6 Monitoring, Assessment, and Performance Measures

Overview

Attachment 6 presents the planned project monitoring, assessment, and performance measures that will demonstrate that the Proposal will meet its intended goals, achieve measurable outcomes, and provide value to the State of California. The purpose of this Attachment is to provide information that would be used in the monitoring plan for the each project. Each project is described with its associated monitoring, assessment, and performance measures which are rolled-up into the Exhibit 6 Summary.

6.1 Project 1 – Madera Avenue Intertie

Project 1, the Madera Avenue Intertie, will be monitored and assessed pursuant to established performance standards for construction and operation. A Monitoring and Reporting Plan for all phases of the Project will be developed upon approval of the grant. The plan will include monitoring objectives and parameters, performance standards, timing and nature of monitoring, and parties' responsibility for monitoring, analysis and reporting. Performance standards for the construction will be based on both environmental review/permitting and engineering design. Construction monitoring will focus on two dimensions of construction, impact reduction and satisfaction of design standards. Operational standards will be based on project objectives. Operational monitoring will comprise measurement of water transportation and distribution, using standard practices and reporting.

6.1.1 Baseline Condition

A discussion of baseline will be included in the Monitoring and Reporting Plan to establish factors such as locations of sensitive resources (construction monitoring), past measurement parameters (location and frequency) and history of water availablity (in the area of benefit). The construction of the project is subject to CEQA review. Baseline conditions are described in the Initial study for the project. In summary, the project will be constructed in agriculture cultivated areas or along existing farm access or county roads, all are areas that have been disturbed by prior human activity and have no known sensitive biological or archaeological resources.

Once final design is completed, the bid package will comprise the design baseline.

Historical records of diversion for the Madera Avenue Intertie are not available since it is a new constructed facility that will be operated for the first time following construction. Historical records of diversion, including the amount of water conveyed through district

canals or pumping plants, are available from Semitropic WSD and Shafter-Wasco ID; two districts that will jointly operate the Madera Avenue Intertie. Districts in the Poso Creek IRWM RWMG maintain records on deliveries and operations. Water delivered among or between the districts will be accounted for and reported annually.

In general, records of water deliveries in the Poso Creek IRWM Plan area are shared and reconciled with the entity responsible for overseeing the water supply. Kern River flow diversions are measured by the City of Bakersfield and reported to the Kern River Water Master. State Water Project (SWP) deliveries are measured by DWR and reconciled with the Kern County Water Agency (KCWA). Reclamation measures CVP-Delta, or CVP-Friant water deliveries. These records are readily available on at least a monthly basis, and in some cases, daily, for the last 25-30 years.

Groundwater levels are measured by each district semi-annually. Representative water wells are measured and the data is provided in reports to each district's Board of Directors and submitted for publication in the Semitropic WSD Water Banking Project Monitoring Reports. Dedicated monitoring wells and idle water production wells are measured with calibrated wire sounders and several observation wells in Semitropic WSD are instrumented with water level transducers.

6.1.2 Project Performance

The Madera Avenue Intertie Project includes two bi-directional meters installed at the Madera Avenue Pumping Plant for measuring flow from or into Semitropic WSD in each of the 30-inch pipelines and adding a flow meter at the Friant-Kern Canal for water delivered into the Friant-Kern Canal from Shafter-Wasco ID's South Mainline. Water deliveries entering Shafter-Wasco ID from the Friant-Kern Canal are already measured. When the Project is in operation, daily measurements will be made and recorded of water delivered by the Madera Avenue Intertie in either operational direction. Project performance will be based on the post-project deliveries through the Intertie, since no flow happened through the Madera Avenue Intertie prior to construction. Measurements of water conveyed through Semitropic to lands served by the South Mainline System in Shafter-Wasco ID and to the Friant-Kern Canal, will provide a direct measure of project performance and a direct indication of the success of CVP Contractors to complete exchanges within the Region.

