

CRESCENTA VALLEY WATER DISTRICT

2700 FOOTHILL BOULEVARD
LA CRESCENTA, CALIFORNIA

Agenda for the Meeting of the Engineering Committee
of the Crescenta Valley Water District

To be held on

November 2, 2018 at 9:00 AM

Posted November 1, 2018 at 9:00 AM

Call to Order

Adoption of Agenda

Information Items

1. Status of Groundwater Wells and Well Capacity
2. Status of TTHM Study and Upgrades to Disinfection System, Project E-995
3. Discussion on Automated Meter Infrastructure Program
4. Status of FY 18/19 Capital Improvement Project Program

Public Comments

At this time, members of the public shall have an opportunity to address the Committee on items of interest that are within the subject matter jurisdiction of this Committee. This opportunity is non-transferable and speakers are limited to three (3) minutes each.

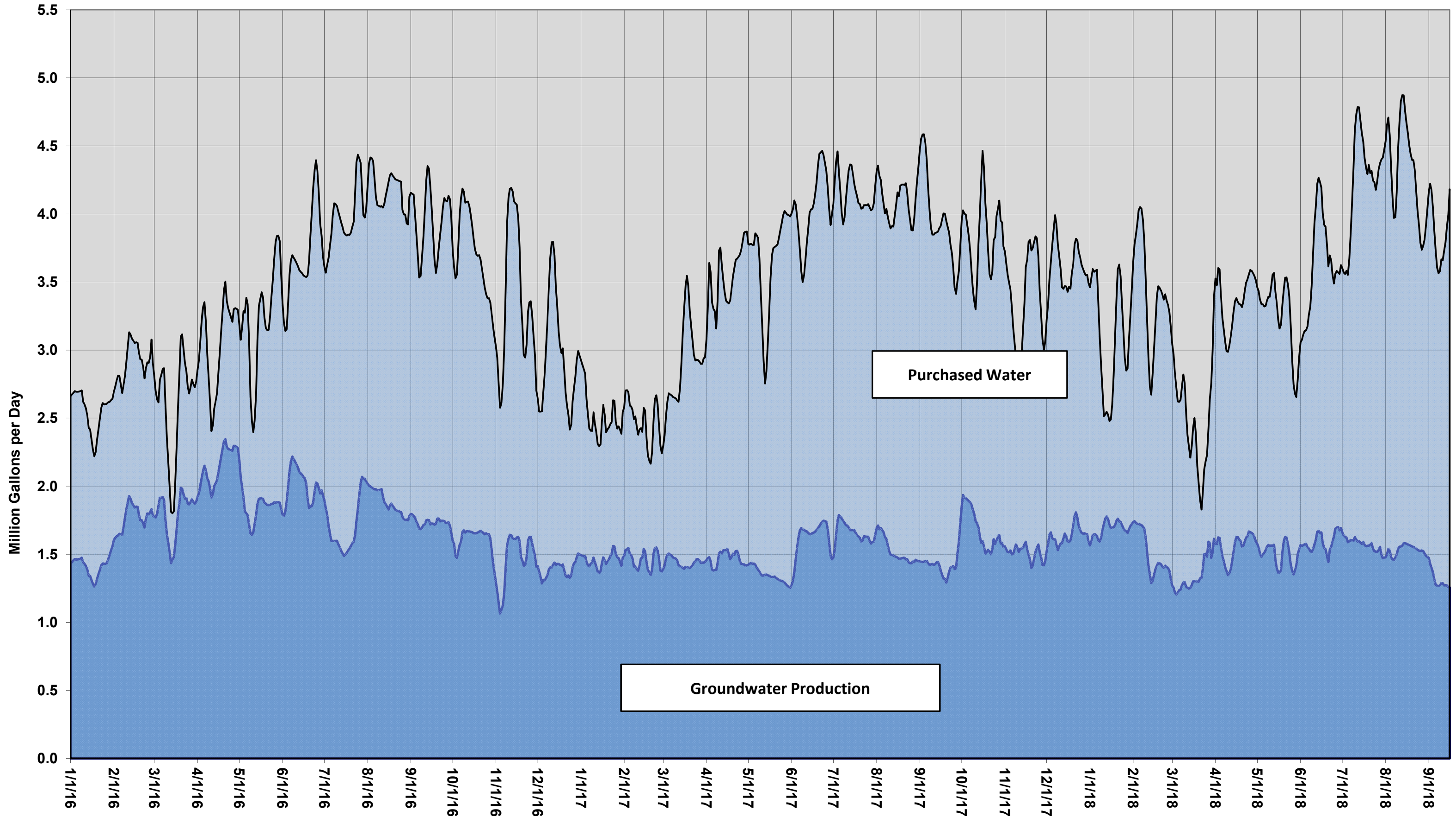
Committee Member's Request for Future Agenda Items

Next Engineering Committee Meeting – December 13, 2018

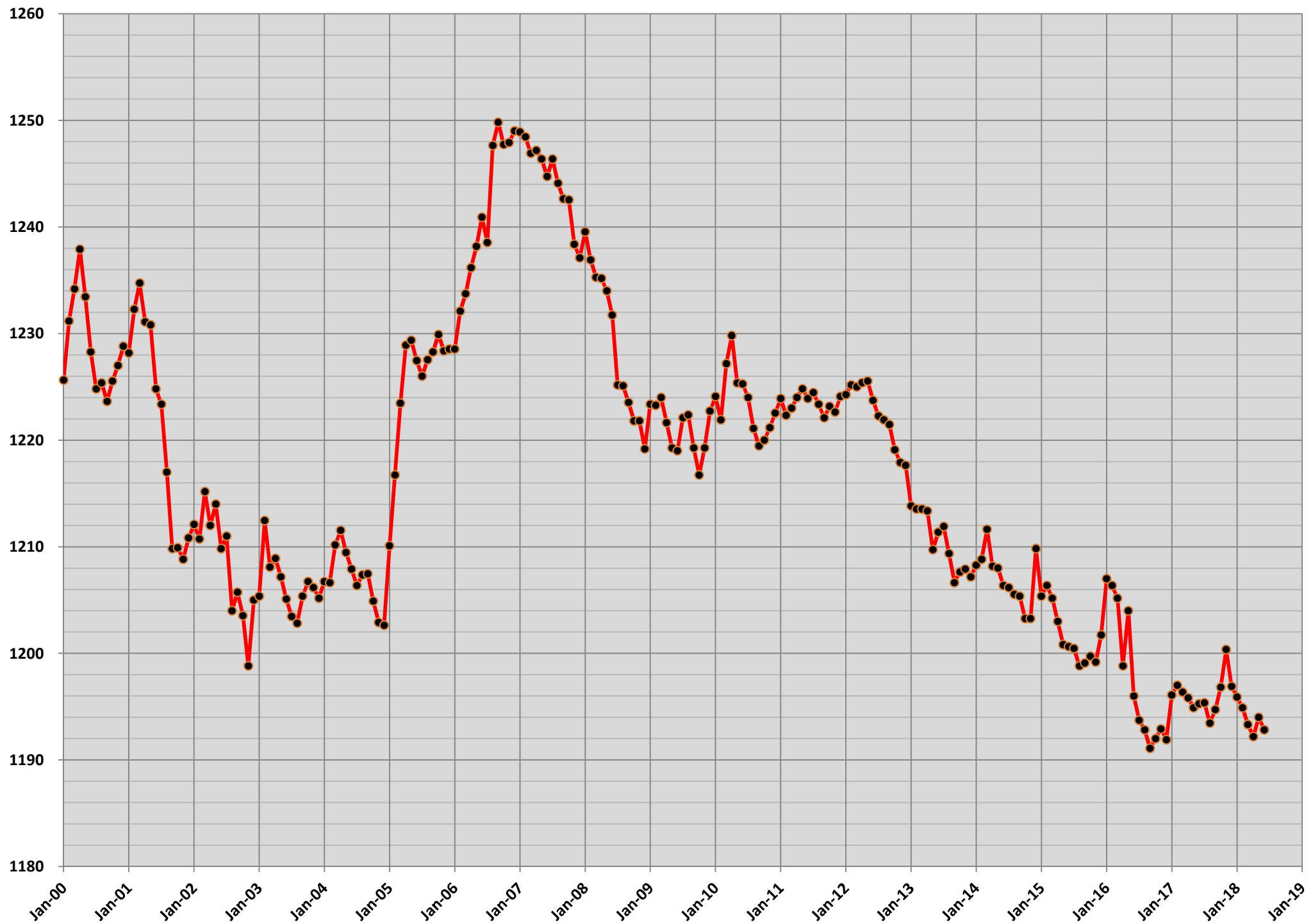
Adjournment

Water Production Chart 2016 - 2018

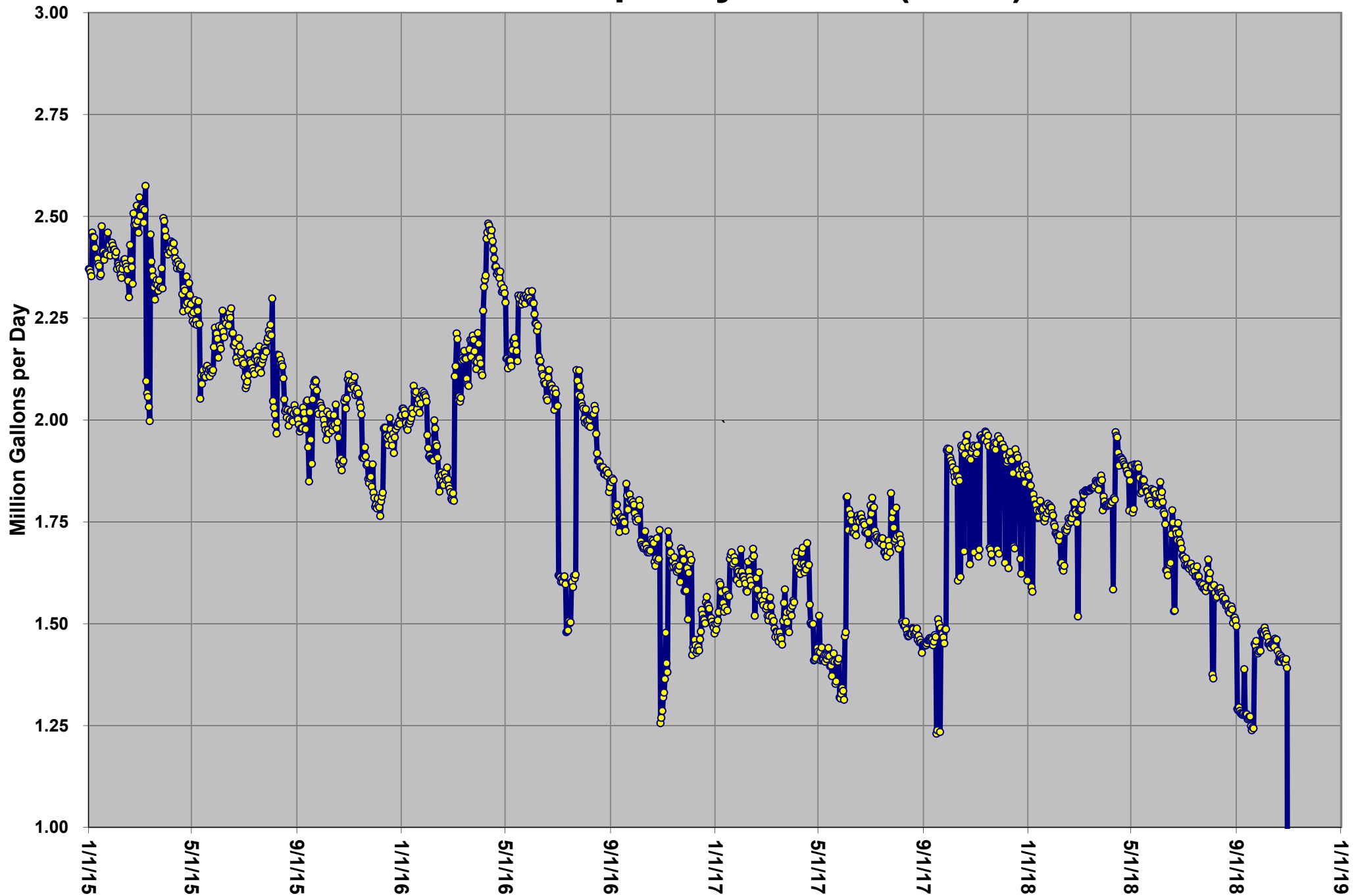
■ Groundwater Production (MGD) ■ Total Water (MGD)



CVWD - Groundwater Wells - Average Static Water Elevation 2000 - 2018



Crescenta Valley Water District 2015-18 Well Capacity Status (MGD)



CRESCENTA VALLEY WATER DISTRICT

STAFF REPORT

Information Item No. 2
November 2, 2018

To: Engineering Committee
From: David S. Gould, P.E. – District Engineer
Subject: TTHM Mitigation and Disinfection Process Upgrades, Project E-995

INFORMATION ITEM:

Status of CVWD's TTHM study and disinfection process upgrades.

BACKGROUND:

The District uses chlorine as a disinfectant to treat drinking water. Chlorine can create disinfection by-products during treatment, known as total Trihalomethanes or TTHMs, as it reacts with naturally occurring organic matter in imported water supplied by FMWD/MWD from either the Colorado River (CRW) or the State Water Project (SWP). The typical water supply blend for CVWD is 60% groundwater and 40% imported water. The water supply blend is now closer to 40% groundwater and 60% imported water.

CVWD has seen a steady rise in the concentration of TTHMs because CVWD is using more imported water as groundwater levels have not yet recovered from the latest drought and coupled with additional chlorine in the system has led to an increase in TTHMs in the distribution system.

