Application for a Permit to Use

Ground Water

Oregon Water Resources Department
725 Summer Street NE, Suite A
Salem, Oregon 97301-1266
(503) 986-0900
www.wrd.state.or.us

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Water-Use Permit Application Processing

1. Completeness Determination

The Department evaluates whether the application and accompanying map contain all of the information required under OAR 690-310-0040 and OAR 690-310-0050 (www.oregon.gov/owrd/law). The Department also determines whether the proposed use is prohibited by statute. If the Department determines that the application is incomplete, all fees have not been paid, or the use is prohibited by statute, the application and all fees submitted are returned to the applicant.

2. Initial Review

The Department reviews the application to determine whether water is available during the period requested, whether the proposed use is restricted or limited by rule or statute, and whether other issues may preclude approval of or restrict the proposed use. An Initial Review (IR) containing preliminary determinations is mailed to the applicant. The applicant has 14 days from the mailing date to withdraw the application from further processing and receive a refund of all fees paid minus $200. The applicant may put the application on hold for up to 180 days and may request additional time if necessary.

3. Public Notice

Within 7 days of the mailing of the initial review, the Department gives public notice of the application in the weekly notice published by the Department at www.oregon.gov/owrd. The public comment period is 30 days from publication in the weekly notice.

4. Proposed Final Order Issued

The Department reviews any comments received, including comments from other state agencies related to the protection of sensitive, threatened or endangered fish species. Within 60 days of completion of the IR, the Department issues a Proposed Final Order (PFO) explaining the proposed decision to deny or approve the application. A PFO proposing approval of an application will include a draft permit, and may request additional information or outstanding fees required prior to permit issuance.

5. Public Notice

Within 7 days of issuing the PFO, the Department gives public notice in the weekly notice. Notice includes information about the application and the PFO. Protest must be received by the Department within 45 days after publication of the PFO in the weekly notice. Anyone may file a protest. The protest filing fee is $350.00 for the applicant and $700.00 for non-applicants. Protests are filed on approximately 10% of Proposed Final Orders. If a protest is filed, the Department will attempt to settle the protest but will schedule a contested case hearing if necessary.

6. Final Order Issued

If no protests are filed, the Department issues a Final Order consistent with the PFO. If the application is approved, a permit is issued that specifies the details of the authorized use and any terms, limitations or conditions that the Department deems appropriate.

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Application for a Permit to Use
Ground Water

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SECTION 1: APPLICANT INFORMATION AND SIGNATURE

Applicant Information

NAME			PHONE (HM)
PHONE (WK)	CELL		FAX
ADDRESS			
CITY	STATE	ZIP	E-MAIL*

Organization Information

NAME SURPRISE VALLEY ELECTRIFICATION CORP.; ATTN: LYNN CULP			PHONE 530-233-3511	FAX
ADDRESS 516 US HWY 395E				CELL
CITY ALTURAS	STATE CA	ZIP 96101	E-MAIL* lynnsvec@frontier.com	

Agent Information – The agent is authorized to represent the applicant in all matters relating to this application.

AGENT / BUSINESS NAME GSI WATER SOLUTIONS; Attn: Bruce Brody-Heine			PHONE 541-390-0591	FAX
ADDRESS 147 SW SHEVLIN HIXON DRIVE, SUITE 201				CELL
CITY BEND	STATE OR	ZIP 97702	E-MAIL* BBHEINE@GSIWS.COM	

Note: Attach multiple copies as needed

* By providing an e-mail address, consent is given to receive all correspondence from the department electronically. (paper copies of the final order documents will also be mailed.)

By my signature below I confirm that I understand:

- I am asking to use water specifically as described in this application.
- Evaluation of this application will be based on information provided in the application.
- I cannot use water legally until the Water Resources Department issues a permit.
- Oregon law requires that a permit be issued before beginning construction of any proposed well, unless the use is exempt. Acceptance of this application does not guarantee a permit will be issued.
- If I get a permit, I must not waste water.
- If development of the water use is not according to the terms of the permit, the permit can be cancelled.
- The water use must be compatible with local comprehensive land-use plans.
- Even if the Department issues a permit, I may have to stop using water to allow senior water-right holders to get water to which they are entitled.

I (we) affirm that the information contained in this application is true and accurate.

Applicant Signature	Print Name *and title if applicable*	Date
Bradley A Kresge	**Bradley A. Kresge/General Manager**	1/14/15

For Department Use

App. No. G-17985 Permit No. _____ Date _____

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SECTION 2: PROPERTY OWNERSHIP

Please indicate if you own all the lands associated with the project from which the water is to be diverted, conveyed, and used.

☐ Yes
- ☐ There are no encumbrances.
- ☐ This land is encumbered by easements, rights of way, roads or other encumbrances.

☒ No
- ☒ I have a recorded easement or written authorization permitting access. **–Attachment D-**
- ☐ I do not currently have written authorization or easement permitting access.
- ☐ Written authorization or an easement is not necessary, because the only affected lands I do not own are state-owned submersible lands, and this application is for irrigation and/or domestic use only (ORS 274.040).
- ☐ Water is to be diverted, conveyed, and/or used only on federal lands.

List the names and mailing addresses of all affected landowners *(attach additional sheets if necessary).*

Colahan Enterprises
P.O. Box 300
45190 Highway 31
Paisley, OR 97636-9724

You must provide the legal description of : 1. The property from which the water is to be diverted, 2. Any property crossed by the proposed ditch, canal or other work, and 3. Any property on which the water is to be used as depicted on the map.

Please see Attachment C

SECTION 3: WELL DEVELOPMENT

		IF LESS THAN 1 MILE:	
WELL NO.	NAME OF NEAREST SURFACE WATER	DISTANCE TO NEAREST SURFACE WATER	ELEVATION CHANGE BETWEEN NEAREST SURFACE WATER AND WELL HEAD
Little Hot Well	Chewaucan River	5000 'distance to the river where hydraulic connection occurs**)	~100 to 115 ft (to nearest potential point of discharge to river)

** - Information based on OWRD review and recommendations on SVEC's 2013 and 2014 limited license applications including OWRD's March 2013 Public Interest Review for Groundwater Applications (hydro review).

Please provide any information for your existing or proposed well(s) that you believe may be helpful in evaluating your application. For existing wells, describe any previous alteration(s) or repair(s) not documented in the attached well log or other materials *(attach additional sheets if necessary).*

Issues cited in Limited License LL-1508

1. Proposed well improvements required to bring the Little Hot Well up to current well construction standards were approved by OWRD in late July 2014. SVEC completed the agreed upon alterations to the well in early August 2014; see Attachment E, Well Log LAKE 52582.
2. SVEC will consult with OWRD to resolve the potential for substantial interference trigger of greater than 25% interference at the end of 30 days issue specified by the Department before a new permit is issued. See Attachment F for potential resolution of this issue.

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SECTION 3: WELL DEVELOPMENT, CONTINUED

Total maximum rate requested: **146 gpm** (each well will be evaluated at the maximum rate unless you indicate well-specific rates and annual volumes in the table below).

The table below must be completed for each source to be evaluated or the application will be returned. If this is an existing well, the information may be found on the applicable well log. *(If a well log is available, please submit it in addition to completing the table.)* If this is a proposed well, or well-modification, consider consulting with a licensed well driller, geologist, or certified water right examiner to obtain the necessary information.

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(See attached well log – Attachment E)

										PROPOSED USE			
OWNER'S WELL NAME OR NO.	PROPOSED	EXISTING	WELL ID (WELL TAG) NO.* OR WELL LOG ID**	FLOWING ARTESIAN	CASING DIAMETER	CASING INTERVALS (IN FEET)	PERFORATED OR SCREENED INTERVALS (IN FEET)	SEAL INTERVALS (IN FEET)	MOST RECENT STATIC WATER LEVEL & DATE (IN FEET)	SOURCE AQUIFER***	TOTAL WELL DEPTH	WELL-SPECIFIC RATE (GPM)	ANNUAL VOLUME (ACRE-FEET)
Little Hot Well	☐	☒	LAKE 1628 LAKE 1626 LAKE 52582	☐	16 -inch 8inch(liner) NA	0 to 270' 0 to 300' NA	100 to 240' 300+ open hole NA	0 to 22' NA 0-23		basin fill sediments	315' 432' NA	146gpm	235.5
	☐	☐		☐									
	☐	☐		☐									
	☐	☐		☐									
	☐	☐		☐									
	☐	☐		☐									
	☐	☐		☐									

* Licensed drillers are required to attach a Department-supplied Well Tag, with a unique Well ID or Well Tag Number to all new or newly altered wells. Landowners can request a Well ID for existing wells that do not have one. The Well ID is intended to serve as a unique identification number for each well.

** A well log ID (e.g. MARI 1234) is assigned by the Department to each log in the agency's well log database. A separate well log is required for each subsequent alteration of the well.

*** Source aquifer examples: Troutdale Formation, gravel and sand, alluvium, basalt, bedrock, etc.

SECTION 4: WATER USE

USE	PERIOD OF USE	ANNUAL VOLUME (ACRE-FEET)
General Industrial	Year-round	146 gpm 235.5 Acre-Ft/year

Exempt Uses: Please note that 15,000 gallons per day for single or group **domestic** purposes and 5,000 gallons per day for a single **industrial or commercial** purpose are exempt from permitting requirements.

For irrigation use only: *- NA -*
Please indicate the number of primary and supplemental acres to be irrigated (*must match map*).

Primary: _____ Acres Supplemental: _____ Acres

List the Permit or Certificate number of the underlying primary water right(s): _____

Indicate the maximum total number of acre-feet you expect to use in an irrigation season: _____

- If the use is **municipal or quasi-municipal**, attach **Form M** - NA -
- If the use is **domestic**, indicate the number of households: - NA -

  If the use is **mining**, describe what is being mined and the method(s) of extraction: - NA -

SECTION 5: WATER MANAGEMENT

A. Diversion and Conveyance
What equipment will you use to pump water from your well(s)?

☒ Pump (give horsepower and type): 25 HP submersible pump

☐ Other means (describe): _____

Provide a description of the proposed means of diversion, construction, and operation of the diversion works and conveyance of water.

Water will be pumped and conveyed from the well to the plant through a pipeline.

B. Application Method
What equipment and method of application will be used? (e.g., drip, wheel line, high-pressure sprinkler)

The plant will use the water for general industrial uses, including but not limited to make-up water for the geothermal energy extraction operations within the plant site.

C. Conservation
Please describe why the amount of water requested is needed and measures you propose to: prevent waste; measure the amount of water diverted; prevent damage to aquatic life and riparian habitat; prevent the discharge of contaminated water to a surface stream; prevent adverse impact to public uses of affected surface waters.

SVEC will constantly manage the use of the water from the well in a manner to prevent waste, minimize leaks and discharges from the well and pipeline. Once the water reaches the plant, it will be used for general industrial uses, including but not limited to make-up water in the operating processes which will be monitored by the operators and carefully managed to minimize use.

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SECTION 6: STORAGE OF GROUND WATER IN A RESERVOIR *- NA -*

If you would like to store ground water in a reservoir, complete this section *(if more than one reservoir, reproduce this section for each reservoir).*

Reservoir name: _____ Acreage inundated by reservoir: _____

Use(s): _____

Volume of Reservoir (acre-feet): _____ Dam height (feet, if excavated, write "zero"): _____

***Note:** If the dam height is greater than or equal to 10.0' above land surface **AND** the reservoir will store 9.2 acre feet or more, engineered plans and specifications must be approved prior to storage of water.*

SECTION 7: USE OF STORED GROUND WATER FROM THE RESERVOIR *- NA -*

If you would like to use stored ground water from the reservoir, complete this section *(if more than one reservoir, reproduce this section for each reservoir).*

Annual volume (acre-feet): _____

USE OF STORED GROUND WATER	PERIOD OF USE
- NA -	

SECTION 8: PROJECT SCHEDULE

Date construction will begin: immediately upon issuance of the permit

Date construction will be completed: immediately upon issuance of the permit

Date beneficial water use will begin: immediately upon issuance of the permit

SECTION 9: WITHIN A DISTRICT

☐ Check here if the point of diversion or place of use are located within or served by an irrigation or other water district.