6.1.3 Assessment

The results from construction and operation phases of the new facilities will be evaluated (assessed) by comparing the changes caused by the project against specific performance standards established in the Monitoring and Reporting Plan. The performance standards will be based on permit conditions and standard practice (construction phase) and operational objectives (optimization of supplies and reduced dependence on the Delta). Semitropic will be responsible for developing and implementing the Project 1 Monitoring and Reporting

Plan. The relationship among Project 1 goals and various elements of the assessment process are shown in Exhibit 6.1-1, below.

Recirculation Water or Optimized Water – To evaluate the amount of Recirculation Water delivered, better managed, or optimized water, records will be maintained of the amount of CVP-Friant water that is conveyed "west-to-east" through the Intertie by pumping to Shafter-Wasco. CVP-Friant or CVP-Delta conveyed to Shafter-Wasco for direct delivery will allow for exchange with other CVP Contractors with access to the Friant-Kern Canal and will be quantified. In addition, water not absorbed in Shafter-Wasco ID, conveyed west to east back to the Friant Kern Canal will be measured and recorded. East to West conveyance through the Intertie into Semitropic will also be measured. Groundwater levels measured during the semi-annual monitoring runs will provide a basis for determining groundwater level changes over time. Specific measurement and analysis protocols will be included in the Monitoring and Reporting Plan.

Reduced Dependence on the Delta – Over the period 1981-2005 diversions from the Delta comprised about one-third of the surface water supplies used within the Region. Project 1 will assist districts within the Region to leverage the west to east conveyance capability of Semitropic within the Region to deliver San Joaquin River – Recirculation Water supplies that are to be delivered differently than historical. The Madera Avenue Intertie will allow districts to move available supplies to available absorptive capability and to deliver environmental water during times of need. With regard to quantification of actual project benefits "upon completion of the project", it is noted that environmental water management flows began to occur in 2012 and will be measurable immediately upon completion since water will be conveyed through the Intertie. A discussion of these factors will be included in the Monitoring and Reporting Plan.

Exhibit 6.1-1
Project 1 Summary of Monitoring, Assessment, and Performance Measure

Project Goal	Desired Outcome	Output Indicators	Outcome Indicators	Measurement Tools and Methods	Targets
Increase water supply reliability.	Provide conveyance capacity west to east for delivery of CVP-Friant and CVP-Delta environmental flows Provide additional dry year yield to Poso Creek RWMG members.	Daily and monthly deliveries from Semitropic to SWID and SWID to Semitropic. Daily and monthly deliveries from SWID to Friant-Kern Canal.	Annual quantity of CVP-Friant and CVP-Delta water conveyed through Semitropic WSD by CVP Contractors Annual quantity of CVP-Friant and CVP-Delta water delivered into Semitropic WSD by CVP Contractors	Rated meters are used by facility operators to quantify deliveries.	Up to 30,000 acre-feet per 10-months of operation; 10,000 to 20,000 acre-feet per year average annual return

Project Goal	Desired Outcome	Output Indicators	Outcome Indicators	Measurement Tools and Methods	Targets
Minimize Water Supply Costs	Recover San Joaquin Restoration Flows	Daily and monthly deliveries through new Intertie. Daily and monthly deliveries from SWID to Friant-Kern Canal.	Record annual quantity of water conveyed by Intertie. Record annual quantity of water delivered from SWID to Friant-Kern Canal	Rated meters are used by facility operators to quantify deliveries. Power records of pump stations are also kept as prepared by the respective utility. Tabulate information to compute a theoretical power cost as if without project facilities were used.	10,000 to 20,000 acre-feet average annual exchange potential.
Reduce regional depende nce on Delta supplies.	Optimize delivery of environmental water west to east by conveyance through Semitropic's facilities. Provide additional dry year yield to Poso Creek RWMG members.	Daily and monthly deliveries from the Region from SWP and CVP.	Record of monthly Delta deliveries that matched with pumping schedule for environmental uses	Rated meters are used by facility operators to quantify deliveries.	10,000 to 20,000 acre-feet per year on annual average basis

6.1.4 Reporting

During construction, Quarterly Progress Reports will be prepared and will provide a brief description of the work performed, description of project activities, milestones achieved, any accomplishments and any problems encountered in the performance of the work during the reporting period. Activities will also include coordinating the preparation and submission of the Quarterly Progress Reports with the local sponsors.

