Minutes of Public Meeting

Skyline Improvement and Service District

August 19, 2021
Berkshire Hathaway Offices

Attendees:

Skyline ISD Directors and Officers Present:	Kurt Harland (Chairman) Latham Jenkins (Vice-chairman) Jim Lewis (Treasurer)
Consultant:	Josh Kilpatrick, Nelson Engineering

Sign-in sheet attached.

I. Opening

A. Call to Order – 4:04 PM by Kurt Harland.

B. Introductions and Purpose of the Meeting

After call to order, Kurt Harland turned the meeting over to Josh Kilpatrick of Nelson Engineering. Welcome and introductions were made. A description of the general purpose of the meeting was presented by Josh as follows: the public meeting is being held to fulfill a SLIB Drinking Water State Revolving Fund Loan requirement as stated in the program rules; its purpose is to give the public an overview of the metering project, present any alternatives that were considered, provide a preliminary schedule, and explain the proposed funding and financial impact on individual users/property owners; public comment and participation are encouraged and welcomed, but a request was made to please hold comments until the end of the presentation. It was explained that the minutes of the meeting along with public comment and responses will be included with the loan application to the State. It was noted that installation of new meters was one of the recommendations from the WWDC Level II report, but the intent of the meeting was to discuss the metering project not the report itself or its findings; Josh explained that the after the public meeting closes, there will be a regular District meeting, and questions pertaining to the report could be posed and addressed by the board at that time.

II. Skyline ISD Metering Project

This section of the meeting included a presentation by Josh Kilpatrick. Josh gave a brief history of the water system and discussed the need for the project. He explained that the project consists of the replacement of 85+ existing residential water meters, the majority of which—around 95%—are in excess of 20-years-old, at which point the meters have mechanical issues and need repair or replacement, as is the industry standard practice. He elaborated on the fact that the condition of the meters is critical to the District so that accurate readings can be obtained for bookkeeping, and on the residents' side of things, new meters would alleviate the often-difficult process of accessing and recording the readings as a number of meters are located in crawlspaces. Another problem that the District faces is that the readings are requested on a bi-annual basis but are not always provided in a timely manner. Josh explained that new meters can better facilitate monthly water audits and decision making regarding the commissioning of leak detection surveys (meter readings can be collected monthly and be compared to the well production to ascertain whether or not there are leaks in the system), and can provide the District with more flexibility for billing based on monthly water usage. He presented a map of the project area (a copy of this exhibit is attached) and explained that new meters will be installed in all of the existing residences within the District.

Josh mentioned that there were not a lot of available project alternatives but that they included a solid-state meter (typically that is an ultrasonic meter) with no internal moving parts, and a mechanical type meter (positive displacement) with internal moving parts that need to be replaced every 20 years, along with the registers.

He gave the total estimated project cost as $145,000.

The timeframe for the projects was given as follows: SLIB meeting in early February 2022, design in March/April of 2022, bidding in May/June of 2022, and installation of meters in July/August of 2022.

III. Proposed Approach to Financing

Josh Kilpatrick then segued into this section of the meeting by explaining that District is requesting a $145,000 loan which is the entirety of the project budget; loan term is 20 years at 0% interest, to be repaid by means of a special assessment made through the Teton County assessor's office which would equate to a per user average annual payment of approximately $85.00.

IV. Questions and Discussion – Public Comment

Josh Kilpatrick relayed that one written comment from Bill Racow was received and read it aloud along with the District's written response. A copy of Bill's comment and the District's response is attached. Josh elaborated on the District's response explaining that typically Districts and municipalities keep to the 20-year cycle for meter replacement, and his understanding is that the board wants to pursue the new meters to reduce the amount of time that it takes to collect the meter readings and would rather not have people accessing their crawlspaces to do so.

Josh then presented product sheets and images of an example meter and meter installation/completion check out form (a copy of these materials is attached), and he explained what the new system would entail as far as components, the general process for collecting and downloading the data, and the benefits of a radio-read system, specifically in relation to a system that has difficulty meeting peak hour demand based on limited well production.

Josh then opened the meeting to the public for project-specific questions and comments.

Maria Johnson asked at what point the District will know what meter will be chosen since she and her husband are in the final stages of building a new house (to be completed in the next couple of months) and would like to install the correct meter now. Josh explained that a certain meter had not yet been chosen. Town of Jackson and Spring Creek ISD use Neptune, and Teton Village WSD uses Sensus. Josh could not commit to a decision within her timeframe. Maria explained that a neighbor put in a Neptune model about a year ago. Josh agreed that a Neptune would probably be a safe choice. He said that what the District would probably do for anyone who has installed a Neptune meter recently (in the last 5-10 years) is get the make and model number and perhaps switch out the register with a register that has a radio-read capability.

Jim Lewis commented that the rules of the loan program stipulate that the meters cannot be Chinese. Josh stated that he believes that the components can be made in China, but the final product cannot be manufactured in China; he further stated that to his knowledge Neptune has its own plant in the United States, and he thinks that Sensus does as well.

Worthy Johnson was wondering, between Nelson Engineering and the board, when the meter selection will be made. He stated that there has been a year-long discussion, and everyone said the meter choice would be Neptune. He said that his building project [previously mentioned by Maria Johnson] is ready for water system connection and will need a meter

installation within the next three weeks, and he doesn't want to switch it out later. Josh stated that he believes that the District can stipulate which meter manufacturer it wants to use but he would need to verify that with DWSRF project engineers. He stated that the last meter project he did was with Spring Creek ISD, and it had a procurement contract where several suppliers submitted bids, and one was selected in that manner. Josh is of the opinion that Neptune is the lowest cost alternative, but he doesn't think that a decision can be made until the project is funded (February 2022).

