State of Idaho
DEPARTMENT OF WATER RESOURCES
322 East Front Street • P.O. Box 83720 • Boise, Idaho 83720-0098
Phone: (208) 287-4800 • Fax: (208) 287-6700 • Website: www.idwr.idaho.gov

C.L. "BUTCH" OTTER
Governor

GARY SPACKMAN
Director

September 14, 2017

Re: Preliminary Order Requiring Measuring Devices for Ground Water Diversions in Water District No. 100 Area of Expansion, Rexburg Bench

Dear Water User,

The Idaho Department of Water Resources ("IDWR") has issued the enclosed Preliminary Order ("Order") requiring installation of measuring devices for ground water rights and diversions within the Water District 100 ("WD100") area of expansion, the Rexburg Bench. The enclosed Order is a preliminary order pursuant to Section 67-5243, Idaho Code. Any party may file a petition for reconsideration of a preliminary order as explained in the enclosed information sheet.

Please note that flow meters must be installed on ground water irrigation diversions by the start of the 2019 irrigation season and on non-irrigation diversions by January 1, 2019. The Order excludes the following ground water uses and diversions unless further notified by IDWR:

a. Domestic and stockwater uses as defined by Section 42-111, Idaho Code;
b. Diversions for irrigation uses less than or equal to five (5) acres; and
c. Non-irrigation uses with a total rate of diversion less than or equal to 0.24 cubic feet per second (approximately 108 gallons per minute).

Please refer to the enclosed documents *"Minimum Acceptable Standards for Open Channel and Closed Conduit Measuring Devices"* and *"List of Approved Closed Conduit Measuring Devices"* for information on types of IDWR acceptable measuring devices. These documents and other information on the topic are available on IDWR's website: www.idwr.idaho.gov → Water Data → Water Measurement → Guidelines.

If you have questions concerning this Preliminary Order or IDWR's water measurement standards, please contact the IDWR State office (208-287-4800) or Eastern Regional office (208-525-7161).

Respectfully,

Tim Luke
Water Compliance Bureau

Encl: *Preliminary Order; Explanatory Information to Accompany a Preliminary Order; Minimum Acceptable Standards for Open Channel and Closed Conduit Measuring Devices*; *List of Approved Closed Conduit Measuring Devices*

C. James Cefalo, IDWR Eastern Region Program Manager and WD100 Watermaster

BEFORE THE DEPARTMENT OF WATER RESOURCES

OF THE STATE OF IDAHO

IN THE MATTER OF REQUIRING MEASURING DEVICES FOR GROUND WATER DIVERSIONS IN THE WATER DISTRICT NO. 100 AREA OF EXPANSION (REXBURG BENCH AREA)	)	**PRELIMINARY ORDER**

BACKGROUND

On May 10, 2017, the Idaho Department of Water Resources ("Department") issued a *Preliminary Order Revising Water District No. 100* ("Preliminary Order") for the purpose of expanding Water District No. 100 ("WD100") to administer ground water rights located within the Rexburg Bench and some surrounding areas within the Eastern Snake Plain Aquifer ("ESPA")[1] Model 2.1 boundary[2] overlying portions of the Department's Administrative Basin Nos. 21, 22 and 23 as shown in the map attached hereto as Attachment A. The Preliminary Order added all ground water rights located within the WD100 area of expansion except those ground water rights used for domestic and stockwater purposes as defined by Idaho Code §§ 42-111 and 42-1401A (11). The WD100 area of expansion is referred to hereinafter as the Rexburg Bench area.

A primary purpose of a water district is the administration of water rights and distribution of water within the water district by a watermaster. Idaho Code § 42-602. The watermaster delivers the flow rate and/or volume authorized by the water right to the water right holder by measuring diversions and adjusting controlling works. Idaho Code § 42-607. To ensure accuracy of the distribution of water, the Director of the Department ("Director") can require installation of a measuring device by a water right holder to assist a watermaster in the administration and distribution of water in a water district. Idaho Code § 42-701.

To assist the watermaster of WD100 in the administration of ground water rights, ground water right holders must install measuring devices for ground water diversions within WD100, including those ground water rights and diversions within the Rexburg Bench area added to WD100 by the Preliminary Order.

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[1] The ESPA is:

> [T]he aquifer underlying the Eastern Snake River Plain as the aquifer is defined in the report, Hydrology and Digital Simulation of the Regional Aquifer System, Eastern Snake River Plain, Idaho, USGS Professional Paper 1408-F, 1992 excluding areas south of the Snake River and west of the line separating Sections 34 and 35, Township 10 South, Range 20 East, Boise Meridian.

IDAPA 37.03.11.050.

[2] The ESPA Model 2.1 boundary is depicted in Attachment A of the Director's November 2, 2016 *Order Designating the Eastern Snake Plain Aquifer Ground Water Management Area*.

FINDINGS OF FACT

1. On December 29, 2006, the Director issued an order creating WD100 pursuant to the provisions of Idaho Code § 42-604. *Final Order Creating Water District No. 100.* The boundaries of WD100 were limited to those portions of Basins 21 and 22 overlying the Eastern Snake Plain Aquifer ("ESPA").