A Project Completion Report will be prepared after completion of the project and will include a description of actual work done, any changes or amendments to the project, and a final schedule showing actual progress versus planned progress, and will include all project deliverables as attachments (if any). Activities will also include coordination with local sponsors for the preparation and submission of the Project Completion Reports for all projects.

As part of the Monitoring and Reporting Plan for Project 1, Annual Reports of the water conveyed through the Intertie will be prepared during the operational phase of the project.

Those reports will be compiled by the Semitropic and Shafter-Wasco ID staff from operational records. In order to assure that the Monitoring and Reporting Plan for Project 1 will evaluate the appropriate issues, a series of questions, as provided in the PSP are addressed in Exhibit 6.1-2

Exhibit 6.1-2
Project 1 Questions Based on Criteria Provided in Proposal Solicitation Package

Items	Explanation
Is the project contained in the proposal consistent with the Basin Plan?	Yes, the Tulare Lake Regional Basin Plan has objectives to decrease groundwater level declines and associated water quality issues. The Madera Avenue Intertie helps accomplish these goals.
Are the identified monitoring targets appropriate for the benefits claimed?	Operational monitoring of water delivered using the Intertie relate directly to project objectives and benefits.
Do the output indicators effectively track output? List the output indicators and describe relevance of indicators to track output of the project.	Yes, the entities responsible for operating local and regional facilities have been doing so and tracking operations for decades. SWP delivery records are published annually through Bulletin 132. CVP Friant-Kern records are presented monthly to the Friant Water Users Authority and Bureau of Reclamation. Semitropic, Shafter-Wasco and their respective Project partners report deliveries monthly and annually to their respective Board of Directors.
Will the measurement tools and methods effectively monitor project performance and target progress?	Environmental protection monitoring is used during construction. Operational monitoring and performance reporting will be applied during operations.
Are the outcome indicators adequate to evaluate change resulting from this project? Describe the importance of outcome indicators to evaluate change resulting from the project?[1]	Yes, there is no historic record of use since this is a new facility and to the extent that it gets used once constructed, measurements of flow will occur. The outcome indicators are the same as those used on a regular basis to document water management in the Southern San Joaquin Valley. Records of flow through the Intertie will quantify the benefits realized by the Project to manage supply.
Is it feasible to meet the targets within the life of the proposal?	Yes, the frequency of CVP Delta water availability, CVP Friant-Kern Class 1, Class 2 and Recirculation Water supplies is well documented. The Intertie is identified as a necessary connection to be able to deliver water west to east for any non-wet period over the life of the Project. The Project Sponsors could have used it in 2012, for example, the first year of Recirculation flows and will use it every dry and typical water year.

[1]*Indicators may include: additional acre-feet of water supply, improved water supply reliability and flexibility, water quality measurements, measurement-based estimates of pollution load reductions, acres of habitat successfully restored, feet of stream channel stabilized, groundwater level measurements, stream flow measurements, improved flood control, or other quantitative measures.*

The Project 1 Monitoring and Reporting Plan will contain a description of the parameters to be included, their assessment process, the parties responsible for monitoring and reporting and the reporting frequency as well as the organizations to which the Reports will be submitted. The key elements of the Project 2 Monitoring and Reporting Plan are summarized in Exhibit 6.1-3.