Corbin McNeill asked if this has been put through a procurement process of evaluating reliability, guarantees, and cost, or is this a matter of just replicating another District that Clearwater Operations is associated with. Josh replied that he contacted HD Fowler for a quote for ultrasonic and positive displacement type meters and the automatic radio-read system, and the loan request includes that quote along with an installation price as discussed with a local plumber, plus a 15% contingency that would account for another company that's more expensive. In Josh's experience, a lot of these companies are pretty close in price; he doesn't anticipate that there will be more than a 15% difference in price.

Corbin stated that he understands that this is a modest-sized project (under 100 meters); he stated that he sat on a board of an automated meter reading company and explained that there are a number of different collection methods for data, such as connection to the local telephone network or tie-in with the Lower Valley Energy's power line meter reading. He'd like to know if those alternatives have been evaluated. Josh stated that those alternatives have not been explored but that his recollection was that when those networks were set up (sub-bases throughout the community that collect meter readings automatically, transmitting from each sub-base back to a main/home base), that was going to be something fairly expensive with only a 20-year life, and he was under the impression that the overall cost would not be worth it. Josh mentioned that another option was cellular data collection, but that service would have monthly fees as well. Cellular is an option provided by all of the major meter reading companies. Radio-read, as proposed, was the simplest and most widely-used data collection method available to residential users.

Corbin asked what experience Josh has had locally. Josh responded that the Town of Jackson, Teton Village WSD, and Spring Creek ISD all collect their meter readings monthly with a hand-held device, and said that he could check into some other local systems. Corbin asked if they use the same system that Josh is recommending. Josh stated that yes, it's roughly the same.

Kurt Harland brought up the fact that backflow preventers (dual check valves) will be installed at every house as part of the project for safety of the system.

Corbin asked if the District is going to replace every meter and add some form of electronic transmission device. Josh responded yes and explained that it's important to gather/collect information pertaining to the size, age, type, and manufacturer of existing meters so that the exact size and number of meters, registers, and backflow preventers needed can be ascertained. If some of the existing meters or backflow preventers are less than 10-years-old and usable, that could save on costs.

Corbin stated that in his experience the majority of the meters will need to be replaced. Josh agreed, adding that 95% of the lots were developed prior to 2001 and only four lots have been built on in the last 20 years, and 20 years is the industry standard for meter replacement.

Corbin stated that he supports the meter replacement but wants to make sure that the District gets the right technology and that a procurement process has been followed so that the right reliability and sustainability standard is secured; he believes that the meter should be guaranteed for 20 years within 5%+/- but that the District would be hard pressed to get that type of guarantee on the electronics. Josh replied that the solid-state ultrasonic meters have a 20-year battery life; a minimum 10-year warranty could be specified, of course the cost would increase, but that's something that can be added, warranty and software requirements if the District needs to download...

Corbin interrupted asking if software updates within five years could be free or part of the cost. Josh agreed stating that typically a software update will be necessary three to five years down the road, and the software has to be compatible with the District's billing software, so that stipulation could be included as well. Josh explained that the project is in its infancy, and there are a fair number of items to be looked at and reviewed.

Worthy Johnson asked if, say, there are four houses that are new, as in two to three years from construction with meters that are 100% compatible with the proposed meters, have wireless communication already available, and numerous backflow preventers are in place, how would the District financially handle a situation like that when the plan is to charge each property owner $87 per year for a new meter and appurtenances. Josh deferred to Jim Lewis to address that question but stated that perhaps the assessment would be reduced for that owner or those owners.

Worthy continued, asking if no upgrade is needed at all, how would that situation be handled. Jim Lewis responded that he sees the meter photos

that are sent in, and he is not aware of any properties that currently have a meter with radio-read, including the four most recently built. They simply have a new style mechanical reader but are not radio-read. He stated that he's not sure what Worthy is planning on installing, but Jim is not aware of a single radio-read meter in Skyline Ranches.

Worthy again asked how it would be handled if anyone put in a compatible unit in the near future. He then asked if Josh assisted Shooting Star or 3 Creek [with their meter projects]. Josh replied that he did assist 3 Creek, but they didn't have existing meters, so it wasn't a comparable project. The meters were all brand new and had to be plumbed in. Jim Lewis replied that if Worthy put in a completely compatible radio-read meter, the District would ask for funding for one less meter/assembly, and only those who get the new units would be assessed.

Worthy then asked Josh, on the systems that he has put in, in relationship to the volume of water coming from the well, how much of a discrepancy has been found between the meter reads and well reads, on average annually, on a percentage basis. Josh explained that the term is "unaccounted for" water and includes unmetered water and leakage, and a good system will be around 5%, and anywhere between 5 and 10% is fairly normal, but anything above 10% should be addressed, a leak detection survey should be commissioned. Worthy asked where the District is at; Josh replied with 15%, clarifying that it could be a meter accuracy issue. The meter readings are also sent in at all different times and so there could be inaccuracies based on that fact. There could also be a small leak in the system. A leak was found and repaired previously, and at that time the unaccounted for water was at 35% or so. Jim Lewis stated that it was not 35%, but it was high. Josh stated that leaks would be noticeable based on the unaccounted for water, and with new meters that are read monthly, the District would know within a month that there is a leak.

Jim Lewis added that he had an open flap on a toilet at his part-time home in Arizona, and with proper metering by the water authority, he was made aware of unusual usage indicating a problem and was able to have it repaired by the caretaker in short order, reducing his bill and strain on the water system.

Josh added that with the new meter technologies, the hand-held unit can be placed beside the meter and, in his experience with the Neptune model, an operator can download and chart the last 45 days of water usage and see the actual water usage, a spike indicative of a leak, etc.