2. On June 30, 2015, the Surface Water Coalition[3] ("SWC") and the Idaho Ground Water Appropriators, Inc.[4] ("IGWA"), executed a settlement related to the SWC water rights delivery call (IDWR Docket No. CM-DC-2010-001). *See Settlement Agreement Entered Into June 30, 2015 Between Participating Members of the Surface Water Coalition and Participating Members of the Idaho Ground Water Appropriators, Inc.* ("Settlement Agreement"). The Settlement Agreement was subsequently filed with the Director as a mitigation plan pursuant to Rule 43 of the Department's *Rules for Conjunctive Management of Surface and Ground Water Resources* ("CM Rules"). The Director approved the mitigation plan on May 2, 2016. *Final Order Approving Stipulated Mitigation Plan* at p. 4.

3. The Settlement Agreement acknowledges a decades-long declining trend in ground water levels of the ESPA and establishes practices that participants in the mitigation plan will implement for the following purposes: (1) to mitigate material injury to the SWC from junior ground water right diversions; (2) to provide "safe harbor" from curtailment under the SWC delivery call to participating ground water right holders; (3) to stabilize ESPA water surface elevations; and (4) to enhance ESPA water surface elevations to the average ESPA water surface elevations observed during the period of time 1991-2001. *Settlement Agreement* at p. 1.

4. Most of the ground water diversions located within the Rexburg Bench are located within the Madison Ground Water District ("MGWD"). The MGWD is both a participating member of IGWA and a party to the Settlement Agreement. The Settlement Agreement stipulates that participating IGWA ground water districts will initiate a number of mitigation and water management strategies, including measurement of ground water diversions.

5. The Settlement Agreement requires the installation of approved closed conduit flow meters on all ground water diversions by ground water users participating in IGWA's mitigation plan by the beginning of the 2018 irrigation season. *Settlement Agreement* at p. 3.

6. On July 20, 2016, the Director issued a *Final Order on Reconsideration,* In the Matter of Requiring Measuring Devices for Ground Water Diversions in the Portions of Water Districts Nos. 31, 34, 100, 110, 120, 130, and 140 Overlying the Eastern Snake Plain Aquifer

[3] The Surface Water Coalition consists of the following seven surface water delivery organizations: A&B Irrigation District, American Falls Reservoir District No. 2, Burley Irrigation District, Milner Irrigation District, Minidoka Irrigation District, North Side Canal Company, and the Twin Falls Canal Company.

[4] The Idaho Ground Water Appropriators, Inc., includes, but is not limited to, the following entities: Aberdeen-American Falls Ground Water District, Bingham Ground Water District, Bonneville-Jefferson Ground Water District, Carey Valley Ground Water District, Jefferson Clark Ground Water District, Madison Ground Water District, Magic Valley Ground Water District, North Snake Ground Water District, Southwest Irrigation District, and Fremont-Madison Irrigation District, Anheuser-Busch, United Water, and Glanbia Cheese.

("ESPA Measurement Order") to assist watermasters in the administration of water rights within the boundaries of the water districts affected by the ESPA Measurement Order. The ESPA Measurement Order was limited to ground water rights and diversions located within the ESPA except those ground water rights used for domestic and stockwater purposes as defined by Idaho Code §§ 42-111 and 42-1401A (11). The ESPA Measurement Order did not include ground water rights located within the Rexburg Bench area because the rights were not included in a water district. However, the SWC petitioned the Director to amend the ESPA Measurement Order to require measuring devices on all ground water diversions within the ESPA Model 2.1 boundary and all ground water diversions within the boundaries of ground water districts signatory to the Settlement Agreement. *See Surface Water Coalition's Petition for Reconsideration and Request for Hearing* at 6, In the Matter of Requiring Measuring Devices for Ground Water Diversion in the Portions of Water Districts 31, 34, 100, 110, 120, 130 and 140 Overlying the Eastern Snake Plain Aquifer (July 1, 2016).

7. On November 2, 2016, the Director designated the ESPA Ground Water Management Area which includes both WD100 and the Rexburg Bench area within the ESPA Model 2.1 boundary. *See Order Designating the Eastern Snake Plain Aquifer Ground Water Management Area* at Attachment A. Ground water in the Rexburg Bench area and the ESPA Model 2.1 boundary is hydraulically connected to the ESPA and the Snake River. *Id.* at 4.

8. On May 10, 2017, the Director issued the Preliminary Order revising WD100 to administer ground water rights located within the Rexburg Bench area. Paragraph three of the Preliminary Order states the following:

> The Department shall issue a separate order requiring the installation of measuring devices for ground water diversions within the Rexburg Bench area added to WD100.

9. The Department held a public informational meeting on August 7, 2017, in Rexburg, Idaho to discuss the issuance and implementation of a measuring device order for water district diversions in the Rexburg Bench area. Notice of the public meeting was sent to all ground water right holders in the Rexburg Bench area of WD100 except those ground water rights used for domestic and stockwater purposes as defined by Idaho Code §§ 42-111 and 42-1401A (11).

10. Department representatives at the August 7, 2017, public information meeting explained that the Department's *Minimum Acceptable Standards for Open Channel and Closed Conduit Measuring Devices* ("Minimum Measurement Standards") require installation of a certified flow meter on closed conduit or pipe line diversions. Most ground water diversions or wells discharge water through closed conduits or pipe lines.