Past Actions:

- o August 14, 2018
 - Discussion by Dr. Issam Najm of WQTS on TTHMs and Chloramines.
 - Awarded a \$10,000 consulting services contract to WQTS for initial study and evaluation.
- o August 28, 2018
 - Awarded a contract to WQTS for \$99,800 for chloramine conversion, public outreach, staff and operator training, Department of Drinking Water (DDW) permitting support, development of necessary mitigation plans, and preparation of 30% design plans.
 - Awarded a contract to Hazen and Sawyer for \$9,971 to perform bench testing of CVWD's source water to determine proper breakpoint chlorination and formation of TTHMs.
- o September 11, 2018
 - Staff working with WQTS and CV Strategies mailed out public information brochures with a list of frequently asked questions.
 - Staff posted information on website and articles in the CV Weekly and Glendale Newspress.
- o September 15, 2018 – Public Workshop at the Glenwood Plant
- o September 25, 2018
 - Authorized General Manager to select and negotiate with consultants and contractors for the installation of chloramination systems at the Glenwood and Mills Plants for \$410,000.
 - Award contract to John Robinson Consulting (JRC) for \$45,225 for contract and construction administration for the new ammonia injection system.
 - Amended contract to WQTS for \$44,240 for additional design work by Carollo Engineers.
- o October 9, 2018
 - Office & field staff trained on the nitrification and chloramines processes
 - Carollo Engineers submitted preliminary 30% design plans for review
- o October 23, 2018
 - Site walk at Glenwood and Mills Plants to determine location of ammonia injection skids, ammonia injection conduits, SCADA and electrical conduits.
 - JRC prepared and sent out a request for quote for purchase of two (2) ammonia injection pump skids.
 - Grace Environmental Services (Grace) provided a proposal for a system operator to assist staff during the chloramine conversion process in the distribution system.
 - Site visit from Apex Manufacturing Solution (APEX), on the design and installation of SCADA equipment and integration at Glenwood and Mill Plants.
 - Met with Hazen and Sawyer on design and installation of new chlorine analyzers at six (6) locations to provide additional monitoring after conversion to chloramines.

DISCUSSION:

Operational Changes:

Staff continued with water system operational changes to bring the TTHM levels at the reservoirs to below a target level of 64 ug/L. This included reducing the amount of water stored in each reservoir and amount of chlorine injected at the Mills and Glenwood Plants. As shown on the attached charts, the TTHM levels at each reservoir site have decreased or are between 64 ug/L and the MCL limit of 80 ug/L.

Staff requested a proposal from Hazen and Sawyer for the installation of spray aeration system at Oak Creek Reservoir to reduce the TTHM levels and to continue use of free chlorine as the disinfection. Hazen and Sawyer proposed engineering design fee was \$77,265 and a preliminary cost for the spray aeration system was \$100,000 - \$150,000 for each reservoir for approximate total cost of \$377,265. Staff reviewed the proposal and construction costs and determined it was not cost effective to install the spray aeration system in the long-term.

Installation of Ammonia Injection System for Chloramine Conversion:

The following are tasks completed by staff and consultants:

- o The 30% design plans were reviewed and sent back to Carollo Engineers for final edits.
- o Field crews potholed the 14-inch water main at the Glenwood Plant for depth and location for the ammonia injection and monitoring concrete vault.
- o JRC working with ammonia chemical suppliers (Hill Brothers Chemical Company and Univar) on the type of ammonia (liquid ammonia sulfate), containment units, transportation, delivery and costs.
- o JRC working with Jensen Precast on the 6'x6'x7'-6" deep concrete vault design and quote.
- o JRC working with Poly Processing Company on quote for 405 gallon tank at Mills Plant.
- o JRC scheduled a meeting with Glendale Fire Department to review the design and obtain the permit.
- o Received proposal from APEX for the design and installation of SCADA equipment and integration at Glenwood and Mill Plants for \$47,725.
- o APEX provided a list of SCADA equipment that CVWD will purchase through Royal Industrial Solutions with an estimate of \$15,200.
- o Staff met to discuss planning for flushing out dead-end water mains in January 2019.
- o JRC and staff met with BrikArt Construction to get a quote for installing a concrete pad and grading at the Mills Plant.
- o WQTS and staff continued working on Nitrification Monitoring & Control Plan for submittal to DDW.

Ammonia Injection Pump Skids:

Received quotes from three (3) vendors for the ammonia injection pump skids, which are shown in the table below.

	<u>Vendor</u>	<u>Total Quote</u>
Low	Cortech Engineering	\$29,850.00
2	Charles P. Crowley Company	\$32,972.50
3	D & H Water Systems, Inc.	\$37,928.48

Cortech Engineering, a DXP Company (Cortech) of Anaheim, CA was the apparent lowest responsible bidder for the project. The engineer's estimate was \$75,000 and the low bid was \$45,515 or 60% lower than the engineer's estimate. Staff has previously worked with Cortech on the construction of CVWD's Glenwood Plant. Staff was satisfied with the progress of this project.

Staff is reviewing Cortech's bid proposal and cost breakdown and compared it to CVWD's cost estimate. The quote for Cortech also stated that the delivery of the system will be in about 8 to 10 weeks and staff is firming up the schedule for both submittal review and delivery of the equipment.

SCADA Programing, Integration and Equipment:

Staff has been working with APEX to formulate a scope of work and list of equipment need to integrate the data from the chlorine analyzers and the ammonia injection pump skids into CVWD's SCADA system. This information will be used to remotely monitor the chlorine and ammonia injection systems and the chloramine level leaving the Glenwood and Mills Plants. APEX proposal was for \$47,525 which includes design of the program logic, off-site and on-site programing and on-site testing of the system (See attached proposal).

Project Schedule - Installation of Ammonia Injection System:

Staff has updated the project schedule based on the tentative lead time for the ammonia skids and the pre-cast concrete vault. Staff will be ordering the ammonia skids on November 1, 2018 and Cortech is estimating 8 – 10 weeks for delivery, which will be around the end of December 2018. CVWD's crews will install the ammonia equipment after arrival and it is anticipated it will be completed by the end of January 2019.

The pre-cast concrete vault will also be ordered by November 1, 2018 and the vendor is estimating 6 – 8 weeks for delivery, which will be around the middle of December 2018. CVWD's crews will install the vault, ammonia injection system (static mixer with injection quill) and sampling port for new chlorine analyzer.

Attached is an updated construction schedule that includes the work at the Mills Plant, delivery and installation at the Glenwood Plant, installation of chlorine analyzers and installation, programming and integration of the SCADA system.

Project Schedule – Conversion to Chloramines:

Staff has reviewed the TTHMs Mitigation Option Decision Tree that was provided by WQTS, which set specific dates for converting to chloramines based on TTHM levels in the reservoirs.

As shown in the attached TTHM charts, the TTHM levels have been reduced and we should be in compliance during the 2018 4th quarter sampling for TTHMs. The next compliance sampling will be in February 2019 for the 2019 1st quarter sampling. Staff believes that the TTHM levels will remain below the MCL limit of 80 ug/L during this period as a result of the low winter demands and lower temperatures,

Staff is concerned that the TTHM levels will rise during spring and summer of 2019 due to high demands, temperature and reduced groundwater. Staff is looking at this period to start the disinfection conversion to chloramines and the ammonia injection systems should be installed by this time. However, if there is significant rainfall this winter and groundwater levels rise, the conversion to chloramines could be delayed until fall 2019.

Additional Monitoring for Nitrification after Conversion to Chloramines:

Staff has been working with WQTS and Hazen and Sawyer on planning for the conversion to chloramines and water quality issues. A major concern is the possibility of nitrification in CVWD's reservoirs, which can result in a reservoir being taken out of service and water being wasted. Currently, we have chlorine analyzers at eleven (11) of the reservoir sites and we will need an additional six (6) chlorine analyzers to monitor for total chlorine, total ammonia and nitrite. Nitrite is a pre-cursor for nitrification and monitoring these levels will give staff advanced notification if nitrification is going to occur at a reservoir.

Staff met with Hazen and Sawyer to discuss a scope of work for engineering services for the installation of the six (6) chlorine analyzers at Cresta Heights Reservoir, Dunsmore Reservoir, Eagle Canyon Reservoir, Goss Canyon Reservoir, Paschall Booster Station, and Shields Reservoir. The scope of work included visits to each site to determine the ideal location of the chlorine analyzers to get a representative chlorine samples, prepare design plans and specifications for construction at each site, project management and meetings. The proposal cost from Hazen and Sawyer was \$53,255, which is about \$9,200 per site (see attached proposal).

The new chlorine analyzers will be provided by HACH and will be installed by CVWD's crews. The estimated cost for each chlorine analyzer is about \$10,000 and a total cost \$60,000. In addition, the data from the chlorine analyzers will need to be connected to CVWD's SCADA system for monitoring purposes. The estimated cost for purchasing new SCADA equipment, programming and integration into CVWD's SCADA system is about \$17,000 per site for a total cost of \$102,000. These additional costs were not included in the original cost estimate and will increase the budget by \$215,255. The design of the new chlorine analyzer could be completed by March 2019 and installation completed by July 2019.

Another water quality issue will be the possibility of nitrification occurring in the distribution system, which could result in positive total coliform results and additional flushing or wasting water. It has been suggested to perform water flushing of the entire distribution system to remove any biofilm that may react with the ammonia. Staff has had preliminary discussions with companies that perform this service and initial costs range from \$12,000 to \$20,000 per week for their crews to perform the work. Staff estimates it will take about 5 – 6 weeks to complete a thorough flushing of the distribution system. Staff will be working with WQTS on the nitrification mitigation plan over the next few weeks and should get a better idea on the scope of work and costs.

Preliminary Cost Estimate:

The table below shows an updated costs and construction estimates for the conversion to chloramines. It does not include staff labor costs or any flush outs labor cost necessary to maintain water quality.

Account Description	Amount
Total Estimated Cost for Project	\$570,000
Consultants - Planning, Design & Construction Admin	
WQTS - Planning	\$10,000
WQTS - Design	\$144,040
Hazen & Sawyer - Water Quality	\$9,970
John Robinson Consulting - Project Management	\$45,225
Grace Environmental Services (3 months part-time service)	\$15,000
Apex Manufacturing Solution - SCADA programing and integration	\$47,725
Public Notification - CV Strategies , Printing & Mailing	\$11,168
WQ Sampling - 7/1/18 to 10/1/18	\$43,284
WQ Sampling - 10/1/18 to 12/31/18 (Estimate)	\$31,000
Subtotal	\$357,412
Construction	
Ammonia Injection Skids (2)	\$29,850
SCADA - Equipment (RTU's, Communication, cabinets, etc.) (Estimate)	\$15,200
Concrete Pad & Grading at Mills (Estimate)	\$27,000
Ammonia Inject Vault at Glenwood (Estimate)	\$29,000
Ammonia Tank at Mills (Estimate)	\$7,000
Conduits/Wiring/Electrical Materials (Estimate)	\$7,000
Upgrade Chlorine Analyzers (Mills & Glenwood) (Estimate)	\$17,000
Safety - Eye Wash, Containment, etc. (materials only) (Estimate)	\$3,200
On-site Welding (Estimate)	\$9,000
Misc (Estimate)	\$5,763
Subtotal	\$150,013
Total Cost	\$507,425
Amount Remaining	\$62,575

RECOMMENDATION:

It is staff's recommendation to continue with the following:

1. Design and installation of the ammonia injection system including the SCADA work with APEX, ordering equipment and materials
2. Continue operational changes to maintain TTHM levels until February 2019
3. Begin the design of the new chlorine analyzers with Hazen & Sawyer
4. Continue working with WQTS on notification mitigation plan
5. Keeping DDW informed on CVWD's progress on the TTHM levels.

Prepared by:



David S. Gould, P.E.
District Engineer

Submitted by:

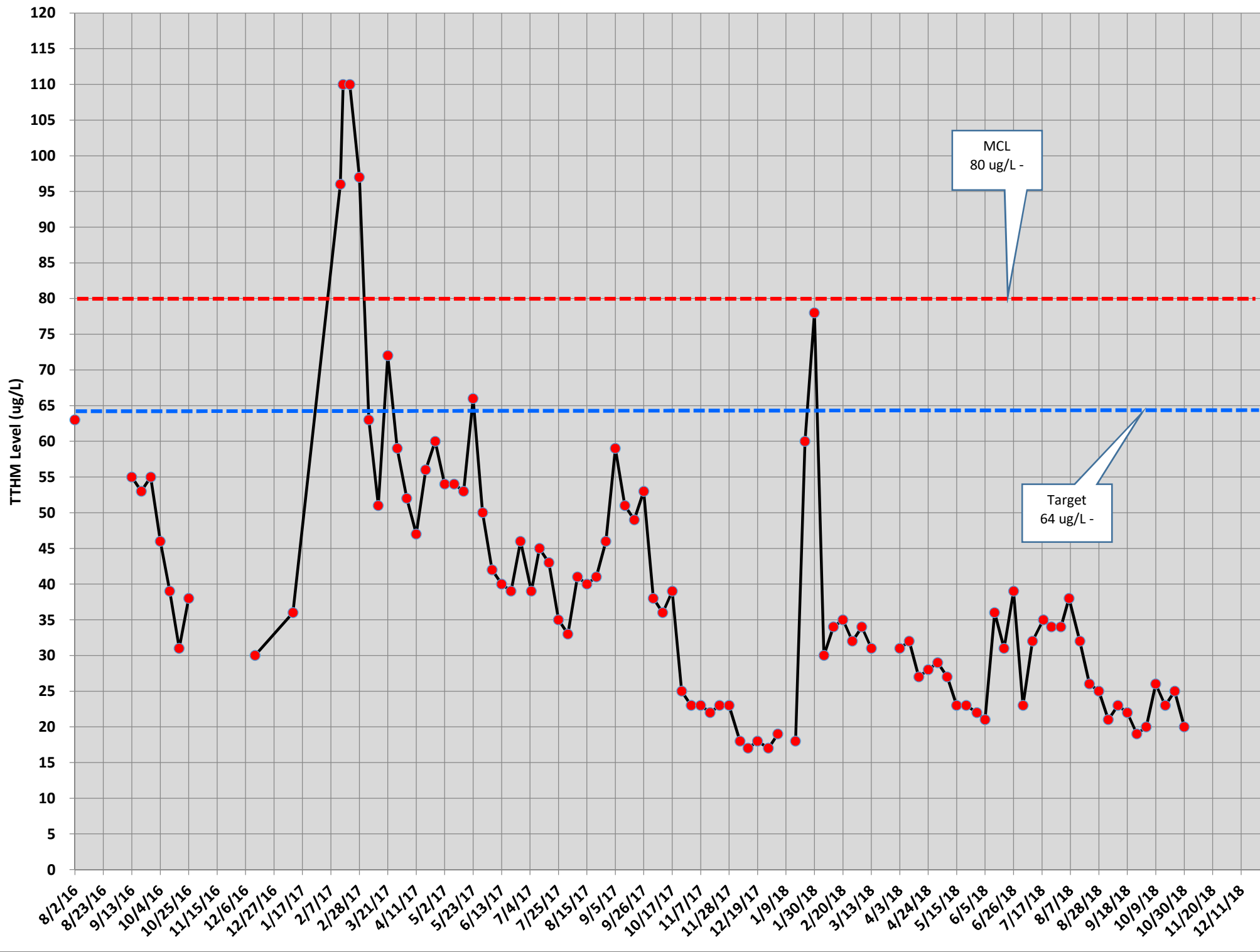


Nem Ochoa
General Manager

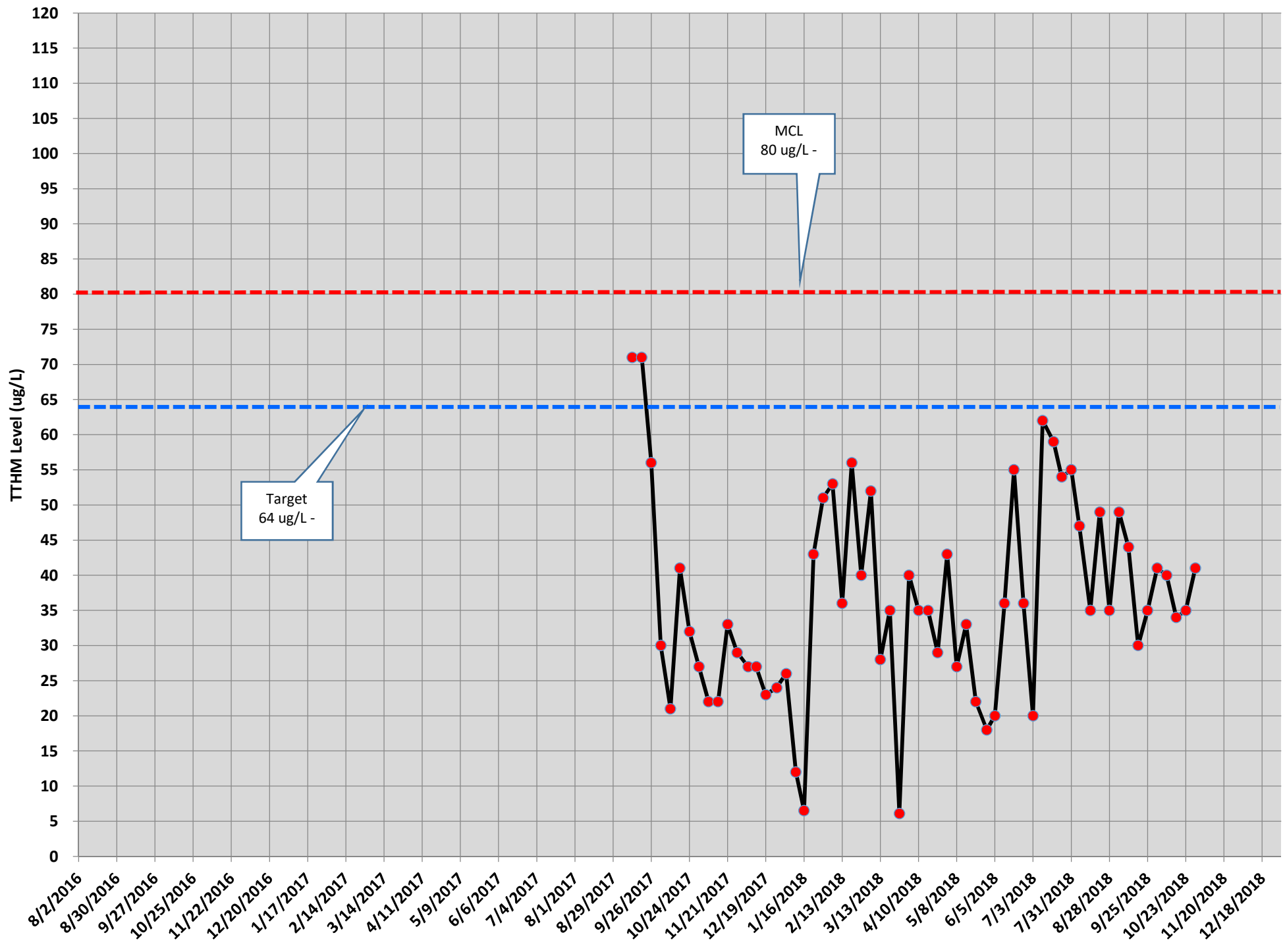
Attachments:

1. TTHM Charts dated 10-30-18
2. Apex Manufacturing Solution proposal dated 10/30/18
3. Hazen and Sawyer Proposal dated 10/24/18

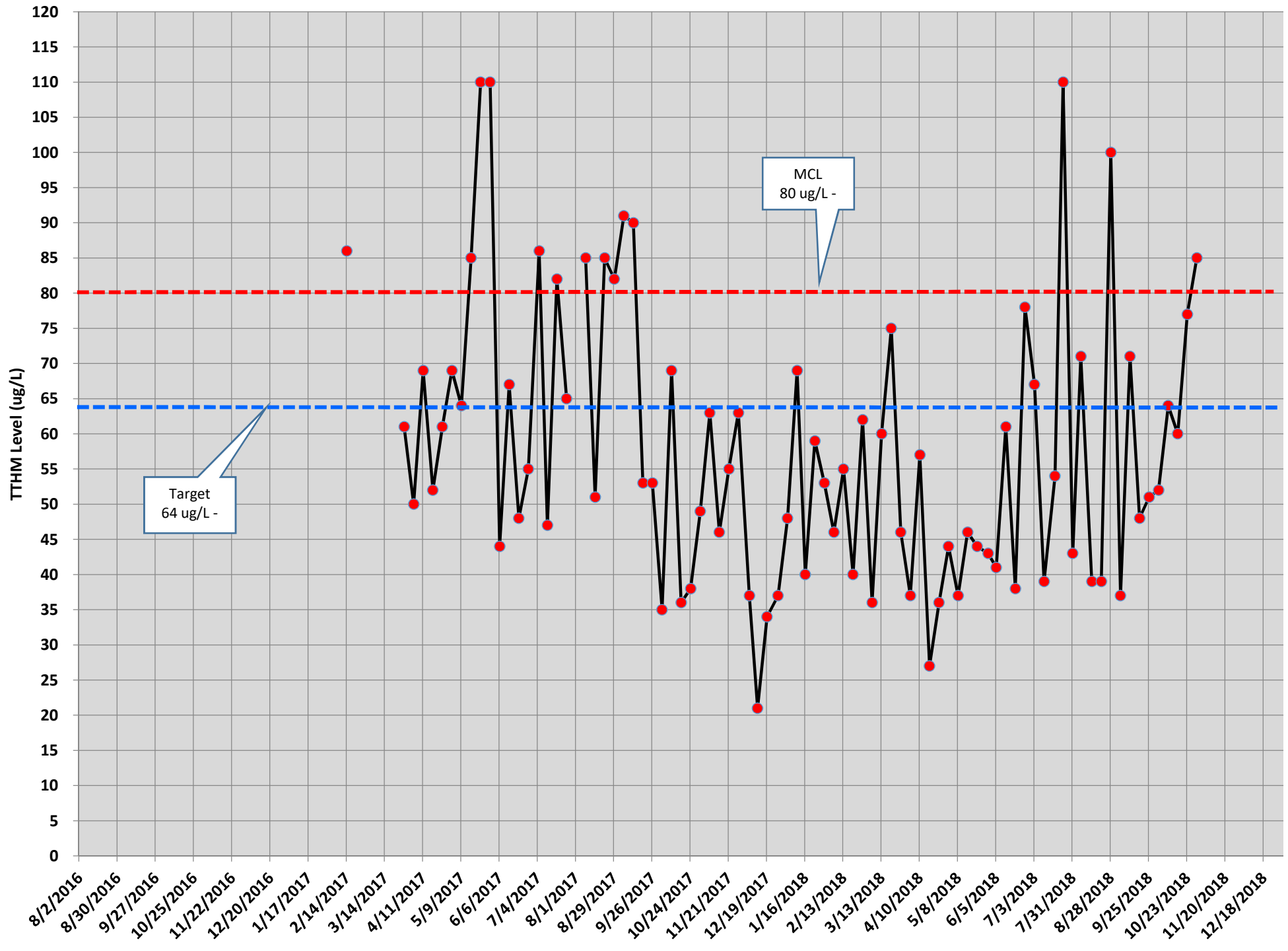
FMWD at Paschall Booster - TTHM's Levels



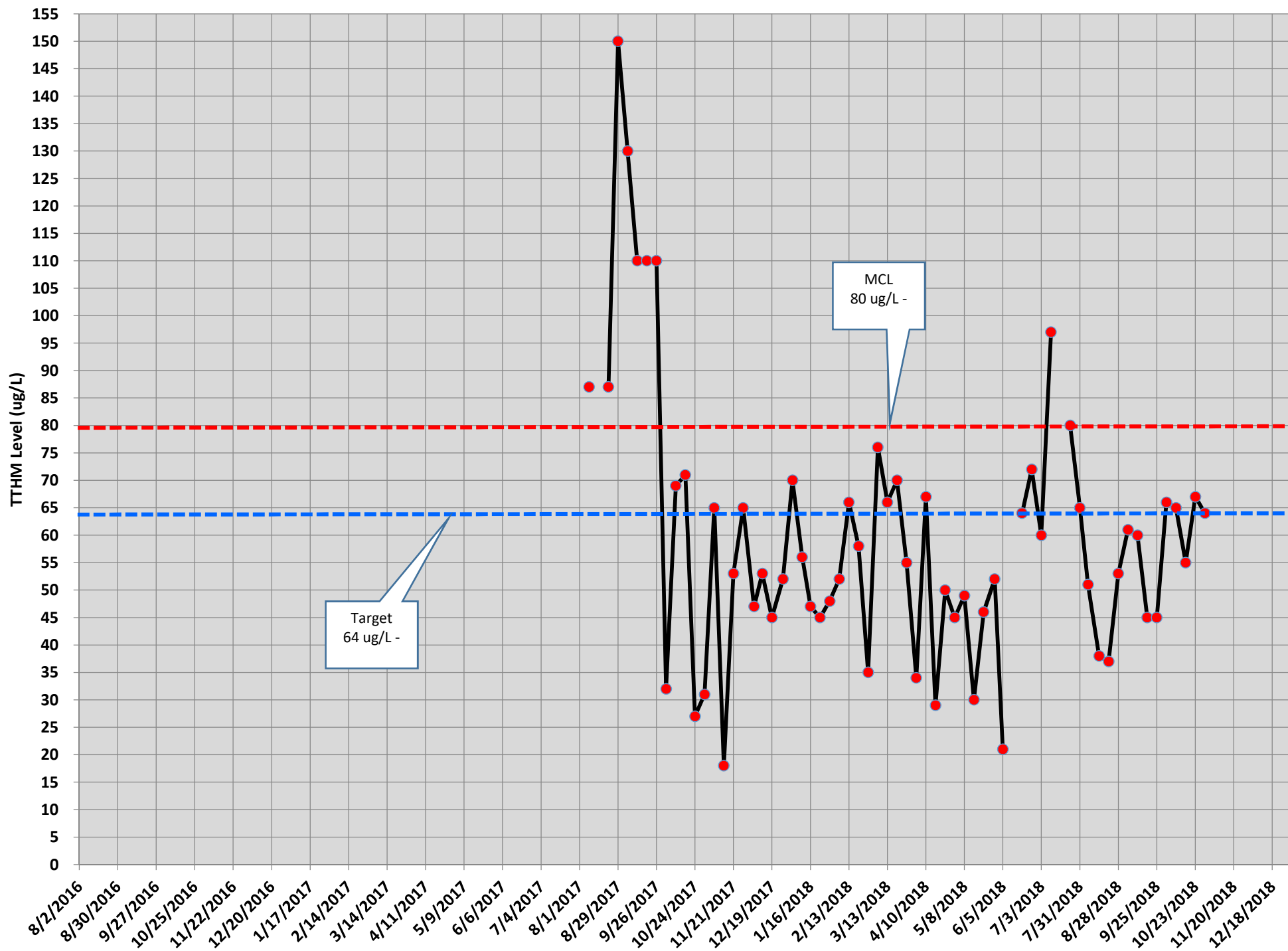
Encinal Reservoir (Zone 1) - TTHMs Levels