Irrigation District Name - NA -	Address	
City	State	Zip

SECTION 10: REMARKS

N/A

Use this space to clarify any information you have provided in the application *(attach additional sheets if necessary).*

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Attachment A

Groundwater Permit Map

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Attachment B

Land Use Information Form

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Land Use Information Form

Oregon Water Resources Department
725 Summer Street NE, Suite A
Salem, Oregon 97301-1266
(503) 986-0900
www.wrd.state.or.us

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NOTE TO APPLICANTS

In order for your application to be processed by the Water Resources Department (WRD), this Land Use Information Form must be completed by a local government planning official in the jurisdiction(s) where your water right will be used and developed. The planning official may choose to complete the form while you wait, or return the receipt stub to you. Applications received by WRD without the Land Use Form or the receipt stub will be returned to you. Please be aware that your application will not be approved without land use approval.

This form is NOT required if:

1) Water is to be diverted, conveyed, and/or used only on federal lands; **OR**
2) The application is for a water right transfer, allocation of conserved water, exchange, permit amendment, or ground water registration modification, and **all** of the following apply:
   a) The existing and proposed water use is located entirely within lands zoned for exclusive farm-use or within an irrigation district;
   b) The application involves a change in place of use only;
   c) The change does not involve the placement or modification of structures, including but not limited to water diversion, impoundment, distribution facilities, water wells and well houses; and
   d) The application involves irrigation water uses only.

NOTE TO LOCAL GOVERNMENTS

The person presenting the attached Land Use Information Form is applying for or modifying a water right. The Water Resources Department (WRD) requires its applicants to obtain land-use information to be sure the water rights do not result in land uses that are incompatible with your comprehensive plan. Please complete the form or detach the receipt stub and return it to the applicant for inclusion in their water right application. You will receive notice once the applicant formally submits his or her request to the WRD. The notice will give more information about WRD's water rights process and provide additional comment opportunities. You will have 30 days from the date of the notice to complete the land-use form and return it to the WRD. If no land-use information is received from you within that 30-day period, the WRD may presume the land use associated with the proposed water right is compatible with your comprehensive plan. Your attention to this request for information is greatly appreciated by the Water Resources Department. If you have any questions concerning this form, please contact the WRD's Customer Service Group at 503-986-0801.

Land Use Information Form

Oregon Water Resources Department
725 Summer Street NE, Suite A
Salem, Oregon 97301-1266
(503) 986-0900
www.wrd.state.or.us

Applicant: Surprise Valley Electrification Corp. (First) Attn: Lynn Culp (Last)

Mailing Address: 516 US HWY 395E

Alturas (City) CA (State) 96101 (Zip) Daytime Phone: 530- 233-3511

A. Land and Location

Please include the following information for all tax lots where water will be diverted (taken from its source), conveyed (transported), and/or used or developed. Applicants for municipal use, or irrigation uses within irrigation districts may substitute existing and proposed service-area boundaries for the tax-lot information requested below.

Township	Range	Section	¼ ¼	Tax Lot #	Plan Designation (e.g., Rural Residential/RR-5)	Water to be:			Proposed Land Use:
33S	18E	23	S ½ NE	1300		☒ Diverted	☒ Conveyed	☐ Used	Industrial
33S	18E	23	NE SE	1300		☐ Diverted	☒ Conveyed	☒ Used	Industrial
						☐ Diverted	☐ Conveyed	☐ Used	
						☐ Diverted	☐ Conveyed	☐ Used	

List all counties and cities where water is proposed to be diverted, conveyed, and/or used or developed:

Lake County

B. Description of Proposed Use

Type of application to be filed with the Water Resources Department:

☒ Permit to Use or Store Water ☐ Water Right Transfer ☐ Permit Amendment or Ground Water Registration Modification
☐ Limited Water Use License ☐ Allocation of Conserved Water ☐ Exchange of Water

Source of water: ☐ Reservoir/Pond ☒ Ground Water ☐ Surface Water (name) ____

Estimated quantity of water needed: 146 ☐ cubic feet per second ☒ gallons per minute ☐ acre-feet

Intended use of water: ☐ Irrigation ☐ Commercial ☒ Industrial ☐ Domestic for ____ household(s)
☐ Municipal ☐ Quasi-Municipal ☐ Instream ☐ Other ____

Briefly describe:

The water will be used for general industrial water (such as make up cooling water) at the geothermal facility.

Note to applicant: If the Land Use Information Form cannot be completed while you wait, please have a local government representative sign the receipt at the bottom of the next page and include it with the application filed with the Water Resources Department.

See bottom of Page 3. →

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For Local Government Use Only

The following section must be completed by a planning official from each county and city listed unless the project will be located entirely within the city limits. In that case, only the city planning agency must complete this form. This deals only with the local land-use plan. Do not include approval for activities such as building or grading permits.

Please check the appropriate box below and provide the requested information

☒ Land uses to be served by the proposed water uses (including proposed construction) are allowed outright or are not regulated by your comprehensive plan. Cite applicable ordinance section(s): Lake County Zoning Ord. Article 3.

☐ Land uses to be served by the proposed water uses (including proposed construction) involve discretionary land-use approvals as listed in the table below. (Please attach documentation of applicable land-use approvals which have already been obtained. Record of Action/land-use decision and accompanying findings are sufficient.) **If approvals have been obtained but all appeal periods have not ended, check "Being pursued."**

Type of Land-Use Approval Needed (e.g., plan amendments, rezones, conditional-use permits, etc.)	Cite Most Significant, Applicable Plan Policies & Ordinance Section References	Land-Use Approval:	
		☐ Obtained ☐ Denied	☐ Being Pursued ☐ Not Being Pursued
		☐ Obtained ☐ Denied	☐ Being Pursued ☐ Not Being Pursued
		☐ Obtained ☐ Denied	☐ Being Pursued ☐ Not Being Pursued
		☐ Obtained ☐ Denied	☐ Being Pursued ☐ Not Being Pursued
		☐ Obtained ☐ Denied	☐ Being Pursued ☐ Not Being Pursued

Local governments are invited to express special land-use concerns or make recommendations to the Water Resources Department regarding this proposed use of water below, or on a separate sheet.

Name: Dorwin Johnson Jr. Title: Planning Director

Signature: _____ Phone: 541-947-6036 Date: 14 Jan 2015

Government Entity: Lake County Planning Dept

Note to local government representative: Please complete this form or sign the receipt below and return it to the applicant. If you sign the receipt, you will have 30 days from the Water Resources Department's notice date to return the completed Land Use Information Form or WRD may presume the land use associated with the proposed use of water is compatible with local comprehensive plans.

Receipt for Request for Land Use Information

Applicant name: _____

City or County: _____ Staff contact: _____

Signature: _____ Phone: _____ Date: _____

Attachment C

Legal Description of Property (Deed)

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KNOW ALL MEN BY THESE PRESENTS, That ROSS H. COLAHAN and DORIS COLAHAN, husband and wife, hereinafter called the grantor, for the consideration hereinafter stated, to grantor paid by COLAHAN ENTERPRISES, INC. an Oregon corporation, hereinafter called the grantee, does hereby grant, bargain, sell and convey unto the said grantee and grantee's heirs, successors and assigns, that certain real property, with the tenements, hereditaments and appurtenances thereunto belonging or appertaining, situated in the County of Lake and State of Oregon, described as follows, to-wit:

Township 33 South, Range 18 East of the Willamette Meridian
Section 23: NE¼, SE¼NW¼, SE¼SW¼, SW¼SE¼ excepting deed recorded in Book 53 at page 435 of Record of Deeds.
N½SW¼
That portion of NE¼SE¼ of said Section 23 lying North of the Chewaucan River, excepting therefrom that portion of said NE¼SE¼ contained in a deed from Northwest Townsite Company to Kittie Loveland recorded in Book 52 at page 593 of the Record of Deeds.
Section 24: N½NW¼, SW¼NW¼, NW¼SW¼, excepting a tract of land conveyed to State of Oregon in Book 79 at page 385 of Record of Deeds and highway right-of-way.
That portion of NW¼NW¼ of said Section 24 lying North of the extension of Mill Street in Paisley, Oregon, excepting therefrom those tracts of land heretofore conveyed by Northwest Townsite Company and its predecessors in interest recorded in Book 44 at Page 95, Book 51 at pages 10, 432 and 549; Book 52 at page 593; Book 53 at page 147; Book 56 at page 504; Book 82 at page 386 of the Record of Deeds.
Section 26: NW¼NE¼.

SUBJECT TO all reservations, restrictions, easements and rights-of-way of record or apparent on the ground, including, but not limited to, reservation of one-half of all gas, coal, oil and other sub-surface minerals, together with right to take and remove.

To Have and to Hold the same unto the said grantee and grantee's heirs, successors and assigns forever.

And said grantor hereby covenants to and with said grantee and grantee's heirs, successors and assigns, that grantor is lawfully seized in fee simple of the above granted premises, free from all encumbrances, and that grantor will warrant and forever defend the above granted premises and every part and parcel thereof against the lawful claims and demands of all persons whomsoever, except those claiming under the above described encumbrances.

The true and actual consideration paid for this transfer, stated in terms of dollars, is $ 1.00 (However, the actual consideration consists of or includes other property or value given or promised which is the whole consideration (indicate which)).

In construing this deed and where the context so requires, the singular includes the plural.

WITNESS grantor's hand this 1st day of April, 1981.

Ross H Colahan

Doris Colahan

STATE OF OREGON, County of Lake) ss. April 1, 1981

Personally appeared the above named Ross H. Colahan and Doris Colahan, husband and wife, and acknowledged the foregoing instrument to be voluntary act and deed.

NOTARY PUBLIC (Official Seal)

Before me: Barbara Souder
Notary Public for Oregon
My commission expires 9-10-82

NOTE—The sentence between the symbols ①, if not applicable, should be deleted. See Chapter 436, Oregon Laws 1967, as amended by the 1967 Special Session.

After recording, return to (Name, Address, Zip):
Ross H. Colahan and Doris Colahan, husband and wife

Until requested otherwise, send all tax statements to (Name, Address, Zip):
Colahan Enterprises, Inc. An Oregon corporation

After recording, return to (Name, Address, Zip):
Colahan Enterprises, Inc.
Rte 1 Box 380
Paisley, Oregon 97636

Until requested otherwise, send all tax statements to (Name, Address, Zip):
Colahan Enterprises, Inc.
Rte 1 Box 380
Paisley, Oregon 97636

STATE OF OREGON,
County of Lake } ss.

I certify that the within instrument was received for record on the 3 day of August, 1981, at 11:45 o'clock A.M., and recorded in book/reel/volume No. 198 on page 770 or as document/fee/file/instrument/microfilm No. ____ Record of Deeds of said county.

Witness my hand and seal of County affixed.

Karen O'Connor, Co. Clerk
NAME TITLE

By ____ Deputy

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Attachment D

Lease Agreement

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GEOTHERMAL LEASE AND AGREEMENT

THIS GEOTHERMAL LEASE AND AGREEMENT, (herein sometimes referred to as "Lease") made and entered as of the 24th day of September, 2010 by and between COLAHAN ENTERPRISES INC., hereinafter referred to as "Lessor", and SURPRISE VALLEY ELECTRIFICATION CORP., a Rural Electric Cooperative, Incorporated under IRS 501(c)(12) . Hereinafter referred to as "Lessee".

WITNESSETH:

1. Purpose. That Lessor, for and in consideration of Ten Dollars ($10.00) in hand paid to Lessor by Lessee, and other good and valuable consideration, the receipt and adequacy of which are hereby acknowledged, and in consideration of the covenants and agreements hereinafter contained, has granted, leased, let and demised and by these presents does grant, lease, let and demise exclusively to Lessee, its grantees, successors and assigns, upon and subject to the terms and conditions hereinafter set forth, these certain extractable mineral rights and certain geothermal rights for real property located in the County of Lake, State of OREGON, more particularly described in Exhibit "A" attached hereto and by this reference made a part hereof (hereinafter referred to as the "leased rights"), including all roads, streets, alleys, easements and rights of way owned or claimed by Lessor, on or within the lands above described. This Lease shall cover all the interest in the leased rights now owned or hereafter acquired by Lessor on the property described in Exhibit A".

By the use of such methods as Lessee may desire, Lessee, and its designated representatives, shall have the sole and exclusive right to utilize the leased rights, including but not limited to the right to explore for, drill for, test, develop, operate, produce, extract, take, remove or sell Hot Water, Steam and Thermal Energy and Extractable Minerals, and to store, utilize, process, convert and otherwise treat such Hot Water, Steam and Thermal Energy, and to extract any Extractable Minerals during the term hereof and to transport same, and to inject or re inject effluents into the well or any wells drilled pursuant to the leased rights; or inject water, gas or other fluid or substances by artificial means into formations containing Hot Water, Steam or Thermal Energy as agreed to in the body of this lease agreement. Further, Lessee, its designated representatives and anyone purchasing Leased Substances (as hereinafter defined) from Lessee are hereby granted the use of any easements owned by Lessor across said land, to the full extent of any such rights held by Lessor as set forth in the body of this lease agreement. The possession by Lessee of the leased rights shall be sole and exclusive for the purposes hereof and for purposes incident or related thereto.