11. Department representatives at the August 7, 2017, public information meeting proposed that a measurement order for the Rexburg Bench area be similar to the Department's 2016 ESPA Measurement Order issued to ground water users within WD100 and other ESPA water districts, except that the deadline for installing meters on irrigation wells in the Rexburg Bench area be extended to the start of the 2019 irrigation season instead of the 2018 irrigation season. The additional year gives ground water users in the Rexburg Bench area a comparable amount of time to install flow meters as received by other ground water users in the ESPA. A 2019 meter installation deadline will enable WD100 to collect pumping data for the Rexburg Bench area wells in approximately two years. At that time, annual water use data collection in the WD100 expansion area will be consistent with data collection efforts in the original WD100 boundary area and result in a quicker, more complete evaluation of water use for the entire water district. Consistent data

collection will create a more accurate, equitable basis for water district assessments throughout the water district.

CONCLUSIONS OF LAW

1. Idaho Code § 42-233b, provides, in pertinent part:

42-233b. GROUND WATER MANAGEMENT AREA.

The director may require all water right holders within a designated water management area to report withdrawals of ground water and other necessary information for the purpose of assisting him in determining available ground water supplies and their usage.

2. Idaho Code § 42-701 provides, in pertinent part:

42-701 INSTALLATION AND MAINTENANCE OF CONTROLLING WORKS AND MEASURING DEVICES BY WATER APPROPRIATORS – PROCEDURE UPON FAILURE TO INSTALL AND MAINTAIN – MEASURING AND REPORTING OF DIVERSIONS – PENALTY FOR FAILURE TO COMPLY – REPORT FILING FEE.

(1) The appropriators or users of any public waters of the state of Idaho shall maintain to the satisfaction of the director of the department of water resources suitable headgates and controlling works at the point where the water is diverted. Each device shall be of such construction that it can be locked and kept closed by the watermaster or other officer in charge, and shall also be of such construction as to regulate the flow of water at the diversion point. Each such appropriator shall construct and maintain, when required by the director of the department of water resources, a rating flume or other measuring device at such point as is most practical in such canal, ditch, wellhead or pipeline for the purpose of assisting the watermaster or department in determining the amount of water that may be diverted into said canal, ditch, wellhead or pipeline from the stream, well or other source of public water. Plans for such headgates, rating flumes or other measuring devices shall be approved by the department of water resources.

(2) If an appropriator determines that installation and maintenance of a measuring device required by the director would be burdensome for his diversion, the appropriator may, upon approval of the director, execute an agreement with the director and submit to the director such information and technical data concerning the diversion and pumping facilities as the director determines necessary to establish the relationship of power usage to water withdrawal by any pump used to divert public water.

(3) Any appropriator or user of the public waters of the state of Idaho that neglects or refuses to construct or maintain such headgates, controlling works, or measuring devices..., upon receiving ten (10) days' notice from the director of the department of water resources within which to begin and diligently pursue to completion the construction or installation of the required device or devices or to begin and diligently pursue to completion a remedy to such defects as exist in accordance with said notice, then the director of the department of water resources may order the duly qualified and acting watermaster of the water district to shut off and refuse to deliver at the point of diversion, the water owned by such appropriator

or user until the user does construct and maintain such headgates, controlling works or measuring devices or remedy the defects which exist or the director may take action pursuant to section 42-1701B, Idaho Code, to enforce the requirement to construct, install or maintain such devices.

(4) The appropriators or users of the public waters of the state of Idaho shall be given a reasonable time within which to complete construction of such headgates, controlling works or measuring devices, depending upon the size and extent thereof, when due diligence has been used in the prosecution of such work.

3. Measurement of diversions is necessary in WD100, including the Rexburg Bench area, for the proper distribution of water and administration of water rights. Measurement of diversions has the following administrative benefits:

i. Collective quantification of ground water withdrawals assists the director of the Department, the water district and local ground water right holders in determining the available ground water supplies and usage;

ii. Quantification of individual ground water withdrawals creates the necessary evidence to ensure ground water rights are used within their authorized diversion limits and that withdrawals can be regulated to the authorized diversion limits of the water rights when such limits are exceeded; and

iii. Collective and individual quantification of ground water withdrawals establishes an equitable, defensible and legal basis for determining water user assessments since Idaho law requires that expenses of the water district be based on water delivery.

4. The Director should require the installation of measuring devices for diversions of ground water within the Rexburg Bench area of WD100. The order should require the installation of flow meters on irrigation wells by the start of the 2019 irrigation season, and by January 1, 2019, for non-irrigation wells. The 2019 installation deadline is consistent with the amount of time given to other ground water users in the ESPA to install measurement devices pursuant to the Department's 2016 ESPA Measurement Order.