Exhibit 6.1-3
Project 1 Summary of Monitoring Plan

Monitoring Plan Features	Monitoring Plan Details
Monitoring Parameters	Construction ▪ Mitigation monitoring plan criteria for archaeology and biology ▪ Conformance between as-built drawings and final design parameters Operational ▪ Water Deliveries
Location of facilities to be monitored and entity	Water Deliveries will be monitored at the Intertie Pumping Plant by the automated bi-directional meters connected to both Shafter-Wasco ID and Semitropic WSD SCADA systems. Water is measured at the Aqueduct by DWR and deliveries into the Friant-Kern Canal will be measured by the Districts. Groundwater levels are monitored at key wells in Semitropic and Shafter-Wasco, which are delivered to DWR through the CASGEM program.
Measures to remedy or react to problems encountered during monitoring	Facility operators will contact facility superintendents if measuring devices are not operational. Estimates based on previous history of readings will be made until repaired or new meters are installed.
Monitoring Frequency	Intertie – Daily when operating Water Wells – Semi-annually
Frequency of performance evaluation and reporting	Project Completion Report will be prepared after completion of the project. During operations, annually by Semitropic and reported to the Poso Creek Regional Water Management Group

6.2 Project 2 – Lost Hills New Well and Tank Replacement

Project 2, Lost Hills New Well and Tank Replacement, will be monitored and assessed pursuant to established performance standards: construction and operation. A Project 2 monitoring and reporting Plan will be developed upon approval of the grant. The plan will include monitoring objectives and parameters, performance standards, timing and nature of monitoring, and parties' responsibility for monitoring, analysis and reporting. Performance standards for construction will be based on both environmental review/permitting and engineering design. Construction monitoring will focus on two dimensions of construction, impact reduction and satisfaction of design standards. Operational standards will be based on project objectives of water quality and reliability. Operational monitoring will comprise measurement of water quality for the new well as well as quality of water delivered through the Lost Hills system. In addition, system reliability will be documented.

6.2.1 Baseline Condition

Historical records of arsenic levels and system reliability are available for the drinking water system operated by Lost Hills Utility District. The District retains records on production and operations, and takes regular water quality samples as proscribed by DPH regulations. These records are readily available for the last 15 years. A discussion of baseline will be included in the monitoring plan to establish factors such as locations of sensitive resources (construction monitoring), past sampling parameters (location and frequency) and analysis protocols (laboratory analysis).

6.2.2 Project Performance

The *Lost Hills New Well and Tank Replacement Project* includes water quality sampling which will, in part, measure Arsenic levels in the water pumped. When both Project elements are in operation, used daily operational record will document the level of reliability of the system. Project performance will be based on two factors: meeting arsenic standards and meeting operational standards. The two existing District wells have arsenic levels of approximately 11 to 15 ppb. The acceptable MCL for potable water is an Arsenic level of less than 10 ppb. Assessment of Arsenic levels form the new well and within the delivery system (as blended water) will be the basis of the water quality performance.

Reliable operation of the storage tank is crucial for providing LHUD's customers (households in the community of Lost Hills) with a firm potable water supply and for meeting the fire protection and domestic consumption, and operational and emergency storage requirement. Hence standard system design requirements and operational improvement will comprise the design standard for the new tank. The tank has been in operation since 1952 and is now subject to frequent repairs. In addition the inside of the tank is severely corroded and the tank cannot be rehabilitated.

Each benefit requires a slightly different assessment of the deliveries as described below.

Meeting the Arsenic Standard – To evaluate meeting the water quality standard for arsenic, water quality samples will be taken during drilling and the well will be constructed to maximize production from zones with low levels of arsenic. The well will be sampled during the well's production testing and a blending plan developed for operation of the system. The water quality in the District's delivery system will be sampled on a regular basis pursuant to Depart of Health requirements to ensure that he blending plan results in water that meets drinking water standards. Specific measurement and analysis protocols will be included in the Monitoring and Reporting Plan.

Meeting Operation Standards – The LHUD will review tank construction as built drawings and evaluate tank storage volume and flow rates as well as estimate well capacity to determine that the system, including the new tank, meets fire protection and domestic consumption, and operational and emergency storage requirements. As part of the Monitoring and Reporting Plan operation records will be compiled and reported to Semitropic and the District Board of Directors on a semi-annual basis.

With regard to quantification of actual project benefits "upon completion of the project", it is noted that this may not be practicable immediately upon completion; rather, it could take a year of production from the new well, depending on hydrology, to obtain a meaningful measure of Project benefits. A discussion of ongoing monitoring and reporting will be included in the Monitoring and Reporting Plan.

