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September 10, 2012

427930.DI.DR

Mike Monasmith
Senior Project Manager
Systems Assessment & Facility Siting Division
California Energy Commission
1516 Ninth Street, MS-15
Sacramento, CA 95814

Subject: Supplemental Data Response, Set 4B
Hidden Hills Solar Electric Generating System (11-AFC-2)

Dear Mr. Monasmith:

On behalf of Hidden Hills Solar I, LLC; and Hidden Hills Solar II, LLC, please find attached a copy of Supplemental Data Response, Set 4B.

Please call me if you have any questions.

Sincerely,
CH2M HILL

John L. Carrier, J.D.
Program Manager

Encl.

c: POS List
Project file

Hidden Hills Solar Electric Generating System (HHSEGS)

(11-AFC-2)

Supplemental Data Response, Set 4B
(Response to Soil & Water Resources)

Submitted to the

California Energy Commission

Submitted by

Hidden Hills Solar I, LLC; and
Hidden Hills Solar II, LLC

September 10, 2012

With Assistance from

CH2MHILL
2485 Natomas Park Drive
Suite 600
Sacramento, CA 95833

Contents

Introduction

Attached are supplemental responses (Set 4B) by Hidden Hills Solar I, LLC, and Hidden Hills Solar II, LLC (collectively, "Applicant") to the California Energy Commission ("CEC") Staff's data requests for the Hidden Hills Solar Electric Generating System project ("HHSEGS" or "project") (11-AFC-2). These materials are provided in response to questions raised at a workshop held on April 27, 2012, information requested directly by staff (phone or email requests), or additional information that has become known since the AFC was filed.

The attachment is numbered in reference to the Supplemental Data Request number. For example, since the data request is WR-3, the Attachment is WR3-2 since it is the second attachment that has been submitted in response to this data request.

Soil and Water Resources (WR-3)

BACKGROUND

Data Request WR-3 was received at a workshop held at the California Energy Commission on April 27, 2012.

DATA REQUEST

WR-3. Please provide copies of maps of the stormwater retention area shown to workshop participants on April 27, 2012.

Response: Supplemental Data Response Set 4 provided the following materials in Attachment WR3-1:

- Evaporation Map
- Infiltration Calculations
- NRCS Physical Soil Properties
- Retention Summary
- Retention Area – Initial Ponding
- Retention Area – 24-hr Ponding

After the Applicant provided these materials, CEC Staff questioned the rate that stormwater would be disbursed. Consequently, the Applicant's expert consultants VTN and Ninyo & Moore performed additional drainage and infiltration tests. The experts concluded that based on the infiltration rates and drain time computations, it is anticipated that three 18-inch discharge pipes would be needed to drain the stormwater retention area in less than 24 hours. The report is provided as Attachment WR3-2.

Attachment WR3-2
Retention Basin Infiltration and Drain Time Analysis

ATTACHMENT WR3-2

MEMORANDUM

Date: August 24th, 2012
To: Michael Rojansky
From: Brian Ruiz
Subject: Hidden Hills Ranch SEGS - Retention Basin Infiltration and Drain Time Analysis
W.O.: 7302

At the request of BrightSource Energy, VTN has prepared an infiltration and drain time analysis for the proposed ±125-acre retention basin located on the Hidden Hills Ranch SEGS project. The analysis is based on infiltration rate testing conducted by Ninyo & Moore which has been included in the memorandum as Appendix B. Ninyo & Moore conducted double ring infiltrometer test at three locations within the proposed onsite retention area. The testing areas were representative of three onsite conditions that included the following:

- Exposed, disturbed soils in the wheel path of an existing unpaved roadway
- Undisturbed native desert soils
- Native desert area with approximately 20 passes of a truck to simulate the anticipated ground surface conditions after construction of the solar facility

Table 1 below shows the results of the infiltration rate testing conducted by Ninyo & Moore.

Table 1: Infiltration Test Results

Test No.	Ground Surface Conditions	Stabilized Infiltration Rate
DRI-1	Wheel path of existing unpaved road near Boring B-9	2.4 cm/hour
DRI-2	Undisturbed native desert near Boring B-5	2.1 cm/hour
DRI-3	Native desert with 20 vehicle passes southeast of Boring B-5	0.7 cm/hour

VTN correlated the above infiltration parameters to the proposed land use of the site as follows:

- DRI-1 test results (2.4 cm/hr) were utilized for concentric heliostat roadways
- DRI-2 test results (2.1 cm/hr) were utilized for all areas encompassed by heliostat mirror arrays
- DRI-3 test results (0.7 cm/hr) were utilized for proposed perimeter access roadways

A composite infiltration rate was computed based on area percentages of the above land usages and their corresponding infiltration rates. Table 2 summarizes the composite infiltration rate calculations.

Table 2: Composite Infiltration Rate

Retention Area	Stabilized Infiltration Rate (cm/hr)	Retention Area (%)	Retention Area Infiltration Rate (cm/hr)
Heliostat Roads	2.4	6.62	0.16
Access Road	0.7	0.06	0.00
Heliostat Area	2.1	93.32	1.96
Retention Area Composite Infiltration Rate =			**2.12**

Note: Stabilized Infiltration Rate referenced from Ninyo & Moore's Infiltration Test Results for Hidden Hills Solar Facility dated July 26, 2012 Project No. 303200004

The composite infiltration rate was used in conjunction with the rate of discharge of proposed 18" discharge pipes to determine the drain time of the proposed retention basin. The iterative analysis is attached in Appendix A of this memorandum. A summary of the drain times are shown on Table 3 below.