ORDER

IT IS HEREBY ORDERED that:

1. The holders of ground water rights within the Rexburg Bench area of WD100, except those ground water rights, uses and diversions identified below, shall install and maintain on each point of diversion or well, a measuring device of a type acceptable to the Department. **Owners of irrigation wells or diversions that are required to be measured shall install acceptable measuring devices by the start of the 2019 irrigation season. Owners of non-irrigation diversions that are required to be measured shall install acceptable measuring devices by January 1, 2019.**

2. The measuring and reporting required by this order is waived until further notification by the Department for the following ground water uses and diversions:

a. Domestic and stockwater uses as defined by Idaho Code §§ 42-111 and 42-1401A(11);

b. Diversions of ground water or water systems with multiple diversions irrigating less than or equal to five (5) acres;

c. Diversions of ground water or water systems with multiple diversions delivering ground water for any purpose other than irrigation that divert less than or equal to 0.24 cubic feet per second (approximately 108 gallons per minute).

3. Measuring devices acceptable to the Department for wells required to be measured shall be flow meters identified in the Department's *List of Approved Closed Conduit Flow Meters* (Version 2.9 updated 8-17-2017) (copy attached*).* These specifications apply to both irrigation and non-irrigation water uses.

4. The Department will consider a request for variance of the Department-approved flow meter requirement upon submittal of a written plan to the Department. Acceptable variances may include the following methods or devices:

- Development of a PCC, which is a ratio of power usage to water withdrawal. The PCC method will *only be considered for irrigation diversions that consist of one (1) well and one irrigation discharge point or one distinct flow and demand condition, and water levels do not change significantly during the irrigation season (example: a well diverting water to one center pivot only with no end gun, a well diverting water to one wheel line, or multiple wheel lines as long as the same multiple wheel lines are always on at the same time)*;

- Timing diversion with an hour meter (time clock) *for one well that discharges to an open ditch or pond where a) discharge is constant and not controlled by valves, b) ground water levels do not change significantly during the annual season of use, and c) the rate of flow is measured annually by a ground water district hydrographer*;

- Measurement with a properly functioning flow meter that was installed *prior to the date of this order, and determined as acceptable by the Department* (meters installed prior to the date of this order and included in the Department's *List of Approved Closed Conduit Flow Meters version 2.9* are deemed acceptable); and

- Measurement with a standard open channel measuring device installed in an open channel or ditch for measuring multiple wells in a well field and the measuring device is read daily, or daily flows are recorded by use of a continuous recorder or data logger.

5. Requests for variance must be submitted to the Department and will be considered by the Water District watermaster and the Department on a case-by-case basis. Variances proposing measurement with an existing flow meter or measuring device must satisfy Department criteria and accuracy tests. Existing meters or measuring devices that do not satisfy standards, or that fail, will be required to be replaced with an approved flow meter unless another variance is obtained. Requests for variance must be made using the Department's form *"Request for Variance of IDWR Approved Flow Meter Requirement"* available on the Department's website or upon request.

6. If a user cannot comply with the deadlines in item 1 above, the Department may grant an extension of time. The Department will consider requests for extensions on a case-by-case basis. Requests for extension must be made to the Department in writing. A water right holder may request an extension because of non-use. Non-use may be required by a federal land set aside program, or the water user may be temporarily not diverting as authorized by the water right. In some situations, the Department may exempt a diversion from the measurement requirements of this order. Conditions that may result in an exemption include, but may not be limited to, the following:

- Abandonment, non-use, or consolidation of diversions that results in a diversion being unused; or
- A reduction or change to the water right that results in an authorized diversion rate less than or equal to 0.24 cubic feet per second (cfs) and/or reduces the authorized irrigation use to five acres or less.

7. The requirements of this order apply to new ground water diversions authorized after the date of this order, except those ground water uses or diversions identified in items 2a. through 2c. of this section. This order does not require the installation of lockable controlling works, although nothing in this order shall preclude the Director and/or the watermaster from mandating the installation of lockable controlling works on any diversion if such works are determined to be necessary for adequate administration and control of the diversion.

