	28.31			
4.0	140.23	4.83		162.68	27.28			
4.5	140.53	5.13		161.71	26.31			
5.0	140.70	5.30		160.67	25.27			
6.0	141.02	5.62		159.83	24.43			
7.0	141.37	5.97		158.71	23.31			
8.0	141.78	6.38		157.69	22.29			
9.0	141.92	6.52		156.72	21.32			
10.0	142.32	6.92		155.81	20.41			
12.0	143.61	8.21		154.63	19.23			
14.0	144.53	9.13		153.59	18.19			
16.0	145.02	9.62		152.61	17.21			
18.0	145.62	10.22		151.57	16.17	-	-	
20.0	145.92	10.52		150.60	15.20	<u> </u>		
25.0	148.23	12.83		149.73	14.33	1 -1		
30.0	151.12	15.72		148.72	13.32			
35.0	151.61	16.21		147.71	12.31	1		
40.0	151.97	16.57		145.69	10.29			
45.0	152.83	17.43		143.68	8.28			
50.0	153.52	18.12		141.78	6.38			
55.0	154.35	18.95		139.67	4.27			
60.0	154.64	19.24		138.66	3.26		<u> </u>	

Constant Discharge & Recorery Test (2/2)

Well Code: District: S-10/1

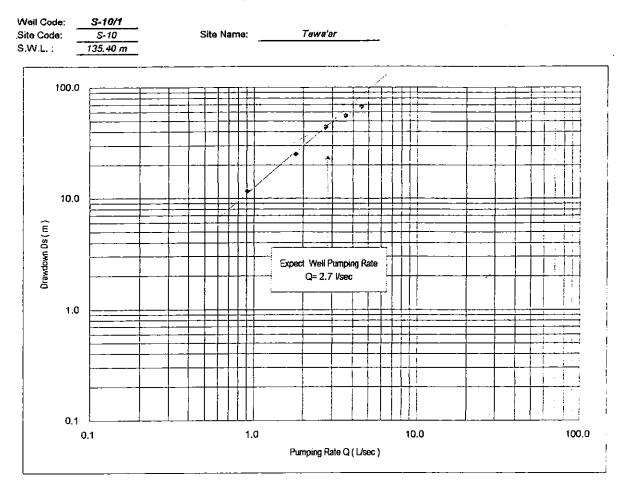
Al Hesn

Site code: <u>S-10</u>

Site name: <u>Tawa'ar</u>

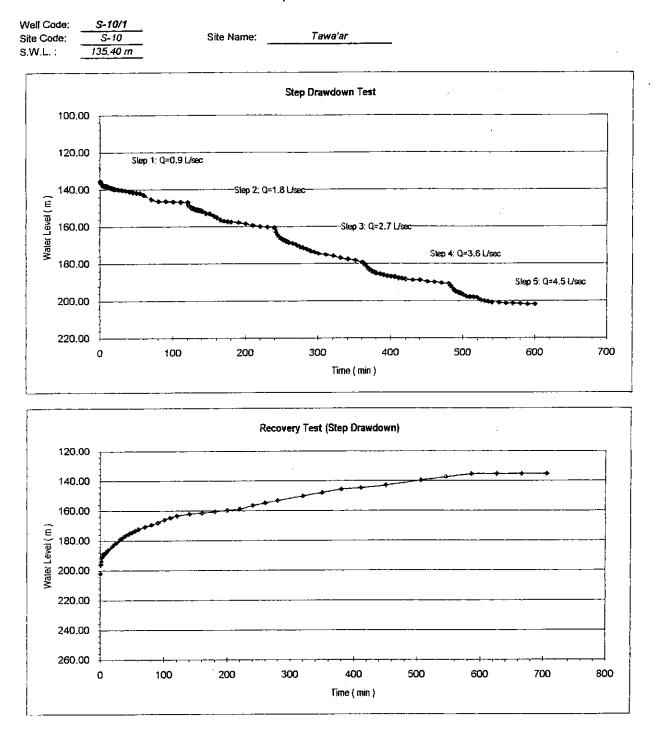
Governorate: Sana'a

Duration	Cons	tant Dischrge Te	est	Recove	ery Test	Water Analysis	
(min) Water level (m)		Drawdown Pumping (m) rate (l/sec)		Water level (m)	Residual (m)	Conductivity ()	Remarks
70.0	155.46	20.06		137.92	2.52		
80.0	155.95	20.55		136.89	1.49		
90.0	156.77	21.37		135.95	0.55		
100.0	157.78	22.38		135.71	0.31		
110.0	158.43	23.03		135.66	0.26		
120.0	159.36	23.96		135.52	0.12		
140.0	160.64	25.24		135.45	0.05	1	
160.0	161.67	26.27		135.40	0.00		
180.0	162.53	27.13		135.40	0.00		
200.0	163.41	28.01	ĺ	135.40	0.00		
220.0	163.97	28.57		135.40	0.00		-
240.0	164.12	28.72		135.40	0.00		
280.0	164.55	29.15			··		
320.0	165.74	30.34				1	
360.0	166.73	31.33					
420.0	166.93	31.53	•••••			·	
480.0	167.24	31.84		2			
540.0	167.53	32.13					
600.0	167.82	32.42					
660.0	168.84	33.44			· · · · · · · · · · · · · · · · · · ·		
720.0	169.54	34.14			· ·		
840.0	169.80	34.40					
960.0	170.04	34.64			· · · · · · · · · · · · · · · · · · ·		
1080.0	173.68	38.28					
1200.0	177.40	42.00					
1320.0	179.38	43.98					
1440.0	181.24	45.84					
·							
i							

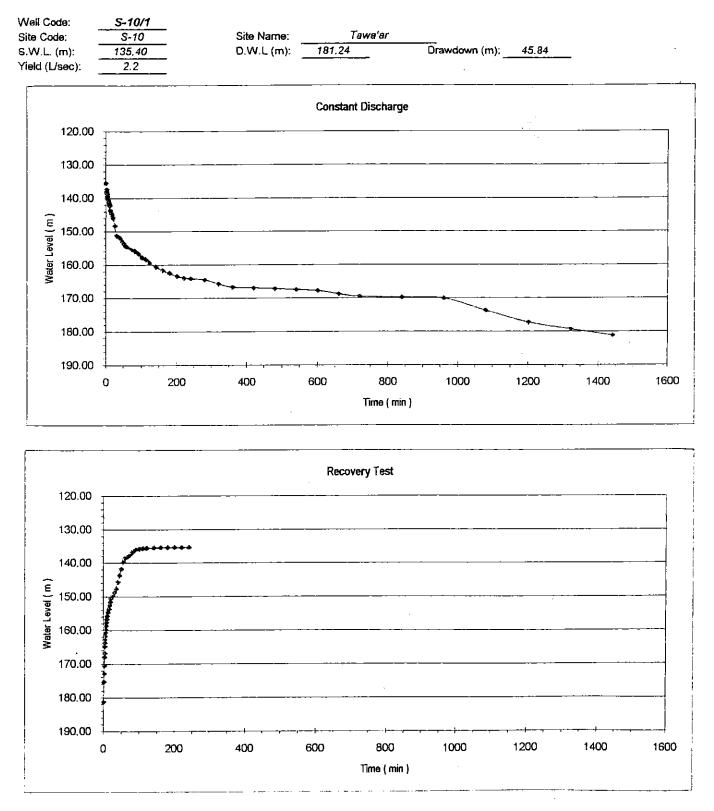


Slep	Q(I/sec)	0.W.L.(m)	Dis(mi)		
1	0.9	146.95	11,55		
2	1.8	160.45	25.05		
3	2.7	179.40	44.00		
4	3,6	190.94	55.54		
5	4.5	201.94	66,54		

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Constant Dischrge Test



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Pumping Test Report Sheet

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Well code: S-10/2 Site code:	S-10 Site пате:	Tawa'ar
District: Al Hesn	Governorate:	Sana'a
Target water source: <u>Existing projected of</u>	<u>deep well</u> Well dep	oth: <u>310 m</u>
Contractor: Abdulkhaleg M	1. AL- Goli	
Hydrogeologist in charge: Ali Abdulla	h Nagi AL- Gounaid	
Operator:Bulul	l	
Date of start of the test: <u>13/8/2006</u>	Date of end of the test:	16/8/2006
Pump type: Vertical pump	Engine:	lveco aifo
Pump installation depth: 220 m	Datum level: 0.53	<u>m</u> S.W.L.: <u>G.L144.74 m</u>
Step drawdown test		—
		006-10:20pm Total hours: <u>16:20</u>
Yield (l/sec): 1^{st} step <u>1.70</u> 2^{nd} step <u>3.4</u>		<u>6.70</u> 5" step <u>8.50</u>
• • •	160.27	
Water level after end of 5 th step (G.Lm):	<u>169.37</u>	y hours: 6:20
Water level after recovery (G.Lm):	144.83 Recover	y nours: 0.20
Constant discharge test	- · · · ·	
Date/hour started: 14-8-2006-10:30pm Viold (l/pape) 2.80	Date/hour finished: <u>16-8-20</u>	006-6:30pm Total hours: 44:00
Yield (l/sec): <u>3.80</u>		
Water level before start of the test (G.Lm):	144.74	
Water level after end of test (G.Lm):	<u>155.96</u> 144.74 Recover	y hours: 20:00 ~
Water level after recovery (G.Lm):	<u>144.74</u> Recovery	y hours: <u>20.00</u>
Drawdown (m): <u>11.22</u>		
Revised by:		
Name :		·
Date:	<u> </u>	