Worthy Johnson added that there's a new product available that insurance companies often require homeowners to have, called a phyn, that is attached to the main supply line to the house, that detects a large flow and

automatically shuts off the water and sends a message to the owner via an app or the owner can shut the phyn remotely. It's a costly item but something that may be of interest. Warren Machol commented that he has that device, and it catches even minor events like a sprinkler set for 15 minutes to water the landscaping and sends a message that there could be a possible leak. It may not catch a running toilet, but it's a good system that can catch a leak and prevent significant internal damage to a house. Josh commented that he did not believe that SLIB would fund a device like that, but the comment was helpful. Josh mentioned that a hydrant was hit by a truck driver recently in Teton Village, and the resultant water hammer (pressure spike) in the system caused flooding in the nearby multi-million-dollar homes with fire sprinklers. Perhaps that device would have been helpful to those homeowners. Warren stated that the device Worthy mentioned was more of a security measure for the internals of a house, not the water system itself.

Warren Machol then had several questions. Warren restated that leakage of 5% [unaccounted for water] for a brand-new system is pretty typical, and for a system the District's age 10% would be a closer expectation, so then he asked the following: if there is 15% that's currently unaccounted for, the extra 5% is how many gallons? Josh and Kurt replied that it's around 2.5 million. Warren asked what the total usage is in gallons; Josh replied 22 million gallons reported at the meters at the home, 25-26 million per year. Warren then questioned or rather stated that the difference between 22 and 25 is 3 million gallons, and 10% is normal, so the District is looking or 500,000 gallons at the homes. Warren stated that the meters aren't accurately reading and reiterated the math that brought him to 500,000 gallons. Josh then stated that perhaps the 500,000 gallons is at the homes, but he was not sure of the breakdown of the unaccounted for water, whether it is leakage, unaccounted for usage, or inaccuracy of the meter.

[Individuals talking over one another.]

Warren then restated that a brand-new system is 5%, 10% is for an older system, and the District has 15%, then the difference is 5% or a delta 5%. Josh agreed. Warren then stated that the math would be 500 times $1.70, and then asked how much money the District is looking for. Kurt Harland stated that the District is looking for accuracy not necessarily money. Warren then stated that the District is going to spend $8,000 a year on debt service (20-year debt service for a product that may last 10 years), and he is trying to understand what the District is spending versus what it is investing, considering that the District needs to spend millions on the water system. He posed the following rhetorical question: what is the best way to spend the money? He went on to state, if the District has 500,000 gallons, times $1.70 [per 1000 gallons], that equals $850, concluding that the District will realize $850 by spending $8,000. Josh replied that the District is looking

for efficiency in collection of meter readings and bookkeeping, in completing water audits, and tracking leaks throughout the distribution system so that the District can make an educated decision in the future regarding when the distribution system will need to be replaced, so there is value to the installation of the new meters now so that those projections can be made.

Warren then commented that the meters at the pumphouse are valuable so that the District can collect that data and know what is being pumped at a relatively low cost, but he is looking at what the District needs to spend in the future and feels that for $150,000 a several hundred-thousand-gallon storage tank could be installed instead, an alternative for the same money, and asked which alternative would give the District the best service and pieces. He then asked, why the District wants to spend $145,000 on meters today. Josh replied that the storage tank cost would depend on the size and would need to include booster pumps, which was discussed during the Level I meeting, and could easily cost over a million dollars.

Warren then summarized that he's looking at the fact that there is a total borrowing capacity for the community and is wondering how the District can get the best, most reliable system for that money; he again mentioned that the District is looking for $850 in savings by spending $8,000 per year; he stated that there are many options to make the system more reliable; and asked what additional benefit the District is getting by putting this system in. He stated that he appreciated the idea that more readings and data can be collected but that there are a lot of things that are not working in the system, so he asked what the net benefit is, because he believes that there's a negative net benefit of $7,000 per year. Josh clarified that he estimated a hard cost of $800-900 per meter installation and alluded to the fact that it's difficult to assign a value to the benefit to the homeowners for the convenience of not having to access crawlspaces to take meter readings as well as the benefit to the District of timely meter readings for bookkeeping and tracking. He stated that it's up to the District to make the final decision. He added that there are many local communities putting in the same systems, and there are good reasons for it. Warren then followed up by saying that he spoke to representatives of the Aspens and Indian Springs, both decided that the cost of labor and meters was better spent in other places throughout the water systems for better value, so he believes that there is some debate about the topic.

Warren then asked, if 20-year debt is incurred on each individual property, and a meter breaks in, say, five years, who is responsible for repairing that meter. Jim Lewis replied that it's the District's responsibility. Jim added that one of the stipulations of the loan application is that the District own and maintain the meters. Jim mentioned that the Town of Jackson has the same policy in place (the Town owns the system's water meters). Warren asked for confirmation that the current District rules and regulations are not written

that way, and Jim agreed. Currently the regulations state that from the curb stop in to the property, the owner is responsible for water service line repairs and maintenance. The District's attorney, Paul D'Amours, is assisting the District with a redraft of the regulations to amend that language.

Warren then asked if the District is taking responsibility for the service lines themselves. Jim replied that no, the District will only own the meters on those service lines, since the financing is for the meters only, not the lines. Warren and Jim discussed the matter for some time and concluded together that the property owner will be responsible for the line from the curb stop to the meter, the District will be responsible for the meter, and then the owner will pick up responsibility for the line after the meter and into the internal plumbing of the house. Warren stated that he'd like to see the new language for the regulations, and Jim said that he certainly could. Warren stated that the situation was unique, and Josh added that it was not unique, Teton Village Water and Sewer District and the Town of Jackson have similar regulations. Josh elaborated that, in the case of new construction, Teton Village WSD and the Town will require a property owner to pay for the meter with the connection fee. Josh stated that moving forward the District would either buy the future meters for the remaining four or five lots and be reimbursed by the owner, or the owner would be required to purchase the meter that the District specifies, and the District would own the meter. Jim agreed.

Warren stated in closing that he appreciated the fact that backflow prevention was considered. Jim thanked Warren for suggesting that protection which has now been added to the project.