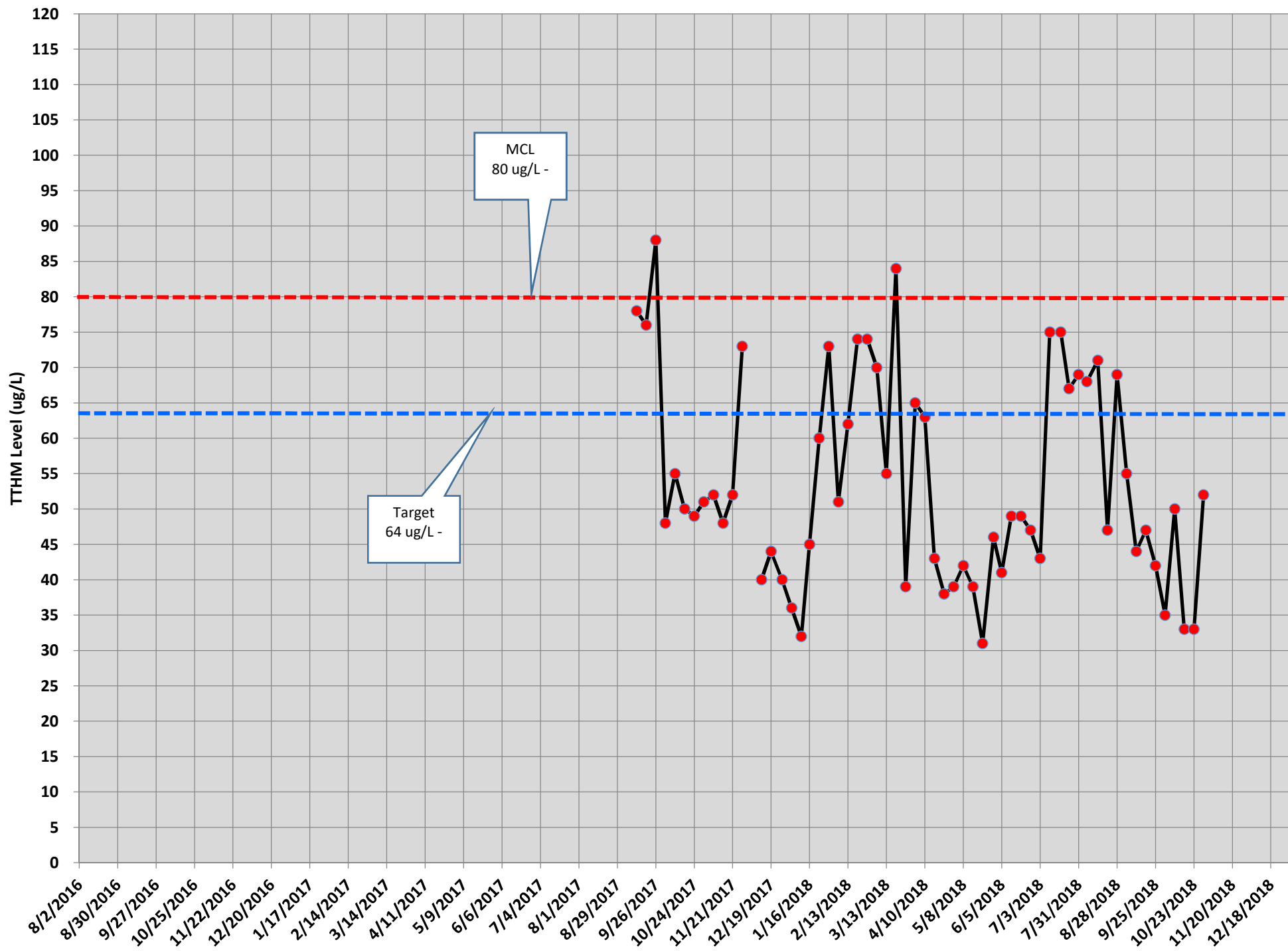
Williams Reservoir (Zone 2) - TTHMs Levels



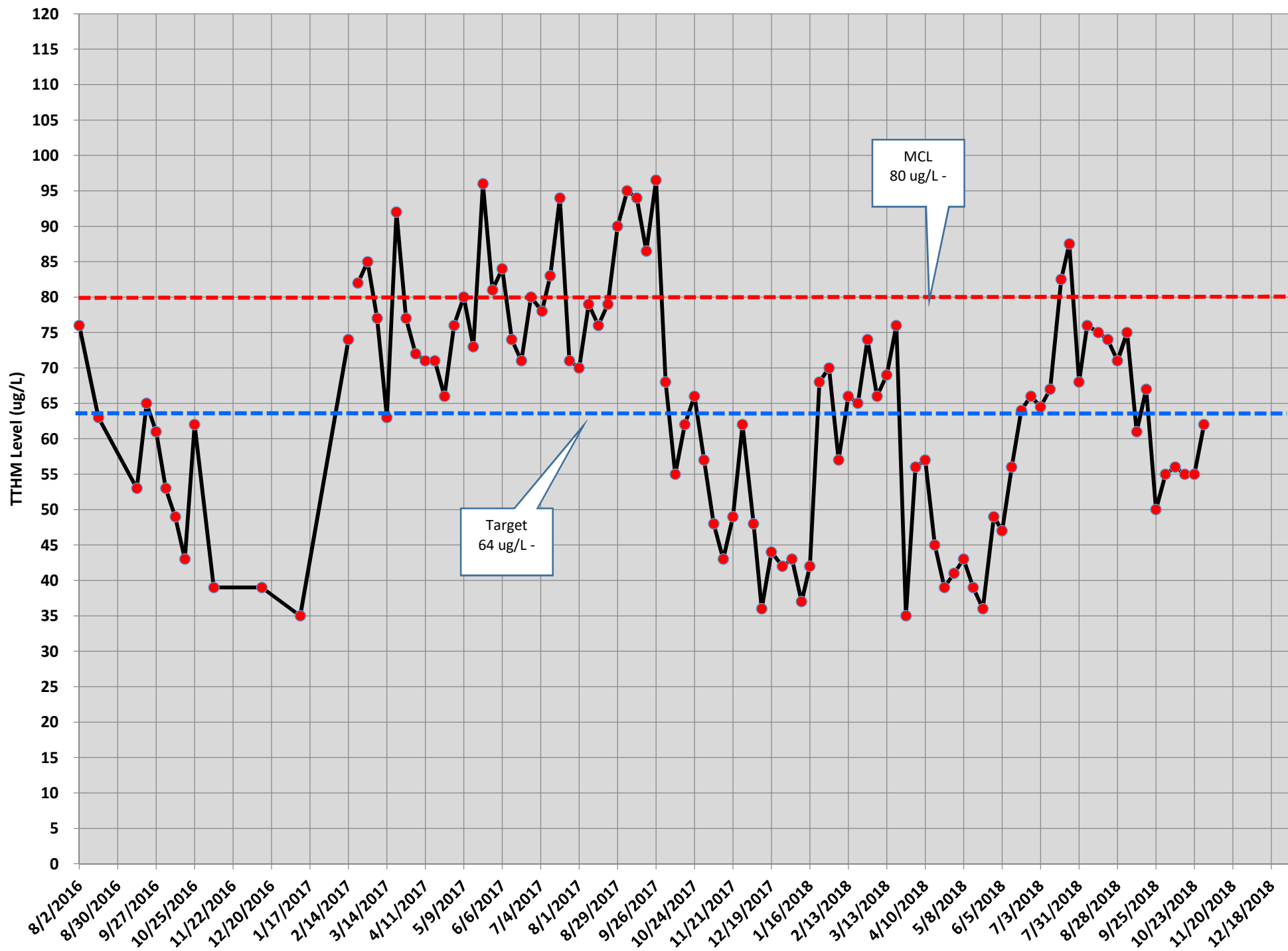
Ordunio Reservoir (Zone 2) - TTHMs Levels



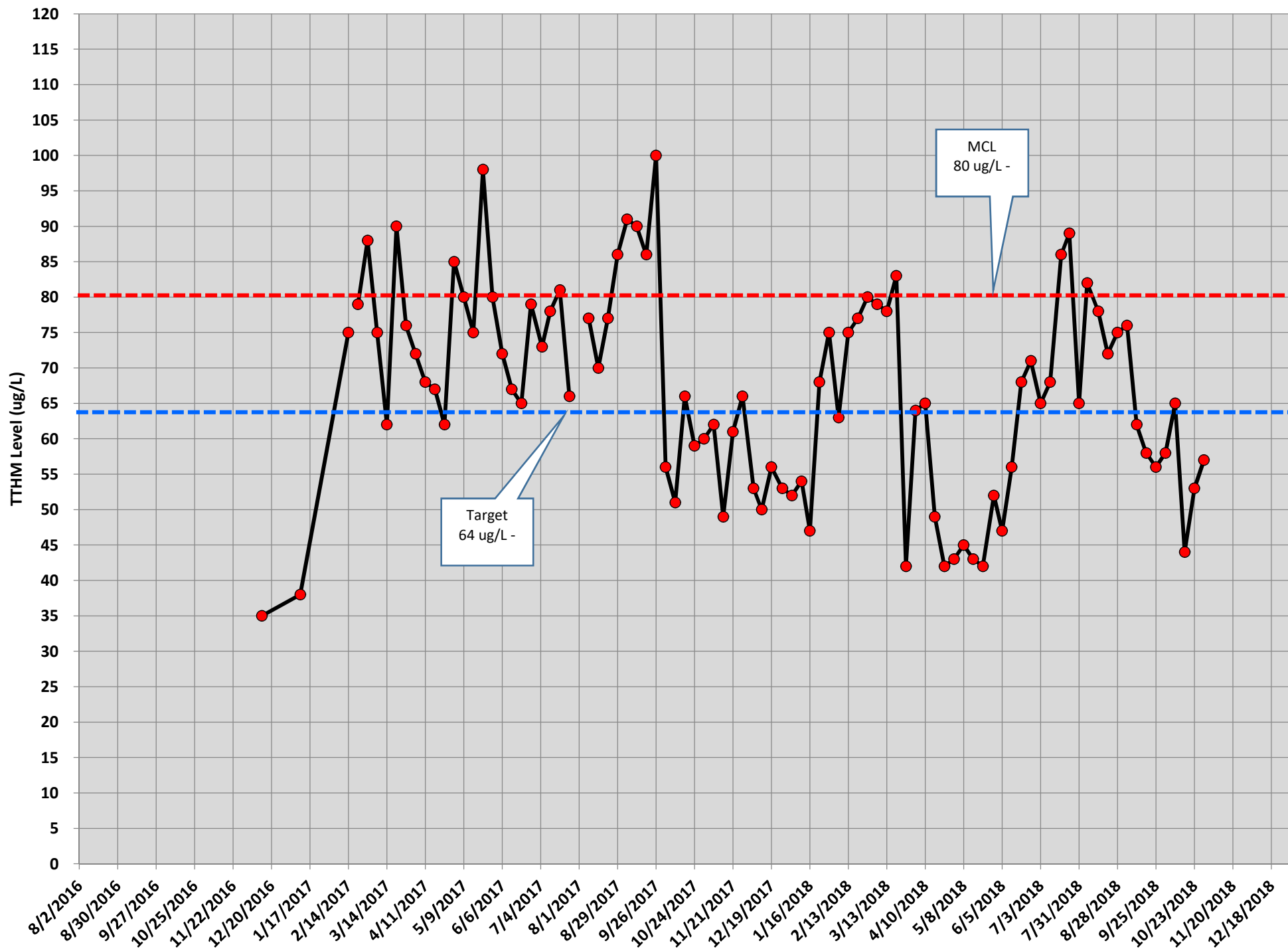
Rosemont Reservoir (Zone 3) - TTHMs Levels



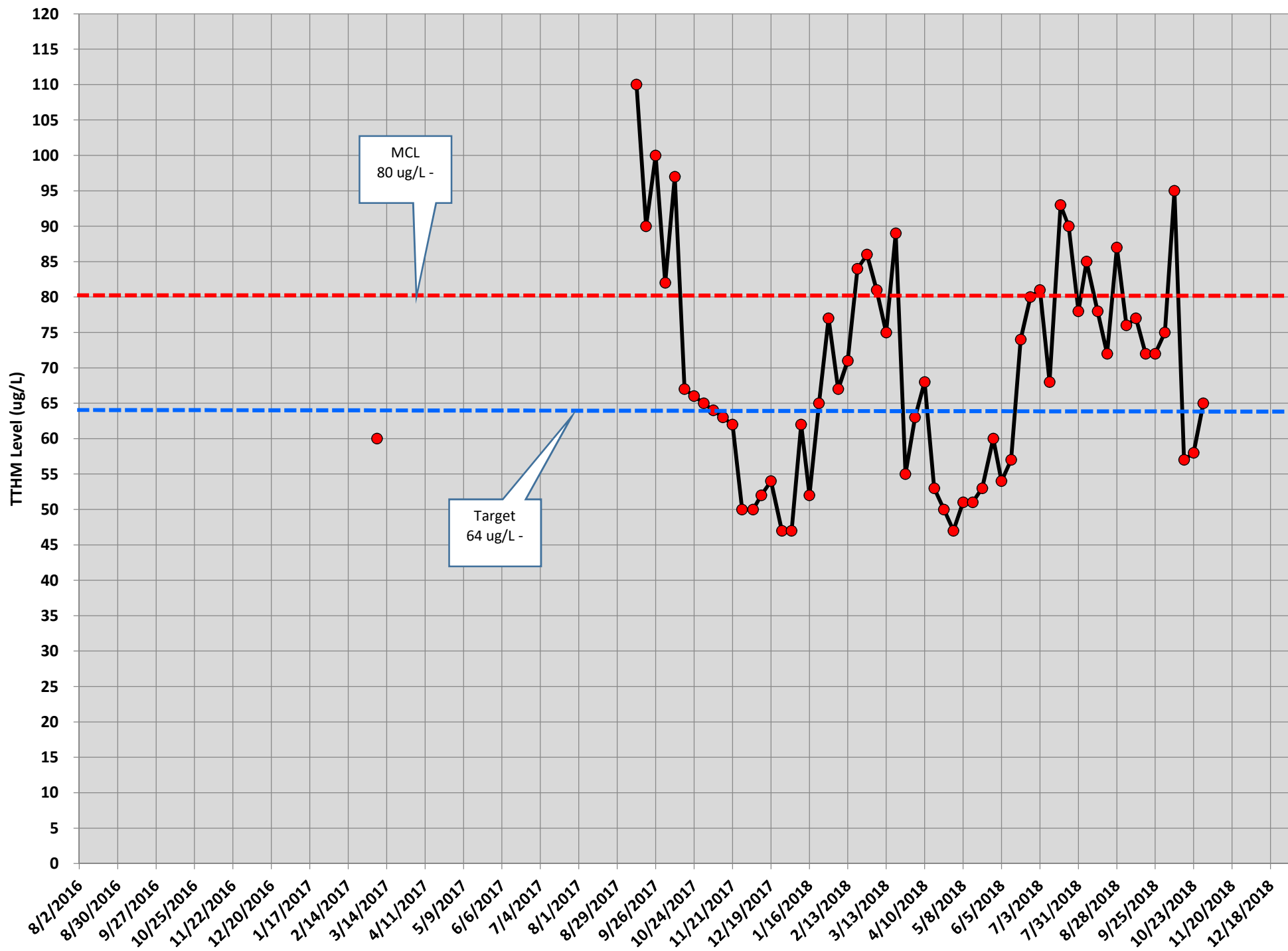
Oak Creek Reservoir (Zone 4) - TTHMs Levels