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Provisional Step Drawdown Test (1/2)

Well Code:	<u>S-10/2</u>	Site code:	<u>S-10</u>
Site name:	Tawa'ar		
District:	Al Hesn		
Governorate:	Sana'a		

Pump on date/hour:	13-8-2006-4;10pm
Pump off date/hour:	13-8-2006-6;40pm
End of recovery hour:	14-8-2006-1:00am
S.W.L (m):	145.27

Contractor: Abdulkhaleg M. AL- Goli

Hydrogeologist: Ali Abdullah Nagi AL- Gounaid

Operator: Bulul

• "			2nd	2nd Step 3rd Step			4th \$	Step	5th Step		D
Duration (min)	W.L. (m)	Yield (1/sec)	W.L. (m)	Yield (l/sec)	W.L. (m)	Yield (l/sec)	W.L. (m)	Yield (I/sec)	W.L. (m)	Yield (I/sec)	Recovery (m)
0.0	145.27	1.70	148.85	3.40	152.10	5.10	156.88	6.80	161.96	8.50	168.18
0.5	146.20		150.60		153.52		158.15		162.48		162.30
1.0	146.60		152.00		154.80		158.86		162.95		158.23
1.5	147.00		152.02		155.45		159.30		163.80		148.50
2.0	147.30		152,02		155.81		159,92		164.60		148.16
2.5	147.80		152.02		155.96		160.48		165.20		147.98
3.0	148.10		152.04		156.12	-	161.10		166.32	·····	147,64
3.5	148.24		52.05		156.21		161.36		167.20		147.28
4.0	148.35		152.07		156.36		161.60		167.55		146.90
4.5	148.52		152.07		156.38		161.70		167.65		146.62
5.0	148.58		152.07		156.40		161.78		167.73		146.18
6.0	148.60		152.07		156.50		161.85		167.93		145.33
7.0	148.64		152.07		156.58		161.87		168.05		145.27
8.0	148.65		152.07		156.60		161.87		168.08		145.33
9.0	148.67		152.08		156.63		161.87		168.10		14535
10.0	148.70		152.09		156.68		161.89		168.12		145.38
12.0	148.75		152.10		156.71		161.89		168.13		145.39
14.0	148.82		152.10		156.75		161.91		168.15		145.39
16.0	148.82		152.10		156.80		161.92		168.15		145.39
18.0	148.82		152.10		156.82		161.92		168.16		145.40
20.0	148.82		152.10		156.83		161.94		168.16		145.40
22.0	148.82		1 52.1 0		156.85		190.95		168.17		145.40
24.0	148.82		152.10		156.87		191.95		168.17		145.40
26.0	148.85		152.10	Î	156.88		161.95		168.18		145,40
28.0	148.85		152.10		156.88		161.96		168.18		145.40
30.0	148.85		152.10		156.88		161.96		168.18		145.39
50.0											145.39
55.0										•	145.38
60.0											145.38
70.0											145.37
80.0											145.36
90.0											145.36
100.0											145.36
110.0											145.36
120.0											145.36
140.0											145.36
160.0											145.36
180.0											145.36
200.0	·						:		5		145.36
220.0									1		145.36

Provisional Step Drawdown Test (2/2)

Well Code:	S-10/2	Site code:	S-10	Pump on date/hour:	
Site name:	Tawa'ar		_	Pump off date/hour:	
District:	Al Hesn		_	End of recovery hour:	· ·
Governorate:	Sana'a	·	_	S.W.L (m):	

Contractor: <u>Abdulkhaleg M. AL- Goli</u> Hydrogeologist: <u>Ali Abdullah Nagi AL- Gounaid</u> Operator: <u>Bulul</u>

Duratian -		1st Step		2nd Step		3rd Step		4th Step		5th Step	
Duration (min)	W.L. (m)	Yield (l/sec)	W.L. (m)	Yield (l/sec)	W.L. (m)	Yield (I/sec)	W.L. (m)	Yield (I/sec)	W.L. (m)	Yield (I/sec)	Recovery (m)
240.0											145.37
260.0											145.36
280.0	· · ·										145.36
300.0							·				145.36
320.0						·		· · · · · · · · · · · · · · · · · · ·			145.36
340.0							-				145.36
360.0							1	i		-	145.36
380.0						• • • •					145,36
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Well Code:	<u>S-10/2</u>	Site code:	<u>S-10</u>
Site name:	Tawa'ar		
District:	Al Hesn	<u></u>	
Governorate:	Sana'a		

Pump on date/hour:	14-8-2006-6:00am
Pump off date/hour:	14-8-2006-4:00pm
End of recovery hour:	14-8-2006-10:20pm
S.W.L (m):	145.36

Contractor: <u>Abdulkhaleg M. AL- Goli</u> Hydrogeologist: <u>Ali Abdullah Nagi AL- Gounaid</u>

Operator: Bulul

D	1st S	Step	2nd	Step	3rd S	Step	4th S	Step	5th S	Step	
Duration (min)	W.L. (m)	Yield (l/sec)	W.L. ' (m)	Yield (l/sec)	W.L. (m)	Yield (l/sec)	W.L. (m)	Yield (l/sec)	W.L. (m)	Yield (I/sec)	Recovery (m)
0.0	145.36	1.70	149.11	3.40	151.97	5.10	157.59	6.80	163.98	8.50	169.90
0.5	146.56		150.20		153.08		158.60		167.20		163.95
1.0	146.70		150.75		154.75		160.30		167.72		156.55
1.5	147.15		151.10		155.69		160.90		167.83		147.63
2.0	147.82		151.36		156.27	-	161.52		168.21		147.38
2.5	148.10		151.52		156.52		161.87		168.50		147.18
3.0	148.20		151.65		156.70		162.12		168.68		147.06
3.5	148.42		151.72		156.83		162.38		168.79		146.95
4.0	148.38		151.76		156.92		162.73		168.94		146.63
4.5	148.38		151.78		157.02		163.00		169.02		146.46
5.0	148.38		151.79		157.08		163.06		169.30		146.34
6.0	148.40		151.80		157.15		163.15		169.38		146.21
7.0	148.49		151.81		157.18		163.18		169.42		146.12
8.0	148.49		151.82		157.20		163.26		169.50		146.03
9.0	148.50		151.82		157,21		163.32		169.58		145.97
10.0	148.52		151.83		157.22		163.35		169.63		145.93
12.0	148.56		151.83		157.22		163.36		169.65		145.86
14.0	148.74		151.83		157.23		163.36	. –	169.66		145.70
16.0	148.82		151.84		157.26		163,37		169.67		145.66
18.0	148.82		151.84		157,31		163.37		169.68		145.61
20.0	148.82		151.84		157.38		163.38		169.69		145.57
25.0	148.82		151.85		157.45		163.38		169.70		145.52
30.0	148.82		151.85		157.46		163.38		169.71		145.48
35.0	148.82		151.86		157.47		163.39		169.71		145.45
40.0	148.82		151.87		157.48		163.39		169,71		145.42
45.0	148.82		151.88		157.49		163.39		169.72		145.39
50.0	148.82		151.89		157.50		163.40		169.72		145.37
55.0	148.82		151.90		157.50		163,40		169.74		145.36
60.0	148.82		151.91		157.52		163.45		169.74		145.36
70.0	148.92		151.92		157.55		163.58		169.80		145.36
80.0	149.05		151.94		157.58		163.71		169.82		145.37
90.0	149.05		151.95		157,58		163.90		169.82		145.37
100.0	149.06		151.96		157.58		163.92		169.84		145.37
110.0	149.08		151.96		157.59		163.95		169.86		145.38
120.0	149.11		151.97		157.59		163.98		169.90		145.38
140.0											145.38
160.0			!								145.37
180.0											145.37
200.0			1								145.37
220.0					i						145.37