6.2.3 Assessment

The results from construction and operation phases of the new facilities will be evaluated (assessed) by comparing the changes caused by the project against specific performance standards established in the Monitoring and Reporting Plan. The performance standards will be based on permit conditions and standard practice (construction phase) and water quality and operability objectives (operations phase). The LHUD will be responsible for developing and implementing the Project 2 Monitoring and Reporting Plan. The relationship among Project 2 goals and various elements of the assessment process are shown in Exhibit 6.2-1, below.

Exhibit 6.2-1
Project 2 Summary of Monitoring, Assessment, and Performance Measure

Project Goal	Desired Outcome	Output Indicators	Outcome Indicators	Measurement Tools and Methods	Targets
Meet Arsenic Standard for drinking water.	Production from new well that allows blending with the remaining district well so as to deliver water below 10 ppb As without further treatment.	Water quality measurements from well and from system at established measurement points, taken by the District pursuant to DOH requirements.	Compare water quality data to standards and blending plan	A certified laboratory is used to perform water quality analysis	Below 10 ppb Arsenic
Meet community water supply standards for reliability and operability	Meet fire protection and domestic consumption, and operational and emergency storage requirements	As built system design	Compare system operability analysis to standards for peak flow and operation al standards	Rated meters and gates are used by facility operators to quantify deliveries. Rated meters are used by facility operators to quantify deliveries. Standard engineering approaches are used to evaluate system performance	Tank Storage is up to 1.6M Gallons Peak flow in GPM-hours to be determined in final design

In order to assure that the Monitoring and Reporting Plan for Project 2 will evaluate the appropriate issues, a series of questions, as provided in the PSP are addressed in Exhibit 6.2-2.

Exhibit 6.2-2
Project 2 Questions Based on Criteria Provided in Proposal Solicitation Package

Items	Explanation
Is the project contained in the proposal consistent with the Basin Plan?	Yes, the Tulare Lake Regional Basin Plan has objectives to address water quality issues such as Arsenic in drinking water. The new well helps accomplish these goals.
Are the identified monitoring targets appropriate for the benefits claimed?	Yes, Arsenic in the delivery system is a direct measurement of water quality delivered to customers. System operation records will be used to prior performance to the modified system.
Do the output indicators effectively track output? List the output indicators and describe relevance of indicators to track output of the project.	Yes, the LHUD is responsible for operating the wells and delivery system facilities has been doing so and tracking operations for decades. Water quality results are reported to the DPH and distributed to customers annually.

Items	Explanation
Are the outcome indicators adequate to evaluate change resulting from this project? Describe the importance of outcome indicators to evaluate change resulting from the project?[1]	Yes, there is a significant historic record of water quality to provide a meaningful baseline. New water quality measurements may be compared directly to previous measurements. The water quality outcome indicators are the same as those used as a basis for protecting public health. The system operability outcome indicators are the same as those used as a basis for designing safe and reliably public water supplies. Records of District operations will be used to measure improvement on operability/reliability
Is it feasible to meet the targets within the life of the proposal?	Yes, the improvements of water quality should be seen within a few months, if not much sooner. Improvement in system operability will occur when the new well and tank are put online.

[1]1Indicators may include: measurement-based estimates of Aresenic levels in the water system and reliability of the system based on operation records.

6.2.4 Reporting

The Project 2 Monitoring and Reporting Plan will contain a description of the parameters to be included, their assessment process, the parties responsible for monitoring and reporting and the reporting frequency as well as the organizations to which the Reports will be submitted. The key elements of the Project 2 Monitoring and Reporting Plan are summarized in Exhibit 6.2-3.