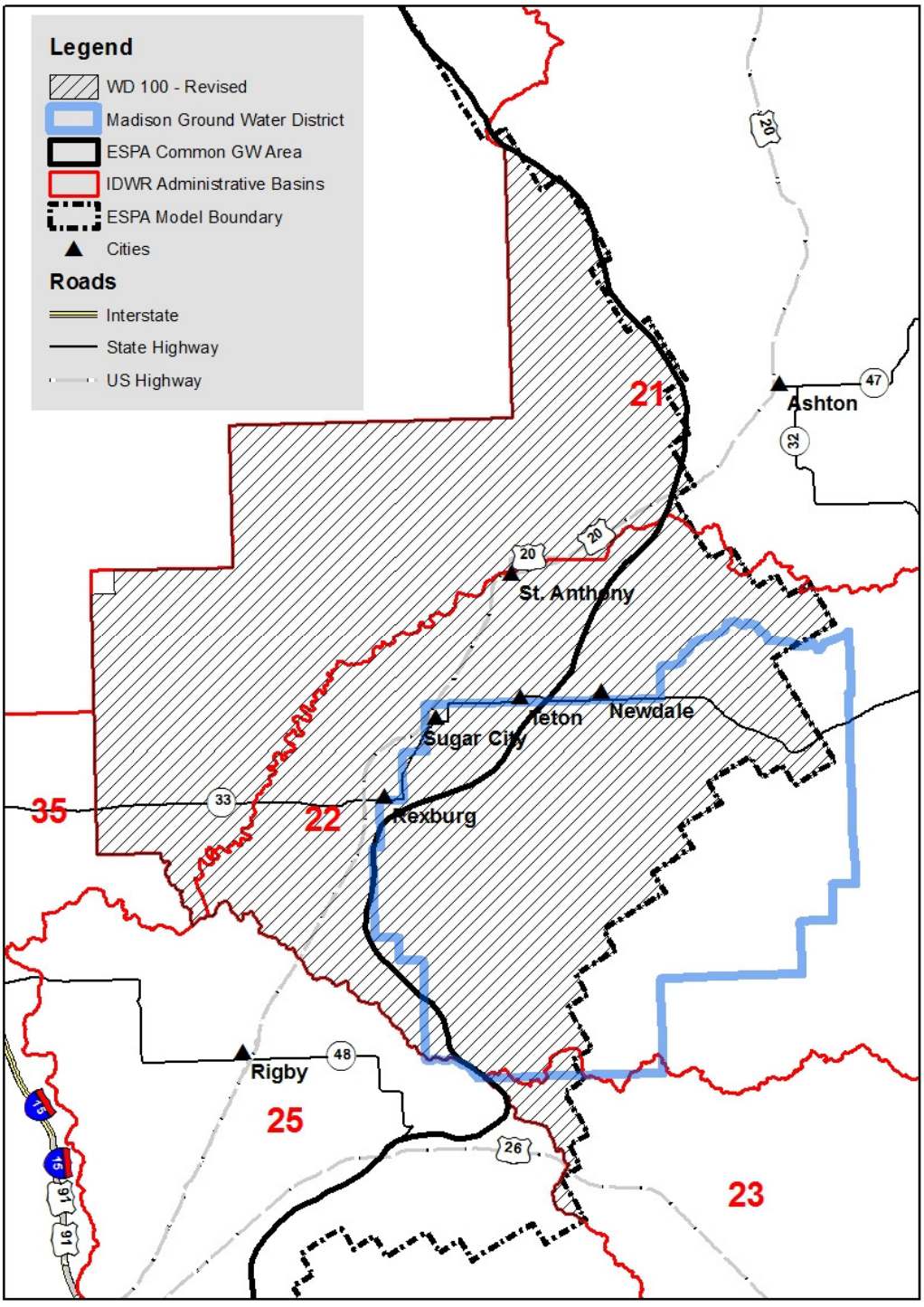
8. The watermaster shall shut off and refuse to deliver water to any ground water user who does not have, or who fails to maintain, an adequate measuring device on a diversion after the start of the 2019 irrigation season (irrigation diversions) or after January 1, 2019 (non-irrigation diversions), unless an extension or exemption has been granted by the Department.

9. The WD100 watermaster shall be responsible for the collection and annual reporting of all measurement data for the diversions within water district boundaries subject to this order. All diversions shall be reported to the Department using the Department's WMIS online database application.

Dated this 12 th day of September 2017

MAT WEAVER
Deputy Director

Water District 100 Revised Boundary



CERTIFICATE OF SERVICE

I HEREBY CERTIFY that on this 14th day of September 2017, the above and foregoing document was served on each individual or entity on the service list for this matter on file at the Idaho Department of Water Resources, 322 East Front Street, Boise, Idaho and www.idwr.idaho.gov. Each individual or entity on the service list was served by placing a copy of the above and foregoing document in the United States mail, postage prepaid and properly addressed.

Documents served: **Preliminary Order in the Matter of Requiring Measuring Devices for Ground Water Diversions in Water District No. 100 Area of Expansion (Rexburg Bench Area).**

Sarah Shaul

Sarah Shaul
Technical Records Specialist
Idaho Department of Water Resources

EXPLANATORY INFORMATION TO ACCOMPANY A PRELIMINARY ORDER

(To be used in connection with actions when a hearing was **not** held)

(Required by Rule of Procedure 730.02)

The accompanying order or approved document is a "**Preliminary Order**" issued by the department pursuant to section 67-5243, Idaho Code. **It can and will become a final order without further action of the Department of Water Resources ("department") unless a party petitions for reconsideration, files an exception and brief, or requests a hearing as further described below:**

PETITION FOR RECONSIDERATION

Any party may file a petition for reconsideration of a preliminary order with the department within fourteen (14) days of the service date of this order. **Note: the petition must be received by the department within this fourteen (14) day period.** The department will act on a petition for reconsideration within twenty-one (21) days of its receipt, or the petition will be considered denied by operation of law. See Section 67-5243(3) Idaho Code.

EXCEPTIONS AND BRIEFS

Within fourteen (14) days after: (a) the service date of a preliminary order, (b) the service date of a denial of a petition for reconsideration from this preliminary order, or (c) the failure within twenty-one (21) days to grant or deny a petition for reconsideration from this preliminary order, any party may in writing support or take exceptions to any part of a preliminary order and may file briefs in support of the party's position on any issue in the proceeding with the Director. Otherwise, this preliminary order will become a final order of the agency.