Well Code: District:	S-1 Al Hes		Site c	ode:	S-10	- Go	Site name overnorate	: <u>Tawa'ar</u> : Sana'a			
	1st	Step	2nd	2nd Step 3rd Ste		Step	4th	Step	5th Step		
Duration - (min)	W.L. (m)	Yield (l/sec)	W.L. (m)	Yield (I/sec)	W.L. (m)	Yield (l/sec)	W.L. (m)	Yield (l/sec)	W.L. (m)	Yield (l/sec)	Recovery (m)
240.0		<u> </u>							+ 	-	145.37
260.0							<u>-</u> -				145.36
280.0									-		145.36
300.0				-							145.36
320.0										••	145.36
340.0											145.36
360.0						<u>.</u>					145.36
380.0								<u> </u>			145.36
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Constant Discharge & Recorery Test (1/2)

Well Code:	S-10/2	Site code:	S-10
Site name:	Tawa'ar		-
District:	Al Hesn		-
Governorate:	Sana'a	<u></u>	_

Contractor: Abdulkhaleg M. AL- Goli Hydrogeologist: Ali Abdullah Nagi AL-Gounaid Bulul

Operator:

Pump on date/hour: 14-8-2006-10:30pm Pump off date/hour: _______15-8-2006-10:30pm____ End of recovery hour: <u>16-8-2006-6:30pm</u>

S.W.L (m): _	145.36
D.W.L (m):	156.49
Yield (I/sec):	4.1

	Cons	tant Dischrge Te	est	Recove	ry Test	Water Analysis	
Duration - (min)	Water level (m)	Drawdown (m)	Pumping rate (I/sec)	Water level (m)	Residual (m)	Conductivity ()	Remarks
0.0	145.36	0.00		156.49	11.13		-
0.5	149.42	4.06		153.33	7.97		
1.0	151.08	5.72		149.62	4.26		
1.5	152.80	7.44		148.23	2.87		
2.0	154.80	9.44		147.95	2.59		
2.5	155.12	9.76		147.53	2.17		
3.0	155.60	10.24		147.18	1.82		
3.5	155.83	10.47		147.05	1.69		
4.0	155.85	10.49		146.93	1.57		
4.5	155.86	10.50		146.84	1.48		
5.0	155.90	10.54		146.75	1.39		
6.0	155.90	10.54	-	146.53	1.17		
7.0	155.90	10.54		146.36	1.00		
8.0	155.95	10.59		146.23	0.87		
9.0	156.00	10.64		146.13	0.77		
10.0	156.00	10.64		146.04	0.68		
12.0	156.04	10.68		145.92	0.56		
14.0	156.05	10.69		145.83	0.47		
16.0	156.05	10.69		145.76	0.40		
18.0	156.07	10.71		145.66	0.30		
20.0	156.09	10.73		145.60	0.24		
25.0	156.23	10.87		145.56	0.20		
30.0	156.26	10.90		145.52	0.16		
35.0	156.32	10.96		145.48	0.12		
40.0	156.34	10.98		145.47	0.11		
45.0	156.37	11.01		145.47	0.11		
50.0	156.38	11.02		145,47	0.11		
55.0	156.38	11.02		145.46	0.10		
60.0	156.38	11.02		145.46	0.10		

Constant Discharge & Recorery Test (2/2)

S-10

Well Code: District: S-10/2

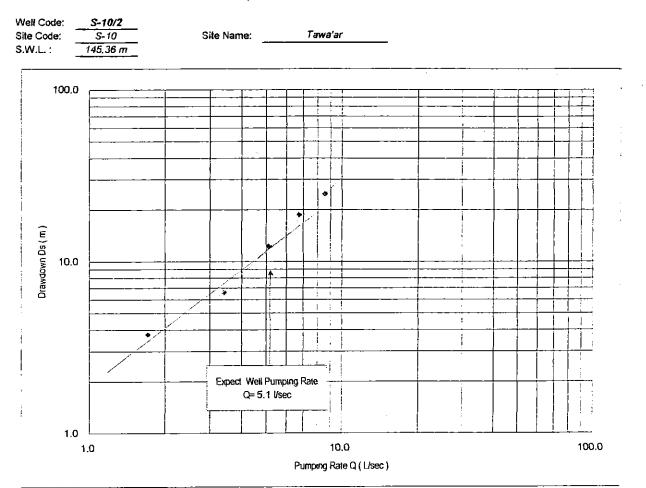
Al Hesn

Site code:

Site name: <u>Tawa'ar</u>

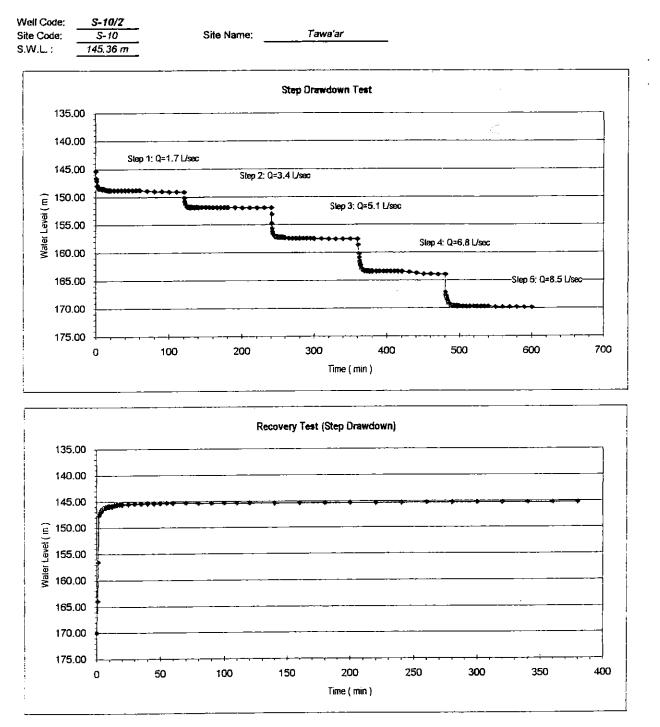
Governorate: Sana'a

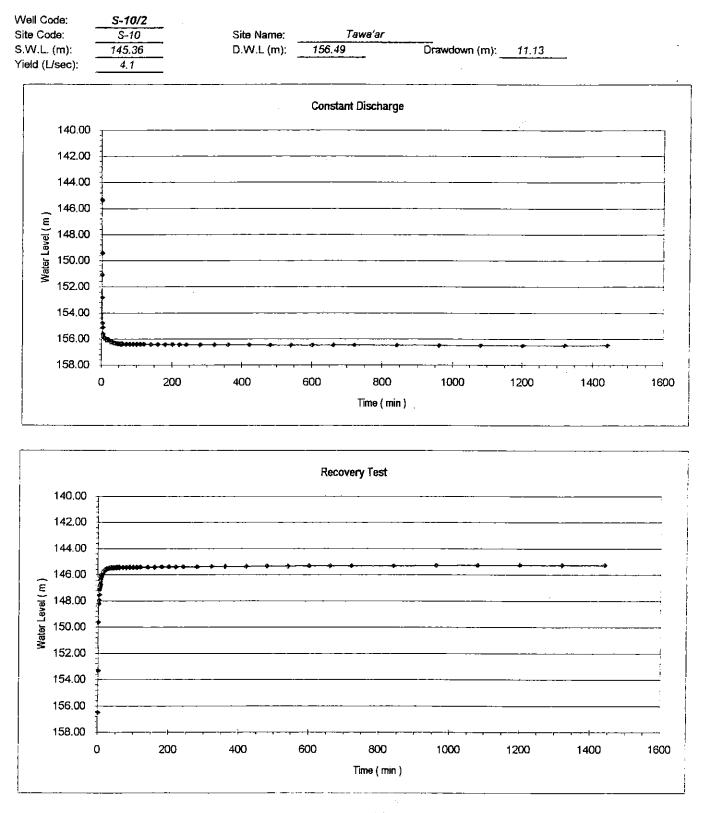
Duration	Cons	tant Dischrge Te	est	Recove	ery Test	Water Analysis	
Duration (min)	Water level (m)	Drawdown (m)	Pumping rate (I/sec)	Water level (m)	Residual (m)	Conductivity ()	Remarks
70.0	156.40	11.04		145.45	0.09		
80.0	156.40	11.04		145.45	0.09		
90.0	156.40	11.04		145.44	0.08		
100.0	156.41	11.05		145.44	0.08		
110.0	156.41	11.05		145.44	0.08		
120.0	156.41	11.05	† †	145.43	0.07	1	
140.0	156.42	11.06		145.42	0.06		
160.0	156.42	11.06		145.42	0.06		
180.0	156.43	11.07		145.41	0.05		
200.0	156.43	11.07		145.41	0.05		
220.0	156.45	11.09		145.41	0.05		<u>.</u>
240.0	156.46	11.10		145.41	0.05		<u>. </u>
280.0	156.46	11.10		145.40	0.04		
320.0	156.46	11.10	1	145.39	0.03		
360.0	156.46	11.10		145.38	0.02		
420.0	156.46	11.10		145.37	0.01		
480.0	156.47	11.11		145.36	0.00		
540.0	156.47	11.11		145.35	-0.01		
600.0	156.48	11.12		145.33	-0.03		
660.0	156.48	11.12		145.33	-0.03		
720.0	156.48	11.12		145.32	-0.04		
840.0	156.48	11.12		145.32	-0.04		
960.0	156.49	11.13		145.31	-0.05		
1080.0	156.49	11.13		145.28	-0.08		
1200.0	156.49	11.13		145.27	-0.09		
1320.0	156.49	11.13		145.27	-0.09		
1440.0	156.49	11.13		145.27	-0.09		
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JULE DIAWOOMI TEST	Step	Drawdown	Test
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Step	Q(I/sec)	D.W.L.(m)	Ds(m)
1	1.7	149.11	3.75
2	3,4	151.97	6.61
3	5.1	157.59	12.23
4	6.7	163.98	18.62
5	8.5	169.90	24.54