Exhibit 6.2-3
Project 2 Summary of Monitoring and Reporting Plan

Monitoring Plan Features	Monitoring Plan Details
Monitoring Parameters	Arsenic level in well and system distribution system will be regularly sampled at the points established for characterizing water quality for other parameters. System operation records used to determine reliability and delivery capacity will be compared to past records.
Location of facilities to be monitored and entity	District personnel will sample water quality at points near the well and within the distribution system at currently used points. District staff will document any system operability issues as part of their normal records keeping.
Measures to remedy or react to problems encountered during monitoring	The District will modify its blending plan to assure that delivered water meeting standards. As a backup, the district will maintain its treatment capability for removal of Arsenic.
Monitoring Frequency	Water quality samples will be taken daily as new well is brought on line and blending plan is implemented. Subsequent to demonstration of well production and blending effectiveness – Semiannually.
Frequency of performance evaluation and reporting	Annually by District as part of water quality report to customers. Changes to the system and its operation will be incorporated into the District Water Master Plan Water quality and operations records will be summarized and provided to Semitropic on a semi-annual basis.

6.3 Project 3 – Allensworth Tank Replacement and SCADA Upgrade

Project 3, Allensworth Tank Replacement and SCADA Upgrade, will be monitored and assessed pursuant to established performance standards for both construction and operation. A Project 3 monitoring and reporting Plan will be developed upon approval of the grant. The plan will include monitoring objectives and parameters, performance standards, timing and nature of monitoring, and parties' responsibility for monitoring, analysis and reporting. Performance standards for construction will be based on both environmental review/permitting and engineering design. Construction monitoring will focus on two dimensions of construction, impact reduction and satisfaction of design standards. Operational standards will be based on project objectives of water quality and reliability. Operational monitoring will comprise measurement of the quality of water delivered through the ACSD system. In addition, system reliability will be documented.

6.3.1 Baseline Condition

The Community is served water by the Allensworth Community Services District (ACSD) which is supplied by two wells. One of the two wells has Arsenic at the level of 6 to 12 ppb and must be blended with water from the other well. The distances between each well and between the wells and the community cause serious operational problems (such as water hammer, well shutdown and uneven blending) that would be addressed with a SCADA system upgrade. A discussion of baseline will be included in the monitoring plan to establish factors such as locations of sensitive resources (construction monitoring), past sampling parameters (location and frequency) and analysis protocols (laboratory analysis).

6.3.2 Project Performance

The proposed project would install a SCADA system upgrade (to improve operability and water quality) and replace an existing tank used for peaking and fire supply (to improve safety and reliability). This project will provide a more affordable and reliable water source to a disadvantaged community.

6.3.3 Assessment

Each benefit requires a slightly different assessment of the deliveries as described below.

Meeting the Arsenic standard – To evaluate meeting the water quality standard for arsenic, water quality samples will be taken in the District's delivery system on a regular basis for ensure that the blending plan results in water that meets drinking water standards. Water quality reports will be provided to the Board of directors and customers annually to demonstrate that the system meets drinking water standards. Specific measurement and analysis protocols will be included in the Monitoring and Reporting Plan.

Meeting Operation Standards – The ACSD will review tank construction as built drawings and evaluate tank storage volume and flow rates as well as estimate the capacity of their two wells to determine that the system, including the new tank, meets fire protection and domestic consumption, and operational and emergency storage requirements. This summary will be provided to the District Board of Directors and the Poso Creek Regional Water management Group to document the efficacy of the system upgrades. As part of the Monitoring and Reporting Plan operation records will be compiled and reported to Semitropic and the District Board of Directors on a semi-annual basis

With regard to quantification of actual project benefits "upon completion of the project", it is noted that this will not be practicable immediately upon completion; rather, it could take several months, depending on to obtain a meaningful measure of Project water quality benefits. A discussion of ongoing monitoring and reporting will be included in the Monitoring and Reporting Plan.

6.3.4 Assessment

The results from construction and operation phases of the new facilities will be evaluated (assessed) by comparing the changes caused by the project against specific performance standards established in the Monitoring and Reporting Plan. The performance standards will be based on permit conditions and standard practice (construction phase) and water quality and operability objectives (operations phase). The ACSD will be responsible for developing and implementing the Project 3 Monitoring and Reporting Plan. The relationship among Project 3 goals and various elements of the assessment process are shown in Exhibit 6.3-1, below.