Table 3: Computed Drain Times

Number of 18" Pipes	Drain Time (hrs)
1	34
2	25
3	22

Based on the infiltration rates established and the drain time computation performed by VTN, it is anticipated that three (3) 18" discharge pipes will be required to drain the proposed retention basin within a 24 hour period.

APPENDIX A

DRAIN TIME CALCULATIONS

RETENTION BASIN DRAIN TIME WITH ONE 18" PIPE

Beginning Ponding Elevation	Time step (hrs)	Starting Basin Volume (ac-ft)	18" Pipe Discharge Rate (cfs)	Infiltration Discharge Volume (ac-ft)	18" Pipe Discharge Volume (ac-ft)	Total Discharge Volume (ac-ft)	Ending Basin Volume (ac-ft)	Ending Ponding Elevation
2588.800	1	125.360	13.55	4.599	1.120	5.719	119.641	2588.716
2588.716	2	119.641	13.55	5.676	1.120	6.796	112.845	2588.632
2588.632	3	112.845	13.55	5.676	1.120	6.796	106.049	2588.549
2588.549	4	106.049	13.55	5.676	1.120	6.796	99.253	2588.465
2588.465	5	99.253	13.55	5.676	1.120	6.796	92.458	2588.381
2588.381	6	92.458	13.55	5.676	1.120	6.796	85.662	2588.297
2588.297	7	85.662	13.55	5.676	1.120	6.796	78.866	2588.213
2588.213	8	78.866	13.55	5.676	1.120	6.796	72.070	2588.130
2588.130	9	72.070	12	6.904	0.992	7.896	64.174	2588.045
2588.045	10	64.174	10.5	3.652	0.868	4.519	59.655	2587.955
2587.955	11	59.655	10.5	3.059	0.868	3.927	55.728	2587.866
2587.866	12	55.728	10.5	3.059	0.868	3.927	51.801	2587.776
2587.776	13	51.801	10.5	3.059	0.868	3.927	47.875	2587.686
2587.686	14	47.875	10.5	3.059	0.868	3.927	43.948	2587.596
2587.596	15	43.948	10.5	3.059	0.868	3.927	40.021	2587.506
2587.506	16	40.021	10.5	3.059	0.868	3.927	36.094	2587.416
2587.416	17	36.094	10.5	3.059	0.868	3.927	32.168	2587.326
2587.326	18	32.168	10.5	3.059	0.868	3.927	28.241	2587.237
2587.237	19	28.241	10.5	3.059	0.868	3.927	24.314	2587.147
2587.147	20	24.314	10.5	3.059	0.868	3.927	20.387	2587.057
2587.057	21	20.387	6	3.212	0.496	3.708	16.679	2586.958
2586.958	22	16.679	6	1.204	0.496	1.700	14.979	2586.859
2586.859	23	14.979	6	1.204	0.496	1.700	13.279	2586.760
2586.760	24	13.279	6	1.204	0.496	1.700	11.580	2586.662
2586.662	25	11.580	6	1.204	0.496	1.700	9.880	2586.563
2586.563	26	9.880	6	1.204	0.496	1.700	8.180	2586.464
2586.464	27	8.180	6	1.204	0.496	1.700	6.480	2586.365
2586.365	28	6.480	6	1.204	0.496	1.700	4.780	2586.266
2586.266	29	4.780	6	1.204	0.496	1.700	3.080	2586.167
2586.167	30	3.080	6	1.204	0.496	1.700	1.380	2586.069
2586.069	31	1.380	1.5	0.681	0.124	0.805	0.575	2585.822
2585.822	32	0.575	1.5	0.049	0.124	0.173	0.402	2585.574
2585.574	33	0.402	1.5	0.049	0.124	0.173	0.229	2585.327
2585.327	34	0.229	1.5	0.049	0.124	0.173	0.056	2585.080

RETENTION BASIN DRAIN TIME WITH TWO 18" PIPES

Beginning Ponding Elevation	Time step (hrs)	Starting Basin Volume (ac-ft)	2x18" Pipe Discharge Rate (cfs)	Infiltration Discharge Volume (ac-ft)	2x18" Pipe Discharge Volume (ac-ft)	Total Discharge Volume (ac-ft)	Ending Basin Volume (ac-ft)	Ending Ponding Elevation
2588.800	1	125.360	27.1	4.599	2.240	6.839	118.521	2588.702
2588.702	2	118.521	27.1	5.676	2.240	7.916	110.605	2588.605
2588.605	3	110.605	27.1	5.676	2.240	7.916	102.690	2588.507
2588.507	4	102.690	27.1	5.676	2.240	7.916	94.774	2588.410
2588.410	5	94.774	27.1	5.676	2.240	7.916	86.858	2588.312
2588.312	6	86.858	27.1	5.676	2.240	7.916	78.943	2588.214
2588.214	7	78.943	27.1	5.676	2.240	7.916	71.027	2588.117
2588.117	8	71.027	24	6.761	1.983	8.745	62.282	2588.018
2588.018	9	62.282	21	2.941	1.736	4.676	57.606	2587.909
2587.909	10	57.606	21	3.059	1.736	4.795	52.811	2587.799
2587.799	11	52.811	21	3.059	1.736	4.795	48.017	2587.689
2587.689	12	48.017	21	3.059	1.736	4.795	43.222	2587.579
2587.579	13	43.222	21	3.059	1.736	4.795	38.428	2587.470
2587.470	14	38.428	21	3.059	1.736	4.795	33.633	2587.360
2587.360	15	33.633	21	3.059	1.736	4.795	28.839	2587.250
2587.250	16	28.839	21	3.059	1.736	4.795	24.044	2587.141
2587.141	17	24.044	21	3.059	1.736	4.795	19.250	2587.031
2587.031	18	19.250	12	2.522	0.992	3.514	15.735	2586.903
2586.903	19	15.735	12	1.204	0.992	2.196	13.540	2586.776
2586.776	20	13.540	12	1.204	0.992	2.196	11.344	2586.648
2586.648	21	11.344	12	1.204	0.992	2.196	9.148	2586.520
2586.520	22	9.148	12	1.204	0.992	2.196	6.953	2586.393
2586.393	23	6.953	12	1.204	0.992	2.196	4.757	2586.265
2586.265	24	4.757	12	1.204	0.992	2.196	2.561	2586.137
2586.137	25	2.561	12	1.204	0.992	2.196	0.365	2586.010