Lessee agrees to conduct its activities in a safe, good and workmanlike manner and use reasonable care at all times in all of Lessee's operations on the premises, in accordance with generally accepted, good engineering practice; with due regard for the protection of life and property, preservation of the environment and conservation of natural resources, and minimal intrusion to agricultural operations of the Lessor to prevent injury or damage to cattle, livestock, buildings, fish, water rights, water diversion works, ditches, tanks and water wells or other property or operations of the Lessor located thereon; and Lessee agrees to repair, mitigate or pay the Lessor the fair market value (as agreed to by the parties, or if no agreement is reached, then after 7 days as determined by an independent third-party appraiser) for all damages to the cattle, crops, buildings, livestock, fish, fences, water rights, water diversions, ditches, tanks, water, water wells and other property of the Lessor situated on the surface of the premises resulting from Lessee's operations on the premises, and conduct its activities in a manner which will not unreasonably interfere with any rights reserved to Lessor. Lessee also agrees that all damages to pipe and equipment caused by cattle shall be the responsibility of Lessee. Lessee shall at all time allow Lessor access to well water for irrigation

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and secondary uses as required by Lessor, and access to the online heat exchange upon construction.

2. Term. This Lease shall be for a term of five (5) years from and after the date hereof (hereinafter referred to as the "Primary Term") and so long thereafter as electricity is produced in commercial quantities from the well or through the leased rights, or lands, and for so long as Lessee is prevented from producing same, or the obligations of Lessee hereunder are suspended, for the causes hereinafter set forth, or this Lease is continued in force by reason of any other provision hereof.

3. Primary Term Consideration. It is understood and agreed that the initial consideration paid upon the execution hereof is Twenty- Five Thousand Dollars ($25,000.00) for all the lease rights during the initial five (5) year lease term, excluding any royalties and rents that are otherwise payable during the term of this lease agreement.

4. Lessee shall conduct all work in compliance with the applicable laws and regulations of the state of Oregon and the United States of America. Lessee shall be fully responsible for compliance with all applicable Federal, state, and local statutes, regulations, and ordinances relating to such work, and for reclamation bonding and any bonding required for geothermal wells. Lessor agrees to cooperate with Lessee in Lessee's application for governmental licenses, permits, and approvals, all costs of which shall be borne by Lessee.

Both Lessee and Lessor are bound by applicable federal, state, and local statutes, regulations, and ordinances that may affect this project now or in the future.

Lessee shall fence all excavations (including sumps and settling ponds), and, upon the termination of the Lease, except any certain sump hole(s) and excavation(s) identified by the Lessor, Lessee shall level and fill all sump holes and excavations, shall remove all debris and shall leave the locations or premises used by Lessee in a clean and sanitary condition.

Lessee shall keep the premises utilized by Lessee clean and orderly throughout the term of occupancy.

Lessee shall replace all fences which the Lessee removed for its purposes and repair all fences which Lessee damaged, and if and when so required by the Lessor, will provide a proper livestock guard at any new point of entry upon lands used by Lessee and utilize best efforts to ensure Lessor's livestock are not allowed to escape as a result of Lessee's utilization of premises.

Lessee shall have reasonable access to and use of water from the leased land for Lessee's drilling, testing and exploration operations thereon, in the vicinity thereof, provided that such use shall not interfere with Lessor's own use for domestic, commercial, stock or agricultural purposes, nor interfere with any legal or contractual commitments of Lessor relating thereto and existing on the date hereof. Lessee shall be allowed to enter on to the Lands during the term of the lease for regular water monitoring activities of all wells or water sources. Lessee acknowledges that except for that certain real property specifically identified and agreed to be taken out of production and for which Lessee is paying rents, Lessor, and Lessor's principals, officers and shareholders, shall have full use and exploitation of the whole of the premises.

Lessee shall protect Lessor's interest in the leased rights against liens of every character arising from its operations thereon. Lessee, at its own expense, prior to commencing operations pursuant to the leased rights, shall obtain, and thereafter while this Lease is in effect shall maintain, adequate Workers Compensation Insurance. Lessee shall protect Lessor

against damages of every kind and character arising out of the operations or working of Lessee or those under Lessee's control pursuant to the leased rights, but Lessee shall not be liable hereunder in the event of the negligence or willful misconduct of parties other than Lessee, unless retained or approved by the Lessee or Lessee's agents to be on the premises, or perform any service on the premises.

Lessee shall indemnify and defend Lessor from any claim, loss, or liability arising out of or related to any activity of Lessee on the premises utilized by Lessee or any condition of the premises in the possession or under the control of Lessee including any such claim, loss, or liability that may be caused or contributed to in whole or in part failure to effect any repair or maintenance required by this lease and damages to growing crops based upon the fair market value of such crops at the time of such damages. Lessor shall have no liability to Lessee for any injury, loss, or damage caused by third parties, or by any condition of the premises.

Lessee, before going into possession of the premises, shall procure and thereafter during the term of the lease shall continue to carry the following insurance at Lessee's cost: comprehensive general liability insurance in a responsible company with limits of not less than $300,000 for injury to one person, $1,000,000 for injury to two or more persons in one occurrence, and $1,000,000 for damage to property, commercial general liability policy (occurrence version) in a responsible company with coverage for bodily injury and property damage liability, personal injury liability, and medical payment with a general aggregate limit of not less than $1,000,000 and a per occurrence limit of not less than $100,000.00. Such insurance shall cover all risks arising directly or indirectly out of Lessee's activities on or any condition of the premises. Such insurance shall protect Lessee against the claims of Lessor on account of the obligations assumed by Lessee and shall name Lessor as an additional insured. Certificates evidencing such insurance and bearing endorsements requiring 10 days' written notice to Lessor prior to any change or cancellation shall be furnished to Lessor prior to Lessee's occupancy of the premises.

Lessor shall have all rights to thermal heat from the electric generating facility after electricity production. In addition, Lessor has the right to the spent geothermal fluids after the generation of electricity to use for traditional agriculture use including, but not limited to irrigation, stock water, aquaculture and greenhouses. Lessee shall provide an online heat exchange to the Lessor adequate for the above purposes.

Lessee shall make available, after the commercial production of electricity and uses by the Lessor and to the extent that it is feasible, thermal energy to the City of Paisley, Oregon, and other non-federal public buildings within the City of Paisley, Oregon, for the purpose of space heating of public buildings.

Lessee shall re inject all geothermal fluids produced after they are used for the production of electricity and Lessor's uses.

5. Royalty. Royalties shall be payable as follows:

(a) With respect to Hot Water, Steam or Thermal Energy produced, saved and used for the generation of electric power which is then sold by Lessee, Lessee shall pay to Lessor as royalty Four Percent (4.0 %) of the Actual Revenue. At the time the Lessee decides to sell the electricity produced to the current and future Members of the Lessee, the royalty payment will then be converted to dollars per kwh in an amount that equals the then total dollar per kwh royalty paid to the Lessor. The dollars per kwh paid to the Lessor at the time the Lessee sells the electricity to the Members of Lessee, and shall increase by two percent (2%) per annum for the remaining life of the project.

(b) With respect to Extractable Minerals, Lessee shall pay as royalty to Lessor Five Percent (5%) of the net proceeds received by Lessee from the sale of any gases (as herein defined) and from the sale of minerals and/or minerals in solution extracted from the effluents produced and sold from the well or in exercise of the leased rights, or, in the event Lessee extracts from the effluents minerals and/or minerals in solution, Five Percent (5%) of the proceeds received by Lessee from the sale of minerals and/or minerals in solution contained in and extracted from such effluents less costs of transportation and extraction.

Lessee shall pay to Lessor on or before the twenty-fifth day of each month the royalties accrued and payable for the preceding calendar month, or on or before the twenty-fifth day of the month next following that in which Lessee receives payment therefore from the purchaser thereof, whichever method may be chosen by Lessee from time to time, and in making such royalty payments Lessee shall deliver to Lessor statements setting forth the basis for computation and determination of such royalty.

Lessee shall not be required to account to Lessor for or to pay any royalty on Hot Water, Steam, Thermal Energy or Extractable Minerals produced by Lessee which is not utilized, saved and sold, or which is used by Lessee in its operations with respect to the well or the leased rights for or in connection with the developing, recovering, producing, extracting and/or processing of Hot Water, Steam, Thermal Energy and/or minerals in solution or in facilities for the generation of electric power, or which are unavoidably lost.

6. Use of Lease. Lessee shall have the right to drill such well or wells as Lessee may deem desirable for the exercise of the leased rights, including wells for injection or re injection purposes, and shall have the further right to dispose in any such wells waste brine, water and other substances, waste products from a well or wells, power plants or other facilities. Lessee shall further have the right for testing purposes, to freely transfer Leased Substances and Geothermal Resources and to inject such leased Substances and Geothermal Resources into well or into any wells developed pursuant to the leased rights.

7. Well Abandonment. In the event Lessor desires to abandon any well it has drilled on the premises, Lessee shall notify Lessor of the Lessee intention to do so, and if the Lessor within thirty(30) days after such notices elect to retain said well as water well or other purpose, and so notifies Lessee in writing of such intent, then Lessee shall not abandon such well and shall be freed of the obligations of abandoning same, and Lessor shall cause Lessee to be released from any abandonment bond posted by Lessee with respect to said well and Lessor shall concurrently post any new bond required for the same as required by any government agency.

8. Land Compensation. In return for actual surface use of leased land, if Producing Agricultural Lands are required by Lessee to be taken out of production, either temporarily or permanently for Lessee's operations, including but not limited to as a result of Lessee's use of water from the leased lands, Lessee shall compensate Lessor at the annual rate of Four Hundred Dollars ($400.00) per acre for such lands so affected for the duration of their use. For greater clarity, if Lessee requires 2 acres of producing agricultural land, but its use impacts 10 acres, the rate would apply to the 10 acres. For these purposes any pipelines shall be deemed to require a 10 foot wide ground area. All pipelines shall be insulated as per typical project specifications and shall be colored according to industry norms or permit requirements as may be imposed. Lessee shall further be responsible for any costs associated with the redesign and/or relocation of structures or sprinkling equipment affected by Lessee's operations, which shall be redesigned and/or relocated according to current commercial agricultural standards, including burying feed lines to pivots at adequate depth to protect the same.

10. Inspection by Lessor. Lessor, or its agents, at Lessor's sole cost and risk, may during normal hours of operation examine the working, installations, structures, or operations of Lessee constructed or undertaken pursuant to the leased rights, and may at reasonable times inspect the books and records of Lessee with respect to matters pertaining to the payment of royalties to Lessor.

11. Default Notice. Upon the violation of any of the terms and conditions of this Lease by Lessee (including but not limited to payment of rental, advance royalty and/or royalty) and the failure of Lessee, as to monetary matters, to make payment, and as to other violations, to begin in good faith to remedy the same, within sixty (60) days after written notice from Lessor so to do, specifying in said notice the nature of such default, then at the option of Lessor this Lease shall forthwith cease and terminate and all rights of Lessee in and to the well and the leased rights shall be at an end.

12. Termination. Notwithstanding any other provisions of this Lease, and in consideration of the payment made by the Lessee to the Lessor for the execution of this Lease, Lessee shall have the right at any time prior to or after default hereunder, to quitclaim and surrender to Lessor all right, title and interest of Lessee in and to the well and the leased rights, and thereupon all rights and obligations of the parties hereto one to the other shall cease and terminate, save and except as to any then accrued royalty or rent obligations of Lessee then payable, and except Lessee's obligations to restore the sump holes and excavations on the premises, as to which Lessee shall remain liable to Lessor.

13. Partial Ownership Interests. In the event Lessor at the time of making this Lease owns an interest in the leased land less than One Hundred Percent (100%) of the right, title and interest purportedly granted or leased hereby to Lessee, then any payments due Lessor hereunder shall be paid to Lessor only in the proportion which Lessor's Interest bears to a One Hundred Percent (100%) interest in the leased land. Notwithstanding the foregoing, should Lessor hereafter acquire any additional right, title or interest in or to the leased land, it shall be subject to the provisions hereof to the same extent as if owned by Lessor at the date hereof, and any increase in payments of money hereunder necessitated thereby shall commence with the payment next following receipt by Lessee of satisfactory evidence of Lessor's acquisition of such additional interest.