Exhibit 6.3-1
Project 3 Summary of Monitoring, Assessment, and Performance Measure

Project Goal	Desired Outcome	Output Indicators	Outcome Indicators	Measurement Tools and Methods	Targets
Meet Arsenic Standard for drinking water.	Blending of production from two wells that allows the District to deliver water below 10 ppb As without further treatment.	Water quality measurements from system at established measurement points, taken by the District pursuant to DOH requirements	Compare water quality data to standards and blending plan	A certified laboratory is used to perform water quality analysis	Below 10 ppb Arsenic
Meet community water supply standards for reliability and operability	Meet fire protection and domestic consumption, and operational and emergency storage requirements	As built system design	Compare system operability analysis to standards for peak flow and operation al standards	Rated meters and gates are used by facility operators to quantify deliveries. Rated meters are used by facility operators to quantify deliveries. Standard engineering approaches are used to evaluate system performance	Up to 55,000 gallons of storage Peak flow in GPM-hours to be determined in final design

In order to assure that the Monitoring and Reporting Plan for Project 3 will evaluate the appropriate issues, a series of questions, as provided in the PSP, are addressed in Exhibit 6.3-2.

Exhibit 6.3-2
Questions Based on Criteria Provided in Proposal Solicitation Package

Items	Explanation
Is the project contained in the proposal consistent with the Basin Plan?	Yes, the Tulare Lake Regional Basin Plan has objectives to address water quality issues such as Arsenic in drinking water. The new well helps accomplish these goals.
Are the identified monitoring targets appropriate for the benefits claimed?	Yes, Arsenic in the delivery system is a direct measurement of water quality delivered to customers. System operation records will be used to document performance of the modified system
Do the output indicators effectively track output? List the output indicators and describe relevance of indicators to track output of the project.	Yes, the entities responsible for operating the wells and delivery system facilities have been doing so and tracking operations for decades. Water quality results are reported to the DPH and distributed to customers annually. System operation records will be used to prior performance to the modified system

Items	Explanation
Are the outcome indicators adequate to evaluate change resulting from this project? Describe the importance of outcome indicators to evaluate change resulting from the project?[1]	Yes, there is a significant historic record of water quality to provide a meaningful baseline. New water quality measurements may be compared directly to previous measurements. The water quality outcome indicators are the same as those used as a basis for protecting public health. The system operability outcome indicators are the same as those used as a basis for designing safe and reliably public water supplies. System operation records will be used to prior performance to the modified system
Is it feasible to meet the targets within the life of the proposal?	Yes, the improvements of water quality should be seen within a few months, if not much sooner. Improvement in system operability will occur when the new well and tank are put online.

[1]*Indicators may include: measurement-based estimates Aresenic levels in the water system and reliability of the system based on operation records. .*

6.3.5 Reporting

The Project 3 Monitoring and Reporting Plan will contain a description of the parameters to be included, their assessment process, the parties responsible for monitoring and reporting and the reporting frequency as well as the organizations to which the Reports will be submitted. The key elements of the Project 2 Monitoring and Reporting Plan are summarized in Exhibit 6.3-3.

Exhibit 6.3-3
Project 3 Summary of Monitoring Plan

Monitoring Plan Features	Monitoring Plan Details
Monitoring Parameters	Arsenic level in the distribution system will be regularly sampled at the points established for characterizing water quality for other parameters. System reliability and delivery capacity will be compared to past records
Location of facilities to be monitored and entity	District personnel will sample water quality at points near the well and within the distribution system established for characterizing water quality for other parameters. District staff will document any system operability issues as part of their normal records keeping.
Measures to remedy or react to problems encountered during monitoring	The District will modify its blending plan to assure that delivered water meets standards.
Monitoring Frequency	Water quality samples will be taken daily well construction contractor or District staff as new well is brought on line and blending plan is implemented. Subsequent to demonstration of well production and blending effectiveness – Semiannually
Frequency of performance evaluation and reporting	Annually by District as part of water quality report to customers. Improvements in the system's operation will be reflected in the District Water Master Plan and rate structure.