RETENTION BASIN DRAIN TIME WITH THREE 18" PIPES

Beginning Ponding Elevation	Time step (hrs)	Starting Basin Volume (ac-ft)	3x18" Pipe Discharge Rate (cfs)	Infiltration Discharge Volume (ac-ft)	3x18" Pipe Discharge Volume (ac-ft)	Total Discharge Volume (ac-ft)	Ending Basin Volume (ac-ft)	Ending Ponding Elevation
2588.800	1	125.360	40.65	4.599	3.360	7.959	117.401	2588.689
2588.689	2	117.401	40.65	5.676	3.360	9.036	108.366	2588.577
2588.577	3	108.366	40.65	5.676	3.360	9.036	99.330	2588.466
2588.466	4	99.330	40.65	5.676	3.360	9.036	90.295	2588.354
2588.354	5	90.295	40.65	5.676	3.360	9.036	81.259	2588.243
2588.243	6	81.259	40.65	5.676	3.360	9.036	72.224	2588.131
2588.131	7	72.224	36	6.925	2.975	9.900	62.324	2588.019
2588.019	8	62.324	31.5	2.956	2.603	5.560	56.764	2587.889
2587.889	9	56.764	31.5	3.059	2.603	5.662	51.102	2587.760
2587.760	10	51.102	31.5	3.059	2.603	5.662	45.439	2587.630
2587.630	11	45.439	31.5	3.059	2.603	5.662	39.777	2587.501
2587.501	12	39.777	31.5	3.059	2.603	5.662	34.115	2587.371
2587.371	13	34.115	31.5	3.059	2.603	5.662	28.452	2587.241
2587.241	14	28.452	31.5	3.059	2.603	5.662	22.790	2587.112
2587.112	15	22.790	31.5	3.059	2.603	5.662	17.128	2586.982
2586.982	16	17.128	18	1.236	1.488	2.723	14.404	2586.826
2586.826	17	14.404	18	1.204	1.488	2.692	11.713	2586.669
2586.669	18	11.713	18	1.204	1.488	2.692	9.021	2586.513
2586.513	19	9.021	18	1.204	1.488	2.692	6.330	2586.356
2586.356	20	6.330	18	1.204	1.488	2.692	3.638	2586.200
2586.200	21	3.638	18	1.204	1.488	2.692	0.946	2586.043
2586.043	22	0.946	4.5	0.265	0.372	0.637	0.309	2585.442

APPENDIX B

INFILTRATION TESTING

BY

NINYO & MOORE

August 24, 2012
Project No. 303200004

Dr. Michael Rojansky
BrightSource Energy
1999 Harrison Street, Suite 2150
Oakland, California 94612

Subject: Infiltration Test Results
Hidden Hills Solar Facility
Tecopa Road and Gold Street
Inyo County, California

Reference: Ninyo & Moore report titled, "Preliminary Geotechnical Evaluation, Hidden Hills Solar Facility, Old Spanish Trail Highway and Gold Street, Inyo County, California," dated March 17, 2011.

Dear Dr. Rojansky:

Ninyo & Moore is pleased to submit this letter presenting the results of our infiltration testing performed at the proposed Hidden Hills Solar Facility site located north of Tecopa Road and generally west of Gold Street in Inyo County, California. The purpose of our testing was to evaluate representative infiltration rates for soils in the planned stormwater retention area at the site.

INFILTRATION TEST PROCEDURES

Ninyo & Moore personnel performed three field infiltration tests using a double-ring infiltrometer in accordance with ASTM D 3385. The tests were performed at existing grade in the proposed stormwater retention area located in the west-central portion of the project site. The infiltration tests were performed in areas representing three ground surface conditions, including: (1) exposed, disturbed soils in the wheel path of an existing unpaved roadway, (2) undisturbed, native desert soils, and (3) native desert area with approximately 20 passes of a truck to simulate the anticipated ground surface conditions after construction of the solar facility (vehicle passes were made just prior to running the test). We observed that the vehicle passes made at DRI-3

tended to loosen the upper few inches of surficial soil, but did not appear to significantly increase density of the subgrade soils at this location.

Small test pits approximately 18 inches deep were excavated adjacent to each of the test locations. Soil types and subsurface conditions observed in these test pits were documented. Representative samples of the excavated soil were collected and will be maintained in our laboratory approximately 6 months for potential future testing (these samples and test pit information are available upon request). To summarize, approximately 10 inches of loose to medium dense sandy silt overlying a layer of dense sandy silt were encountered at DRI-1. An approximately 8 inches thick layer of loose sandy silt overlying a layer of dense sandy silt was encountered at DRI-2. Approximately 2 inches of loose sandy silt overlying very dense sandy silt were encountered at DRI-3. Based on these test pits and our previous subsurface explorations at the site, it is our opinion that there is a natural variation in the depth of the dense to very dense sandy silt layers at the project site.