Constant Dischrge Test

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Pumping Test Report Sheet

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Well code:	Site code:S	S-11	Site name	:AI	Hesn-Al Abya	ad .
District:	Jehana		Governo	orate:	Sana'a	
	-				-	
Target water source:	New projected de	ep well	_	Well depth:	350 m	
Contractor:	Abdulkhaleg M.	1.0				
Hydrogeologist in charge:	- <u>-</u>		Gounaid	·		
Operator:	Mohammed	Azeen				
Date of start of the test:	08/08/2006	n	ate of end o	of the test	13/08/20	າດຄ
					lveco aifo	<u>////</u>
Pump type: <u>V</u>			ngine:	0.67 m	•••••••••••••••••••••••••••••••••••••••	<u></u>
Pump installation depth:	<u>248 m</u>		atum ievei.	<u>0.67 m</u>	3.VV.L	G.L152.82 r
Step drawdown test						
	9-8-2006-4:15pm	Date/hou	r finished:	11-8-2006-6	5:00amTota	al hours: <u>37:4</u>
Yield (l/sec): 1 st step	1.20 2 nd step 2.40	03 rd ste	р_ <u>3.60</u>	4 th step	305 th step	6.00
Water level before start th	 ie test (G.Lm):	154.1	1	-		
Water level after end of 5th	^{ih} step (G.Lm):	243.1	2			
Water level after recovery	-	154.1	1	Recovery hou	urs: <u>27:45</u>	
Constant discharge test	=					
Date/hour started:1	11-8-2006-8:00am	Date/hour	r finished:	13-8-2006-1.	2:00am_ Tota	al hours: <u>50:00</u>
Yield (I/sec): <u>3.80</u>	-					
Water level before start of the	e test (G.Lm):	154.11	1			
Water level after end of te	st (G.Lm):	219.12	?			
Water level after recovery	(G.Lm):	154.11	1	Recovery hou	irs: <u>26:00</u>	
Drawdown (m):65.0)1					

Revised by:

Name.:

Date:

Provisional Step Drawdown Test

Well Code:	S-11/1	Site code:	<u>S-11</u>	Pump on date/hour:	8-8-2006-8:30am
Site name:	Al Hesn-Al Abyad			Pump off date/hour:	8-8-2006-11:00am
District:	Jehana			End of recovery hour:	9-8-2006-4:10am
Governorate:	Sana'a			S.W.L (m):	153.49

Contractor: <u>Abdulkhaleg M. AL- Goli</u> Hydrogeologist: <u>Ali Abdullah Nagi AL- Gounaid</u>

Operator: Mohammed Azeen

5	1st S	Step	2nd 3	Step	3rd St	ер	4th S	Step	5th S	Step	Because
Duration (min)	W.L. (m)	Yield (l/sec)	W.L. (m)	Yield (!/sec)	W.L. (m)	Yield (l/sec)	W.L. (m)	Yield (l/sec)	W.L. (m)	Yield (l/sec)	Recovery (m)
0.0	153.49	1.20	160.14	2.40	168.19	3.60	178.98	4.80	194.60	6.00	213.58
0.5	155.14		190.92		168.93		179.31		194.21		207.95
1.0	156.60		161.34		168.89		179.87		195.04		204.12
1.5	157.08		161.45		169.28		180.54		195.52		201.99
2.0	157.61		161.81		169.59		181.19	· · · · · · · · · · · · · · · · · · ·	196.01		200.22
2.5	158.12		162.01		169.86		181.72		196.54		198.88
3.0	158.62		162.38		170.01		182.11		197.68		197.83
3.5	158.64		162.82		170.22		182.62		198.45		197.27
4.0	158.70		163.09		170.31		182.81		199.03		196.98
4.5	158.75		163.59		170.44		183.27		199.50		196.66
5.0	158.77		163.72		170.58		183.76		199.98		196.10
6.0	158.79		164.06		171.09	-	184.30		200.66		195.01
7.0	158,81		164.19		171.73		184.85		201,70		193.98
8.0	158.85		164.31		172.42		185.52		202.73		193.11
9.0	158.89		164.47		172.96		186.03		203.21		192.21
10.0	159.08		164.52		173.37		186.59		203.94		191.42
12.0	159.34		165.64		174.15		187.45		205.22		198.88
14.0	159.41		165.48		174.87		188.38		206.43		188.21
16.0	159.48		165.73		175.44		189.26		207.52		186.94
18.0	159.59		165.98		175.87		189.95		208.46		185.69
20.0	159.98		166.33	-	176.49		190.78		209.47		184.45
22.0	160.00		166.68		176.71	ĺ	191.35		210.35		183.57
24.0	160.04		166.71		177.02		192.04		211.18		182.56
26.0	160.07		166.95		177.64		193.02		212.02		181.81
28.0	160.11		167.88		178.53		193.83		212.95	-	180.96
30.0	160.14		168.19		178.98		194.60		213.58		180.33
50.0											178.49
60.0	• •		-			-	<u> </u>				176.08
70.0			-			_					174.89
80.0			<u>.</u>								172.76
90.0					-				<u>.</u>		170.41
100.0							-				168.35
110.0						<u> </u>					166.33
120.0		t			<u> </u>	· ·					164.34
140.0			 .		<u> </u>						161.73
160.0			· · · ·				·· ·· ··			ſ	159.17
180.0											158.18
200.0					i						157.07
220.0	<u>_</u>		<u> </u>		-						156.90
340.0	1					[156.06

Provisional Step Drawdown Test (2/2)

Well Code:	<u>S-11/1</u>	Site code:	<u>S-11</u>	Pump on date/hour:	
Site name:	Al Hesn-Al Abyad			Pump off date/hour:	
District:	Jehana			End of recovery hour:	<u>_</u>
Governorate:	Sana'a			S.W.L (m):	
				_	

Contractor: <u>Abdulkhaleg M. AL- Goli</u> Hydrogeologist: <u>Ali Abdullah Nagi AL- Gounaid</u> Operator: <u>Mohammed Azeen</u>

	1st S	Step	2nd 3	Step	3rc	Step	4th	Step	5th	Step	D
Duration (min)	W.L. (m)	Yield (l/sec)	W.L. (m)	Yield (l/sec)	W.L. (m)	Yield (l/sec)	W.L. (m)	Yield (l/sec)	W.L. (m)	Yield (I/sec)	Recovery (m)
460.0								·			155.59
760.0											155.30
820.0											155.22
880.0											155.17
940.0			<u></u>								155.08
1000.0				<u> </u>							155.05
1060.0	<u></u>	<u> </u>	·								155.02
1180.0			<u> </u>								154.98
1300.0							· ·				154.89
1360.0			-				;				154.81
1430.0											154.78
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Step Drawdown Test (1/2)

Well Code:	<u></u>	Site code:	S-11
Site name:	Al Hesn-Al Abyad		
District:	Jehana		
Governorate:	Sana'a		

Pump on date/hour:	9-8-2006-4:15pm
Pump off date/hour:	10-8-2006-2:15am
End of recovery hour:	11-8-2006-6:00am
S.W.L (m):	154.78