REQUEST FOR HEARING

Unless a right to a hearing before the Department or the Water Resource Board is otherwise provided by statute, any person aggrieved by any final decision, determination, order or action of the Director of the Department and who has not previously been afforded an opportunity for a hearing on the matter may request a hearing pursuant to section 42-1701A(3), Idaho Code. A written petition contesting the action of the Director and requesting a hearing shall be filed within fifteen (15) days after receipt of the denial or conditional approval.

ORAL ARGUMENT

If the Director grants a petition to review the preliminary order, the Director shall allow all parties an opportunity to file briefs in support of or taking exceptions to the preliminary order and may schedule oral argument in the matter before issuing a final order. If oral arguments are to be heard, the Director will within a reasonable time period notify each party of the place, date and hour for the argument of the case. Unless the Director orders otherwise, all oral arguments will be heard in Boise, Idaho.

CERTIFICATE OF SERVICE

All exceptions, briefs, requests for oral argument and any other matters filed with the Director in connection with the preliminary order shall be served on all other parties to the proceedings in accordance with IDAPA Rules 37.01.01302 and 37.01.01303 (Rules of Procedure 302 and 303).

FINAL ORDER

The Director will issue a final order within fifty-six (56) days of receipt of the written briefs, oral argument or response to briefs, whichever is later, unless waived by the parties or for good cause shown. The Director may remand the matter for further evidentiary hearings if further factual development of the record is necessary before issuing a final order. The department will serve a copy of the final order on all parties of record.

Section 67-5246(5), Idaho Code, provides as follows:

> Unless a different date is stated in a final order, the order is effective fourteen (14) days after its service date if a party has not filed a petition for reconsideration. If a party has filed a petition for reconsideration with the agency head, the final order becomes effective when:
>
> (a) The petition for reconsideration is disposed of; or
> (b) The petition is deemed denied because the agency head did not dispose of the petition within twenty-one (21) days.

APPEAL OF FINAL ORDER TO DISTRICT COURT

Pursuant to sections 67-5270 and 67-5272, Idaho Code, if this preliminary order becomes final, any party aggrieved by the final order or orders previously issued in this case may appeal the final order and all previously issued orders in this case to district court by filing a petition in the district court of the county in which:

i. A hearing was held,
ii. The final agency action was taken,
iii. The party seeking review of the order resides, or
iv. The real property or personal property that was the subject of the agency action is located.

The appeal must be filed within twenty-eight (28) days of this preliminary order becoming final. See section 67-5273, Idaho Code. The filing of an appeal to district court does not itself stay the effectiveness or enforcement of the order under appeal.

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES (IDWR)

MINIMUM ACCEPTABLE STANDARDS AND REQUIREMENTS FOR OPEN CHANNEL AND CLOSED CONDUIT MEASURING DEVICES

The water source, diversion structure and conveyance system must be adequately evaluated prior to selection of a measuring device. Surface water sources such as streams, springs and drains are commonly diverted into open channels, ditches or canals. Closed conduits such as pipes or culverts are also used to convey surface water. Ground water is more commonly diverted into pipes (closed conduits) which convey water from the well to system discharge points such as irrigation sprinkler systems. Ground water may also discharge from a well through a short section of pipe to open channels, ditches or ponds. When required by IDWR, measuring devices must be installed at or very near the point of diversion to ensure the watermaster can accurately determine the amount of water diverted from the public water source. The standards below are intended to qualify measuring devices that are "acceptable to the Department", and to assist water users and watermasters in the proper selection and installation of such devices when required pursuant to Section 42-701, Idaho Code.

I. MEASUREMENT IN OPEN CHANNELS

The following requirements are applicable to diversions from surface water sources. Measurement of a ground water diversion with an open channel measuring device must be specifically approved by IDWR.

A. Industry Standard Open Channel Measuring Devices

All open channel surface water diversions must be measured using one of the following industry standard (standard) open channel flow measuring devices:

- **Weirs:** contracted or suppressed rectangular weirs, Cipolletti weir, 90 degree V-notch weir
- **Submerged Orifices:** submerged rectangular orifice, constant head orifice
- **Flumes:** Parshall flume, trapezoidal flume, ramped flume (ramped, broad-crested weir)
- **Current Meter/Acoustic Profiler:** acoustic Doppler flow meter (ADFM), acoustic Doppler current profiler

Construction, installation and operation of these devices must be consistent with water measurement guidelines, published by the United States Bureau of Reclamation[1] or the United Stated Geological Survey[2]. Measuring devices, associated rating tables and specifications contained in these publications are considered by IDWR to be industry standard.

B. Non-Standard Open Channel Devices Including Rated Structures or Rated Sections

Any weir, flume or other measuring device that has not been constructed, installed or maintained to measure flow consistent with industry standard rating tables or curves shall be considered non-standard. IDWR may authorize the use of non-standard devices or rated channel sections on a case by case basis, upon the submittal and approval of a measurement plan. A measurement plan must contain an acceptable proposal, using industry standard procedures for developing a rating curve, or document that a rating curve has been fully developed for the device or section. Proposed rating plans must include provisions for periodic re-measurement and maintenance of the rating. The established rating must achieve the desired accuracy standard of plus or minus ten percent (±10%), the equivalent accuracy of a standard open channel device. All rating measurements must be conducted by a qualified individual (eg. engineer, hydrologist, certified examiner), using a standard portable open channel measuring device. If a measurement plan is not approved by IDWR, a standard device must be installed and maintained.