A summary of ground surface conditions and the coordinates of the infiltration tests are provided in the following table:

Infiltration Test Locations

Test No.	Ground Surface Condition	Approximate North Latitude (decimal degrees)	Approximate West Longitude (decimal degrees)
DRI-1	Wheel path of existing unpaved road near Boring B-9	35.986370	-115.917150
DRI-2	Undisturbed, native desert near Boring B-5	35.996940	-115.916898
DRI-3	Native desert with 20 vehicle passes southeast of Boring B-5	35.993850	-115.915020

INFILTRATION TEST RESULTS AND CONCLUSIONS

The results of the infiltration tests are provided in the attached figures and summarized in the following table:

Infiltration Test Results

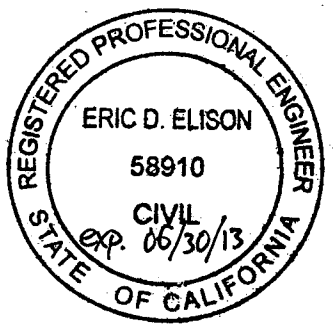
Test No.	Ground Surface Condition	Stabilized Infiltration Rate
DRI-1	Wheel path of existing unpaved road near Boring B-9	2.4 cm/hour
DRI-2	Undisturbed, native desert near Boring B-5	2.1 cm/hour
DRI-3	Native desert with 20 vehicle passes southeast of Boring B-5	0.7 cm/hour

Based on these results and subsurface conditions encountered in our shallow test pits, it is our opinion that the stabilized infiltration rates are somewhat dependent on the depth of the dense to very dense sandy silt. In general, the deeper the dense to very dense layer, the faster the infiltration rate will tend to be.

We appreciate the opportunity to be of service to you on this project. If you have any questions or comments regarding this letter, please contact the undersigned.

Respectfully submitted,
NINYO & MOORE

Eric D. Elison, PE
Chief Geotechnical Engineer
EDE/ltk



Attachments: Figure 1 through Figure 6 – Double-Ring Infiltrometer Test Measurements

Distribution: (3) Addressee (2 via mail and 1 via e-mail)

Date of Test: July 13, 2012

Tested By: EDE/RBD

Test Number: DRI-1

Ground Temp (12 inches deep): 85

Weather: cloudy, occassional rain, 75° to 85° F

Inner Mariotte Tube Area, A_{IC} =	53.52	cm^2
Annular Mariotte Tube Area, A_{AC} =	167.53	cm^2
Inner Ring Area, A_{IR} =	729.7	cm^2
Annular Ring Area, A_A =	2189.0	cm^2

Equations:

$\Delta V_{IR} = (\Delta D_{IC})(A_{IC})$

$\Delta V_A = (\Delta D_{AC})(A_{AC})$

$V_{IR} = \Delta V_{IR}/[(A_{IR})(\Delta t)]$

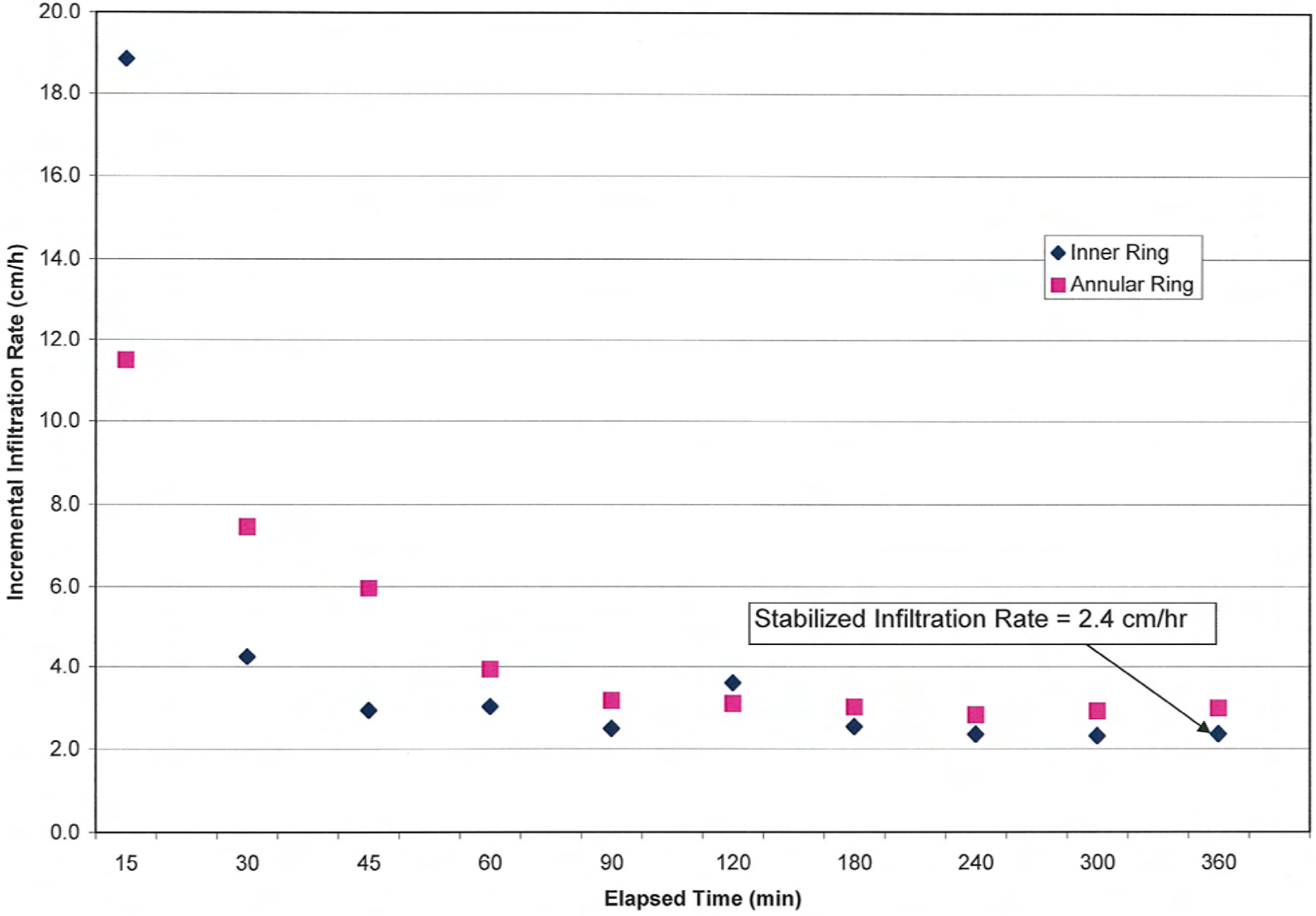
$V_A = \Delta V_A/[(A_A)(\Delta t)]$

Trial	Time (hr:min)	Time Interval, Δt (hr)	Inner Mariotte Tube Reading, D_{IC} (cm)	Annular Mariotte Tube Reading D_{AC} (cm)	Depth of Water in Inner Ring (in)	Depth of Water in Annular Ring (in)	Liquid Temp (°F)	Inner Ring Liquid Volume, ΔV_{IR} (cm^3)	Inner Ring Incremental Infiltration Velocity, V_{IR} (cm/hr)	Annular Ring Liquid Volume, ΔV_A (cm^3)	Annular Ring Incremental Infiltrataion Velocity, V_A (cm/hr)	Notes
1	9:05	0.25	64.3	46	5.75	6	76	3441.3	18.9	6299.1	11.5	
	9:20		0	8.4	6.5	6.25	76					
2	9:20	0.25	26.5	28.5	7	7	76	776.0	4.3	4087.7	7.5	
	9:35		12	4.1	7	7	76					
3	9:35	0.25	48.7	40	7	7	75	535.2	2.9	3266.8	6.0	
	9:50		38.7	20.5	7	7	75					
4	9:50	0.25	38.7	20.5	7	7	75	551.3	3.0	2161.1	3.9	
	10:05		28.4	7.6	7	7	75					
5	10:05	0.50	53.5	47.5	7	7	76	909.8	2.5	3484.6	3.2	
	10:35		36.5	26.7	7	7	76					
6	10:35	0.50	36.5	26.7	7	7	76	1316.6	3.6	3400.9	3.1	
	11:05		11.9	6.4	7	7	76					
7	11:05	1.00	54.6	48.5	7	7	77	1851.8	2.5	6600.7	3.0	
	12:05		20	9.1	7	7	77					
8	12:05	1.00	55	53.6	7	7	77	1718.0	2.4	6181.9	2.8	
	13:05		22.9	16.7	7	7	77					
9	13:05	1.00	53.7	56.7	7	7	78	1691.2	2.3	6399.6	2.9	
	14:05		22.1	18.5	7	7	78					
10	14:05	1.00	56.2	50.6	7	7	80	1723.3	2.4	6550.4	3.0	
	15:05		24	11.5	7	7	80					
11												
12												

Stabilized Infiltration Rate = 2.4 cm/hr

Ninyo & Moore	DOUBLE-RING INFILTROMETER TEST MEASUREMENTS	FIGURE
PROJECT NO. 303200004 / DATE 8/12	Hidden Hills Solar Facility Tecopa Road and Gold Street Invo County, California	1

Double-Ring Infiltrometer DRI-1
Performed July 13, 2012
Incremental Infiltration Rate Vs. Time



Ninyo & Moore		DOUBLE-RING INFILTROMETER TEST RESULTS	FIGURE
PROJECT NO.	DATE	Hidden Hills Solar Facility Tecopa Road and Gold Street Inyo County, California	2
303200004	8/12		

Date of Test: July 16, 2012

Tested By: BOM

Test Number: DRI-2

Ground Temp (12 inches deep): 82

Weather: clear to partly cloudy, 95° to 100° F

Inner Mariotte Tube Area, A_{IC} =	53.52	cm^2
Annular Mariotte Tube Area, A_{AC} =	167.53	cm^2
Inner Ring Area, A_{IR} =	729.7	cm^2
Annular Ring Area, A_A =	2189.0	cm^2

Equations:

$\Delta V_{IR} = (\Delta D_{IC})(A_{IC})$

$\Delta V_A = (\Delta D_{AC})(A_{AC})$

$V_{IR} = \Delta V_{IR}/[(A_{IR})(\Delta t)]$

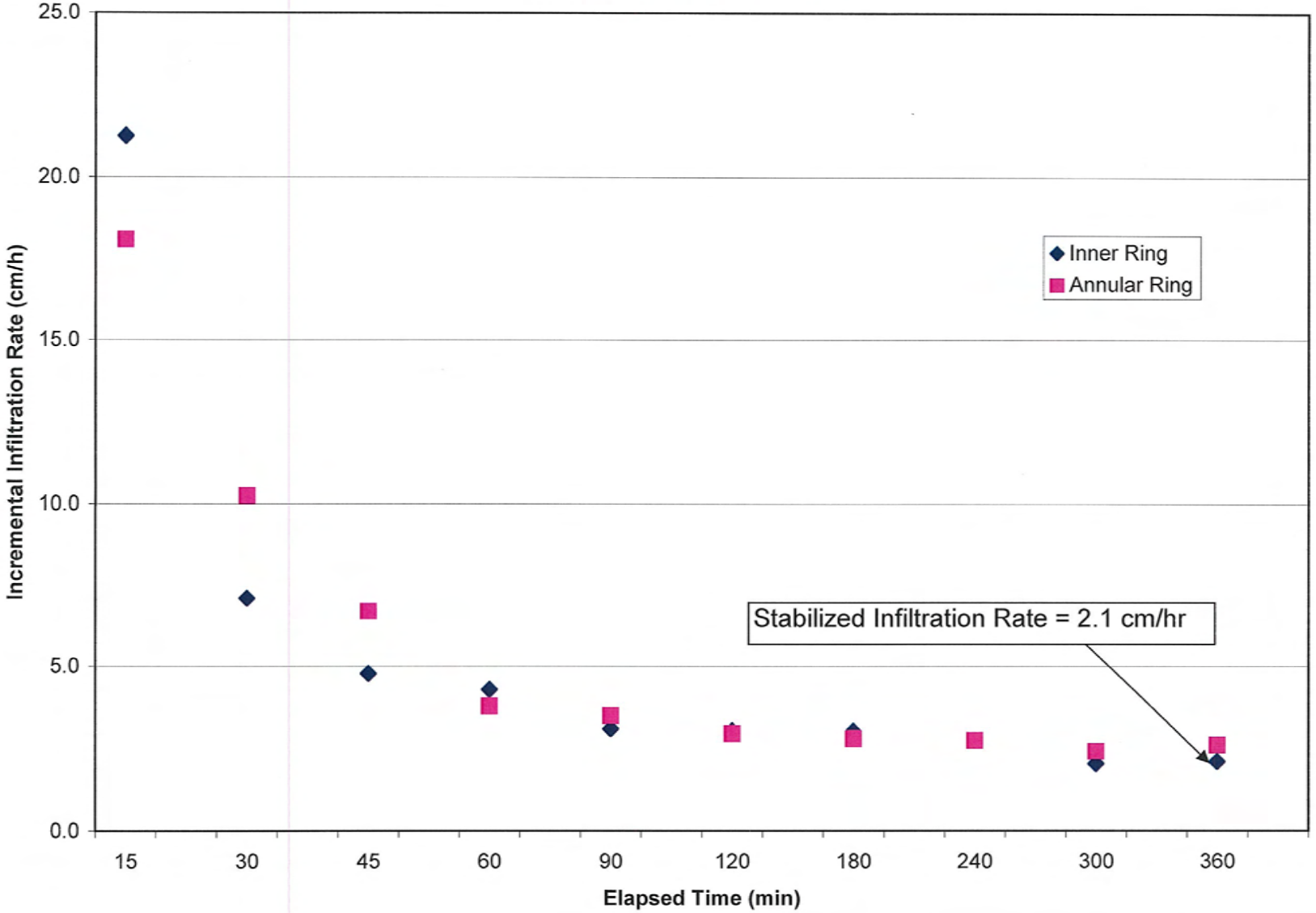
$V_A = \Delta V_A/[(A_A)(\Delta t)]$

Trial	Time (hr:min)	Time Interval, Δt (hr)	Inner Mariotte Tube Reading, D_{IC} (cm)	Annular Mariotte Tube Reading D_{AC} (cm)	Depth of Water in Inner Ring (in)	Depth of Water in Annular Ring (in)	Liquid Temp (°F)	Inner Ring Liquid Volume, ΔV_{IR} (cm^3)	Inner Ring Incremental Infiltration Velocity, V_{IR} (cm/hr)	Annular Ring Liquid Volume, ΔV_A (cm^3)	Annular Ring Incremental Infiltrataion Velocity, V_A (cm/hr)	Notes
1	13:50	0.25	75.5	61.5	5.5	5.25	73	3874.8	21.2	9917.8	18.1	
	14:05		3.1	2.3	5.5	5.25	73					
2	14:08	0.25	35.7	38.8	5.5	5.25	73	1300.5	7.1	5612.3	10.3	
	14:23		11.4	5.3	5.75	5.5	73					
3	14:25	0.25	35.7	24.2	5.75	5.5	73	872.4	4.8	3685.7	6.7	
	14:40		19.4	2.2	5.75	5.75	73					
4	14:42	0.25	37.9	19.8	6	5.75	73	781.4	4.3	2077.4	3.8	
	14:57		23.3	7.4	6	6	73					
5	15:00	0.50	50.3	43.4	6	6	74	1129.3	3.1	3819.7	3.5	
	15:30		29.2	20.6	6	6	74					
6	15:31	0.50	40.8	33.6	6	6	74	1107.9	3.0	3233.3	3.0	
	16:01		20.1	14.3	6	6	74					
7	16:02	1.00	50.7	39.3	6	6	74	2199.7	3.0	6114.8	2.8	
	17:02		9.6	2.8	6	6	74					
8	17:03	1.00	49.7	41.7	6	6	74	2007.0	2.8	6014.3	2.7	
	18:03		12.2	5.8	6	6	74					
9	18:04	1.00	38.8	32.9	6	6	74	1482.5	2.0	5277.2	2.4	
	19:04		11.1	1.4	6	6	74					
10	19:05	1.00	40.4	36.7	6	6	74	1530.7	2.1	5696.0	2.6	
	20:05		11.8	2.7	6	6	74					
11												
12												