14. Title. Lessor hereby warrants and agrees to defend title to the leased rights and agrees that Lessee, at its option, may pay and discharge any taxes, mortgages, trust deeds or other liens or encumbrances existing, levied or assessed on or against the well or the leased rights, and in the event Lessee exercises such option, Lessee shall be subrogated to the rights of any holder thereof, and shall have, among other rights, the right of applying to the discharge of any such mortgage, tax or other lien or encumbrance any payments accruing to Lessor hereunder.

15. Tax Payments. Lessee shall pay all taxes levied on structures and improvements constructed by Lessee pursuant to this Lease. In the event any taxes are levied or assessed against the right to produce Leased Substances, or against any Leased Substances on or in the land associated with the well or the leased rights, or in the event any increase in the taxes levied or assessed against the well or the leased rights shall be based upon the production of Leased Substances from, or reserves of Leased Substances attributed to, the well or the lease rights, then in either such event Lessee shall pay One Hundred Percent (100%) of any such taxes or increase, as the case may be, and Lessor shall not be required to pay any part thereof.

16. Assignment. The rights of either party hereunder may be assigned in whole or in part, and the right and privilege to do so is hereby reserved by each party, and the provisions hereof shall extend to the heirs, personal representatives, successors and assigns of the parties hereto, but no change or division in ownership of the well, rights, rentals or royalties,

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however accomplished, shall operate to enlarge the obligations or diminish the rights of Lessee, and no such change in ownership shall be binding upon Lessee until the expiration of thirty (30) days after Lessee is furnished with written notice of such transfer or assignment, together with a certified copy of the instruments of transfer or assignment. Lessee's right of assignment expressly includes the right to sublease all or any portion of its rights and obligations hereunder. Lessee must notify the Lessor, in writing, within 30 days of any assignment, however, Lessee will guarantee the performance of any assignee, unless released in writing by Lessor.

17. Force Majeure. The obligation of the Lessee hereunder shall be suspended and the terms of this Lease shall be extended as the case may be, while Lessee is prevented from complying therewith, in whole or in part, by strikes, lockouts, riots, war or the results thereof, acts of God or the elements, fire, flood, accidents, delays in transportation, inability to secure labor or material in the open market, laws, orders, rules, or regulations of Federal, State, County, Municipal, or other governmental agencies, authority, or representative, or any other matter or condition beyond reasonable control of Lessee, whether or not similar to the conditions or matters herein specifically enumerated, or while litigation contesting Lessor's title to the well or the leased rights or the rights granted Lessee hereunder or litigation involving Lessee's operations hereunder shall be pending and undetermined or during any period when Lessee has no market for the products it is then capable of producing from the leased rights or the market price then available for such products will not produce an acceptable profit. For so long as any of the above circumstances continue to exist, Lessee, without impairment of its rights hereunder, shall be excused from performance of all obligations hereunder except payment of taxes, protection of the leased rights, keeping the premise clean and free from debris, and paying the sum of $4.00 per acre per annum if conditions continue for a period of 6 months or more. It is expressly agreed that the prevention of settlement of any litigation or strike or labor disturbance shall not be considered a matter subject to Lessee's control within the meaning of this Paragraph.

If the permission or approval of any governmental agency is necessary before drilling or producing operations may be commenced pursuant to the leased rights, then if such permission or approval has been applied for at least thirty (30) days prior to the date upon which such operations must be commenced under the terms hereof, the obligation to commence such operations shall be suspended until ninety (90) days after the governmental permit is granted or approval given, or if such permit or approval is denied initially, then so long as Lessee in good faith appeals from such denial or conducts further proceedings in an attempt to secure such permit or approval and ninety (90) days thereafter. Lessor agrees to fully support and cooperate with Lessee in securing permits and authorizations to conduct geothermal operations on the leased rights, all costs of which shall be borne by Lessee.

18. All statements of production and royalty and all payments to be made by Lessee to Lessor hereunder shall be sent to the person hereinafter set forth, at the address indicated:

COLAHAN ENTERPRISE INC.
P.O. BOX 300
PAISLEY, OR 97636

Lessee shall, upon written notification of change of ownership in the well or leased rights or in the rentals or royalties hereunder, as provided in Paragraph ___ above hereof, divide and distribute the same to the new owners of such interest; provided,

however, that if at any time there are three or more persons entitled to rentals or royalties hereunder, Lessee may, at its option, withhold payment of such rentals or royalties until a majority in interest of such persons designate in writing in a recordable instrument delivered to Lessee, a bank, trust company or corporation, as a common agent and depositary, to receive all payments due hereunder to such persons. Such designation may be changed at any time in the same manner. Delivery of all statements and payments hereunder may be made by depositing same in the United States mail duly addressed to Lessor at the above address or addresses or to such agent and depositary, which shall constitute full performance of Lessee's obligation to make such delivery.

19. Notice. Any notice herein required, or permitted to be given, or furnished by one party to the other shall be in writing. Delivery of such written notice to Lessor shall be made in person, by depositing the same in the United States mail duly certified or by express delivery and addressed to Lessor at P.O. BOX 300 PAISLEY, OR 97636 and delivery of such written notice to Lessee shall be made in person, by depositing the same in the United States mail duly certified or delivered by express delivery and addressed to Lessee at P.O. BOX 691 ALTURAS, CA 96101. Either party hereto may by written notice to the other party change its address to any other location.

20. Definitions. For the purposes of this Lease the following definitions shall apply:

(a) The terms "Hot Water", "Steam" and "Thermal Energy", collectively referred to as "Energy Produced", each shall mean natural geothermal water and/or steam, and shall also mean the natural heat of the earth and the energy present in, resulting from or created by, or which may be extracted from, the natural heat of the earth or the heat present below the surface of the earth, in whatever form such heat or energy naturally occurs;

(b) The term "Extractable Minerals" shall mean any minerals in solution in the well or effluents and all minerals and gases in solution or in the effluents produced from or by means of the well or any well or wells developed in exercise of the leased rights or by means of condensing steam or processing water produced from the effluents from any such well or wells. Said terms shall also include any water so produced or obtained from condensation or steam; provided, however, that the term "gases" shall not include hydrocarbon gases that can be produced separately from the well effluents;

(c) The term "Leased Substances" shall collectively mean the matter, substances and resources defined in subparagraphs 18(a) and 18(b) that are subject to this Lease;

(d) The term "Geothermal Resources" shall collectively mean the matter, substances and resources defined in subparagraph 18(a) and 18(b) that are not subject to this Lease but are located on adjacent land or lands in reasonable proximity thereto;

(e) The term "Actual Revenues" shall mean the sum of those gross sales derived from the sale of electricity generated from the premises, together with production incentives, carbon credits, green tags, and other quantifiable benefits, that now exist or may exist at some future time, that accrue from use of the geothermal resources or production of electricity from the leased premises, and less third party wheeling costs to disseminate the electricity generated from the premises.

(f) The term "Producing Agricultural Lands" shall mean all crop lands, irrigated lands, or grazing lands (which may or may not be irrigated), holding facilities, operational facilities.

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21. Severability. In the event any part or portion or provision of this instrument shall be found or declared to be null, void or unenforceable for any reason whatsoever by any Court of competent jurisdiction, then and in such event only such part, portion or provision shall be affected thereby, and such finding, ruling or decision shall not in any way affect the remainder of this instrument or any of the other terms or conditions hereof, which said remaining terms and conditions shall remain binding, valid and subsisting and in full force and effect between the parties hereto, it being specifically understood and agreed that the provisions hereof are severable for the purposes of the provisions of this clause. In this connection, this Lease shall not in any event extend beyond such term as may be legally permissible under present applicable laws, and should be any such applicable law limit the term hereof to less than that herein provided, then this Lease shall not be void but shall be deemed to be in existence for such term and no longer.

22. Exclusive Rights. Subject to the the Water Rights associated with the premises which are wholely and exclusively retained by the Lessor and the Lessee's obligations hereunder, including the obligation to re inject all geothermal fluids produced after they are used for the production of electricity and Lessor's uses, Lessee shall have the exclusive rights to all Leased Substances and to all power production from Leased Substances on and/or from leased land during the term hereof, subject only to payment of the rents and royalties to Lessor as set forth herein, and other rights and uses as set forth herein.

23. Counterparts. This Lease may be executed in any number of counterparts and all such counterparts shall be deemed to constitute a single lease and the execution of one counterpart by any party Lessor shall have the same force and effect as if such party had signed all the other counterparts.

24. Binding Effect. This Geothermal Lease and Agreement and all of the terms, covenants and conditions hereof shall extend to the benefit of and be binding upon the respective heirs, personal representatives, successors and assigns of the parties hereto.

25. Memorandum of Lease. This lease agreement shall not be recorded. Lessee and Lessor shall, concurrently with execution of this lease, execute and cause to be acknowledged a Memorandum of Geothermal Lease and Agreement approved by Lessee and Lessor, which Memorandum shall be recorded in the official records of the county in which the leased land is located.

26. This lease and agreement shall be interpreted, governed by and construed under the laws of the state of Oregon, without consideration of any conflicts of law between the location of the parties or states of domicile thereof.

[*The remainder of this page is intentionally left blank*]

IN WITNESS WHEREOF, the parties have caused this instrument to be duly executed as of the date hereinabove first written.

On behalf of,
COLAHAN ENTERPRISES INC.

Erin K. Douglas, Secretary
Lessor

On behalf of,
SURPRISE VALLEY ELECTRIFICATION CORP.

Daniel W. Silveria, General Manager
Lessee

State of ~~California~~ Oregon)
County of ~~Modoc~~ Lake)

OFFICIAL SEAL
MONICA WEIDNER
NOTARY PUBLIC-OREGON
COMMISSION NO. 448732
MY COMMISSION EXPIRES JUNE 12, 2014

On this 24th day of September, 2010 before me,

the undersigned Notary Public, personally appeared
Daniel W. Silveria
( ) personally known to me
(X) proved to me on the basis of satisfactory evidence
to be the person(s) whole name(s) Daniel W. Silveria
subscribed to the within instrument, and acknowledged that
Daniel W. Silveria, executed it.
WITNESS my hand and official seal.

Monica Weidner
Notary's Signature
Commission Expires: June 12, 2014

MONICA WEIDNER NOTARY PUBLIC STATE OF OREGON

State of Oregon)
County of Lake)

OFFICIAL SEAL
MONICA WEIDNER
NOTARY PUBLIC-OREGON
COMMISSION NO. 448732
MY COMMISSION EXPIRES JUNE 12, 2014

On this 24th day of September, 2010, before me,

the undersigned Notary Public, personally appeared

( ) personally known to me
(X) proved to me on the basis of satisfactory evidence
to be the person(s) whole name(s) Erin K. Douglas
subscribed to the within instrument, and acknowledged that
Erin K. Douglas executed it.
WITNESS my hand and official seal.

Monica Weidner
Notary's Signature

MONICA WEIDNER NOTARY PUBLIC STATE OF OREGON

G-17485

RECEIVED
JAN 23 2015
OWRD

Recording requested by
and when recorded mail to:

~~Re-Recorded to add Exhibit 'A'~~ ~~M0711422~~

~~M0711101~~

M0711742

Surprise Valley Electrification Corp.
Attn: Daniel W. Silveria
P.O. Box 691
Alturas, CA 96101

Re-Recorded to Correct Exhibit 'A'

130476

~~130359~~

~~130251~~

MEMORANDAM OF GEOTHERMAL LEASE AGREEMENT

THIS MEMORANDUM OF GEOTHERMAL LEASE AGREEMENT (this "Memorandum") is made and entered into as of Sept 24 2010, 2010, by and between COLAHAN ENTERPRISES INC., P.O. Box 308 Paisley, OR 97636 "Landowner" and SURPRISE VALLEY ELECTRIFICATION CORP., a Rural Electric Cooperative, Incorporated under IRS 501(c)(12), P.O. Box 691, Alturas, CA 96101 ("Lessee"), with reference to that certain unrecorded Geothermal Lease Agreement for Colahan Enterprises Inc. dated Sept 24 2010 Assessor's Parcel No.'s 33S18E-203, 33S18E-801, 33S18E-802, 33S18E-1200, 33S18E-1300 (sec 23), 33S18E-1303, 33S18E-1300 (sec 24), situated in Lake County, Oregon, more particularly described on Exhibit A.

Any capitalized terms used and not defined herein shall have the meaning given such terms in the Lease.