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[1] The BOR guidelines can be found at: https://idwr.idaho.gov/files/water-measurement/2001-Bureau-of-Reclamation-Water-Measurement-Manual.pdf

[2] The USGS guidelines can be found at: https://pubs.er.usgs.gov/

II. Closed Conduit Measuring Devices

The following requirements are applicable to measurement of diversions from any water source that conveys water through a full pipe or conduit. Full pipe means that water within the pipe is under at least some positive pressure and contains insignificant amounts of air or gas.

A. Standard Closed Conduit Measuring Devices

Standard closed conduit measuring devices are flow meters that have been approved for use by IDWR based on independent third party testing. IDWR has developed and published a list of meters that have been tested and approved for use[3]. Tests were conducted for both accuracy and repeatability on all submitted models. The lab tested accuracy standard for flow rate is plus or minus two percent (± 2%). The *IDWR List of Approved Closed Conduit Flow Meters* (approved list) may be found at: https://idwr.idaho.gov/files/water-measurement/approved-flow-meter-list.pdf

Approved full profile magnetic flow meters and spooled ultrasonic flow meters must be installed with a minimum straight pipe length equivalent of three (3) pipe diameters upstream and two (2) pipe diameters downstream measured from the center of the meter spool. Approved clamp-on and wetted ultrasonic flow meter transducers must be located with a minimum straight pipe equivalent of ten (10) pipe diameters upstream and five (5) pipe diameters downstream of the nearest transducer. All other manufacturer installation specifications (excepting up and down spacing) must be met. *Installation of an approved meter inconsistent with the requirements noted above, may be cause for IDWR to require reinstallation of the meter.*

B. Requests for Variance to Use Power Consumption, Hour Meter or Existing Meter

Requests for variance will be considered for qualifying diversions on a case by case basis only upon submittal of the appropriate "Request for Variance" form. If a water user can demonstrate that an existing flow meter or other method of measurement meets an equal standard of accuracy when compared to meters on the approved list, a variance may be granted. If a variance request is not granted, an approved meter will be required.

The following alternate measurement methods may be considered:

- Development of a Power Consumption Coefficient (PCC), which is a ratio of power usage to water withdrawal,
- Use of an hour meter (time clock), or
- Use of a flow meter that was *installed prior* to the date a measurement order was issued and *is not* on the IDWR approved list.

Any alternate measurement method will require field testing using a portable ultrasonic flow meter or other meter tested and accepted by IDWR (testing meter). Field testing may be performed by any of the following:

- IDWR staff,
- a water district watermaster,
- a ground water district hydrographer,
- an irrigation district hydrographer,
- a certified field examiner, or
- as otherwise approved by IDWR

Existing flow meters must be operational and installed consistent with applicable specifications. If the testing margin of error of an installed meter when compared to the testing meter exceeds plus or minus ten percent (±10%) for mechanical type meters, or plus or minus five percent (±5%) for magnetic or ultrasonic type meters, the installed meter must be replaced with a new meter from the approved list. The owner or operator of any diversion system which requires a field measurement must provide a testing section of unobstructed straight pipe 15 pipe diameters in length.

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[3] Testing was conducted at the Utah Water Research Laboratory (UWRL), a National Institute of Standards and Technology (NIST) traceable lab in Logan, Utah.

Version 2.9 updated 08-17-2017

Idaho Department of Water Resources
List of Approved Closed Conduit Flow Meters

The tables below list flow meters (meters) that have been independently tested and subsequently approved by the Idaho Department of Water Resources (IDWR) for use in closed conduit measurement applications. These meters were tested by the Utah Water Research Laboratory at Utah State University using NIST* traceable instrumentation. Meters on this list performed at or above the standard established by IDWR for: 1) accuracy of +/- 2% of flow rate over the entire range of tested flows; and 2) repeatability of +/- 0.5% defined as the percent deviation of flow rate from average accuracy at each data point. More details on IDWR minimum acceptable standards can be at the following URL:
https://idwr.idaho.gov/files/water-measurement/Measuring-Devices-Minimum-Acceptable-Standards.pdf

Prior to selecting a meter, review this list completely and consult the manufacturer's installation requirements to ensure that all installation specifications for the specific model can be achieved. The specific models listed below must also be installed consistent with IDWR installation requirements (below) and any applicable notes (see page 4). This list is subject to change as additional meters are added or removed. The most current list can be found here:
https://idwr.idaho.gov/files/water-measurement/approved-flow-meter-list.pdf

Straight Pipe Length - The required minimum length of straight pipe immediately upstream and downstream of the meter or meter transducers. Straight pipe lengths must be free of flow disturbers and be in-line with the meter or transducer location. For spooled (flanged) meters, this pipe length must be the same nominal diameter as the meter. ***Chemical injection ports must not be located upstream of a meter or meter transducer location.***

Flow Disturber - Any fitting or appliance in the piping that may disturb flow through the meter or meter transducer locations. Flow disturbers may include but are not limited to: pump discharges, elbows, check, butterfly or gate valves, pipe reducers, couplings, intrusions, bells or reducers.