Stabilized Infiltration Rate = 2.1 cm/hr

Ninyo & Moore	DOUBLE-RING INFILTROMETER TEST MEASUREMENTS	FIGURE
PROJECT NO. 303200004 / DATE 8/12	Hidden Hills Solar Facility Tecopa Road and Gold Street Invo County, California	3

Double-Ring Infiltrometer DRI-2
Performed July 16, 2012
Incremental Infiltration Rate Vs. Time



Ninyo & Moore		DOUBLE-RING INFILTROMETER TEST RESULTS	FIGURE
PROJECT NO.	DATE	Hidden Hills Solar Facility Tecopa Road and Gold Street Inyo County, California	4
303200004	8/12		

Date of Test: July 17, 2012

Tested By: BOM

Test Number: DRI-3

Ground Temp (12 inches deep): 83° F

Weather: clear , 95° to 100° F

Inner Mariotte Tube Area, A_{IC} =	53.52	cm^2
Annular Mariotte Tube Area, A_{AC} =	167.53	cm^2
Inner Ring Area, A_{IR} =	729.7	cm^2
Annular Ring Area, A_A =	2189.0	cm^2

Equations:

$\Delta V_{IR} = (\Delta D_{IC})(A_{IC})$

$\Delta V_A = (\Delta D_{AC})(A_{AC})$

$V_{IR} = \Delta V_{IR}/[(A_{IR})(\Delta t)]$

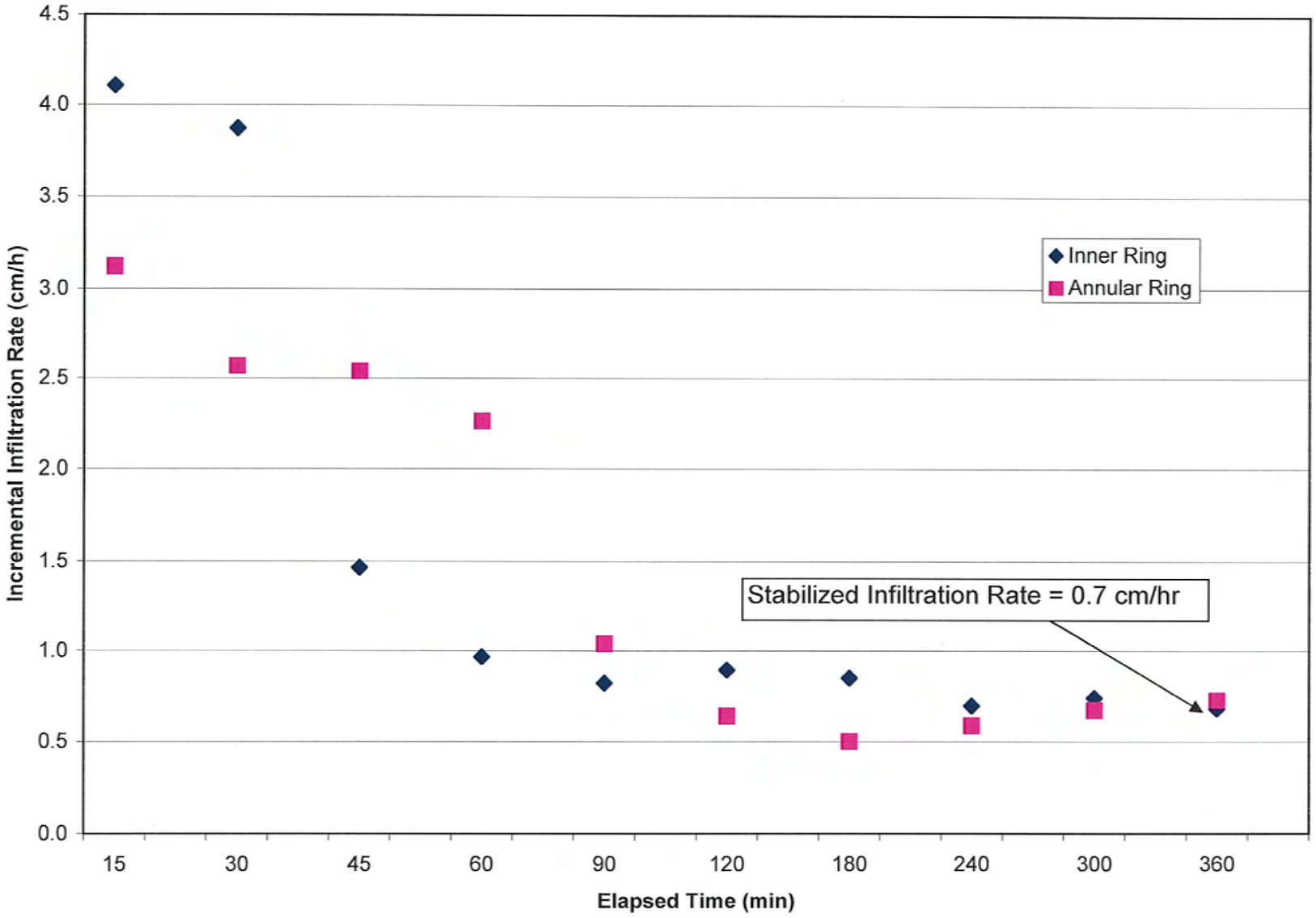
$V_A = \Delta V_A/[(A_A)(\Delta t)]$

Trial	Time (hr:min)	Time Interval, Δt (hr)	Inner Mariotte Tube Reading, D_{IC} (cm)	Annular Mariotte Tube Reading D_{AC} (cm)	Depth of Water in Inner Ring (in)	Depth of Water in Annular Ring (in)	Liquid Temp (°F)	Inner Ring Liquid Volume, ΔV_{IR} (cm^3)	Inner Ring Incremental Infiltration Velocity, V_{IR} (cm/hr)	Annular Ring Liquid Volume, ΔV_A (cm^3)	Annular Ring Incremental Infiltrataion Velocity, V_A (cm/hr)	Notes
1	9:40	0.25	57.6	56.7	6.5	6	74	749.3	4.1	1708.8	3.1	
	9:55		43.6	46.5	6.5	6	74					
2	9:55	0.25	43.6	46.5	6.5	6.25	74	706.5	3.9	1407.3	2.6	
	10:10		30.4	38.1	6.5	6.25	74					
3	10:10	0.25	30.4	38.1	6.75	6.25	74	267.6	1.5	1390.5	2.5	
	10:25		25.4	29.8	6.75	6.25	74					
4	10:25	0.25	25.4	29.8	6.75	6.25	74	176.6	1.0	1239.7	2.3	
	10:40		22.1	22.4	6.75	6.25	74					
5	10:40	0.50	22.1	22.4	6.75	6.25	75	299.7	0.8	1139.2	1.0	
	11:10		16.5	15.6	6.75	6.25	75					
6	11:10	0.50	16.5	15.6	6.75	6.25	75	326.5	0.9	703.6	0.6	
	11:40		10.4	11.4	6.75	6.25	75					
7	11:42	1.00	51.4	37.8	6.75	6.25	75	620.8	0.9	1105.7	0.5	
	12:42		39.8	31.2	6.75	6.25	75					
8	12:42	1.00	39.8	31.2	6.75	6.25	75	508.4	0.7	1290.0	0.6	
	13:42		30.3	23.5	6.75	6.25	75					
9	13:42	1.00	30.3	23.5	6.75	6.25	75	540.6	0.7	1474.3	0.7	
	14:42		20.2	14.7	6.75	6.25	75					
10	14:42	1.00	20.2	14.7	6.75	6.25	75	497.7	0.7	1591.5	0.7	
	15:42		10.9	5.2	6.75	6.25	75					
11												
12												

Stabilized Infiltration Rate = 0.7 cm/hr

Ninyo & Moore	DOUBLE-RING INFILTROMETER TEST MEASUREMENTS	FIGURE
PROJECT NO. 303200004 / DATE 8/12	Hidden Hills Solar Facility Tecopa Road and Gold Street Inyo County, California	5

Double-Ring Infiltrometer DRI-3
Performed July 17, 2012
Incremental Infiltration Rate Vs. Time



Ninyo & Moore		DOUBLE-RING INFILTROMETER TEST RESULTS	FIGURE