Notice is hereby given that, pursuant to the Lease, Landowner has leased the real property described in Exhibit "A" attached hereto and incorporated herein to Lessee for the sole and exclusive right to utilize the leased rights, including but not limited to the right to explore for, drill for, test, develop, operate produce, extract, take, remove, or sell Hot Water, Steam, and Thermal Energy, and Extractable Minerals, and to store, utilize, process, convert and otherwise treat such Hot Water, Steam and Thermal Energy, and to extract any Extractable Minerals during the term hereof and to transport same, and to inject or reinject effluents into the well or any wells drilled pursuant to the leased rights; or inject water, gas or other fluid or substances by artificial means into formations containing Hot Water, Steam, or Thermal Energy as agreed to in the body of the lease agreement.

The initial term of the Lease shall be for five (5) years from and after the date hereof, referred to as the "Primary Term", and so long thereafter as electricity is produced in commercial quantities from the well or through the leased rights, or lands, and for so long as Lessee is prevented from producing same, or the obligations of Lessee hereunder are suspended, for the causes hereinafter set forth, or this Lease is continued in force by reason of any other provision hereof.

M0711743 ~~M0711423~~ ~~M0711102~~

Landowner and Lessee hereby ratify and adopt the Lease, and agree to be bound by all of the terms and provisions thereof.

This Memorandum and the Lease, and all of the terms and provisions hereof and thereof shall run with the land and shall be binding upon and inure to the benefit of the Landowner and Lessee and their respective successors and assigns.

Reference is hereby made to executed copies of the Lease in the possession of the Landowner and Lessee, respectively, for all of the terms and provisions thereof, and such terms and provision s are incorporated herein and made a part hereof in all respects as though fully set forth herein. This Memorandum is prepared for the purpose of recordation only, and in no way modifies the terms or provisions of the Lease. If there is any inconsistency between this Memorandum and the terms and provisions of the Lease, the terms and provisions of the Lease shall control. This Memorandum may be executed in multiple counterparts, all of which shall constitute one and the same Memorandum.

(SIGNATURES ON NEXT PAGE)

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M0711744 ~~M0711424~~ ~~M0711103~~ 491 ~~811~~ ~~327~~

IN WITNESS WHEREOF, Landowner and Lessee have executed this Memorandum as of the date first set forth above.

On behalf of,
COLAHAN ENTERPRISES INC.

Lessor

On behalf of,
SURPRISE VALLEY ELECTRIFICATION CORP.

Daniel W. Silveria, General Manager
Lessee

State of ~~California~~ Oregon)
County of ~~Modoc~~ Lake)

On this 24 day of Sept, 2010 before me,

the undersigned Notary Public, personally appeared
Daniel W. Silveria
( ) personally known to me
(X) proved to me on the basis of satisfactory evidence
to be the person(s) whose name(s) Daniel W. Silveria
subscribed to the within instrument, and acknowledged
that Daniel W. Silveria, executed it.
WITNESS my hand and official seal.

OFFICIAL SEAL
MONICA WEIDNER
NOTARY PUBLIC-OREGON
COMMISSION NO. 448732
MY COMMISSION EXPIRES JUNE 12, 2014

MONICA WEIDNER NOTARY PUBLIC STATE OF OREGON

Monica Weidner
Notary's Signature
Commission Expires: June 12, 2014

State of Oregon)
County of Lake)

on this 24 day of Sept, 2010, before me,

the undersigned Notary Public, personally appeared
Erin K Douglas
( ) personally known to me
(X) proved to me on the basis of satisfactory evidence
to be the person(s) whose name(s)
subscribed to the within instrument, and acknowledged
that
executed it.
WITNESS my hand and official seal.

OFFICIAL SEAL
MONICA WEIDNER
NOTARY PUBLIC-OREGON
COMMISSION NO. 448732
MY COMMISSION EXPIRES JUNE 12, 2014

MONICA WEIDNER NOTARY PUBLIC STATE OF OREGON

Monica Weidner
Notary's Signature
Commission Expires: June 12, 2014

STATE OF OREGON, COUNTY OF LAKE Reel 71 File 1101

I hereby certify that the within document was received and filed for record this 24 **day of** September 20 10

EXCEPTING and otherwise excluding, that certain real property described as Tax Lot #33S18E24C0070000 in the property tax records of Lake County, Oregon.

AND EXCEPTING those mineral rights accruing to the following real property parcels that are otherwise retained by the United States of America.

Tax Lot #33S18E000080100 and 33S18E000080200
Township 33 South, Range 18 East of the Willamette Meridian
Section 14: SE ¼ SE ¼ Section 23: NE ¼ NW ¼

Tax Lot #33S18E000020300
Township 33 South, Range 18 East of the Willamette Meridian
Section 13: W ½ SW ¼ SW ¼ Section 13: SE ¼ SW ¼ SW ¼

State of Oregon } ss. Reel 71
County of Lake } File 1742

I hereby certify that the within instrument was received and filed for record on the 3 day of Nov 20 10 10:30 o'clock a M. and recorded on page 489 in book 275 record of Deeds, of said County

Stacie Geaney
County Clerk
By Monica Walker Deputy

G-17885

492

Commission Expires:__ _____

M0711745

EXHIBIT A

Lands located in Lake County, Oregon

Tax Lot # 33S18E000130000 and 33S18E000130300
Township33 South, Range 18 East of the Willamette Meridian
Section 23:
NE ¼, SE ¼ NW ¼ , SE ¼ SW ¼ , SW ¼ SE ¼ excepting deed recorded in Book 53 at page 635 of Record of Deeds
N ½ SW ¼
That portion of NE ¼ SE ¼ of said Section 23 lying North of the Chewaucan River, excepting therefrom that portion of said NE ¼ SE ¼ contained in a deed from Northwest Townsite Company to Kittie Loveland recorded in Book 52 at page 593 of the Record of Deeds.
Section 24:
N ½ NE ¼, SW ¼ NE ¼, NW ¼, excepting a tract of land conveyed to State of Oregon in Book 79 at page 395 of Record of Deeds and highway right-of-way.
That portion of NW ¼ SW ¼ of said Section 24 lying North of the extension of Mill Street in Paisley, Oregon, excepting therefrom those tracts of land heretofore conveyed by Northwest Townsite Company and its predecessors in interest recorded in Book 44 at Page 95, Book 51 at pages 10, 432 and 549; Book 52 at page 593; Book 53 at page 147; Book 56 at page 504; Book 62 at page 386 of the Record of Deeds
Section 26:
NW ¼ NW ¼

Tax Lot # 33S18E000120000
SW ¼ SW ¼ of Section 23, Township 33 South, Range 18 East, Willamette Meridian.

Tax Lot #33S18E24C0010000
All that tract or parcel of land in Sections 23 and 24, Township 33 South, Range 18 East of the Willamette Meridian, bounded band described as follows: Beginning at a point on the section line between said sections 23 and 24 South 0 degrees 14 minutes West, 550.84 feet from the quarter corner between said sections 23 and 24, and 15 feet from the mill race of the Chewaucan Mills, thence parallel and 15 feet from said Mill race, North 32 degrees 25 minutes East, 121.95 feet; thence North 40 degrees 45 minutes East, 67.20 feet; thence North 54 degrees 54 minutes East, 85 feet; thence North 74 degrees 16 minutes East, 62.90 feet to a flood channel of the Chewaucan River South 15 degrees 44 minutes East, 27.20 feet; thence southwesterly along the bank of said flood channel to said section line; thence along the north bank of the river westerly about 75 feet; thence North 51 degrees 39 minutes East 73 feet, more or less, to a point and place of beginning, containing one acre, more or less.

Tax Lot #33S18E000139900
A parcel of land lying in the S ½ of the NW ¼ of Section 24, Township 33 South, Range 18 East, Willamette Meridian, Lake County, Oregon, and being that property described in that deed to Ross A. Colahan, recorded in Book 205, Page 230 of Lake County Record of deeds. (Which deed references a prior deed, to the State of Oregon, recorded in Book 79, Page 395 of the Lake County Record of Deeds.)

Attachment E

Well Logs

G-17985

NOTICE TO WATER WELL CONTRACTOR
The original and first copy of this report are to be filed with the STATE ENGINEER, SALEM 10, OREGON within 30 days from the date of well completion.

RECEIVED
APR 7 1964
STATE ENGINEER
SALEM, OREGON

WATER WELL REPORT
STATE OF OREGON
(Please type or print)

Lake 1628

State Well No. 33/18-23G

State Permit No. .....

(1) OWNER:
Name Ross Colohan
Address Paisley, Oregon

(2) LOCATION OF WELL:
County Lake Driller's well number
SW ¼ NE ¼ Section 23 T. 33S R. 18 E W.M.
Bearing and distance from section or subdivision corner
1½ miles NW of Paisley, Oregon

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(3) TYPE OF WORK (check):
New Well ☒ Deepening ☐ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 12.

(4) PROPOSED USE (check):
Domestic ☐ Industrial ☐ Municipal ☐
Irrigation ☒ Test Well ☐ Other ☐

(5) TYPE OF WELL:
Rotary ☐ Driven ☐
Cable ☒ Jetted ☐
Dug ☐ Bored ☐

(6) CASING INSTALLED:
Threaded ☐ Welded ☒
16 " Diam. from 0 ft. to 270 ft. Gage .250
" Diam. from ft. to ft. Gage
" Diam. from ft. to ft. Gage

(7) PERFORATIONS:
Perforated? ☒ Yes ☐ No
Type of perforator used Mills
Size of perforations ¼ in. by 4 in.
1400 perforations from 100 ft. to 240 ft.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

(8) SCREENS:
Well screen installed ☐ Yes ☒ No
Manufacturer's Name
Type Model No.
Diam. Slot size Set from ft. to ft.
Diam. Slot size Set from ft. to ft.

(9) CONSTRUCTION:
Well seal—Material used in seal puddled clay
Depth of seal 22 ft. Was a packer used? no
Diameter of well bore to bottom of seal 22 in.
Were any loose strata cemented off? ☐ Yes ☒ No Depth
Was a drive shoe used? ☒ Yes ☐ No
Was well gravel packed? ☐ Yes ☒ No Size of gravel:
Gravel placed from ft. to ft.
Did any strata contain unusable water? ☐ Yes ☒ No
Type of water? Depth of strata
Method of sealing strata off

(10) WATER LEVELS:
Static level 83 ft. below land surface Date 4/3/64
Artesian pressure lbs. per square inch Date

(11) WELL TESTS:
Drawdown is amount water level is lowered below static level
Was a pump test made? ☒ Yes ☐ No If yes, by whom? Contractor
Yield: 150 gal./min. with 83 ft. drawdown after 3 hrs.
" " " "
" " " "
Bailer test gal./min. with ft. drawdown after hrs.
Artesian flow g.p.m. Date
Temperature of water 104 Was a chemical analysis made? ☐ Yes ☒ No

(12) WELL LOG:
Diameter of well below casing 8
Depth drilled 315 ft. Depth of completed well 315 ft.
Formation: *Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.*

MATERIAL	FROM	TO
soil zone, gravelly	0	3
loose gravel and sand, med.	3	11
clay&sand, brown	11	35
volcanic gravel & clay, brn.	35	92
gravel, med. seepage of wat	92	94
gravel & clay, brn.	94	110
med. gravel & brn.	110	112
hard-packed sand and clay,	112	118
soft sandy clay, brown	118	121
sticky clay & gravel, brn.	121	124
loose gravel, fine waterbe	124	125
boulders & clay, gray	125	159
sandy clay , brown	159	176
fine gravel, waterbearing	176	182
sticky clay & gravel, gray	182	194
fine sand, white, waterbe	194	199
clay & gravel, brn.	199	220
fine sand, wht. & pink, wat	220	225
sandy clay & gravel,fine	225	230
med. gravel, waterbearing	230	234
sticky clay, brn.	234	298
basalt rock w/ clay string-ers, brown	298	315

Work started 3/7/64 19 Completed 4/3/ 1964
Date well drilling machine moved off of well 4/4 1964

(13) PUMP:
Manufacturer's Name
Type: H.P.

Water Well Contractor's Certification:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Jack Stooksberry, Jr.
(Person, firm or corporation) (Type or print)
Address Route 2, Box 47, Lakeview, Ore.
Drilling Machine Operator's License No. 45
[Signed] Jack Stooksberry Jr.
(Water Well Contractor)
Contractor's License No. 211 Date 4/3, 19 64

G-17685

(USE ADDITIONAL SHEETS IF NECESSARY)

Lake 1626

33S/18E-23aC
Deep.