IDWR Installation Requirements:
Magnetic meters and spooled ultrasonic meters must be installed with a minimum straight pipe length equivalent of three (3) pipe diameters upstream and two (2) pipe diameters downstream from the center of the meter. Ultrasonic meters with remote mount transducers require a minimum straight pipe length equivalent of ten (10) pipe diameters upstream and five (5) pipe diameters downstream of the nearest transducer. These straight pipe spacing requirements must be maintained regardless of the manufacturer specifications, unless a variance has been approved by IDWR. All other manufacturer installation specifications must be met.

* NIST - National Institute of Standards and Technology

Approved Full Profile Magnetic Flow Meters

Manufacturer	Model/Specifications	Power Supply	IDWR-accepted Pipe Applications (Nominal Pipe Size)	NOTES
ABB	WaterMaster	AC	3/8" to 96"	See note 1, page 4
ABB	AquaMaster 3 with FER Series Transmitter	INTERNAL	½" to 24"	See note 1 and 8, page 4
Badger	M2000 Amplifier with M2000 Detector	AC	1/4" to 54"	See note 1, page 4
Burkert	8054/8055 with Magflow Transmitter	AC	1" to 80"	See note 1, page 4
Endress+Hauser	ProMag L400	AC	1" to 90"	See note 1, page 4
Endress+Hauser	ProMag W400	AC	2" to 78"	See note 1, page 4
FloCat	MFE	AC	¾" to 24"	See note 1, page 4
Growsmart by Lindsay	IM3000	INTERNAL	4" to 12"	See note 1, page 4
Khrone	Enviromag 2100 C	AC	3/8" to 80"	See note 1, page 4
Khrone	Waterflux 3100 C/F	AC	1" to 24"	See note 1, page 4
McCrometer	Dura Mag	DC	4" to 12"	See notes 1 and 7, page 4
McCrometer	Ultra Mag with M-Series Converter	AC	2" to 48"	See note 1, page 4
Rosemount	8705 with 8732E Transmitter	AC	1/2" to 36"	See note 1, page 4
Rosemount	8750W with 8732 or 8712 Transmitter	AC	1/2" to 48"	See note 1, page 4
~~Seametrics~~	~~AG 2000 (retired)~~	~~DC~~	~~4" to 10"~~	See note 2, page 4

Approved Full Profile Magnetic Flow Meters (continued)				
Manufacturer	**Model/Specifications**	**Power Supply**	**IDWR-accepted Pipe Applications (Nominal Pipe Size)**	**NOTES**
Seametrics	AG 3000	DC	4" to 12"	See notes 1 and 3, page 4
Seametrics	iMag 4700	DC	4" to 12"	See notes 1 and 3, page 4
Siemens	Sitrans Mag5100W w/ Mag5000 Transmitter	AC	1" to 78"	See note 1, page 4
Siemens	Sitrans Mag8000	INTERNAL	1" to 24"	See note 1, page 4
Sensus	iPerl	INTERNAL	5/8" to 1"	See note 1, page 4
Sparling	TigermagEP – FM656 (Flanged)	AC	3/8" to 48"	See notes 1 and 5, page 4
Valmont	Valley 3000	DC	4" to 12"	See notes 1 and 3, page 4
Approved Spooled Ultrasonic Flow Meters				
Badger	E-Series	INTERNAL	3/4" to 2"	See note 1, page 4
Master Meter	Octave	INTERNAL	2" to 10"	See note 1, page 4
Netafim	Octave	INTERNAL	2" to 12"	See note 1, page 4
Approved Clamp-on and Wetted Transducer Ultrasonic Flow Meters				
Fuji	Time Delta C w/ 1MHz Transducers	AC	14"+	See notes 1 and 4, page 4
GE Panametrics	AT868 w/ 1MHz Transducers	AC	14"+	See notes 1 and 4, page 4
Siemens	Sitrans FUS1010 w/ High Precision Sensor (type H)	AC	14"+	See notes 1, 4 and 6, page 4

Notes:

1. Installation must be consistent with manufacturer specifications and IDWR installation requirements.

2. Removed from approved list October, 2016 (retired and replaced by AG 3000). AG 2000 meters installed prior to October, 2016, may continue to be used unless the meter becomes inoperable or fails to meet the required accuracy standard.

3. Seametrics AG 3000, iMag 4700, and Valmont Valley 3000 must be installed with external DC power in addition to the internal battery. A functional internal battery must remain in the meter.

4. Ultrasonic meters with remote transducers may not be used on pipe smaller than 14 inches unless a variance is approved by IDWR.

5. Sparling FM HT-hot tap model was not tested or approved.

6. Sitrans High Precision sensor selection is based on pipe wall thickness and may only be used on steel pipe.

7. Dura Mag must be installed with an external DC power supply. External power supply options may include an AC/DC transformer or external battery with solar panel or other charging source. Power supplied must meet the manufacturer specification for DC input voltage sufficient to maintain the meter in a continuous sampling mode.

8. Meter may be operated in connection with an external power supply. Consult the manufacturer specifications for external power supply options. A functional internal battery must remain in the meter.