PROJECT NO.	DATE	Hidden Hills Solar Facility Tecopa Road and Gold Street Inyo County, California	6
303200004	8/12		

BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT COMMISSION OF THE STATE OF CALIFORNIA
1516 NINTH STREET, SACRAMENTO, CA 95814
1-800-822-6228 – WWW.ENERGY.CA.GOV

APPLICATION FOR CERTIFICATION
FOR THE *HIDDEN HILLS SOLAR ELECTRIC GENERATING SYSTEM*

DOCKET NO. 11-AFC-02

PROOF OF SERVICE
(Revised 8/27/2012)

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DECLARATION OF SERVICE

I, John Carrier, declare that on September 10, 2012, I served and filed copies of the attached Supplemental Data Response, Set 4B, dated September 10, 2012. This document is accompanied by the most recent Proof of Service list, located on the web page for this project at: www.energy.ca.gov/sitingcases/hiddenhills/index.html.

The document has been sent to the other parties in this proceeding (as shown on the Proof of Service list) and to the Commission's Docket Unit or Chief Counsel, as appropriate, in the following manner:

(*Check all that Apply*)

For service to all other parties:

__x__ Served electronically to all e-mail addresses on the Proof of Service list;

____ Served by delivering on this date, either personally, or for mailing with the U.S. Postal Service with first-class postage thereon fully prepaid, to the name and address of the person served, for mailing that same day in the ordinary course of business; that the envelope was sealed and placed for collection and mailing on that date to those addresses NOT marked "e-mail preferred."

AND

For filing with the Docket Unit at the Energy Commission:

__x__ by sending an electronic copy to the e-mail address below (preferred method); *OR*

____ by depositing an original and 12 paper copies in the mail with the U.S. Postal Service with first class postage thereon fully prepaid, as follows:

CALIFORNIA ENERGY COMMISSION – DOCKET UNIT
Attn: Docket No. 11-AFC-02
1516 Ninth Street, MS-4
Sacramento, CA 95814-5512
docket@energy.ca.gov

OR, if filing a Petition for Reconsideration of Decision or Order pursuant to Title 20, § 1720:

____ Served by delivering on this date one electronic copy by e-mail, and an original paper copy to the Chief Counsel at the following address, either personally, or for mailing with the U.S. Postal Service with first class postage thereon fully prepaid:

California Energy Commission
Michael J. Levy, Chief Counsel
1516 Ninth Street MS-14
Sacramento, CA 95814
mchael.levy@energy.ca.gov

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct, that I am employed in the county where this mailing occurred, and that I am over the age of 18 years and not a party to the proceeding.

s 

John L. Carrier, CH2M Hill