STATE OF OREGON

WATER WELL REPORT

(as required by ORS 537.765)

(1) OWNER: Owner's Well Number: _____

Name Ross Colohan & Son

Address P.O. Box

City Paisely State Oreg. Zip 97636

(2) TYPE OF WORK:

☐ New Well ☒ Deepen ☐ Recondition ☐ Abandon

(3) DRILL METHOD:

☒ Rotary Air ☐ Rotary Mud ☐ Cable ☐ Other

(4) PROPOSED USE:

☐ Domestic ☐ Community ☐ Industrial ☒ Irrigation

☐ Thermal ☐ Injection ☐ Other _____

(5) BORE HOLE CONSTRUCTION:

Depth of Completed Well 415 ft.

Special Standards date of approval _____

HOLE Diameter	From	To	SEAL Material	From	To	Amount sacks or pounds
7"	306	430	xxx	not disturbed		

How was seal placed? Method ☐ A ☐ B ☐ C ☐ D ☐ E

☐ Other not disturbed

Backfill placed from _____ ft. to _____ ft. Material _____

Gravel placed from _____ ft. to _____ ft. Size of gravel _____

(6) CASING/LINER:

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:	8"	+2	300	.188	☒	☐	☒	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
Liner:					☐	☐	☐	☐
					☐	☐	☐	☐

Final location of shoe(s) _____

(7) PERFORATIONS/SCREENS:

☐ Perforations Method none

☐ Screens Type _____ Material _____

From	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐

(8) WELL TESTS: Minimum testing time is 1 hour

☐ Pump ☐ Bailer ☒ Air ☐ Flowing Artesian

Yield gal/min	Pumping level	Drill stem at	Time
			½ hr
50		415	1 hr

Temperature of water 175* Depth Artesian Flow Found _____

Was a water analysis done? ☐ Yes By whom no

Did any strata contain water not suitable for intended use? ☐ Too little

☐ Salty ☐ Muddy ☐ Odor ☐ Colored ☐ Other no

Depth of strata: _____

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(9) LOCATION OF WELL by legal description:

County Lake Latitude _____ ' " Longitude _____ ' "

Township 33S N or S, Range 18E E or W, WM.

Section 23 SW ¼ NE ¼

Tax Lot _____ Lot _____ Block _____ Subdivision _____

Street Address of Well (or nearest address) _____

(10) STATIC WATER LEVEL:

120 ft. below land surface. Date Mar. 18-87

Artesian pressure _____ lb. per square inch. Date _____

(11) WELL LOG: Ground elevation unknown

Material	From	To	WB?	SWL
Hard Grey Basalt	306	329		
Mild Brown Lava	329	331		
Hard Grey Basalt	331	337		
Mild Brown Lava	337	339		
Broken Lava, W/B	339	353	WB-	
Hard Basalt	353	360		
White Clays	360	375		
Brown & Blue Clays	375	430		
Brown & Blue Clays	430	432		

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Date started Mar. 9-87 Completed Mar. 18-87

(unbonded) Water Well Constructor Certification:

I constructed this well in compliance with Oregon well construction standards. Materials used and information reported above are true to my best knowledge and belief.

Signed _____ Date Mar. 22-87

(bonded) Water Well Constructor Certification:

I accept responsibility for construction of this well and its compliance with all Oregon water well standards. This report is true to the best of my knowledge and belief.

Signed _____ Date 4-9-87

Company Orvall Buckner Well Drilling, Inc. Co. Reg. No.

LAKE 52582

STATE OF OREGON
WATER SUPPLY WELL REPORT
(as required by ORS 537.765 & OAR 690-205-0210)

WELL LABEL # L [ ]

START CARD # 209512

(1) LAND OWNER

Owner Well I.D. 33/18-23G

First Name Ross Last Name Colhan

Company

Address 38650 HWY 31

City Paisley State Or Zip 97636

(2) TYPE OF WORK

☐ New Well ☐ Deepening ☐ Conversion
☑ Alteration (repair/recondition) ☐ Abandonment

(3) DRILL METHOD

☒ Rotary Air ☐ Rotary Mud ☐ [illegible] ☐ Auger ☐ Cable Mud
☐ Reverse Rotary ☐ Other

(4) PROPOSED USE

☐ Domestic ☐ [illegible] ☐ Community
☑ Industrial/ Commericial ☐ Livestock ☐ Dewatering
☐ Thermal ☐ Injection ☐ Other

(5) BORE HOLE CONSTRUCTION

Special Standard ☐ (Attach copy)

Depth of Completed Well _____ ft.

BORE HOLE Dia	From	To	SEAL Material	From	To	Amt	sacks/ lbs
			Neat Cmnt	0	23		35

How was seal placed: Method ☑ A ☐ B ☐ C ☐ D ☐ E

☐ Other

Backfill placed from _____ ft. to _____ ft. Material _____

Filter pack from _____ ft. to _____ ft. Material _____ Size _____

Explosives used: ☐ Yes Type _____ Amount _____

(6) CASING/LINER

Casing	Liner	Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd
○	○						○	○		
○	○						○	○		
○	○						○	○		
○	○						○	○		
○	○						○	○		

Shoe ☐ Inside ☐ Outside ☐ Other Location of shoe(s) _____

Temp casing ☐ Yes Dia _____ From _____ To _____

(7) PERFORATIONS/SCREENS

Perforations Method _____

Screens Type _____ Material _____

Perf/Screen	Casing/ Liner	Screen Dia	From	To	Scrn/slot width	Slot length	# of slots	Tele/ pipe size

(8) WELL TESTS: Minimum testing time is 1 hour

○ Pump ○ Bailer ○ Air ○ Flowing Artesian

Yield gal/min	Drawdown	Drill stem/Pump depth	Duration (hr)

Temperature _____ °F Lab analysis ☐ Yes By _____

Water quality concerns? ☐ Yes (describe below)

From	To	Description	Amount	Units

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NOV 18 2014
SALEM, OR

(9) LOCATION OF WELL (legal description)

County LAKE Twp 33 S N/S Range 18 E E/W WM

Sec 23 SW 1/4 of the NE 1/4 Tax Lot 1300

Tax Map Number _____ Lot _____

Lat ° ' " or _____ DMS or DD

Long ° ' " or _____ DMS or DD

○ Street address of well ○ Nearest address

1-1/2 miles NW of Paisely, Oregon

(10) STATIC WATER LEVEL

	Date	SWL(psi)	+	SWL(ft)
Existing Well / Predeepening				
Completed Well				

Flowing Artesian? ☐ Dry Hole? ☐

WATER BEARING ZONES Depth water was first found _____

SWL Date	From	To	Est Flow	SWL(psi)	+	SWL(ft)

(11) WELL LOG

Ground Elevation _____

Material	From	To
Remove original puddled clay seal with overshot — replace with 24" cement seal to 23'		

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Date Started 7.30.14 Completed 7-30-14

(unbonded) Water Well Constructor Certification

I certify that the work I performed on the construction, deepening, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.

License Number _____ Date _____

Password : (if filing electronically) _____

Signed _____

(bonded) Water Well Constructor Certification

I accept responsibility for the construction, deepening, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.

License Number 1946 Date 11-12-14

Password : (if filing electronically) _____

Signed [signature]

Contact Info (optional) _____

ORIGINAL - WATER RESOURCES DEPARTMENT

THIS REPORT MUST BE SUBMITTED TO THE WATER RESOURCES DEPARTMENT WITHIN 30 DAYS OF COMPLETION OF WORK

Form Version: 0.96

G-17985

WATER SUPPLY WELL REPORT
continuation page

LAKE 52582

WELL I.D. # L ____________

START CARD # 209512

(5) BORE HOLE CONSTRUCTION

BORE HOLE

Dia	From	To

SEAL

Material	From	To	Amt	sacks/ lbs

FILTER PACK

From	To	Material	Size

(6) CASING/LINER

Casing	Liner	Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐

(7) PERFORATIONS/SCREENS

Perf/Screen	Casing/ Liner	Screen Dia	From	To	Scrn/slot width	Slot length	# of slots	Tele/ pipe size

(8) WELL TESTS: Minimum testing time is 1 hour

Yield gal/min	Drawdown	Drill stem/Pump depth	Duration (hr)

Water Quality Concerns

From	To	Description	Amount	Units
		~~RECEIVED BY OWRD~~		
		~~NOV 18 2014~~		

(10) STATIC WATER LEVEL

Water Bearing Zones

SWL Date	From	To	Est Flow	SWL(psi)	+	SWL(ft)
					☐	
					☐	
					☐	
					☐	
					☐	
					☐	
					☐	
					☐	
					☐	
					☐	

(11) WELL LOG

Material	From	To

Comments/Remarks

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SALEM, OR

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Attachment F

Little Hot Well Stream Interference Evaluation

G-17985

GSI
Water Solutions, Inc.

Technical Memorandum

To: Lynn Culp, Surprise Valley Electrification Corp

From: Bruce Brody-Heine, GSI Water Solutions, Inc.

Date: January 9, 2015

Re: **Little Hot Well - Stream Interference - Greater than 25% at 30 days Issue Evaluation**

OWRD has authorized the use of water from the Little Hot Well by Surprise Valley Electrification Corp. (SVEC) for up to 5 years under Limited License LL-1508. As part of the OWRD review process for the limited license, a Groundwater Public Interest Review was completed on the Little Hot Well (LAKE 1628). The review, dated March 25, 2013 (completed under LL-1450), automatically triggered an assumed "potential to cause substantial interference" (PSI) to surface water flows given the well is in hydraulic connection with the Chewaucan River. The resulting PSI evaluation concluded that the interference with the river at the end of 30 days of continuous pumping exceeded the trigger of greater than 25 percent interference. As a result, LL-1508 contains a condition that before a permit can be issued the greater than 25% issue needs to be resolved.

Potential Resolution

OWRD's original analysis uses aquifer parameters developed from a pumping test in the nearby deep well LAKE 1627 & 4448 (called the Hot Well). This well produces water from a highly productive aquifer zone located approximately 500 to 1000 below ground surface and can produce well over 1000 gpm. The Little Hot Well is completed in the much shallower geologic units which has much lower permeability. The low permeability is reflected in the much lower production rate from the well and in the pump test results conducted on the Little Hot Well.

GSI believes that the PSI analysis for the Little Hot well should be completed using the testing results from the Little Hot well. The current use of the testing data from the nearby well does not accurately represent the aquifer conditions in the upper portion of the unconfined system in which the Little Hot well and the river reside. Well Log LAKE 1628 indicates a pump test at the rate of 150 gpm was conducted for three hours, with a total of 83 feet of drawdown (see Attachment A). This pump test results in a transmissivity of 340 ft^2/day (see Attachment B). Using a saturated thickness of 232 feet results in a horizontal hydraulic conductivity (K_H) of 1.464 feet/day. Using this parameter developed from the Little Hot Well pumping test results in 19.9 percent interference (all other parameters being equal). The following table presents the

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parameters used in OWRD's original analysis and the slightly different parameters used in the Hunt model interference analysis.

OWRD's LAKE 4448 Analysis [1]	Little Hot Well Analysis	Parameter Description
26,820	339.9	Transmissivity from pumping test data (ft^2/day)
900	232	Aquifer saturated thickness (ft)
29.8	1.464	Horizontal hydraulic conductivity K_H(ft/day)
50	50	Average stream width (ft)
0.30	0.30[2]	Streambed conductivity (aquifer horizontal conductivity/100)
20	20	Streambed thickness
5,000	5,000	Distance to river where hydraulic connection occurs
28.2%	19.9%	Percent interference

Notes:
The percentage interference is independent of the pumping rate.
Red – Aquifer parameter values from Little Hot Well pump test and only values different from OWRD's calculations
1. See attachment C for copy of the OWRD parameters and analysis results
2. To minimize changes to the evaluation this value is from the OWRD LAKE 4448 analysis (29.8/100)

Attachment D presents Hunt model results using the aquifer parameters developed from the Little Hot Well.

GSI believes using the aquifer parameters in the interference analysis developed from testing completed on the Little Hot Well is more representative of aquifer conditions surrounding the Little Hot Well and the nearby river and provides a more accurate result.

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ATTACHMENT A

LAKE 1628 Well Log & Pump Test

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NOTICE TO WATER WELL CONTRACTOR
The original and first copy of this report are to be filed with the STATE ENGINEER, SALEM 10, OREGON within 30 days from the date of well completion.

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APR 7 1964
STATE ENGINEER
SALEM, OREGON

WATER WELL REPORT
STATE OF OREGON
(Please type or print)

Lake 1628

State Well No. 33/18-23G

State Permit No.

(1) OWNER:
Name Ross Colohan
Address Paisley, Oregon

(2) LOCATION OF WELL:
County Lake Driller's well number
SW ¼ NE ¼ Section 23 T. 33S R. 18 E W.M.
Bearing and distance from section or subdivision corner
1½ miles NW of Paisley, Oregon

(3) TYPE OF WORK (check):
New Well ☒ Deepening ☐ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 12.