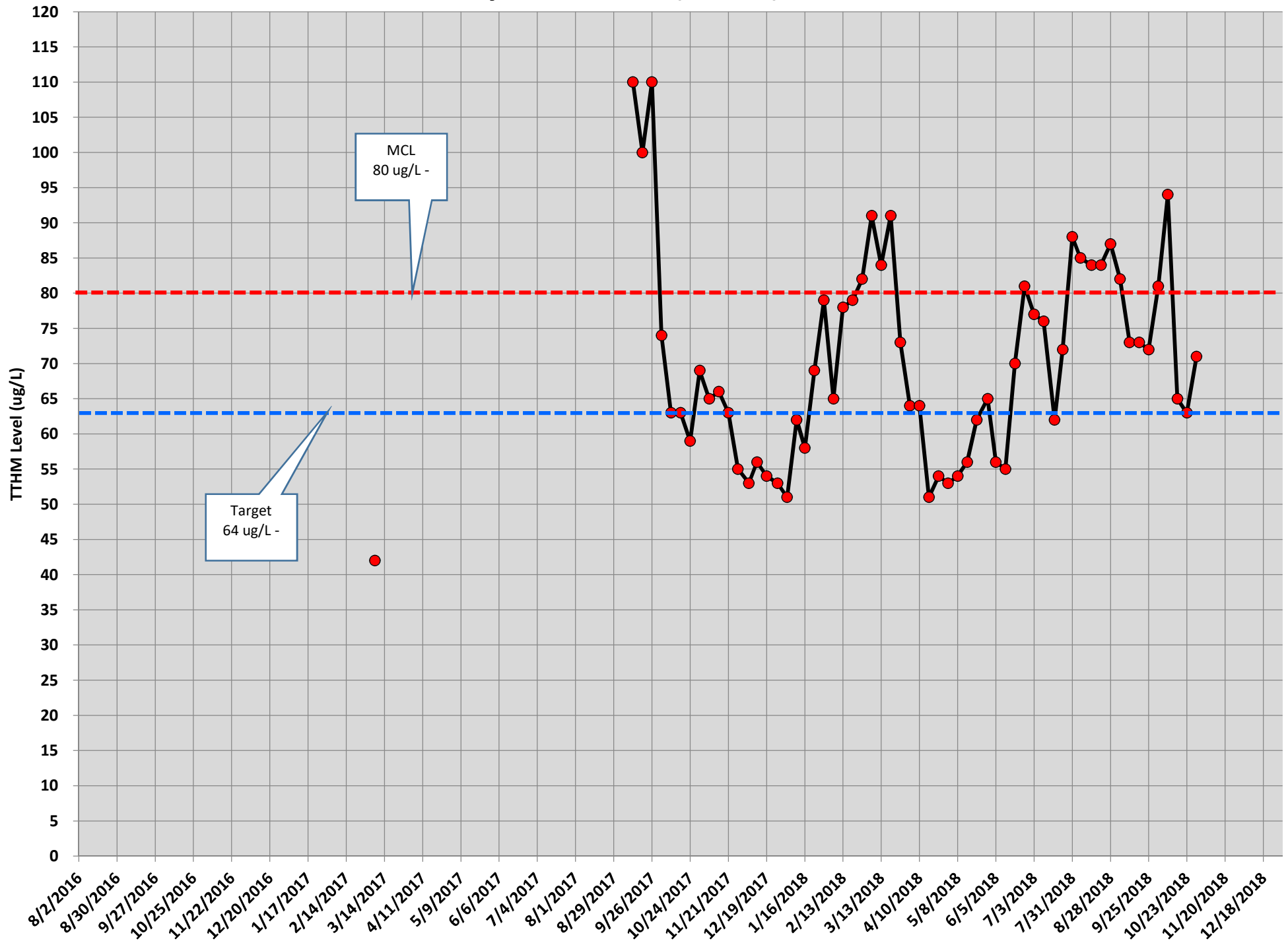
Markridge Reservoir (Zone 5) - TTHMs Levels



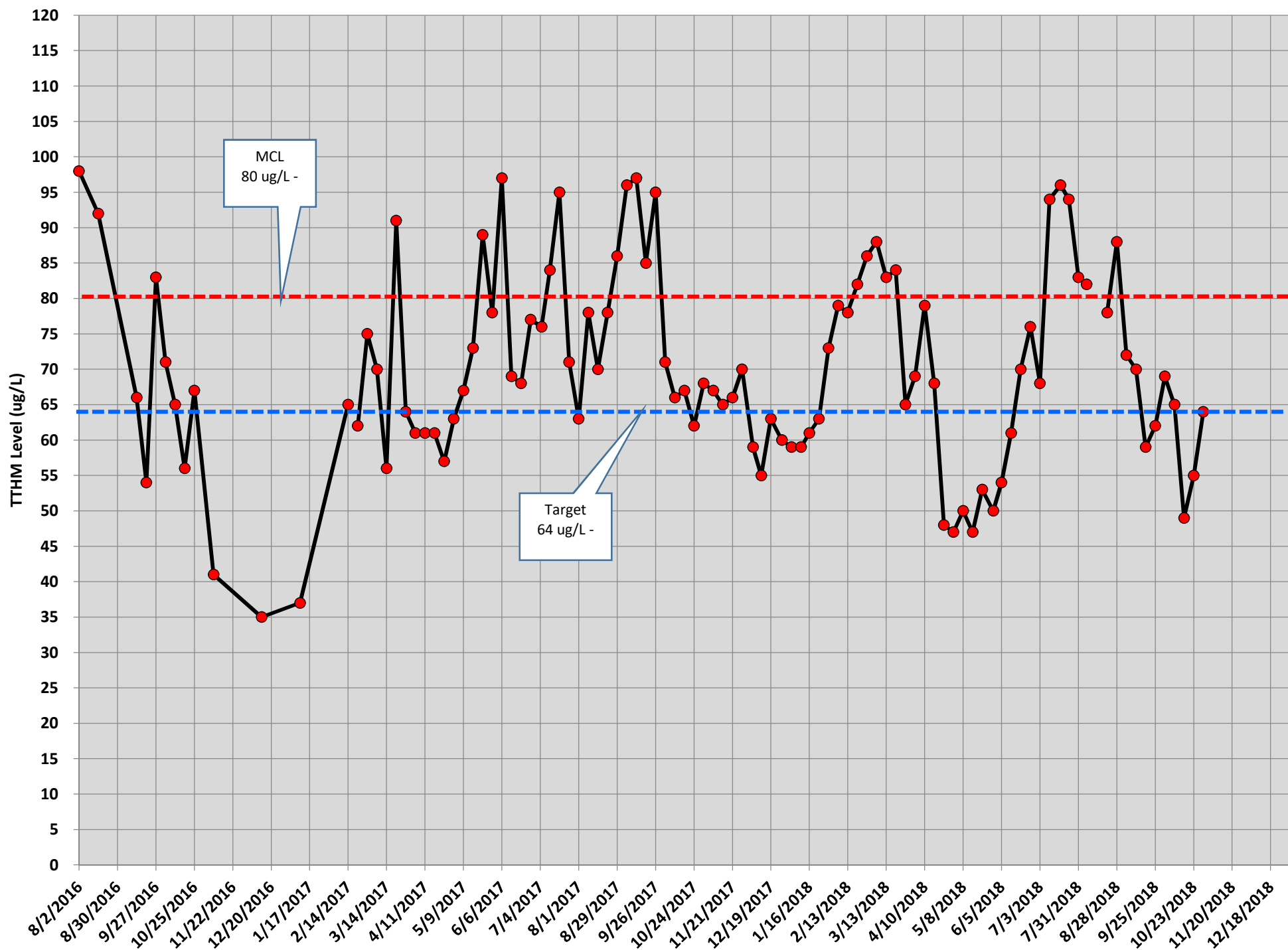
Eagle Canyon Reservoir (Zone 5) - TTHMs Levels



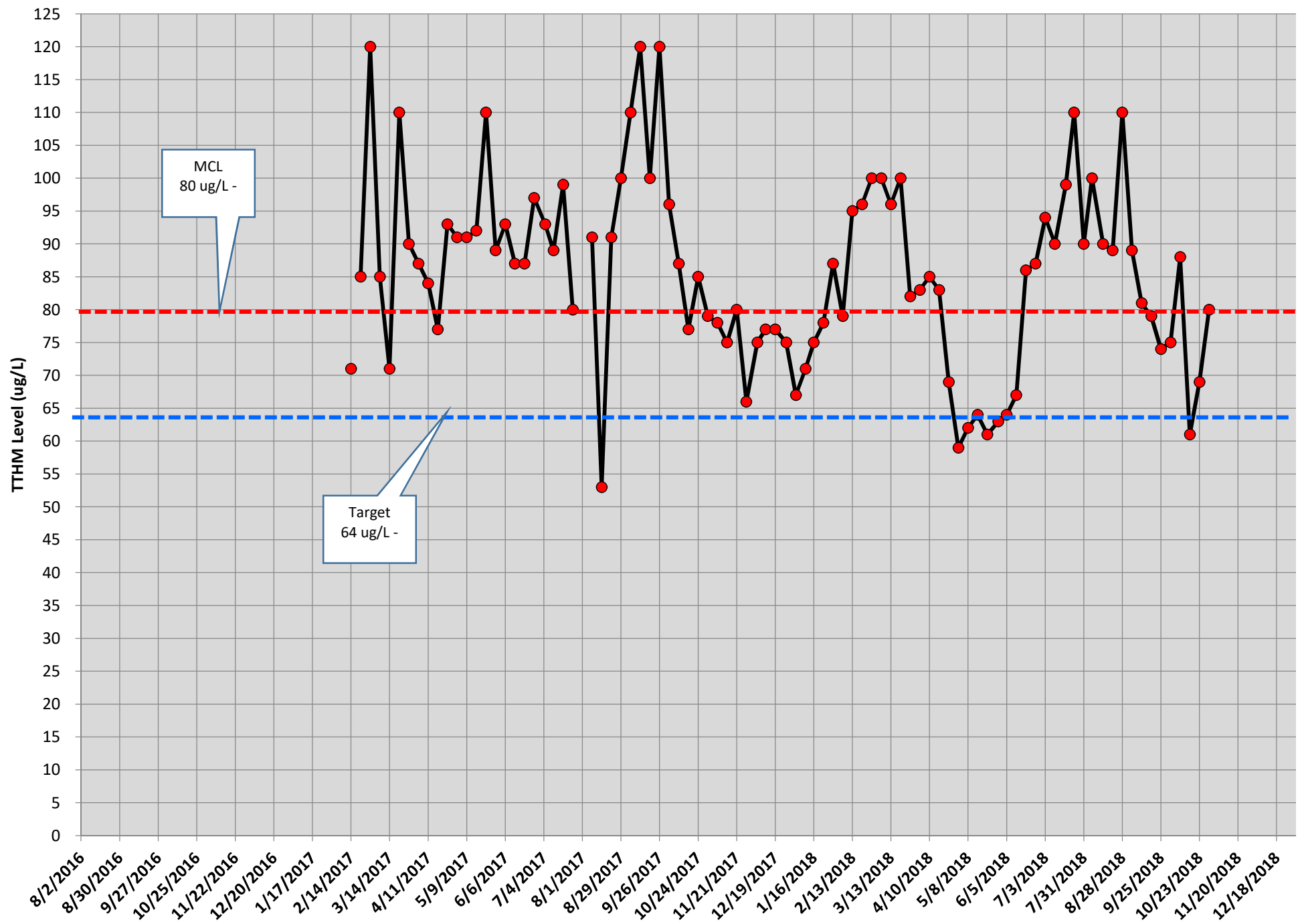
Goss Canyon Reservoir (Zone 6) - TTHMs Levels



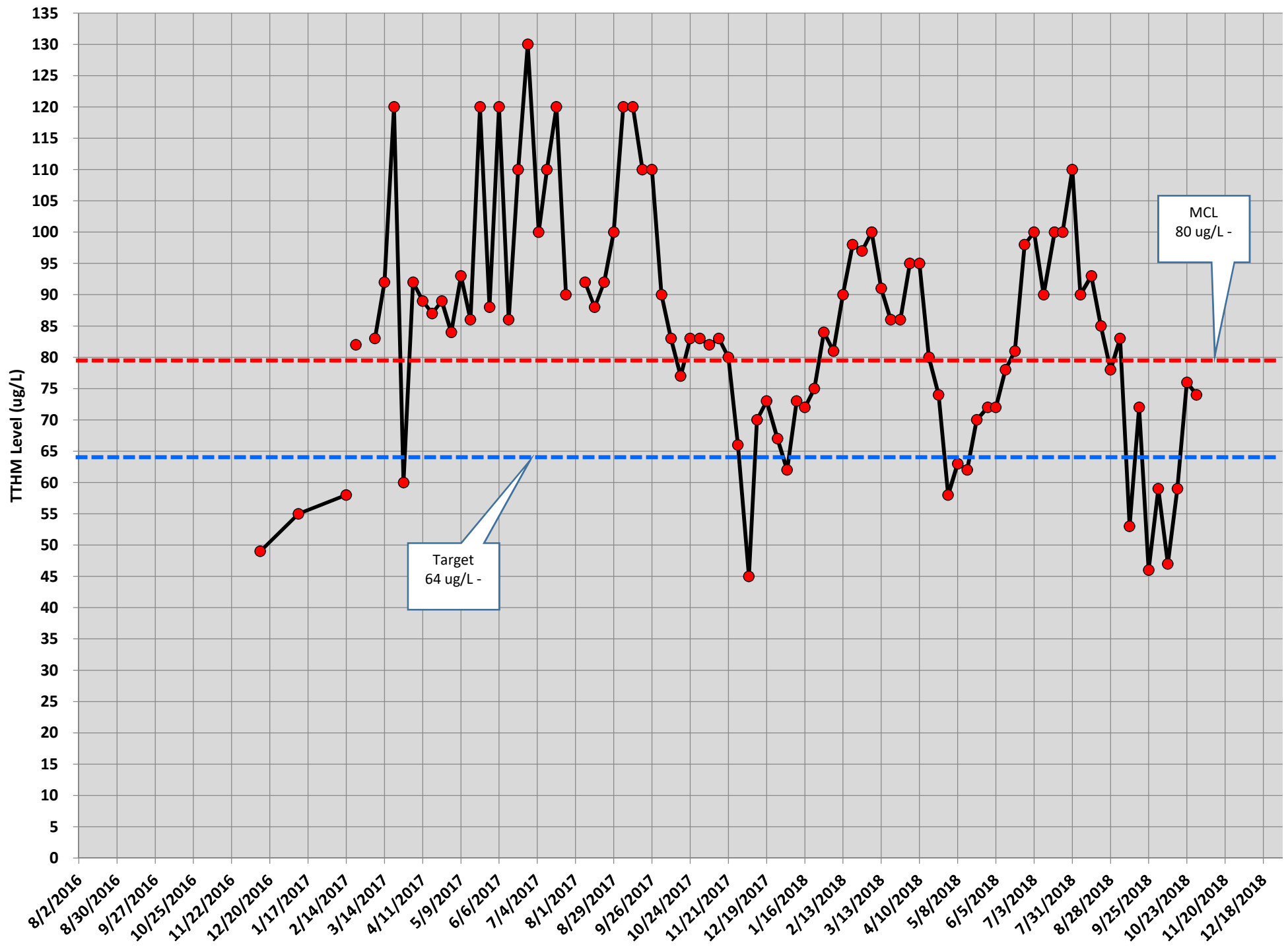
Dunsmore Reservoir (Zone 7) - TTHMs Levels