V. Close Public Meeting

Josh Kilpatrick asked for additional questions, and when there were none, Kurt Harland closed the public hearing. The hearing was adjourned at 4:56 PM.

Minutes respectfully submitted: Suzanne Lagerman, Nelson Engineering

Approved:

Kurt Harland
Chairman

SKYLINE IMPROVEMENT AND SERVICE DISTRICT
SKYLINE ISD METERING PROJECT
PUBLIC MEETING
SIGN-IN SHEET
AUGUST 19, 2021

NAME	ADDRESS	PHONE	EMAIL
Suzanne Lagerman	Nelson Engineering, 430 S. Cache St. PO Box 1599 Jackson WY 83001	307-733-2087	slagerman@nelsonengineering.net
Josh Kilpatrick	"	"	jkilpatrick@nelsonengineering.net
Kurt Harland	3195 Mallard Rd Jackson, WY 83001	307-413-6887	kurt@[illegible]jacksonhole.com
Latham Jenkins	3155 Mallard Rd - Jackson, WY 83001	307-690-1642	latham@[illegible].biz
Via Zoom:			
Jim Lewis	655 N. Meadowlark Road Jackson WY 83001	307-413-0829	james1554@gmail.com
Maria Johnson	500 N. Meadowlark Road Jackson WY 83001		
Worthington Johnson	"		
Warren Machol	500 N. West Ridge Road Jackson WY 83001		
Corbin McNeill	525 N. West Ridge Road Jackson WY 83001		

AREA OF REVIEW

SUBDIVISION BOUNDARY

SKYLINE RANCH SUBDIVISION

SUBDIVISION ENTRANCE

SKYLINE & SERVICE DISTRICT IMPROVEMENT

TOWN OF JACKSON

US HWY 22

VICINITY MAP
JACKSON, WYOMING
0 5000 10000

0 200 400

LEGEND

LINE TYPES
- SUBDIVISION/WATER SERVICE AREA BOUNDARY
- ROAD EASEMENT
- WATER SYSTEM EASEMENT
- 1"W WATER SERVICE
- 2"W 2"ø WATER MAIN
- 4"W 4"ø WATER MAIN
- 6"W 6"ø WATER MAIN
- D 4"ø DRAIN LINE

PIPE TYPES
- ASBESTOS CEMENT (AC) c.1969
- POLYVINYL CHLORIDE (PVC) c.1974
- DUCTILE IRON PIPE (DIP), c.2006

SYMBOLS
- FIRE HYDRANT
- WATER VALVE
- AIR RELIEF VALVE
- CURB STOP
- WATER MANHOLE
- WELL

ACRONYMS

FH-1	FIRE HYDRANT #
FHV-1	FIRE HYDRANT VALVE #
ARV-1	AIR RELIEF VALVE #
PRV-1	PRESSURE RELIEF VALVE #
V-1	BURIED GATE VALVE #

DATE	MAY 2021	REV.
SURVEYED	NE	
ENGINEERED	BO	
DRAWN	BO	
CHECKED	JK	
APPROVED	JK	

NELSON ENGINEERING
P.O. BOX 1599, JACKSON WYOMING (307) 733-2087

DRAWING TITLE
EXHIBIT A
SKYLINE METERING PROJECT
AREA OF REVIEW

JOB TITLE
SKYLINE RANCH
TETON COUNTY, WY

DRAWING NO
EX. A

JOB NO
20-094-01

slagerman@nelsonengineering.net

From: Jim Lewis <jamesl5546@gmail.com>
Sent: Saturday, August 14, 2021 4:12 PM
To: Suzanne Lagerman; Josh Kilpatrick
Subject: Fwd: Water meter assessment feedback from Bill Racow - Action Required

Follow Up Flag: Follow up
Flag Status: Flagged

fyi

---------- Forwarded message ---------
From: **Skyline Ranch ISD - Office** <office@skylineranchisd.com>
Date: Fri, Aug 13, 2021 at 3:25 PM
Subject: Water meter assessment feedback from Bill Racow - Action Required
To: Bill Racow <billracow@hotmail.com>, Jim Lewis <jamesl5546@gmail.com>

Very good, Bill. I'm also passing your comments along to our Treasurer, Jim.

Thanks.

Dave Adams
Bookkeeper
Skyline Improvement Service District
307-413-2488

On Thu, Aug 12, 2021 at 7:36 PM Bill Racow <billracow@hotmail.com> wrote:

> Hello Dave, Thank you for your reply. I have to say that this still does not make financial sense to me. $145000 buys alot of office time. Again I say that if the water income is lacking, raise the rates on usage and charge those who are not reporting for new meters.I do understand a little bit of the financial side of things in that I was on the board for 9 years. Please include my comments at the board meeting, I am presently in Alaska
> Thank You
> Bill Racow

From: Skyline Ranch ISD - Office <office@skylineranchisd.com>
Sent: Thursday, August 12, 2021 6:37:48 AM
To: Bill Racow <BillRacow@hotmail.com>
Subject: Re: Water meter assessment

Hi Bill,

The new meter plan, if it goes forward, will greatly save on the significant labor costs currently necessary to manually capture and compile the meter data for submission to the County. In order to automate the system all the meters need to be upgraded to work with the new software used to collect the readings.

Jim is more involved with putting this together. If my response is lacking, let me know how and I'll be happy to elaborate or you might reach out to Jim. He will be back next week.

Thanks.

Dave Adams
Bookkeeper
Skyline Improvement Service District
307-413-2488

On Wed, Aug 11, 2021 at 11:14 AM Bill Racow <BillRacow@hotmail.com> wrote:

> I don't understand the reasoning for requiring everyone to install new water meters. If some individuals are not reading their meters, they should be required to have new meters installed at their expense.
> If the district requires additional funds, the rate per 1000 gallons should be increased.
> If new meters have to be installed, which I question, let me buy the meter and install it without having to pay for approximately the next 20 years.
> Bill Racow
> 3-11

ARB® UTILITY MANAGEMENT SYSTEMS™

NEPTUNE TECHNOLOGY GROUP

Field Service Tool

Immediate installation notification is critical to a successful AMI deployment. Without this functionality, system deployment can be an overwhelming task. The logistics of an installation can cost a utility substantial time and money regardless of whether the deployment is being performed by the utility or by an outsourced installation firm. Of the challenges facing AMI deployments, a primary concern is knowing whether an MIU installation is successful before the installer moves to a new location.