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Domestic ☐ Industrial ☐ Municipal ☐
Irrigation ☒ Test Well ☐ Other ☐

(5) TYPE OF WELL:
Rotary ☐ Driven ☐
Cable ☒ Jetted ☐
Dug ☐ Bored ☐

(6) CASING INSTALLED:
Threaded ☐ Welded ☒
16 " Diam. from 0 ft. to 270 ft. Gage .250
" Diam. from ft. to ft. Gage
" Diam. from ft. to ft. Gage

(7) PERFORATIONS:
Perforated? ☒ Yes ☐ No
Type of perforator used Mills
Size of perforations ¼ in. by 4 in.
1400 perforations from 100 ft. to 240 ft.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

(8) SCREENS:
Well screen installed ☐ Yes ☒ No
Manufacturer's Name
Type Model No.
Diam. Slot size Set from ft. to ft.
Diam. Slot size Set from ft. to ft.

(9) CONSTRUCTION:
Well seal—Material used in seal puddled clay
Depth of seal 22 ft. Was a packer used? no
Diameter of well bore to bottom of seal 22 in.
Were any loose strata cemented off? ☐ Yes ☒ No Depth
Was a drive shoe used? ☒ Yes ☐ No
Was well gravel packed? ☐ Yes ☒ No Size of gravel:
Gravel placed from ft. to ft.
Did any strata contain unusable water? ☐ Yes ☒ No
Type of water? Depth of strata
Method of sealing strata off

(10) WATER LEVELS:
Static level 83 ft. below land surface Date 4/3/64
Artesian pressure lbs. per square inch Date

(11) WELL TESTS:
Drawdown is amount water level is lowered below static level
Was a pump test made? ☒ Yes ☐ No If yes, by whom? Contractor
Yield: 150 gal./min. with 83 ft. drawdown after 3 hrs.
" " " "
" " " "
Bailer test gal./min. with ft. drawdown after hrs.
Artesian flow g.p.m. Date
Temperature of water 104 Was a chemical analysis made? ☐ Yes ☒ No

(12) WELL LOG:
Diameter of well below casing 8
Depth drilled 315 ft. Depth of completed well 315 ft.
Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
soil zone, gravelly	0	3
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clay&sand, brown	11	35
volcanic gravel & clay, brn	35	92
gravel, med. seepage of wat	92	94
gravel & clay, brn.	94	110
med. gravel & brn.	110	112
hard-packed sand and clay,	112	118
soft sandy clay, brown	118	121
sticky clay & gravel, brn.	121	124
loose gravel, fine waterbe	124	125
boulders & clay, gray	125	159
sandy clay , brown	159	176
fine gravel, waterbearing	176	182
sticky clay & gravel, gray	182	194
fine sand, white, waterbe	194	199
clay & gravel, brn.	199	220
fine sand, wht. & pink, wat	220	225
sandy clay & gravel,fine	225	230
med. gravel, waterbearing	230	234
sticky clay, brn.	234	298
basalt rock w/ clay string-ers, brown	298	315

Work started 3/7/64 19 Completed 4/3/ 1964
Date well drilling machine moved off of well 4/4 1964

(13) PUMP:
Manufacturer's Name
Type: H.P.

Water Well Contractor's Certification:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Jack Stooksberry, Jr. (Person, firm or corporation) (Type or print)
Address Route 2, Box 47, Lakeview, Ore.
Drilling Machine Operator's License No. 45
[Signed] Jack Stooksberry Jr. (Water Well Contractor)
Contractor's License No. 211 Date 4/3, 19 64

(USE ADDITIONAL SHEETS IF NECESSARY)

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ATTACHMENT B

Tranmissivity from Specific Capacity Using the Theis Equation Calculations

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Transmissivity from Specific Capacity using the Theis Equation

Adapted from Vorhis (1979)

Theis Equation: T = [Q/(4*s*pi)][W(u)]
u = (r*r*S)/(4*T*t)
W(u) = (-ln u)-(0.5772157)+(u/1*1!)-(u*u/2*2!)+(u*u*u/3*3!)-(u*u*u*u/4*4!)+...

T = transmissivity (L*L/T)
s = drawdown (L)
S = storage coefficient (dimensionless)
pi = 3.141592654
r = radial distance (L)
t = time (T)
u = dimensionless
W(u) = well function

Note: Transmissivity is derived using an iterative process
The calculations use a known or assumed Storage Coeficient (S) provided by the user
Specific Capacity (Q/s) is used to first approximate the Transmissivity (T) used to calculate u in the first Theis equation iteration
The Transmissivity of the previous iteration is used to calculate u in a given Theis equation iteration
Total Theis Equation iterations = 25 iterations
Can accept answer if difference in calculated Transmissivity for the last 2 iterations is < 0.0001
Can accept answer if u in the last iteration is < 7.1

Note: Well efficiency is not included in the calculations

References:

Theis, C.V. 1935. The relation between the lowering of the piezometric surface and the rate and duration of discharge of a well using ground water storage. American Geophysical Union Transactions, 16 annual meeting, vol. 16, pg. 519-524.

Vorhis, R.C. 1979. Transmissivity from pumped well data. Well Log, National Water Well Association newsletter, vol. 10, no. 11, Dec. 1979, pg. 50-52.

Data Entry	Enter Data Below (yellow boxes only)	
Well Log ID or Comment for Records	LAKE 1628	
Pumping Rate (gpm) = Q =	150.00	(gpm)
Drawdown (feet) = s =	83.00	(feet)
Time (hours) = t =	3.0000	(hours)
Storage Coefficient = S =	0.001000	(dimensionless)
Well Diameter (inches) = d =	16.0000	(inches)
	Press F9 to Calculate	

Calculated Results	Calculated Results	
Transmissivity (ft2/day) = T =	339.88	(ft2/day)
Transmissivity (gpd/ft) = T =	2,542.46	(gpd/ft)
Transmissivity Difference = (last 2 iterations)	0.0000E+00 okay to use T if diff < 0.0001	(ft2/day)
u = (last iteration)	2.6153E-06 okay to use T if u <7.1	

Drawdown s (feet)	Storage Coefficient S	Pumping Rate Q (gal/min)	Pumping Rate Q (ft3/sec)	Time t (days)	Distance r = d/2 (feet)	u	W(u)	Transmissivity T (ft2/day)	Transmissivity difference from previous	Comments	Theis Equation Iteration
Note:	yellow grid areas are where values are calculated					Note : W(u) calculation valid when u < 7.1					
						7.0000	1.1545E-04			W(u) calculation test	
83.00	0.00100	150.00	0.33	0.13	0.67			347.89		T = Q/s	
83.00	0.00100	150.00	0.33	0.13	0.67	2.5551E-06	12.3002	340.52	-7.3683E+00	T = Theis Equation	1.00
83.00	0.00100	150.00	0.33	0.13	0.67	2.6104E-06	12.2788	339.93	-5.9265E-01	T = Theis Equation	2.00
83.00	0.00100	150.00	0.33	0.13	0.67	2.6149E-06	12.2771	339.88	-4.8224E-02	T = Theis Equation	3.00
83.00	0.00100	150.00	0.33	0.13	0.67	2.6153E-06	12.2769	339.88	-3.9277E-03	T = Theis Equation	4.00
83.00	0.00100	150.00	0.33	0.13	0.67	2.6153E-06	12.2769	339.88	-3.1992E-04	T = Theis Equation	5.00
83.00	0.00100	150.00	0.33	0.13	0.67	2.6153E-06	12.2769	339.88	-2.6059E-05	T = Theis Equation	6.00
83.00	0.00100	150.00	0.33	0.13	0.67	2.6153E-06	12.2769	339.88	-2.1226E-06	T = Theis Equation	7.00
83.00	0.00100	150.00	0.33	0.13	0.67	2.6153E-06	12.2769	339.88	-1.7289E-07	T = Theis Equation	8.00
83.00	0.00100	150.00	0.33	0.13	0.67	2.6153E-06	12.2769	339.88	-1.4083E-08	T = Theis Equation	9.00
83.00	0.00100	150.00	0.33	0.13	0.67	2.6153E-06	12.2769	339.88	-1.1471E-09	T = Theis Equation	10.00
83.00	0.00100	150.00	0.33	0.13	0.67	2.6153E-06	12.2769	339.88	-9.3394E-11	T = Theis Equation	11.00
83.00	0.00100	150.00	0.33	0.13	0.67	2.6153E-06	12.2769	339.88	-7.6739E-12	T = Theis Equation	12.00
83.00	0.00100	150.00	0.33	0.13	0.67	2.6153E-06	12.2769	339.88	-6.2528E-13	T = Theis Equation	13.00
83.00	0.00100	150.00	0.33	0.13	0.67	2.6153E-06	12.2769	339.88	0.0000E+00	T = Theis Equation	14.00
83.00	0.00100	150.00	0.33	0.13	0.67	2.6153E-06	12.2769	339.88	0.0000E+00	T = Theis Equation	15.00
83.00	0.00100	150.00	0.33	0.13	0.67	2.6153E-06	12.2769	339.88	0.0000E+00	T = Theis Equation	16.00
83.00	0.00100	150.00	0.33	0.13	0.67	2.6153E-06	12.2769	339.88	0.0000E+00	T = Theis Equation	17.00
83.00	0.00100	150.00	0.33	0.13	0.67	2.6153E-06	12.2769	339.88	0.0000E+00	T = Theis Equation	18.00
83.00	0.00100	150.00	0.33	0.13	0.67	2.6153E-06	12.2769	339.88	0.0000E+00	T = Theis Equation	19.00
83.00	0.00100	150.00	0.33	0.13	0.67	2.6153E-06	12.2769	339.88	0.0000E+00	T = Theis Equation	20.00
83.00	0.00100	150.00	0.33	0.13	0.67	2.6153E-06	12.2769	339.88	0.0000E+00	T = Theis Equation	21.00
83.00	0.00100	150.00	0.33	0.13	0.67	2.6153E-06	12.2769	339.88	0.0000E+00	T = Theis Equation	22.00
83.00	0.00100	150.00	0.33	0.13	0.67	2.6153E-06	12.2769	339.88	0.0000E+00	T = Theis Equation	23.00
83.00	0.00100	150.00	0.33	0.13	0.67	2.6153E-06	12.2769	339.88	0.0000E+00	T = Theis Equation	24.00
83.00	0.00100	150.00	0.33	0.13	0.67	2.6153E-06	12.2769	339.88	0.0000E+00	T = Theis Equation	25.00

ATTACHMENT C

OWRD Interference Analysis

G-17985

Application LL- 1450 continued **Date 25 March 2013**

C3a. **690-09-040 (4):** Evaluation of stream impacts for each well that has been determined or assumed to be **hydraulically connected and less than 1 mile** from a surface water source. Limit evaluation to instream rights and minimum stream flows that are pertinent to that surface water source, and not lower SW sources to which the stream under evaluation is tributary. Compare the requested rate against the 1% of 80% *natural* flow for the pertinent Water Availability Basin (WAB). If Q is not distributed by well, use full rate for each well. Any checked ☒ box indicates the well is assumed to have the potential to cause PSI.

Well	SW #	Well < ¼ mile?	Qw > 5 cfs?	Instream Water Right ID	Instream Water Right Q (cfs)	Qw > 1% ISWR?	80% Natural Flow (cfs)	Qw > 1% of 80% Natural Flow?	Interference @ 30 days (%)	Potential for Subst. Interfer. Assumed?
1	1	☐	☐	N.A.	N.A.	☐	32.80	☒	28.2	☒
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐

C3b. **690-09-040 (4):** Evaluation of stream impacts by total appropriation for all wells determined or assumed to be **hydraulically connected and less than 1 mile** from a surface water source. **Complete only if Q is distributed among wells.** Otherwise same evaluation and limitations apply as in C3a above.

	SW #		Qw > 5 cfs?	Instream Water Right ID	Instream Water Right Q (cfs)	Qw > 1% ISWR?	80% Natural Flow (cfs)	Qw > 1% of 80% Natural Flow?	Interference @ 30 days (%)	Potential for Subst. Interfer. Assumed?
			☐			☐		☐		☐
			☐			☐		☐		☐
			☐			☐		☐		☐
			☐			☐		☐		☐

Comments:

The proposed well LAKE 1628 is less than 1-mile from the Chewaucan River, and it is less than 1-mile from where hydraulic connection with the river begins.

The proposed groundwater use at the well (LAKE 1628) automatically triggers an assumed potential for substantial interference given it is determined to be in hydraulic connection with the Chewaucan River, and the calculated interference with the river at the end of 30 days is greater than 25 percent. The percent interference is independent of the pumping rate (the same for any pumping rate).