Contractor: Abdulkhaleg M. AL- Goli

Hydrogeologist: Ali Abdullah Nagi AL- Gounaid

Operator: Mohammed Azeen

	1st \$	Step	2nd	Step	3rd S	Step	4th S	Step	5th S	Step	
Duration (min)	W.L. (m)	Yield (I/sec)	W.L. (m)	Yield (l/sec)	W.L. (m)	Yield (l/sec)	W.L. (m)	Yield (I/sec)	W.L. (m)	Yield (l/sec)	Recovery (m)
0.0	154.78	1.20	168.71	2.40	180.04	3.60	199.49	4.80	223.78	6.00	243.79
0.5	161.08		169.16		181.69		200.01		224.22		238.02
1.0	161.10		169.51		182.05		201.18		224.54		236.13
1.5	161.14		169.89		182.20		202.25		224.87		230.00
2.0	161.16		170.08		182.26		202.85		225.08		229.82
2.5	161.19		170.21	_	182.30		203.15		225.63		229.41
3.0	161.22		170.31		182.35		203.63		225.95		228.06
3.5	161.26		170.42		182.58		203.97		226.28		227.08
4.0	161.28		170.59		182.76		204.21		226.57		226.65
4.5	161.30		170.68		183.09		204.88		226.80		226.37
5.0	161.34		170.76		183.52		205.33		227.11		226.03
6.0	161.41		171.08		183.64		205.95		227.69		224.95
7.0	161.46		171.21		183.90		206.22		228.14		223.98
8.0	161.54		171.32		184.21	_	206.77		228.52		223.12
9,0	162.01		171.48		184.52		206.11		228.82		222.09
10.0	162.39		171.69		184.77		207.70		229.00		221,20
12.0	162.50		171.90		185.30		208.56		230.01		219.43
14.0	162.78		172.06		185.71		209.37		230.38		217.49
16.0	163.00		172.21		186.00	ſ	210.22		230.82		216.27
18.0	163.54		172.37		186.66		210.74		231.32		214.48
20.0	163.99		172.61		186.78		211.35		231.74		21 3.18
25.0	164.73		172.13	-	187.86		212.69		232.50		209.95
30.0	165.42	l	173.13	-	188.72		213.78		233.41		207.23
35.0	165.97		173.30		189.34		214.73		234.10		204.71
40.0	166.35		173.37		189.96	Î	215.48		235.03		202.71
45.0	166.58		173.44		190.86		216.11		235.92		200.45
50.0	166.73	·	174.08		192.04		216.83		236.54		198.73
55.0	167.35		174.85		193.67		217.31		237.16		197.16
60.0	167.52		175.10		195.05		217.98		237.61		195.68
70.0	168.03		175.26		196.28		219.49		238.64		192.95
80.0	168.24		176.90		196.99		220.94		239.47		191.19
90.0	168.36		177.54		197,95		221.98		240.26		189.47
100.0	168.69		178.88		198.63		222.77		241.38		188.27
110.0	168.70		179.54		199.07		223.29		242.52		187.37
120.0	168.71		180.04		199.49		223.78		243.79		186.10
140.0											185.12
160.0											184.61
180.0											183.60
200.0											182.59
230.0	· · · · · ·										179.14

Step Drawdown Test (2/2)

S-11

Well	Code:
Distri	ict:

Jehana

S-11/1 Site code:

Site name: <u>Al Hesn-Al Abyad</u>

1st Step 2nd Step 3rd Step 4th Step 5th Step Duration Recovery W.L. Yield W.L, Yield W.L. Yield W.L. Yield W.L. Yield (min) (m) (m) (I/sec) (m) (l/sec) (m) (l/sec) (m) (l/sec) (m) (l/sec) . 290.0 177.30 350.0 176.22 380.0 173.46 440.0 171.50 500.0 168.40 560.0 166.08 680.0 165.03 800.0 164.23 860.0 163.10 920.0 162.40 980.0 161.51 1040.0 160.50 1100.0 159.49 1160.0 158.48 1220.0 157.38 1280.0 156.89 1340.0 156.41 1400.0 156.06 1460.0 155.90 1520.0 155.45 1580.0 155.02 1640.0 154.78

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Constant Discharge & Recorery Test (1/2)

Well Code:	<u>S-11/1</u>	Site code:	S-11
Site name:	Al Hesn-Al Abyad		
District:	Jehana		
Governorate:	Sana'a		

 Contractor:
 Abdulkhaleg M. AL- Goli

 Hydrogeologist:
 Ali Abdullah Nagi AL- Gounaid

 Operator:
 Mohammed Azeen

 Pump on date/hour:
 11-8-2006-8:00am

 Pump off date/hour:
 12-8-2006-8:00am

 End of recovery hour:
 13-8-2006-12:00am

S.W.L (m): _	154.78
D.W.L (m):	219.79
Yield (l/sec):	3.8

Duration Co		tant Dischrge T	est	Recove	ry Test	Water Analysis	
Duration (min)	Water level (m)	Drawdown (m)	Pumping rate (l/sec)	Water level (m)	Residual (m)	Conductivity ()	Remarks
0.0	154.78	0.00		219.79	65.01		
0.5	160.16	5.38		213.97	59.19		
1.0	163.52	8.74		210.09	55.31		
1.5	166.34	11.56		209.99	55.21		
2.0	167.29	12.51		208.13	53.35		
2.5	168.14	13.36		207.06	52.28		
3.0	169.70	14.92		206.76	51.98		
3.5	169.95	15.17		205.75	50.97		
4.0	170.30	15.52		205.75	50.97		
4.5	170.48	15.70		205.74	50.96		
5.0	170.60	15.82		204.98	50.20		
6.0	171.11	16.33		204.13	49.35		
7.0	171.62	16.84		203.88	49.10		
8.0	172.01	17.23		202.93	48.15		
9.0	172.55	17.77		202.76	47.98		
10.0	172.89	18.11		202.42	47.64		
12.0	173.60	18.82		201.02	46.24		
14.0	174.20	19.42		200.56	45.78		
16.0	174.65	19.87		199.93	45.15		
18.0	175.23	20.45		198.28	43.50		
20.0	175.61	20.83		197.12	42.34		
25.0	177.14	22.36		196.93	42.15		
30.0	178.63	23.85		195.87	41.09		
35.0	179.69	24.91		194.21	39.43		
40.0	180.50	25.72		193.41	38.63		·
45.0	181.03	26.25		192.72	37.94		
50.0	181.52	26.74		191.93	37.15		
55.0	182.70	27.92		190.41	35.63		
60.0	183.95	29.17	1	189.82	35.04		

Constant Discharge & Recorery Test (2/2)

Well Code: District: S-11/1

Jehana

.