Other systems require days before an installation can be confirmed as successful. Even systems that can validate communication over the network and report it back in hours or even minutes are likely to be of little value since installers will likely not want to wait for the confirmations. Without immediate validation, MIUs that are not communicating properly with the network will require follow-up trips so that the installer can troubleshoot the previous installations. This process can cause project costs to increase and inconvenience the homeowner.

Neptune's Field Service Tool (FST) eliminates this problem entirely. The FST is a handheld-based device with an integrated 450 MHz transceiver that utilizes the two-way communication to confirm an installation is successful before the installer leaves the site. Upon a magnet swipe, the R450™ MIU sends a signal which is received by all collectors within range. The collector which records the best RSSI (Received Signal Strength Indication) sends a signal back in response. The FST records this communication in real time and supplies the installer with a green light for successful installation or a red light indicating that signal strength isn't optimal for two-way communication. This information is provided as part of the normal installation procedure, resulting in instantaneous validation of the installation.

Additionally, receiving this information as part of the install process allows the installer to make adjustments if needed so that the MIU will be successfully received by the collector. These adjustments are often as simple as altering the location of the MIU or antenna.

Many systems claim to save your utility time and money in the long-run but only Neptune can save you both from day one.

KEY BENEFITS

- Lowers installation costs
- Decreases AMR/AMI deployment time
- Optimizes installation for two-way communication
- Reduces the number of truck rolls due to improper installation
- Reduces homeowner inconvenience

KEY FEATURES

- Real-time installation confirmation
- MIU simulator
- Collector simulator
- Integrated 450 Mhz transceiver
- Handheld-based for in-field use

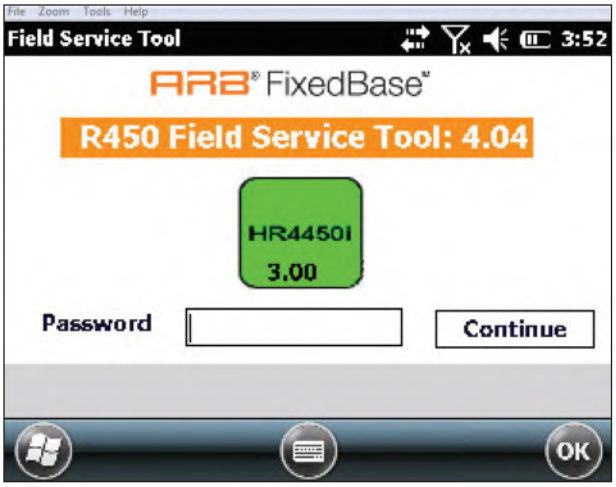

Figure A. Field Service Tool Start Screen

Figure A. The security verification in the Field Service Tool ensures that only authorized personnel can interact with the system.

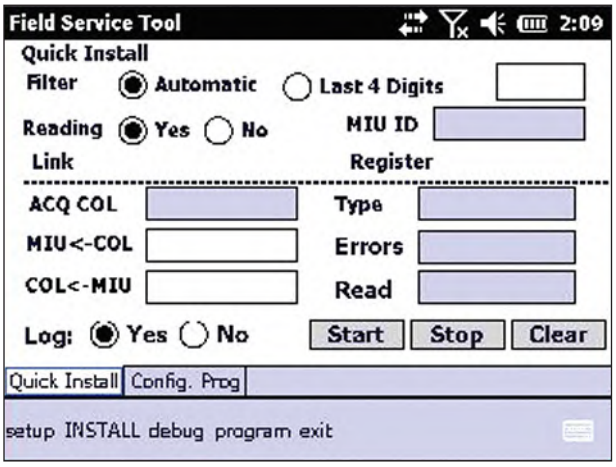

Figure B. Quick Install Results Screen

Figure B. Upon a magnet swipe of the R450 MIU, the FST will record the two-way communication between the collector and MIU in real time. The results are displayed on this screen. If the installation was successful, this box will be highlighted green. A red highlight indicates that the installer would need to alter the location of the MIU/antenna.

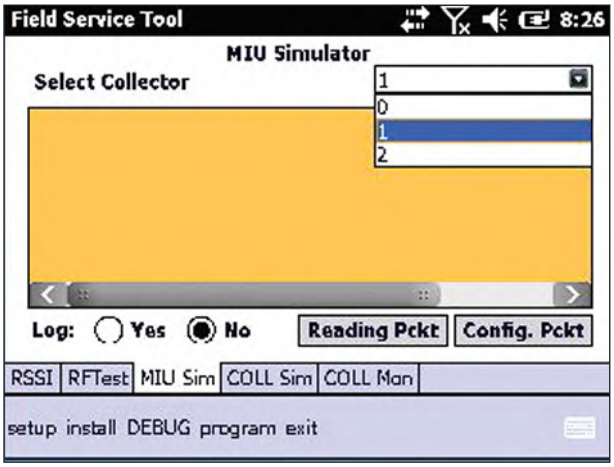

Figure C. MIU Simulator Screen

Figure C. The MIU Simulator allows the user to simulate an MIU transmission in order to test an R450™ Data Collector (DC). This can be used to confirm a DC is fully operational once it has been installed.