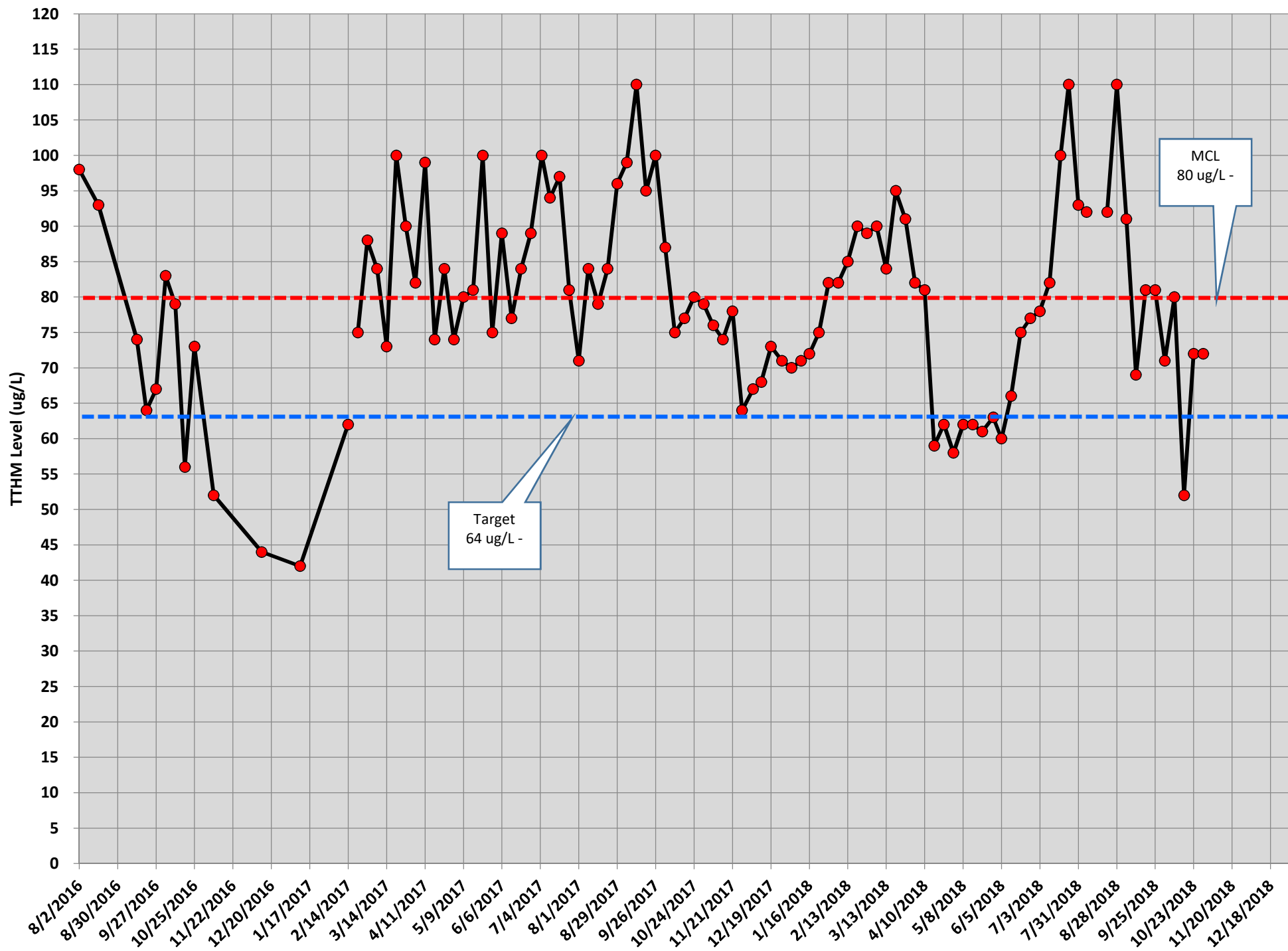
Cresta Heights Reservoir (Zone 8) - TTHMs Levels



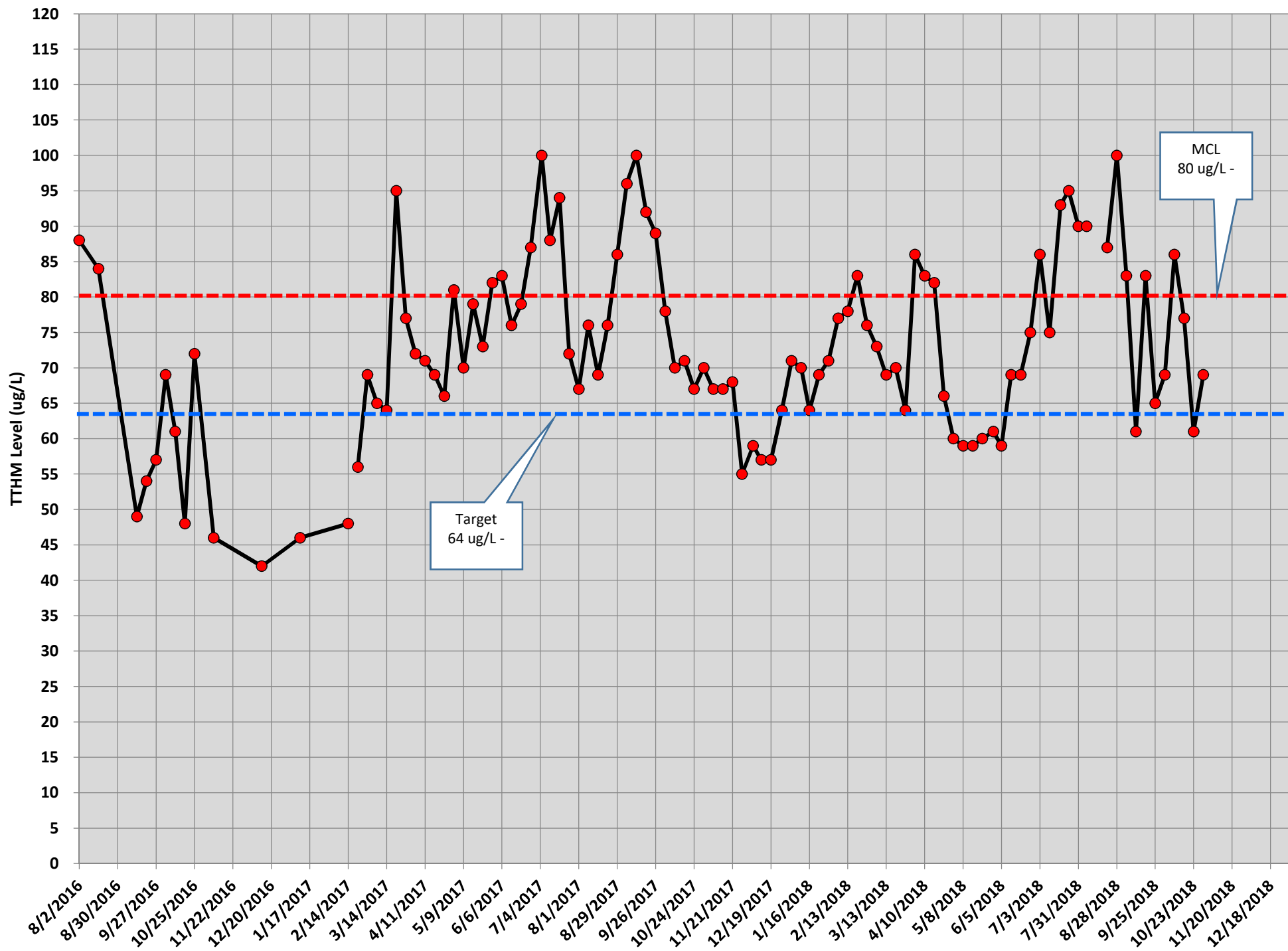
Edmund No. 1 Reservoir (Zone 9) - TTHMs Level



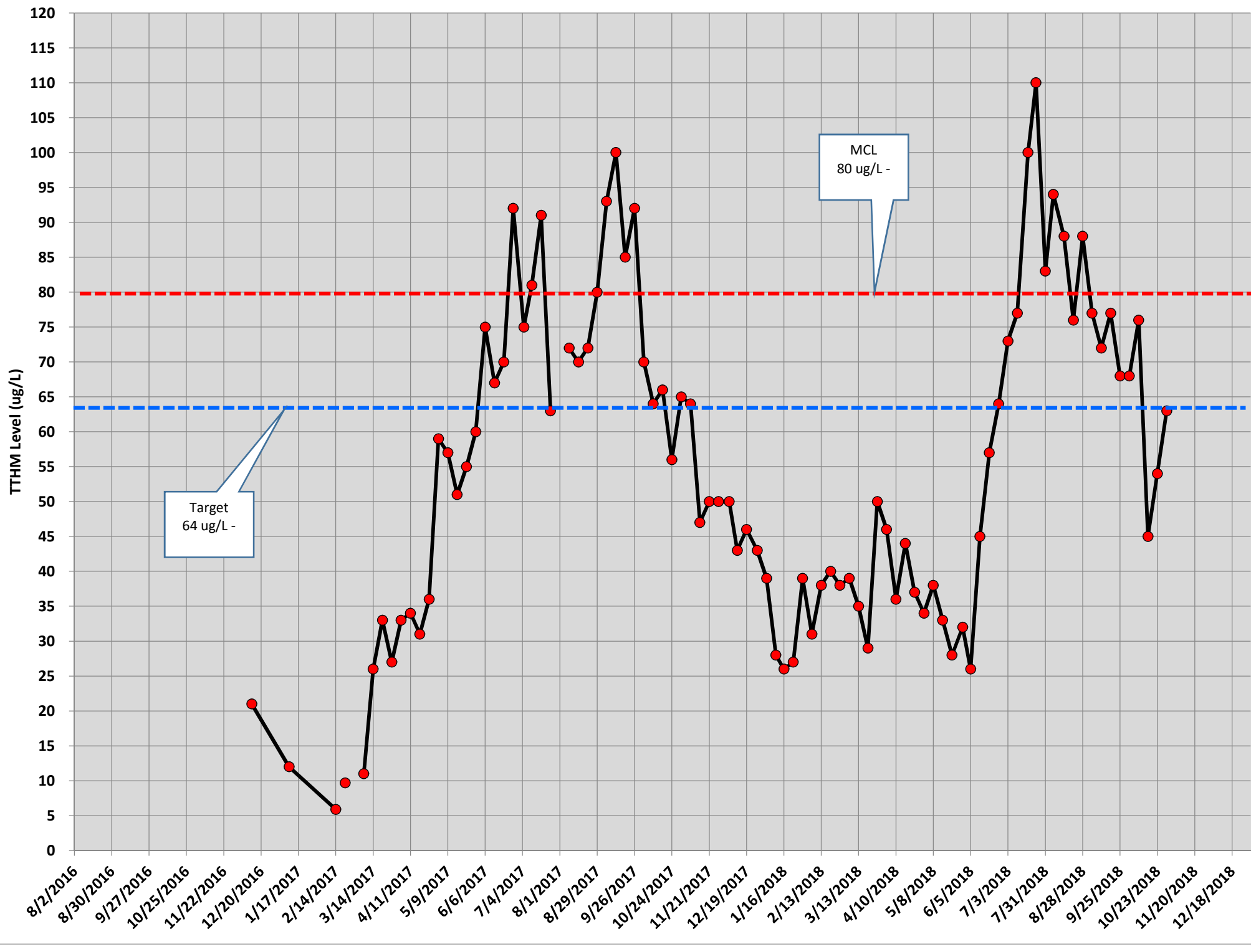
Edmund No. 2 (Zone 9) - TTHMs Levels



Shields Reservoir (Zone 10) - TTHMs Levels



Pickens Reservoir (Zone 11) - TTHMs Levels





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www.apexmfgsolutions.com

10/30/2018

Mark Haas
Crescenta Valley Water District
(818) 248-3925

SUBJECT: CVWD0008 – Ammonia Injection Skid Integration
Apex Project Number – CVWD0008 REV1

Dear Mark,

Thank you for the opportunity to submit this proposal to Crescenta Valley Water District (CVWD). This proposal covers the design and integration efforts required to introduce two (2) new ammonia injection skids into the existing CVWD control and SCADA systems. This is a services-only proposal that includes system design development and integration but will not include hardware acquisition, assembly, radios or installation. These can be quoted separately once the design phase has been completed. The "REV1" of this proposal reflects specific requests by Crescenta Valley to remove the installation support and reduce the onsite time from 10 days to 6.