Hunt (1999) was used to calculate the interference with the Chewaucan River. The parameters used were a horizontal hydraulic conductivity of 29.8 feet/day (transmissivity = 26,820 ft2/day based on specific capacity data for LAKE 4448), 0.001 intermediate value for the storage coefficient, a stream width of 50 feet average, a streambed conductivity of 0.30 feet/day (aquifer horizontal conductivity/100), a streambed thickness of 20 feet (a thicker streambed given this is a river), and the distance to the river where hydraulic connection occurs (5,000 feet) rather than the distance to the nearest river reach (950 feet). The aquifer hydraulic parameters are within the ranges found in Morgan (1988) and in Gonthier (1985).

The calculation used the proposed pumping rate of 0.89 cfs (400 gpm). The pumping rate used is inconsequential because the percent interference is independent of the pumping rate (the same for any pumping rate).

G-17985

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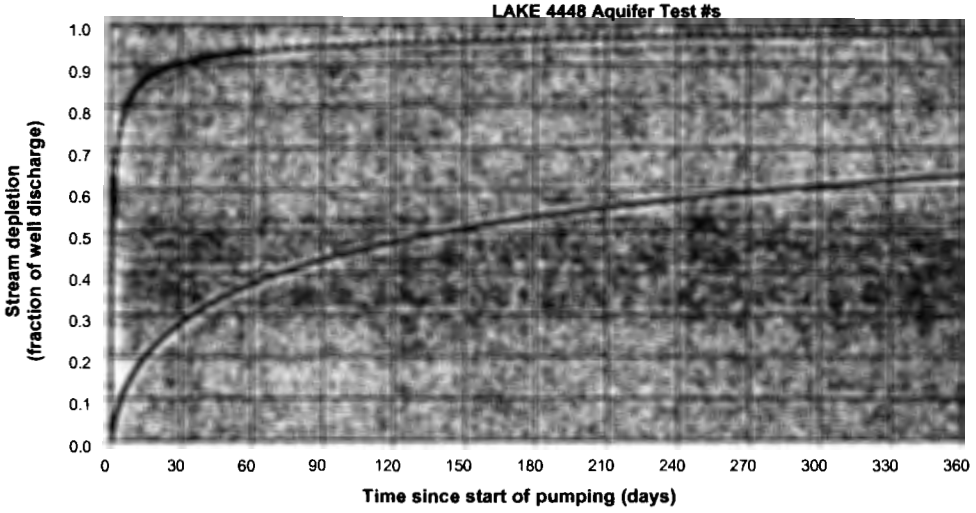
Transient Stream Depletion (Jenkins, 1970; Hunt, 1999)



Input data:

yellow = required blue = recommended

Name	Scenario 1	Scenario 2	Scenario 3	Unit	Description
Well		LAKE 4448 Aquifer Test #s			Well owner or well number
Qw		0.89		cfs	Net steady pumping rate of well
a		5000		ft	Perpendicular distance from well to stream
b		900		ft	Aquifer thickness
d		1260		ft	Well depth
K	29.8	29.8	29.8	ft/day	Aquifer hydraulic conductivity
S		0.001			Aquifer storativity or specific yield
Ks	0.3	0.3	0.3	ft/day	Streambed hydraulic conductivity
ws		50		ft	Stream width
bs	20	20	20	ft	Streambed thickness
tpon		365		days	Time pump on

Output for Hunt Stream Depletion, Scenerio 2 (s2): **Time pump on = 365 days**

Days	30	60	90	120	150	180	210	240	270	300	330	360
Qw, cfs	0.890	0.890	0.890	0.890	0.890	0.890	0.890	0.890	0.890	0.890	0.890	0.890
Jenk SD %	0.901	0.930	0.943	0.950	0.956	0.959	0.962	0.965	0.967	0.969	0.970	0.971
Jenk SD cfs	0.802	0.827	0.839	0.846	0.850	0.854	0.857	0.859	0.861	0.862	0.863	0.864
Hunt SD %	0.282	0.374	0.433	0.475	0.508	0.534	0.557	0.576	0.593	0.608	0.621	0.633
Hunt SD cfs	0.251	0.333	0.385	0.423	0.452	0.476	0.496	0.513	0.528	0.541	0.552	0.563

Time pump on = 365 days

	Scenario 1	Scenario 2	Scenario 3	Units
Qw	0.89	0.89	0.89	cfs
a	5000	5000	5000	ft
K	29.8	29.8	29.8	ft/day
b	900	900	900	ft
T	26820	26820	26820	ft*ft/day
S	0.001	0.001	0.001	
ws	50	50	50	ft
Ks	0.3	0.3	0.3	ft/day
bs	20	20	20	ft
sbc	0.75	0.75	0.75	ft/day
sdf	0.932140194	0.932140194	0.932140194	days
sbf	0.139821029	0.139821029	0.139821029	

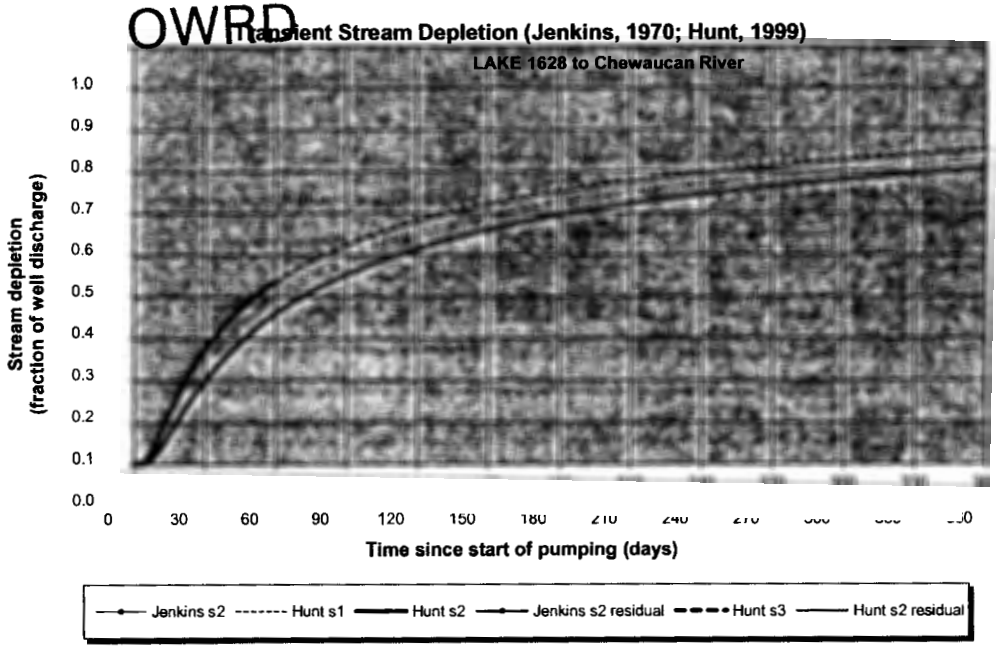
Parameters:		Scenario 1	Scenario 2	Scenario 3	Units
Net steady pumping rate	Qw	0.89	0.89	0.89	cfs
Distance to stream	a	5000	5000	5000	ft
Aquifer hydraulic conductivity	K	29.8	29.8	29.8	ft/day
Aquifer thickness	b	900	900	900	ft
Aquifer transmissivity	T	26820	26820	26820	ft*ft/day
Aquifer storage coefficient	S	0.001	0.001	0.001	
Stream width	ws	50	50	50	ft
Streambed hydraulic conductivity	Ks	0.3	0.3	0.3	ft/day
Streambed thickness	bs	20	20	20	ft
Streambed conductance	sbc	0.75	0.75	0.75	ft/day
Stream depletion factor (Jenkins)	sdf	0.932140194	0.932140194	0.932140194	days
Streambed factor (Hunt)	sbf	0.139821029	0.139821029	0.139821029	

ATTACHMENT D

Little Hot Well Parameters - Hunt Model Interference Analysis

G-17985

G-17885



Using the Little Hot Well Pump Test for T - Value

Input data:

yellow = required blue = recommended

Name	Scenario 1	Scenario 2	Scenario 3	Unit	Description
Well		LAKE 1628 to Chewaucan River			Well owner or well number
Qw		0.89		cfs	Net steady pumping rate of well
a		5000		ft	Perpendicular distance from well to stream
b		232		ft	Aquifer thickness
d		315		ft	Well depth
K	1.464	1.464	1.464	ft/day	Aquifer hydraulic conductivity
S		0.001			Aquifer storativity or specific yield
Ks	0.3	0.3	0.3	ft/day	Streambed hydraulic conductivity
ws		50		ft	Stream width
bs	20	20	20	ft	Streambed thickness
tpon		365		days	Time pump on

Time pump on = 365 days

	Scenario 1	Scenario 2	Scenario 3	Units
Qw	0.89	0.89	0.89	cfs
a	5000	5000	5000	ft
K	1.464	1.464	1.464	ft/day
b	232	232	232	ft
T	339.648	339.648	339.648	ft*ft/day
S	0.001	0.001	0.001	
ws	50	50	50	ft
Ks	0.3	0.3	0.3	ft/day
bs	20	20	20	ft
sbc	0.75	0.75	0.75	ft/day
sdf	73.60561523	73.60561523	73.60561523	days
sbf	11.04084228	11.04084228	11.04084228	

Output for Hunt Stream Depletion, Scenerio 2 (s2): **Time pump on = 365 days**

Days	30	60	90	120	150	180	210	240	270	300	330	360
Qw, cfs	0.890	0.890	0.890	0.890	0.890	0.890	0.890	0.890	0.890	0.890	0.890	0.890
Jenk SD %	0.268	0.434	0.523	0.580	0.620	0.651	0.675	0.695	0.712	0.726	0.738	0.749
Jenk SD cfs	0.239	0.386	0.465	0.516	0.552	0.579	0.601	0.619	0.634	0.646	0.657	0.667
Hunt SD %		0.360	0.453	0.515	0.560	0.595	0.622	0.645	0.664	0.680	0.694	0.706
Hunt SD cfs	0.177	0.320	0.403	0.459	0.499	0.529	0.554	0.574	0.591	0.605	0.618	0.629

Parameters:		Scenario 1	Scenario 2	Scenario 3	Units
Net steady pumping rate	Qw	0.89	0.89	0.89	cfs
Distance to stream	a	5000	5000	5000	ft
Aquifer hydraulic conductivity	K	1.464	1.464	1.464	ft/day
Aquifer thickness	b	232	232	232	ft
Aquifer transmissivity	T	339.648	339.648	339.648	ft*ft/day
Aquifer storage coefficient	S	0.001	0.001	0.001	
Stream width	ws	50	50	50	ft
Streambed hydraulic conductivity	Ks	0.3	0.3	0.3	ft/day
Streambed thickness	bs	20	20	20	ft
Streambed conductance	sbc	0.75	0.75	0.75	ft/day
Stream depletion factor (Jenkins)	sdf	73.60561523	73.60561523	73.60561523	days
Streambed factor (Hunt)	sbf	11.04084228	11.04084228	11.04084228	

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JAN 23 2015
OWRD

GSI
Water Solutions, Inc.

January 22, 2015

Ivan Gall
Oregon Water Resources Department
725 Summer Street NE, Suite A
Salem, OR 97301

RE: Application for a Permit to Use Ground Water

Dear Ivan,

As discussed with the Department during the Spring of 2014, the attached application for a groundwater permit is a follow-up to the issuance of the Surprise Valley Electrification Corp's (SVEC) Limited License LL-1508 that allows use of water from well Little Hot Well for plant operations. The enclosed application proposes to use water for general industrial uses, including cooling purposes, at SVEC's geothermal facility and is intended to replace the current Limited License LL-1508. SVEC will be working with the Department to resolve the greater than 25 percent issue noted in Limited License LL-1508 while this application is being processed and has included a proposed resolution for the Department to consider in Attachment F of the application.

GSI Water Solutions, Inc., is the authorized representative for the applicant regarding this transaction, and should be copied on all correspondence associated with this application. Please do not hesitate to call if you have any questions or need additional information.

Enclosed is a check for the application fee in the amount of $1,900.00.

Sincerely,

Bruce Brody-Heine

Bruce Brody-Heine
GSI Water Solutions, Inc.

Enclosures

Cc: Lynn Culp, Surprise Valley Electrification Corporation

147 SW Shevlin Hixon Drive, Suite 201 Bend, OR 97702 P: 541.678.5117 www.gsiws.com

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