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NEPTUNE TECHNOLOGY GROUP

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A PRODUCT SHEET OF NEPTUNE TECHNOLOGY GROUP

E-CODER®)R900*i*™

Protect And Expand Your Technology Investments

Neptune® designed the R900® System to make it easy for your utility – installation, everyday use, and expansion for the future without stranded assets. The E-CODER®)R900*i*™ combination absolute encoder register/ radio frequency meter interface unit (RF MIU) is a perfect example of all of the above. Not only does it work with past generations of meters and meter reading systems, but seamless integration is built into this single-unit end-point itself, providing two-way communications of advanced metering data. The E-CODER)R900*i*'s interleaved mobile and high-power fixed network messages allow for simple migration from mobile to fixed network reading without site visits or reprogramming.

Streamline Operations And Manage Resources

In addition to eliminating the need for programming, the E-CODER)R900*i* has no external wires, making installation easier, faster, and less costly; plus it reduces potential vandalism or tamper. As with the rest of the R900 System, the design of the unit is intuitive and user-friendly so that minimal training is required for operation. It's designed to help manage time, labor, and other resources. The radio frequency transmission of the E-CODER)R900*i* can save your utility significant amounts of time in terms of both meter reading and billing, and provide flexibility to reallocate personnel to different tasks or departments depending on your changing workforce needs.

Do More With Detailed, Actionable Data

The types of data your utility can generate through the E-CODER)R900*i* can take you far beyond a simple meter reading for a monthly bill. Hourly consumption profile information over an account's last 96 days, along with alerts for leak or backflow, help to proactively identify and resolve customer issues – heading off high bill complaints, reducing delinquent payments, and eliminating write-offs. Using Neptune® 360™ host software, your utility can leverage detailed data from the E-CODER)R900*i* to balance water produced versus water consumed, group accounts for District Metered Area analysis, and track and manage Non-Revenue Water. From increasing efficiencies to pinpointing possible tamper or water theft to aiding customer service, the data supplied by the E-CODER)R900*i* can help your utility make better, more confident decisions.

KEY BENEFITS

Facilitates Migration to AMI

- 1 Watt fixed network message reduces infrastructure costs
- Interleaved mobile and fixed network messages facilitate migration without changing the "modes" in the MIU

Reduces Non-Revenue Water

- Provides leak history/diagnostics
- Enables proactive leak notification
- Provides hourly consumption data
- Improves meter reading accuracy
- Eliminates estimated reads

Identifies Potential Theft

- Tamper detection
- Reverse flow detection
- Identifies significant periods of zero consumption

Simplifies Installation Process

- Easy to install/no programming required
- No external wires
- Reduces labor cost
- Reduces potential wire vandalism and damage

Technical Specifications

Electrical Specifications

- MIU power: Lithium battery with capacitor

Transmitter Specifications

- Two-way MIU
- Transmit period (interleaved mobile and fixed network messages):
  - Standard mobile message every 14 seconds at 100 mW
  - Standard fixed network message every 7½ minutes at 1 Watt
- FCC verification: Part 15.247:
  - Transmitter channels: 50; frequency-hopping, spread-spectrum
  - Channel frequency: 910 to 920 MHz
- Encoder register reading interval:
  - Every 15 minutes
- Data logging interval:
  - 96 days of hourly data

Environmental Conditions

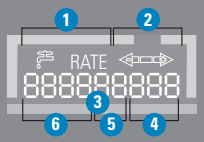
- Operating temperature: -22°F to +149°F (-30°C to +65°C)
- Storage temperature: -40°F to +158°F (-40°C to +70°C)
- Operating humidity:
  - Inside set - 0 to 95%, condensing
  - Pit set - 100% submersible

Materials

- Register housing:
  - Inside set: plastic polycarbonate
  - Pit set: roll-sealed copper shell
- Lens:
  - Inside set: plastic
  - Pit set: glass

Antennas

- Standard internal antenna
- Optional through-the-lid antenna:
  - 18" Coax
  - 6' Coax
  - 20' Coax

	FLOW INDICATOR Shows the direction of flow through the meter: ON Water in use. OFF Water not in use. Flashing Water is running slowly. (-) Reverse flow. (+) Forward flow.
	LEAK INDICATOR Displays a possible leak: OFF No leak indicated. Flashing Intermittent leak indicates that water has been used for at least 50 of the 96 15-minute intervals during a 24-hour period. On Continuously Indicates water use for all 96 15-minute intervals during a 24-hour period.
RATE	RATE OF FLOW Average flow rate is displayed every twelve seconds on LCD display.
	LCD DISPLAY Nine-digit LCD displays the meter reading in billing units of measure: U.S. gallons, cubic feet, Imperial gallons, or cubic metres. 1 E-CODER basic reading/customary 6-digit remote reading 2 Customary sweep hand digits 3 E-CoderPLUS reading (8-digit remote reading) 4 Testing units used for diagnostics 5 Extended reading units 6 Customary billing units

Options

Compatibility

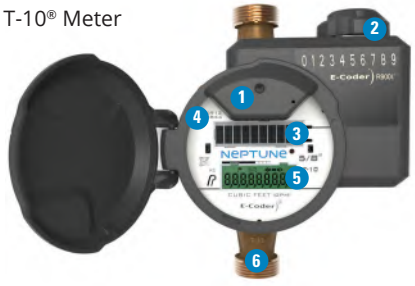
- Available for all sizes and makes of current Neptune meters
- Handhelds with R900® Belt Clip Transceiver - mobile RF
- MRX920™ - mobile RF
- R900® Gateways - fixed network RF

Units of Measure: U.S. Gallons, Cubic Feet, Imperial Gallons, Cubic Metres

Warranty

- 20 years (10/10); Neptune provides a limited warranty for performance, materials, and workmanship. See warranty statement for details.