The proposed solution architecture would utilize DNP3 routers to allow Rockwell-based Remote Transmission Units (RTUs) to communicate via radio to a central software-based node. This approach would be used to control and acquire data from the injection skid located at the Mills facility and will be the first of the new RTUs. The ammonia injection skid to be installed at the Glenwood facility would be controlled via a dedicated Rockwell CompactLogix PLC that would be accessed via the existing Ethernet network at the Glenwood facility. Data from both injection skids will be integrated into the existing Wonderware-based SCADA system and Historian.

Apex is pleased to offer our knowledge and expertise, and we are dedicated to providing you with the resources, talent, and skill needed to ensure your success with this project. Upon your approval we will engage with you and others on your team, and work to ensure your deliverables are met. Thank you again for this opportunity and please do not hesitate to contact me if you have further questions or comments.

Regards,

Margo Shew
Project Manager
Phone: (208) 344-5535 Ext. 206
Margo.Shew@apexmfgsolutions.com



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CONFIDENTIAL



**Crescenta Valley Water District
Ammonia Injection Skid Integration**

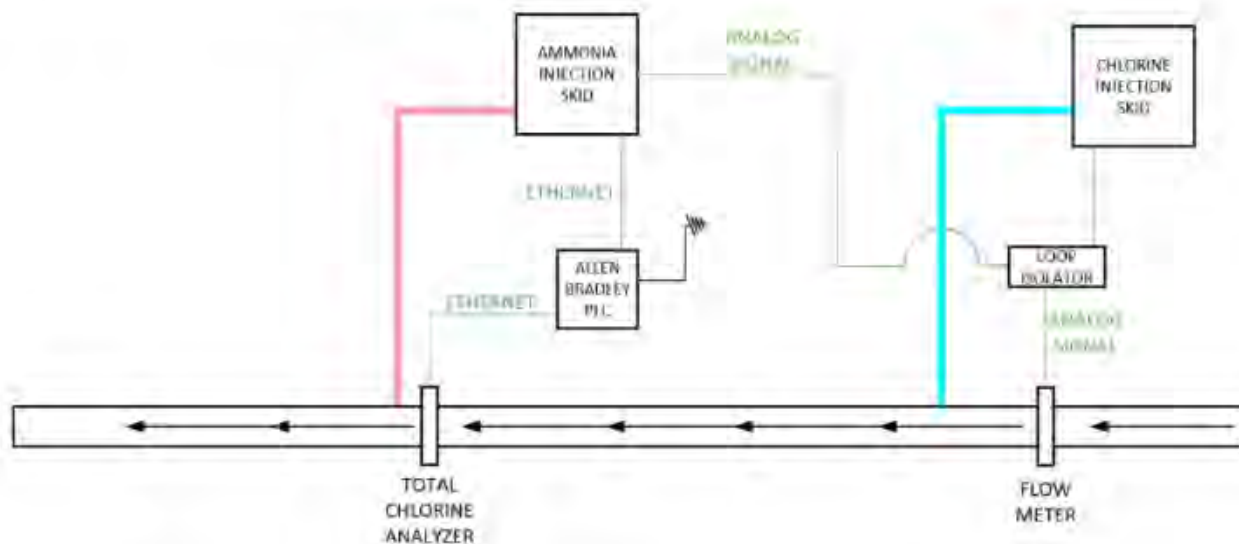
Apex Project Number – CVWD0008 REV1

October 30, 2018

1. Project Description

The Crescenta Valley Water District will soon begin adding ammonia to the process water. Injection will take place at two geographically isolated locations. The primary facility is the Glenwood location. This location hosts the Wonderware SCADA system tag servers, operator stations, Historian, and other system components. The second injection skid will be located at the Mills facility which is approximately one mile away from the Glenwood facility. The two facilities will be connected via a wireless (900 MHz) network.

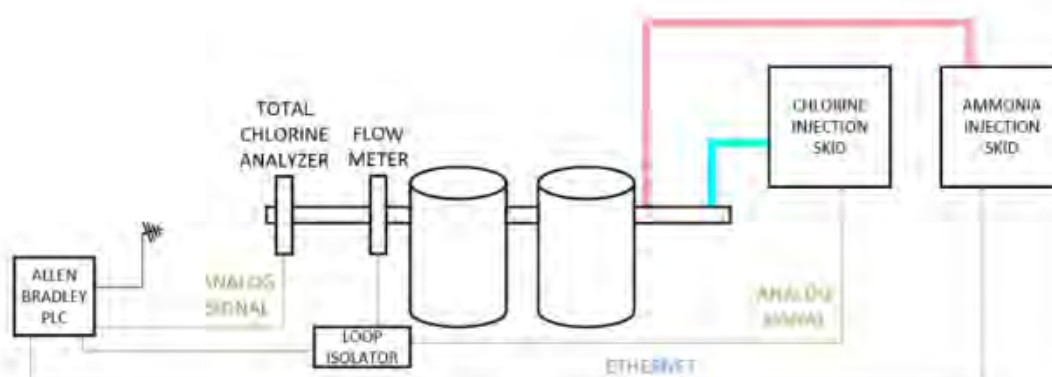
The high-level control strategy for the Glenwood facility is shown in the diagram below:



The chlorine injection rate is controlled by the flow meter via an analog output connected directly to the speed command input on the metering pumps. Injection rate is a simple linear response defined within the metering pumps themselves. The chlorine will be thoroughly mixed prior to entering the free chlorine analyzer. The analog output from the free chlorine analyzer will be connected to a remote IO station which will then relay this information to the new Rockwell PLC added to the existing MCC as a part of this project. The PLC will be connected to another remote IO station on the ammonia dosing skid. The calculated metering pump speed command will be used to control the ammonia injection rate.

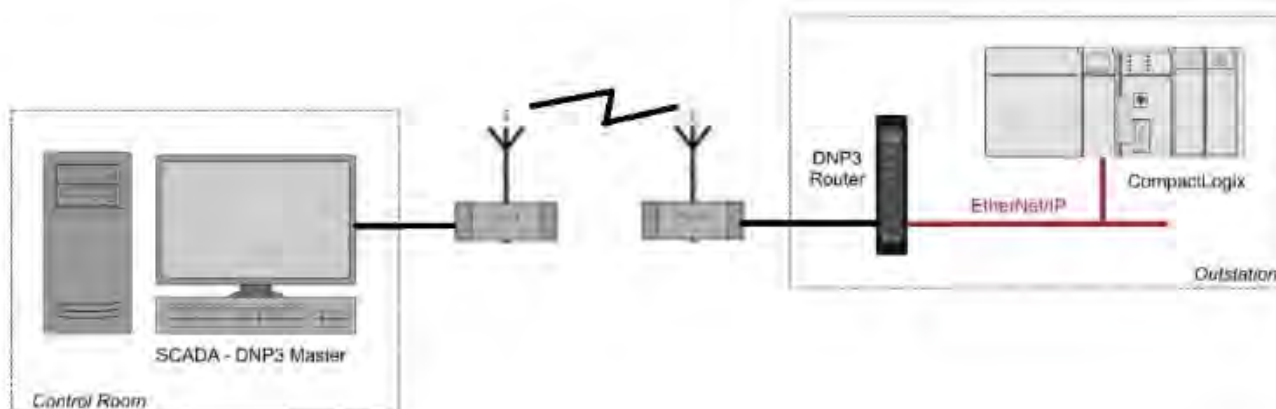
It is important to note that ammonia injection must stop if supply water stops flowing. Due to the critical nature of this constraint a redundant approach will be utilized interlock ammonia injection. First, the analog signal will be routed from the flow meter via a loop isolator to the remote IO station within the ammonia dosing station. Should the flow signal drop below a configurable threshold, the logic within the controller will discontinue injection. Secondly, the flow currently routed to SCADA from the Tesco controller will be forwarded to the ammonia injection controller. Again, if the flow rate falls below a configurable threshold ammonia injection will stop.

The overall control strategy and logic within the controller employed for the Mills facility is very similar insofar as a free chlorine analyzer will be used to determine the ammonia dosing rate. The control strategy for the Mills facility is shown in the diagram below:



In support of the two new ammonia injection skids tags will be added to the existing tag servers without changing the configuration or architecture. Two interfaces will be added to the existing InTouch application. These new injection skid interfaces will be closely modeled after existing interfaces and will allow the operator to control ammonia injection in response to measured total chlorine.

The proposed solution architecture would utilize DNP3 routers to allow Rockwell-based Remote Transmission Units (RTUs) to communicate via radio to a central software-based node. This approach would be used to control and acquire data from the injection skid located at the Mills facility and will be the first of the new RTUs. The ammonia injection skid to be installed at the Glenwood facility would be controlled via a dedicated Rockwell CompactLogix PLC that would be accessed via the existing Ethernet network at the Glenwood facility. Data from both injection skids will be integrated into the existing Wonderware-based SCADA system and Historian. Conceptual design of the solution is shown in the following diagram.



The DNP master would be integrated into the Wonderware SCADA system and would utilize a new DNP-capable IO server to handle the polling and communications with the RTUs via radio. The wireless architecture developed to support this project will form the basis for future work towards modernizing other remote stations such as wells, reservoirs, and pump stations. The new architecture will run in parallel with the existing wireless architecture and support transitioning additional RTU's using a modular approach. After all remote units have been updated the existing wireless network will be removed.

This project will include commissioning only the main node and the node at the Mills plant. However, all programming efforts associated with this project will include as a design criteria the need for easy extensibility and streamlined RTU transition in the future.

System operation of the ammonia injection skids will be documented within a Control Sequence Functional Document (CSFD) including both functional descriptions and a complete IO listing. This document will be updated during the commissioning and testing phase to represent the true as-installed state. Project also includes other necessary documentation, including drawings, Operations and Maintenance (O&M) manuals, and User Training.

Apex uses a work package method to do project estimation. A detailed task breakdown by work package is include in Appendix A below.

2. Project Constraints & Assumptions

This proposal is based on the following project constraints and/or assumptions.

- Proposal assumes the customer will supply all required project hardware, tools and software licensing except where this scope of supply is explicitly included as part of a work package.
- Proposal scope excludes computer server/workstation configuration or maintenance (e.g. OS loading, network configuration, etc.) except where this scope of work is explicitly included as part of a work package.
- Proposal scope does not include installation or mounting of equipment or hardware of any kind, including electrical, mechanical, chemical, etc. For purposes of this proposal they are assumed to be the responsibility of the customer or other designated contractors.
- Proposal scope does not include device, equipment or network wiring of any kind. For purposes of this proposal they are assumed to be the responsibility of the customer or other designated contractors.
- Branded development toolkits required for project execution but not intended to delivery to customer as part of the project deliverables (e.g. Rockwell or Siemens development software, Wonderware development software, etc.) will be provided by Apex unless otherwise specified within the proposal.
- Prior to system start-up or commissioning, the client shall confirm that:
 - Client-owned equipment, hardware and software is properly installed, mounted, and wired according to the manufacturers' specifications and conforms to applicable trade and safety codes.
 - In the case of equipment and hardware, client shall ensure the appropriate technical support staff (electrical, mechanical, maintenance, etc.) are available to quickly resolve installation, mechanical, or electrical errors.
 - In the case of software, client shall ensure that appropriate information technology resource(s) are readily available to resolve any installation or infrastructure issues, and that all software applications are appropriately licensed.
- Additional on-site time or return visits to site due to lack of client system readiness, unavailability of support resources, etc. are subject to additional charges at our standard service and travel rates.

3. Project Risks

All projects include some element of risk, and most can either be mitigated or managed. Apex feels that the following risk factors are present in this project and believes it is important to bring these to the attention of the Crescenta Valley Water District. Where possible, Apex has included suggested means to mitigate these risks.

- **RISK 1 – Integration with existing TESCO System** - Although no integration with the existing Tesco architecture is expected, however, any such integration with the existing TESCO system would likely represent significant obstacle due primarily to the highly proprietary nature of the TESCO solution. This risk can be mitigated by having appropriate support personnel available to answer questions during design and commissioning.
- **RISK 2 – Reduction in Startup Time** - Per Crescenta Valley request, the proposed onsite time has been reduced from ten (10) days to six (6) days. Apex still believes the original estimate of ten (10) days to be an accurate estimate of the scope of work associated with the commissioning of the new system. Should the reduced time estimate prove to be insufficient, this will create the risk of requiring a change order to support the onsite installation.

4. Project Costing

Project costing is summarized in the following tables. Apex's standard terms & conditions are attached in Appendix "C" below.

Services	Cost
System Design <i>Quoted on a firm fixed basis</i>	\$ 14,505.00
Programming <i>Quoted on a firm fixed basis</i>	\$ 14,160.00
Commissioning and Testing <i>Quoted on a time & material (T&M) basis 1 Resource x 6 Days x 12hours/day</i>	\$ 14,160.00
Post-Commission Support <i>Removed</i>	\$ 0.00
Subtotal Services Cost	\$ 42,825.00

Travel & Living Expenses (Estimated)	Cost
Commissioning and Testing	\$ 4,700.00
Subtotal Travel & Living Expenses	\$ 4,700.00

Total Project Cost **\$ 47,525.00**

Project Payment Milestones:

- 25% Down payment upon placement of order
- Monthly progress payments on balance due up to 90% of total project cost
- Final invoice for 10% of total project cost due upon acceptance of system by client successful completion of site acceptance test (SAT) and completion of any open SAT punch list items.

5. Project Schedule

Project schedule will be mutually determined by Apex and the client upon Apex's receipt of purchase order for the project.

6. Appendix A – Work Package Details

Work Package 1- System Design & Programming

Description:

This phase would include all of the required system design and design documentation.

Scope of Work:

- Project kickoff meeting
- Hardware specification
- Project Documentation
 - Panel Layout Drawings
 - IO Diagrams
 - Network & Communication Drawings
- Master IO List
- Control Sequence Functional Description (CSFD)
- Installation Plan
- Startup & Commissioning Plan
- Factory Acceptance Test (FAT) Plan
- Site Acceptance Test (SAT) Plan
- User & Administrative Training

Dependencies:

This work package is based on the following dependencies:

- None

Exclusions:

This work package is based on the following exclusions:

- None

Assumptions:

This work package is based on the following assumptions:

- No modification of the existing Tesco architecture will be required
- Crescenta Valley employees will be available to answer questions in a timely fashion

Deliverables:

This work package will provide the following deliverables:

- Hardware Specification
- Project Documentation Package ("As-Designed")

Work Package 2 – Programming

Description:

This phase would include all of the required PLC programming as well as setup and configuration of the DNP3-based RTU communications.