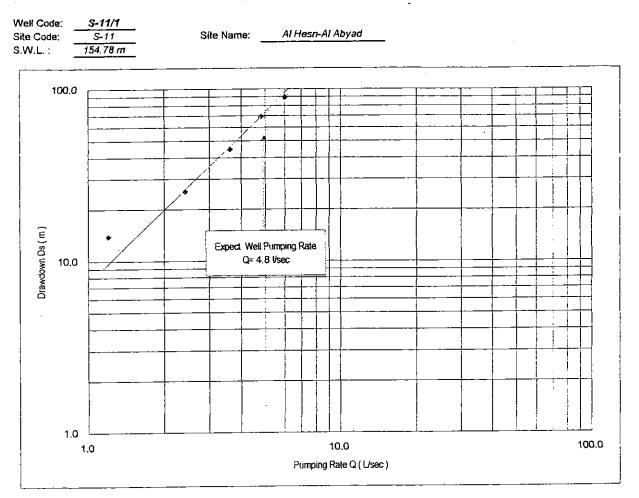
Site code: ______S-11

Site name: <u>Al Hesn-Al Abyad</u>

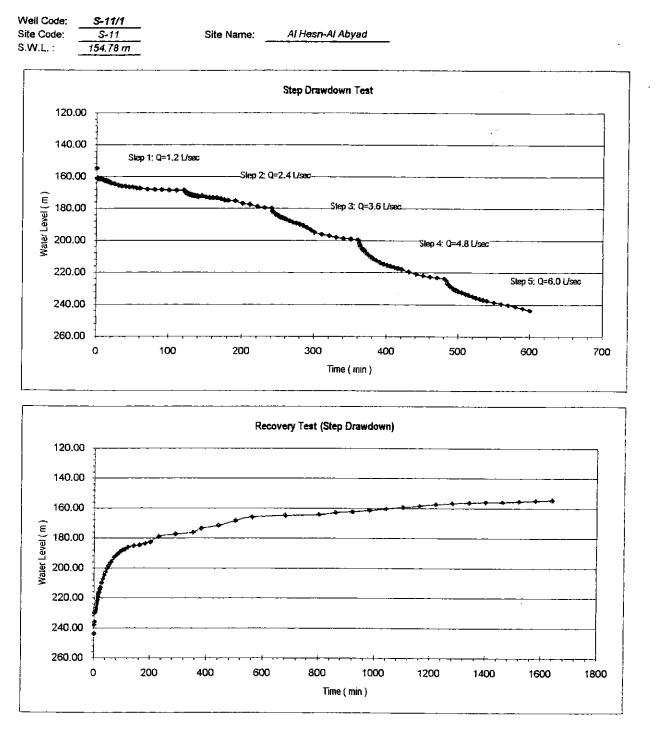
Governorate: Sana'a

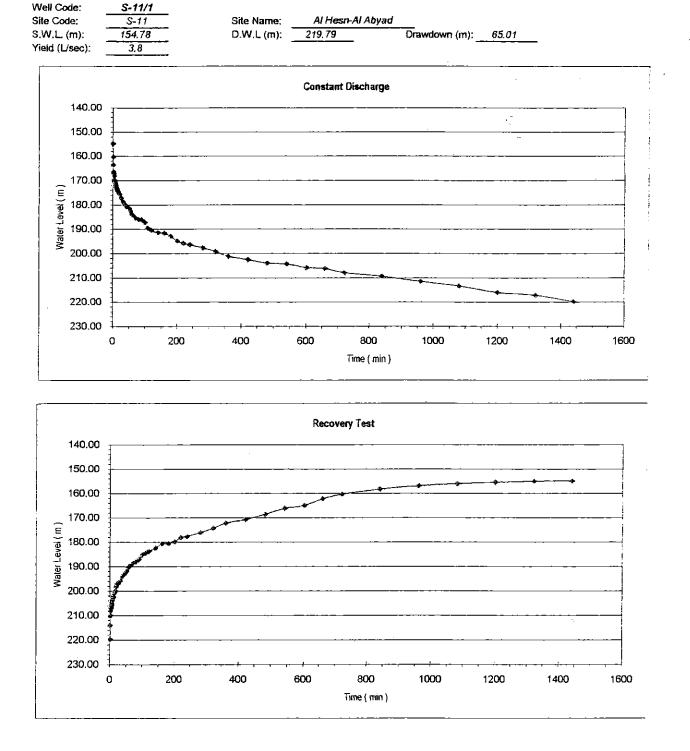
Duratian	Cons	tant Dischrge Te	est	Recove	ery Test	Water Analysis	
Duration((min)	Water level (m)	Drawdown (m)	Pumping rate (l/sec)	Water level (m)	Residual (m)	Conductivity ()	Remarks
70.0	185.37	30.59		188.68	33.90		
80.0	185.93	31.15		187.84	33.06		
90.0	186.18	31.40		187.03	32.25		
100.0	187.14	32.36		185.18	30.40		
110.0	189.53	34.75		184.45	29.67		
120.0	190.44	35.66		183.68	28.90		
140.0	191.37	36.59		182.48	27.70		
160.0	191.56	36.78		180.64	25.86		<u>.</u>
180.0	193.04	38.26		180.68	25.90		
200.0	194.97	40.19		179.90	25.12		
220.0	195.93	41.15		178.13	23.35		
240.0	196.42	41.64		177.73	22.95		
280.0	197.76	42.98		176.10	21.32		
320.0	199.17	44.39		174.37	19.59		
360.0	201.24	46.46		172.20	17.42		
420.0	202.49	47.71		170.78	16.00		
480.0	203.91	49.13		168.63	13.85		
540.0	204.39	49.61		166.22	11.44		
600.0	205.85	51.07		164.96	10.18		
660.0	206.25	51.47		162.28	7.50		
720.0	207.98	53.20		160.38	5.60		
840.0	209.35	54.57		158.31	3.53		
960.0	211.49	56.71		156.96	2.18		
1080.0	213.33	58.55		156.06	1.28		
1200.0	215.97	61.19		155.58	0.80		
1320.0	217.12	62.34		155.07	0.29		
1440.0	219.79	65.01		154.95	0.17		
1560.0				154.78	0.00		
	-						

1.2 · · · 2.25



Slep	Q(I/sec)	D,W.L.(m)	Ds(m)
1	1.2	168.71	13.93
2	2.4	180.04	25.26
3	3.6	199.49	44.71
4	4.8	223.78	69.00
5	6.0	243.79	89.01





Constant Dischrge Test

	·····	. <u></u>					
		Pumpir	ia Test	Report	Sheet		
		· · · · · · · · · · · · · · · · · · ·					
Well code:	S-12	_ Site code:	S-12	Site name	:	Mahdah	<u> </u>
District:		Jehana		. Governo	orate:	Sana'a	
- / /		No			Well depth:	350 m	
l arget water	source:	New projected	aeep weii		wen deptri.		
Contractor:		Abdulkhaleg	M. AL- Go	li			
_		Ali Abdu					
Operator:		Mohmme					
			-				
Date of start o	f the test:	12/8/2006		Date of end of	of the test:	15/8/200	06
Pump type:	Ve	ertical pump		Engine:		lveco aifo	
Pump installat	ion depth:	248 m	<u> </u>	Datum level:	0.82 m	S.W.L.: _	G.L57.78 m
Step drawdov							
		-8-2006-10:15am				- <u>9:05am</u> Tota	-
		<u>30</u> 2 nd step 2			_4" step <u>_5.</u>	<u>20</u> 5 th step _	6.50
		e test (G.Lm):					
		step (G.Lm):		5.71		0.40	
Water level aft	er recovery ((G.Lm):	63.	01	Recovery ho	ours: <u>3:40</u>	
Constant dia	abarra taat						
Constant dis Date/hour star	<u>*_</u>	= 3-8-2006-8:10pm	Date/h/	our finished:	15-8-2006-	5.10am Tota	il hours: 31:00
Yield (l/sec):		<u>5-0-2000-0. TOpin</u>			0_0_2000	<u>0.100</u> 10.0	
Water level befo		- • test (G tm);	57.	78			
Water level aft		•	76.				
Water level aft		•	57.		Recovery ho	urs: 7:00	
Drawdown (m)	-						
		<u> </u>					
							ч.

Revised by:

Name :

Date:

Provisional Step Drawdown Test

Well Code:	<u>S-12</u>	Site code:	
Site name:	Mahdah	· · · · · · · · · · · · · · · · · · ·	
District:	Jehana		
Governorate:	Sana'a		

 Pump on date/hour:
 12-8-2006-11:30pm

 Pump off date/hour:
 13-8-2006-2:00am

 End of recovery hour:
 13-8-2006-10:10am

 S.W.L (m):
 58.60

Contractor: Abdulkhaleg M. AL- Goli

Hydrogeologist: Ali Abdullah Nagi AL- Gounaid

Operator: Mohmmed Azeen

D ()	1st 9	Step	2nd s	Step	3rd S	Step	4th 3	Step	5th S	Step	
Duration (min)	W.L. (m)	Yield (l/sec)	W.L. (m)	Yield (l/sec)	W.L. (m)	Yield (l/sec)	W.L. (m)	Yield (l/sec)	W.L. (m)	Yield (l/sec)	Recovery (m)
											70.14
0.0	58.60	1.30	61.64	2.60	64.39	3.90	71.04	5.20	77.08	6.50	79.41
0.5	60.35		62.32		65.40		71.87		77.23		77.00
1.0	60.79		62.44	<u> </u>	65.56		72.19		77.28		76.07
1.5	61.12		62.50		65.62		72.88		77.31		75.36
2.0 2.5	61.17 61.22		62.55		65.68 65.75		73.14		77.35		74.28
2.5	61.22		62.57 62.67		65.81		73.92		77.37		72.09
3.0	61.26				65.86		73.92		77.41		72.09
4.0	61.30		62.75 62.83		65.92		74.18 74.64		77.41		70.68
4.0	31.32		62.83		66.02		74.84		77.43		69.54
<u>4.5</u> 5.0	61.34		62.87		66.17		74.85		77.50		68.76
6.0	61.35		62.92		66.28		75.93		77.53		67.81
7.0	61.36		63.18		66.37		76.54		77.57		66.17
8.0	61.30	<u> </u>	63.37		66.49	<u> </u>	76.73		77,61	<u></u>	65.64
9.0	61.38		63.56		66.57		76.77		77.66		65.38
<u>9.0</u> 10.0	61.39		63.81		66.66		76.81	-	77.71		65.19
12.0	61.45		64.16		67.01		76.83		77.95	<u> </u>	65.03
14.0	61,48		64.20		67.74		76.88		78.24		64.87
16.0	61.51		64.23		68.19	·	76.91		78.37		64.71
18.0	61.54		64,26		68.81	+	76.94		78.59	<u>+</u>	64.53
20.0	64.57		64.29		69.31		76.95		78.71		64.33
20.0	61.59		64.33		69.71		76.97		78.87		64.12
24.0	61.61		64.36		70.32		76.99		78.99		63.96
24.0	61.62		64.37		70.52	<u> </u>	77.02		79.15		63.82
28.0	61.63		<u></u>		70.37		77.05		79.29		63.68
30.0	61.64		64.39		71.04		77.08		79.41		63.55
50.0	01.04		04.00				11.00		10.41	<u> </u>	62.82
70.0											62.15
90.0			··		-	+					61.59
110.0	- <u></u>					+					61.19
130.0				<u> </u>		 -					60.44
150.0											60.11
170.0						- +					59.87
190.0											59.68
210.0						-	· ·			<u> </u> -	59.50
230.0					····		· · · · · · · · ·				59.32
250.0		<u>_</u>							· · · ·	[59.15
270.0											59.00
290.0						· {·			<u> </u>		58.88
490.0		— - · · · •	i						<u> </u>		58.60