1. Internal Antenna
2. Optional Antenna Port
3. Solar Panel
4. Date of Manufacture
5. LCD Display
6. T-10® Meter



NEPTUNE TECHNOLOGY GROUP

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neptunetg.com

Neptune Technology Group
1600 Alabama Highway 229
Tallassee, AL 36078
800-633-8754 f 334-283-7293

Be Confident with Sustained Accuracy Over Time

Neptune® MACH 10® Ultrasonic Meter

The MACH 10® ultrasonic water meter features solid state metrology with no degradation of accuracy over time. Combined with a corrosion-resistant, lead free, high-copper alloy maincase, the MACH 10 is built to withstand demanding service conditions and deliver sustained accuracy over the life of the meter.

- Sizes ⅝", ¾", and 1"
- Extended low-flow range for superior leak detection
- Accuracy sustained over meter life
- Can be installed in both horizontal and vertical applications
- Advanced ultrasonic technology
- Lead free, high-copper alloy maincase
- Certified to UL 327B (¾", 1") for residential fire service applications
- No maintenance

NEPTUNE
TECHNOLOGY GROUP

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ARB® UTILITY MANAGEMENT SYSTEMS™

NEPTUNE TECHNOLOGY GROUP

MACH 10® ULTRASONIC METER

Sizes: 5/8", 3/4", and 1"

The MACH 10® is Neptune's newest water meter that offers solid state metrology with a rugged, lead free bronze maincase. The MACH 10 was designed to have the look and feel of a traditional water meter to help eliminate new technology concerns of your customers. Engineered to fit into even the smallest residential meter boxes, the MACH 10 fits the bill for all meter applications. At first glance you know the MACH 10 is a water meter…"Made in America."

MAXIMIZE REVENUE

The extended low-flow accuracy of the MACH 10 allows you to measure virtually every drop used by your customers. Maintaining this level of meter performance over the life of the meter will maximize your utility's revenue stream from your metering program. The MACH 10 features no moving parts. Because there are no internal parts that can wear over time, there is no opportunity for accuracy loss over the life of the meter (flat accuracy curve).

No wear = No accuracy loss = Maximum revenue dollars

NO MAINTENANCE REQUIRED

Imagine having a residential meter with no moving parts and a 20-year battery life. Is that really possible? The answer is, "Yes" – the MACH 10.

No moving parts = No wear + 20-year battery = Maintenance free for life

SOLID STATE METROLOGY WITH SOLID BRONZE MAINCASE

The MACH 10 provides the best of both worlds, solid state metrology with a rugged, lead free, bronze maincase. With the MACH 10, there is no concern over breaking plastic meter spuds or cross-threading of plastic threads because there are none. Neptune believes that if a meter is capable of providing sustained accuracy over its life, the maincase should be designed to last the meter's lifetime as well. This is why we designed the MACH 10 solid state meter with a solid bronze maincase. The corrosion-resistant, lead-free, high-copper alloy maincase is built to withstand demanding service conditions; internal water pressure, rough handling during installation, and in-line piping stresses.

Field proven NSF/ANSI 61 bronze maincase = Confidence = No stranded assets

OPERATING CHARACTERISTICS

Meter Size	Normal Operating Range @ 100% Accuracy (+/- 1.5%)	AWWA Standard	Low Flow @ 97% Accuracy
5/8"	0.10 to 25 US gpm 0.02 to 4.55 m^3/h	1 to 20 US gpm 0.23 to 4.5 m^3/h	0.05 US gpm 0.01 m^3/h
3/4"	0.10 to 35 US gpm 0.02 to 6.82 m^3/h	2 to 30 US gpm 0.45 to 6.8 m^3/h	0.05 US gpm 0.01 m^3/h
1"	0.38 to 55 US gpm 0.08 to 11.36 m^3/h	3 to 50 US gpm 0.68 to 11.4 m^3/h	0.15 US gpm 0.03 m^3/h

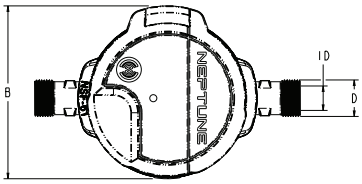
KEY BENEFITS

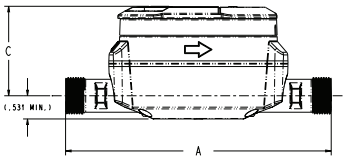
- Extended low-flow range and accuracy
- No maintenance plus accuracy sustained over meter life
- Regulatory compliance – peace of mind
- Health and asset protection with the highest lead free legislation compliance
- Supports Water Conservation
  - Provides leak history/diagnostics
  - Enables proactive leak notification
- Onsite customer event troubleshooting tools
- Increased operational efficiencies
  - Workorder reduction for high water bill inquiries
  - Drought management
  - Reduction of water loss through proactive notification of water leaks
- Tamper management
  - Identification and prioritization of potential tamper situations

KEY FEATURES

- Advanced ultrasonic technology
- No moving parts
- NSF/ANSI 61 approved meter – lead free, bronze maincase
- 20-year battery life
- "Absolute" 9-digit meter reading on display
- 8-digit remote meter reading
- Long-life lithium thionyl-chloride batteries
- Single design for pit and inside set applications
- Submersible in pit environments
- True point-of-use leak detection*
- Tamper detection*
- Reverse flow detection*
- LCD leak indicators
- Directional flow indicator
- Rate of flow on LCD display
- Data logging**