Scope of Work:

- DNP3 Master Setup & Testing
- DNP RTU Setup & Testing
- Radio Configuration & Testing
- Ammonia Dosing PLC Programming

Dependencies:

This work package is based on the following dependencies:

- Completion of Work Package 1

Exclusions:

This work package is based on the following exclusions:

- None

Assumptions:

This work package is based on the following assumptions:

- None

Deliverables:

This work package will provide the following deliverables:

- DNP3 Master Configuration
- DNP3 RTU Configuration
- Ammonia Dosing PLC Program
- New Wonderware HMI Screens

Work Package 3 - Commissioning & Testing

Description:

Apex personnel will be onsite to commission hardware, install programming, and complete system testing. Note that as per request of Crescenta Valley, the proposed onsite time was reduced from 10 days to 6 days. This work package is proposed at a time and materials rate, if more time is required to complete the onsite commissioning, a change order will be required.

Scope of Work:

Apex will send one (1) engineer onsite for six (6) days to perform the following activities:

- DNP3 Master Installation, configuration & validation
- DNP3 RTU installation, configuration & validation
- Ammonia Skid PLC programming & validation
- HMI modifications:
 - Ammonia dosing skid
 - RTU communications status

Dependencies:

This work package is based on the following dependencies:

- Completion of Work Package 2
- Completion of hardware acquisition, assembly, and installation
- All radio communications will be established and validated by Crescenta Valley or others prior to onsite commissioning.

Exclusions:

This work package is based on the following exclusions:

- No radio work is required of Apex

Assumptions:

This work package is based on the following assumptions:

- Project hardware installation and wiring is complete prior to Apex arrival
- No modification of the existing Tesco architecture will be required
- Crescenta Valley will provide support as required during commissioning

Deliverables:

This work package will provide the following deliverables:

- Operational DNP3 master & RTU
- Functional ammonia injection process as defined in CSFD
- Completed test plan
- As built documentation

Work Package 4 – Post Commissioning Support

Description:

Any support required after onsite installation and commissioning is not included as part of this proposal. This was removed as per Crescenta Valley request.

PROPOSAL
RESERVOIR CHLORINE ANALYZER DESIGN
HAZEN AND SAWYER FOR CRESCENTA VALLEY WATER DISTRICT
Draft, 10/25/18

Scope of Services

This scope of services includes the engineering design services for the installation of a chlorine analyzer at the six (6) identified District reservoirs, including Cresta Heights Reservoir, Dunsmore Reservoir, Eagle Canyon Reservoir, Goss Canyon Reservoir, Paschall Reservoir, and Shields Canyon Reservoir.

Services to be provided in this work are described below in several tasks.

Task 1. Site Visits and Analysis

CVWD will provide Hazen staff with site tours of the six (6) reservoir locations identified by CVWD for chlorine analyzers. Operations staff will be present and will provide their preferences on locations for optimal operations and maintenance activities.

At this time, CVWD would like to conduct the first step in identifying representative sampling locations from the reservoirs, which involves collecting samples for chlorine residual measurement on the inlet/outlet line and the sample tap on the side of the reservoirs.

For tanks without mixers, sampling may be recommended within the tanks at various heights if CVWD elects to characterize stratification in the reservoirs. Alternately, CVWD might consider computational fluid dynamics (CFD) modeling of the reservoirs if stratification of the reservoirs are a concern, which would be additional scope.

Task 2. Preparation of Design Drawings

Hazen will prepare design drawings for the installation of a chlorine analyzer at the six (6) identified District's reservoirs. Design drawings will be prepared to the 75% level design in order for the CVWD staff to install the equipment and all related facilities. The 75% level design drawings will include civil, electrical, and mechanical work. All specifications and construction notes will be included on the drawings. A separate set of technical specifications will not be prepared. Plans for the entire project will be produced in 22" X 34" format in AutoCAD. Hazen will anticipate one (1) progress workshop to review the design (at approximately 30% level design) with the CVWD staff prior to the 75% level design submittal. Sub-tasks to be performed and facilities to be designed under the design services include:

- Preparation of the 75% level design drawings.
- Preparation of an opinion of probable construction cost at the 75% design submittal.
- Attendance at and distribution of meeting minutes from the Kick-off, design progress meeting, and 75% design review meeting.

Assumptions:

- This scope of work does not include topographic survey of the site. CVWD will provide Hazen with as-built drawings and AutoCAD files of the reservoir sites for use as a basis for the preparation of the design drawings.

- This scope of work does not include the sub-surface geotechnical investigation.
- Permitting is excluded from this scope of work.
- SCADA system integration will be done by others.
- The scope of work does not include preparation of bid documents.
- The scope of work does not include preparation of frontend documents.

A list of anticipated design drawings is provided in the following table.

Sheet No.	Drawing No.	Sheet Title
1	G-1	Cover Sheet
2	G-2	Legend, Notes and Drawing Index
3	C-1	Chlorine Analyzer - Cresta Heights Reservoir Plan and Details
4	C-2	Chlorine Analyzer - Dunsmore Reservoir Plan and Details
5	C-3	Chlorine Analyzer - Eagle Canyon Reservoir Plan and Details
6	C-4	Chlorine Analyzer – Goss Canyon Reservoir Plan and Details
7	C-5	Chlorine Analyzer – Paschall Reservoir Plan and Details
8	C-6	Chlorine Analyzer – Shields Canyon Reservoir Plan and Details

Task 3. Project Management, Meetings, and QA/QC

Hazen will administer the budget, schedule, work progress, and work quality to meet CVWD's expectations. Hazen will implement a QA/QC program and maintain regular contact with the CVWD's Project Manager to coordinate work progress. Hazen will prepare and submit monthly invoices for work performed to date. Three (3) meetings are budgeted for the support of the project as follows:

1. Kickoff Meeting
2. Design Progress Review Meeting (30% Design)
3. 75% Submittal Review Meeting

Schedule

Following the issuance of a Notice-To-Proceed (NTP), Hazen will begin the project effort immediately. It is anticipated that the detailed design be completed within ten (10) weeks from the NTP. Hazen has assumed one (1) week review period for the 75% submittal by the CVWD staff.

Budget

The total fee for the design services described in the above scope of work is **\$53,255.00** in accordance with the assigned hours per task and associated rates as shown on the attached Exhibit B, Fee Estimate.

	Hazen and Sawyer												
	Project Manager	Technical QA/QC	Project Engineer	Senior Associate Electrical / I&C	Assistant Engineer Mechanical	Assistant Engineer Electrical	Principal Engineer Cost Estimate	CAD Designer					
NB	IM	AR	GF	VD	HB	CP	RS						
\$285	\$245	\$195	\$225	\$150	\$135	\$160	\$130						
									TMH	Labor	ODC	Total	Grand Total
Task 1 - Site Visits and Data Analysis													
1.1 Site Visits and Data Analysis	16	-	16	16	-	-	-	-	48	\$11,280	\$200	\$11,480	\$11,480
TASK 1 TOTALS	16	0	16	16	0	0	0	0	48	\$11,280	\$200	\$11,480	\$11,480
Task 2 - Preparation of Design Drawings													
2.1 Prepare 75% Level Design Drawings	8	-	24	12	32	60	-	60	196	\$30,360	\$200	\$30,560	\$30,560
2.2 Prepare Cost Estimate	1	-	2	-	-	-	8	-	11	\$1,955	\$0	\$1,955	\$1,955
TASK 2 TOTALS	9	0	26	12	32	60	8	60	207	\$32,315	\$200	\$32,515	\$32,515
Task 3 - Project Management, Meetings, and QA/QC													
3.1 Project Management	8	-	-	-	-	-	-	-	8	\$2,280	\$0	\$2,280	\$2,280
3.2 Meetings	8	-	12	-	-	-	-	-	20	\$4,620	\$400	\$5,020	\$5,020
3.4 QA/QC	-	8	-	-	-	-	-	-	8	\$1,960	\$0	\$1,960	\$1,960
TASK 2 TOTALS	16	8	12	0	0	0	0	0	36	\$8,860	\$400	\$9,260	\$9,260
TASKS 1-3 GRAND TOTALS	41	8	54	28	32	60	8	60	291	\$52,455	\$800	\$53,255	\$53,255

CRESCENTA VALLEY WATER DISTRICT

STAFF REPORT

Information Item No. 3
November 2, 2018

To: Engineering Committee
From: David S. Gould, P.E. – District Engineer
Subject: Status of the District's Advanced Metering Infrastructure (AMI) Program

INFORMATION ITEM:

Discussion on Status of CVWD's Advanced Metering Infrastructure (AMI) Program

BACKGROUND:

- Presentation to Board – February 2018 – Broken down into three (3) phases
 1. Smart Meters – Meter Replacement
 2. Communications & Data Collection – wireless communication infrastructure
 3. Data Management System – Water use info and data; Customer Outreach
 4. Estimated Cost - \$2.53M
 5. Completion date – Estimate July 2020
- Presentation at August 2018 Engineering Committee – Brett Foreman from WaterSMART on Preparing for AMI

DISCUSSION:

There has been discussion at previous Board meetings about the status of CVWD's AMI program, the process of working towards the next step of installation and implementation of the program, and an estimation of costs to complete the project along with possible available grant funding for the project.

Status – Water Meter Replacement:

CVWD crews have replaced over 5,500 ¾-inch water meters and 515 1-inch water meters over the last 6-years. There are about 1,500 ¾-inch water meters and 350 1-inch water meters remaining to be replaced. The program has been put off until January 2019 while CVWD crews are redirected toward the installation of the new ammonia injection system as part of the chloramine conversion.

The water meter replacement program has concentrated on replacing the 7,000 residential meters and will begin replacing the larger meters (1½-inch to 4-inch meters) after the residential meters are completed.

Project Management and Consulting Services:

Staff met with Kody Salem from UtiliWorks, Inc. about assisting the District with moving the AMI program forward. UtiliWorks is a consulting firm that moves AMI projects forward by developing the baseline business case for AMI (go/no-go based on a cost-benefit analysis) and then managing the project in terms of identifying vendors and implementing and installing AMI. UtiliWorks has assisted utility agencies of all sizes throughout California, including the Cities of Buena Park, Palo Alto, Roseville, Long Beach, and Riverside, Azusa Light & Water, and Glendale Water & Power on such tasks as business case assessment, preparing request for proposals, and implementation of a full-scale AMI program.

Staff requested a proposal from UtiliWorks for consulting services that includes the following scope of work:

Task 1: Review the Status of CVWD's Automated Meter Infrastructure Program

1. Review data and information completed by CVWD
2. Research and provide recommendations for the following:
 - a. Radio transceivers
 - b. Water meter box lids for radio transceivers – Concrete and Metal

- c. Communication Networks from meter box to storing data on "Cloud" including:
 - i. Review Propagation Study
 - ii. Data Collection Units and/or repeaters
 - iii. Programing meter
 - iv. Integration into Cloud
 - v. Methods to retrieve information
- d. Meter Data Management System to generate billing, water usage analysis, customer reports and alerts including
 - i. Determine information needed for CVWD such as leak detection, high or low water use, and emergencies
 - ii. Review Companies that provide these services
 - iii. Provide recommendation

Task 2: Prepare and present Business case for implementation of CVWD's AMI program including

- 1. Preliminary Cost Estimate including
 - a. Purchase of equipment and materials
 - b. Labor by outside company
 - c. Purchase of software and annual subscription costs
- 2. Payback period or Return on Investment
- 3. Presentation at Engineering Committee Meeting and Board meeting
- 4. Project Schedule for implementation by June 2021 (or sooner)

Task 3: Implementation of AMI Program

- 1. Research and provide recommendation for the following
 - a. Pilot Study
 - b. Phasing project over 2 or 3 year period

Task 4: Project Schedule – Study to be completed by end of February 2019

Task 5: Proposed fee

UtiliWorks is finalizing the proposal and will be available for review at the Engineering Committee meeting. Staff will include Water Smart in the discussion with UtiliWorks.

Grant Funding:

Staff has been working with John Robinson Consulting (JRC) on the status of grant funding from the U.S. Bureau of Reclamation (USBR) through its WaterSMART grants. USBR grant funding ranges from \$300,000 and \$1,000,000 with a 50/50 cost sharing. The next round of grant application should be available in March 2019.

RECOMMENDATION:

Staff will discuss its recommendation at the Engineering Committee meeting as we review the proposal from UtiliWorks. \$40,000 was included in the FY 18/19 Capital Outlay Budget for the AMI program.

Prepared & Submitted by:



David S. Gould, P.E.
District Engineer

Crescenta Valley Water District																																																											
Design and Construction Schedule for FY 18/19																																																											
Project	July				August				September				October				November				December				January				February				March				April				May				June														
	2	9	16	23	30	6	13	20	27	3	10	17	24	1	8	15	22	29	5	12	19	26	3	10	17	24	31	7	14	21	28	4	11	18	25	4	11	18	25	1	8	15	22	29	6	13	20	27	3	10	17	24							
FY 18/19 - Projects																																																											
Re-Activate Well 2 - Design/Construction	Construction				Testing/DDW Review																Well 2 in Service																																						
Oak Creek #1 & #2 Rehabilitation														AC				Construction										OC #2 Back in Service																															
2700, 3000 & 3100 Block of Brookhill & 5000 Block of La Crescenta	Construction												Construction																																														
Encinal - Booster B													Construction																																														
New Emergency Electrical Generator at Main Office (included in FY 18/19 Capital Outlay)					Design								AB	Bidding	AC	Shop Drawing Review				Construction																																							
Well 7, 11 & 14 Rehabilitation																	Design								AB	Bidding	AC	Shop Drawing Review				Construction																											
Installation of Ammonia Injection System													Design				Shop Drawing Review & Project Coord.				Construction																																						