Well Code:	<u>S-12</u>	Site code:	S-12
Site name:	Mahdah		
District:	Jehana		
Governorate:	Sana'a		

Pump on date/hour:	13-8-2006-10:15am
Pump off date/hour:	12/8/2006 3:45am
End of recovery hour:	14-8-2006-9:05am
S.W.L (m);	58.60

Contractor: Abdulkhaleg M. AL- Goli

Hydrogeologist: Ali Abdullah Nagi AL- Gounaid

Operator: Mohmmed Azeen

Duration	1st \$	Step	2nd S	Step	3rd S	Step	4th	Step	5th \$	Step	2
Duration (min)	 W.L. (m)	Yield (I/sec)	W.L. ((m)	Yield (l/sec)	W.L. (m)	Yield (l/sec)	W.L. (m)	Yield (l/sec)	W.L. (m)	Yield (l/sec)	Recovery (m)
0.0	58.60	1.30	63.20	2.60	67.85	4.20	76.97		92.47	6.50	107.53
0.5	59.42		63.31		68.40	4.20	76.93	0.20	93.74		107.53
1.0	60.38		63.48		69.38		76.98		94.21	-	99.12
1.5	61.41		63.59		69.80		77.03	- ·	94,79		95.64
2.0	61.45		63.68		70,20		77.05		95.11		93.49
2.5	61.47	- -	63.84		70.32		77.05		95.63		91.52
3.0	61.48		63.79		70.48		77.06		95.73		89.88
3.5	61.49		64.08		71.00		77.06		96.04		89.54
4.0	61.50		64.19		71.32		77.08	·	96.66	·	89.44
4.5	61.60		64.21		71.52		77.08		96.96		89.35
5.0	61.61		64.24		71.73		77.09		97.27		88.39
6.0	61.63		64.27		72.13		77.09		97.79		85.98
7.0	61.64		64.32		72.30		77.10	-	98.44		83.87
8.0	61,66		64.43	· · · · · · · · · · · · · · · · · · ·	72.93		77.11		99.36		81.27
9.0	61.67		64.44		73.32		77.13		99.68		79.25
10.0	61.69		64.47		73.57		77.17		100.32		77.79
12.0	61.70		64.47		73.84		77.19		100.93		77.34
14.0	61.71		64.59		74.16		77.24		101.59		77.13
16.0	61.74		64.59		74.43		77.43		102,17		77.03
18.0	61.80		64.67		74.72	1	77.53		102.62		76.97
20.0	61.96		64.74		74.76		78.28		102.84		76.85
25.0	62.13		64.92		75.12		81.97		103.14		75.47
30.0	62.57		65.04		76.39		84.34		103.43		70.66
35.0	62.86		65.05 <u>;</u>		76.64		85.65		104.03	'	67.64
40.0	62.93		65.11		76.82		87.99		104.59		66.99
45.0	62.95		65.18	1	76.88		89.14		104.68		65.69
50.0	62.95		65.23		76.89		89.63		104.76		65.61
55.0	62.95		65.37	1	76.91		89.74		105.06		65.60
60.0	62.97		65.48		76.92		89.85		105.16		65.59
70.0	62.99		65.78		76.93		90.03		105.40	†	65.57
80.0	63.01		66.34		76.93		91.05		105.64		65.50
90.0	63.01		67.57		76.94		91.06		105.98		65.44
100.0	63.13		67.57		76.95		91.74		106.14		65.32
110.0	63.18		67.58		76.96		92.13		106.87		65.30
120.0	63.20		67.85		76.97		92.47		107.53		65.27
140.0			· · · · · · · · · · · · · · · · · · ·								64.93
160.0											64.64
180.0	· ·						Ì			. 1	64.37
200.0							i				64.10
220.0											63.83

Constant Discharge & Recorery Test (1/2)

Well Code:	S-12	Site code:	<u>S-12</u>
Site name:	Mahdah		
District:	Jehana		
Governorate:	Sana'a		

Contractor: <u>Abdulkhaleg M. AL- Goli</u> Hydrogeologist: <u>Ali Abdullah Nagi AL- Gounaid</u> Operator: Mohmmed Azeen
 Pump on date/hour:
 13-8-2006-8:10pm

 Pump off date/hour:
 14-8-2006-8:10pm

 End of recovery hour:
 15-8-2006-5:10am

S.W.L (m):	58.60
D.W.L (m): _	77.34
Yield (l/sec):	2.2

Duration	Cons	tant Dischrge T	est	Recove	ery Test	Water Analysis	
Duration (min)	Water level (m)	Drawdown (m)	Pumping rate (I/sec)	Water level (m)	Residual (m)	Conductivity ()	Remarks
0.0	58.60	0.00		77.34	18.74		
0.5	62.72	4.12	· .	72.73	14.13		
1.0	63.33	4.73		71.81	13.21		<u> </u>
1.5	63.82	5.22		71.52	12.92		
2.0	64.01	5.41		71.02	12.42		
2.5	64.22	5.62		70.98	12.38		
3.0	64.43	5.83		70.79	12.19		
3.5	64.54	5.94	1-	70.66	12.06		
4.0	64.65	6.05		70.52	11.92		
4.5	64.78	6.18		70.40	11.80		•.
5.0	64.93	6.33		70.21	11.61		
6.0	65.06	6.46		70.01	11.41		
7.0	65.13	6.53		69.23	10.63		
8.0	65.23	6.63		68.33	9.73		
9.0	65.27	6.67		68.00	9.40		
10.0	65.32	6.72		67.88	9.28		
12.0	65.43	6.83		67.45	8.85		
14.0	65.80	7.20		67.08	8.48		_
16.0	65.87	7.27		66.99	8.39		
18.0	65.99	7.39		66.56	7.96		
20.0	66,17	7.57		66.17	7.57	2	
25.0	66.97	8.37		65.92	7.32		
30.0	67.50	8.90		65.66	7.06		
35.0	67.62	9.02		65.39	6.79		
40.0	67.82	9.22		65.13	6.53		
45.0	68.32	9.72		64.97	6.37		
50.0	68.58	9.98		64.68	6.08		
55.0	68.67	10.07		64.41	5.81		
60.0	68.72	10.12		64.13	5.53		

Constant Discharge & Recorery Test (2/2)

Well Code: District: S-12

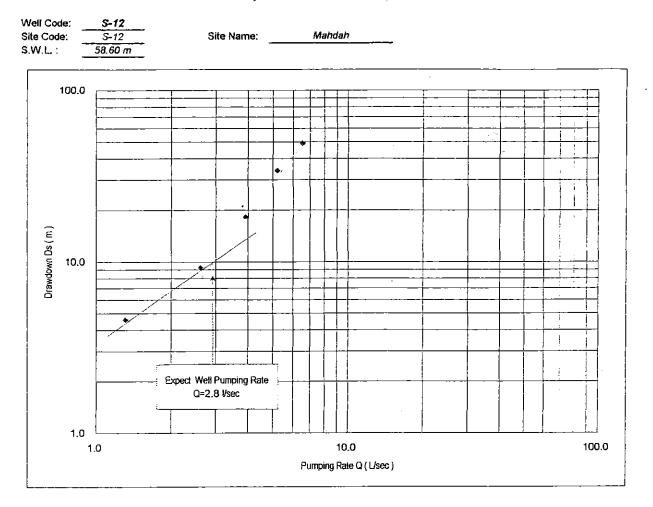
Jehana

Site code:

S-12 Site name: <u>Mahdah</u>

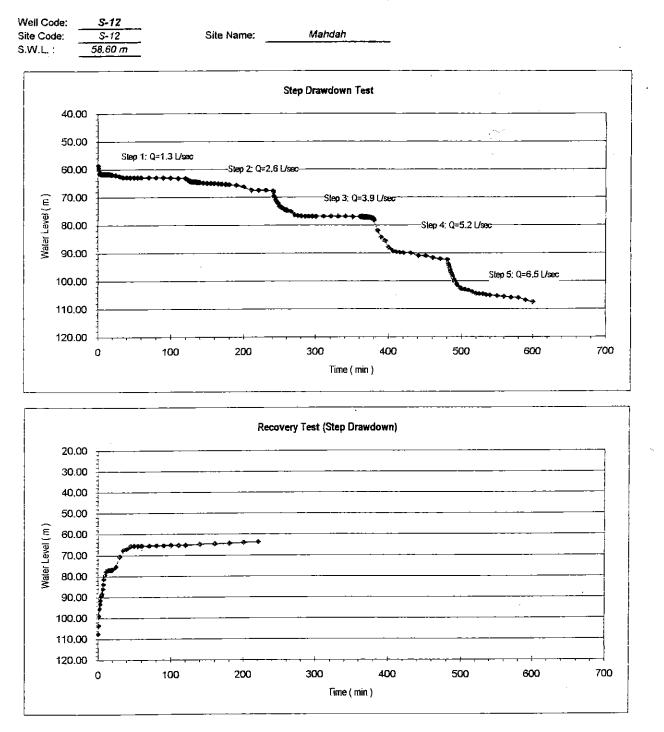
Governorate: Sana'a

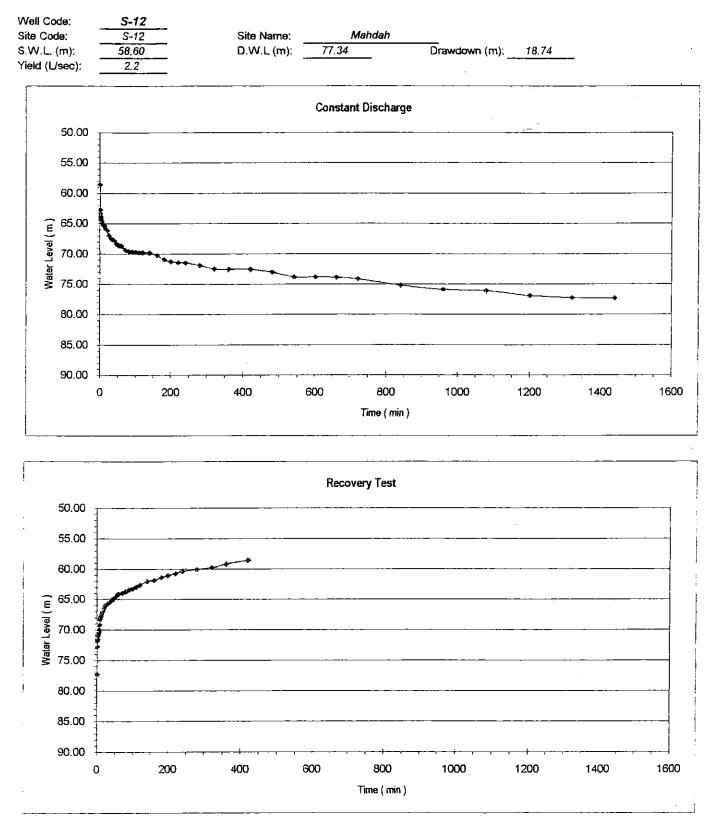
	Cons	tant Dischrge Te	est	Recove	ery Test	Water Analysis	
Duration (min)	Water level (m)	Drawdown (m)	Pumping rate (l/sec)	Water level (m)	Residual (m)	Conductivity ()	Remarks
70.0	69.40	10.80		63.98	5.38		
80.0	69.64	11.04		63.71	5.11		
90.0	69.69	11.09		63.43	4.83		
100.0	69.76	11.16		63.19	4.59		
110.0	69.79	11.19		62.95	4.35		
120.0	69.79	11.19		62.65	4.05		
140.0	69.87	11.27		62.02	3.42		
160.0	70.30	11.70		61.88	3.28		
180.0	70.99	12.39		61.38	2.78		
200.0	71.32	12.72		61.06	2.46		
220.0	71.47	12.87		60.79	2.19		
240.0	71,53	12.93		60.37	1.77		
280.0	71.95	13.35		60.12	1.52		
320.0	72.53	13.93		59.81	1.21		54 1
360.0	72.56	13.96		59.21	0.61		
420.0	72.58	13.98		58.60	0.00		
480.0	73.03	14.43					
540.0	73.84	15.24					
600.0	73,86	15.26					
660.0	73.88	15.28			·		
720.0	74.16	15.56				,	
840.0	75.23	16.63					
960.0	75.90	17.30					
1080.0	76.10	17.50					
1200.0	76.89	18.29					
1320.0	77.27	18.67					
1440.0	77.34	18.74					
	· · · · · · · · · · · · · · · · · · ·						
						↓	<u>-</u> <u>-</u>
						<u> </u>	



Step	Step Q(I/sec)		Ds(m)
1	1,3	63.20	4.60
2	2.6	67.85	9.25
3	3.9	76.87	18.27
4	5.2	92.47	33.87
5	5 6.5		48.93

14 - 302





Constant Dischrge Test

Pumping Test Report Sheet

Well code:	S-14	Site code:	S-14	Site name	•	Al Ghail	
District:		 Nehm		Governo	orate:	Sana'a	
Target water	source:	Existing projecte	d deep wel	I	Well depth:	<u>185 m</u>	
Contractor:		Abdulkhaleg	<u> M. AL- Go</u>	li			
Hydrogeologi	st in charge:	Ali Abdu	illah Nagi A	L- Gounaid			
Operator:		Βι	ılul				
Date of start of	of the test:	6/8/2006		Date of end of	of the test:	6/8/200	6
Pump type:	V	ertical pump		Engine:		lveco aifo	
Pump installa	ition depth:	<u>131 m</u>		Datum level:	<u>0.62 m</u>	S.W.L.: _	G.L73.28 n
Step drawdo	own test						
Date/hour sta	irted:		Date/ho	our finished:		Tota	I hours:
Yield (l/sec):	1 st step	0. <u>60</u> 2 nd step	1.20 _ 3 rd s	tep <u>1.80</u>	4 th step	105 th step	3.00
		e test (G.Lm):					
Water level a	fter end of 5 ¹	^h step (G.Lm):		. <u>.</u>			
Water level a	fter recovery	(G.Lm):			Recovery hou	ırs:	
Constant di	scharge test						
Date/hour sta	irted:		Date/ho	our finished:		Tota	hours:
Yield (l/sec):							
Water level be	fore start of th	e test (G.Lm):					
Water level a	fter end of te	st (G.Lm):		<u> </u>			
Water level a	fter recovery	(G.Lm):		<u> </u>	Recovery hou	ırs:	
Drawdown (m	ı):						
							`
Revised by:							
Name :	<u></u>	• • • • • • • • • • • • • • • • •	_				
Date:				~ .			
			14-9	05	<u> </u>		

Provisional Step Drawdown Test

<u> </u>	Site code:	S-14	Pump on date/hour:	6-8-2006-7:00am
Al Ghail			Pump off date/hour:	6-8-2006-8:00am
Nehm			End of recovery hour:	
Sana'a			S.W.L (m):	73.90
	Al Ghail Nehm	Al Ghail	Al Ghail	Al Ghail Pump off date/hour: Nehm End of recovery hour:

Contractor: Abdulkhaleg M. AL- Goli

Hydrogeologist: Ali Abdullah Nagi AL- Gounaid

Operator: Bulul

	1st S	Step	2nd	Step	3rd	Step	4th	Step	5th	Step	
Duration (min)	W.L. (m)	Yield (l/sec)	W.L. (m)	Yield (I/sec)	W.L. (m)	Yield (l/sec)	W.L. (m)	Yield (l/sec)	W.L. (m)	Yield (l/sec)	Recovery (m)
0.0	73.90	0.60	83.64	1.20		1.80		2.40		3.00	
0.5	79.30		83.96				·				
1.0	79.92		84.21								
1.5	80.20		84.40								
2.0	80.42		84.60				•		- •		
2.5	80.70		85.00								
3.0	80.85		85.48								
3.5	80.98		85.86								
4.0	81.02		86.20								
4.5	81.14		86.64								
5.0	81.25		87.00								۰.
6.0	81.33		87.74								
7.0	81.52		88.20								
8.0	81.65		88.82								
9.0	81.75		89.47								-
10.0	81.80		90.02						-		
12.0	81.80		90.73								
14.0	81.84		91.51								
16.0	81.82		91.95								
18.0	82.06		92.00								
20.0	82.35		92.26								
22.0	82.35		92.56					_			
24.0	82.79		93.40								
26.0	83.15		93.86		-						
28.0	83.50		94.15								
30.0	83.64		94.36						_		
				· .							
							- <u>-</u>				
		Pumped water is very dirty (lot of cla Pump blocked. Can not continue Well collapsed? Well depth measu				nd)	-				
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				•							
											<u> </u>
					1	4-306			:		