** When connected to Neptune R900® or R450™ RF MIUs.*
*** When connected to R900v4 or newer version.*





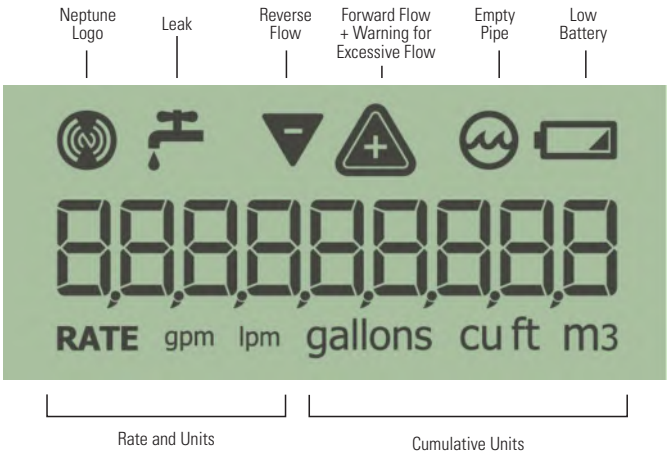
DIMENSIONS

Meter Size	A	B	C	D NSPM	ID
5/8"	7 1/2"	4 7/8"	2 17/32"	1.030	0.69"
5/8" x 3/4"	7 1/2"	4 7/8"	2 17/32"	1.290	0.69"
3/4	9"	4 7/8"	2 19/32"	1.290	0.755"
3/4" SL	7 1/2"	4 7/8"	2 19/32"	1.290	0.755"
3/4" x 1"	9"	4 7/8"	2 19/32"	1.626	0.755"
1"	10 3/4"	4 7/8"	2 23/32"	1.626	1"
1" x 1 1/4"	10 3/4"	4 7/8"	2 23/32"	1.865	1"

REGISTRATION

High Resolution (8-digit reading)		5/8"	3/4" & 1"
0.1	US Gallons	√	√
0.1	Imperial Gallons	√	√
0.01	Cubic Feet	√	√
0.001	Cubic Metres	√	√

LCD DISPLAY



SPECIFICATIONS

- AWWA C700 compliant
- NSF/ANSI 61 certified
- Application: Cold water measurement of flow in residential potable, combination potable and fire service, and reclaim/ secondary water applications.
- Maximum operating water pressure: 175 psi
- Maximum operating water temperature: 100°F

OPTIONS

- Sizes:
  - 5/8", 5/8" x 3/4"
  - 3/4", 3/4" x 1"
  - 1", 1" x 1 1/4"
- Units of measure: U.S. gallons, Imperial gallons, cubic feet, cubic metres
- Meter options:
  - Potable water
  - Reclaim water
  - Residential fire service (combo or standalone meter service lines)
- Environmental conditions:
  - Operating temperature: +14ºF to +149ºF (-10ºC to +65ºC)
  - Storage temperature: -40ºF to +158ºF (-40ºC to +70ºC)

WARRANTY

Neptune provides a limited warranty with respect to its MACH 10 residential line of ultrasonic meters for performance, materials, and workmanship.

AMR/AMI SYSTEM COMPATIBILITY

All MACH 10 residential ultrasonic meters provide ProRead™, E-Coder® 8-digit, and E-CoderPLUS protocols to interface with Neptune and third-party AMR/AMI meter reading systems.

Neptune Technology Group Inc.
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Tallassee, AL 36078
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Fax: (334) 283-7293

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Mississauga, Ontario
L5N 5M9
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Tel: (905) 858-4211
Fax: (905) 858-0428

Neptune Technology Group Inc.
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Colonia Polanco V Sección
C.P. 11560
Delegación, Miguel Hidalgo
Mexico D.F.
Tel: (525) 5203-4032 / (525) 5203-6204
(525) 5203-5294
Fax: (525) 5203-6503

NEPTUNE TECHNOLOGY GROUP

neptunetg.com


3109

BCA

Date of Installation (Mo./Day/Yr.)
4-27-12

CONTRACTOR'S METER INSTALLATION & COMPLETION FORM

SPRING CREEK ISD METER INSTALLATION (2011)

COMPLETE EITHER BOX BELOW

RESIDENTIAL

Owner:	Kauffman, Mr. Kevin	**Unit No.**	3109
Physical Address:	1800 N Spirit Dance Raod	**Subdivision:**	
		Lot No.:	

COMMERCIAL

Name of Business	**Unit No.:**
Owner:	**Subdivision:**
Representative:	**Lot No.:**
Physical Address:	

METER INFORMATION

Meter Size (in): 3/4 inch	**Manufacturer:** Neptune	**Model:** E-coder	**Serial No. :** 18331567 92

Meter Location: *Circle **BOLD** text that applies.*

Meter located on/in (**MAIN FLOOR** / **BASEMENT** / **OUTSIDE** / Hort) in (**CRAWL SPACE** / **CLOSET** / **MECHANICAL ROOM** / **BASEMENT** / **PIT** / **MANHOLE** / **VAULT** / _____) near (**NORTH** / **SOUTH** / **EAST** / **WEST** / _____) building/ foundation wall. *Describe location of outside pit relative to the street or house.*

Additional Info: used 2 - 3/4 x 1" Propress fittings. brass.

Transceiver Unit Location: *Circle **BOLD** text that applies.*

Transciever located (**INSIDE** / **OUTSIDE**) on (**METER** / **WALL** / **LID** / _____).

Additional Information or Remarks: *Circle **BOLD** text that applies.*

Meter Usage? (**DOMESTIC** / **IRRIGATION**)

Owner Running Water to Prevent Freezing? (Y / N)

Existing Check Valve on Water Service Main? (Y / N) If yes, located (**BEFORE** / **AFTER**) meter, (**BEFORE** / **AFTER**) fire sprinkler sys.

Type of Check Valve? (**DOUBLE** / **SINGLE** / **REDUCED PRESSURE PRINCIPLE**)

Expansion Tank Present? (Y / N) Located (**UPSTREAM** / **DOWNSTREAM**) of (**CHECK VALVE** / **HOT WATER HTR** / _____).

Include any additional comments regarding plumbing including code compliance or inadequacies.

Meter Checkout:

Initial Reading *(gpm)*	**Leakage Check**	**Meter Photo No.**	**Handheld Meter Reader Check**
.21	(Y / N)	3109.	(**ADEQUATE** / **INADEQUATE**)

Contractor: Plumbing Anytime — **Installer:** Frank Corey

See Back for Additional Plumbing Work