6.4 Project 4 – Groundwater Well Destruction Program

Project 4, Groundwater Well Destruction Program, will be monitored to document the basis of wells selected for identifying and properly destroying up to 15-wells that have no remaining useful purpose and that have a potential to contribute to DAC water quality problems if not properly destroyed.

6.4.1 Baseline Condition

Project funding will be used to buy down the cost of destroying unused wells that pose a threat to DAC water supplies. Well owners often regard unused wells as potential backup in the event that additional supplies are needed. However, these older wells were often constructed without regard to isolating poor quality zones or deteriorate with time, in either case allowing poor quality water to enter higher quality production zones. This can contribute significantly to water quality problems in near-by urban supply wells. The two most common contaminants in DAC water supply wells are Arsenic and Nitrate (discussed below).

6.4.2 Project Performance

Project 4 will provide funding to address a critical water supply need for several disadvantaged communities (DACs) in the region: identify and partially fund proper destruction of up to 15 unused wells that may contribute to DAC water quality problems. Contribution to well destruction costs will motivate landowners to accelerate proper permanent abandonment of unused wells that due to poor design or deterioration may allow contaminants to enter production zones used for DAC supply. Wells will be identified and selected on the basis of location, construction and water quality (if available). Specific criteria for wells to be destroyed under Project 4 will be developed in collaboration among Semitropic and the County of Kern and DAC representative on the IRWM RMG.

The program would be administered under the direction of Semitropic WSD in collaboration with the affected DACs and community interest groups as well as the Counties of Kern and Tulare.

6.4.3 Assessment

The benefits will be measured as described below.

Protect water quality in DAC supplies – Water quality samples will be taken from selected monitoring wells annually to document any change in water quality due to the destruction of problem wells. To the extent possible these wells will be wells used for DAC water supply or wells regularly sampled by a public agency. This approach will provide a historical basis for assessing improvement in water quality. Results of well destruction activities and water

quality measurements will be compiled by Semitropic as part of their annual report on implementing the grant.

With regard to quantification of actual project benefits "upon completion of the project", it is noted that this may not be practicable immediately upon completion; rather, it could take several years depending on the timing of changes due to well destruction to obtain a meaningful measure of Project benefits.

Exhibit 6.4-1
Project 4 Summary of Monitoring, Assessment, and Performance Measure

Project Goal	Desired Outcome	Output Indicators	Outcome Indicators	Measurement Tools and Methods	Targets
Improved water supply reliability.	Improve DAC water supply systems to increase reliability.	Improved water supply reliability.	Destruction of problem wells to be documented by Semitropic and County of Kern.	Well destruction reports required by State law.	15 wells destroyed.
Improve water quality if DAC supply.	100% of samples meet water quality standards.	Water quality measurements of water delivered.	Consistently meet water quality standards.	Direct samples of delivered water by local water districts an public suppliers.	100% of samples meet water quality standards.

In order to assure the Project meets appropriate criteria for monitoring and reporting, a series of questions, as provided in the PSP are addressed in Exhibit 6.4-2.

Exhibit 6.4-2
Questions Based on Criteria Provided in the Project Solicitation Package

Items	Explanation
Is the project contained in the proposal consistent with the Basin Plan?	Yes, the Tulare Lake Regional Basin Plan has goals to improve water quality for municipal use. The project studies and destruction of problem wells are both consist with Basin Plan objectives.
Are the identified monitoring targets appropriate for the benefits claimed?	Yes. Destruction of problem wells eliminates them as a potential avenue for degradation of high quality aquifer zones that are the source of DAC water supply. The technology of successful well destruction is established. The cost of typical well destruction was the basis for the project cost and estimated number of wells.
Do the output indicators effectively track output? List the output indicators and describe relevance of indicators to track output of the project.	Yes, Destruction of wells will be tracked by filing of required reports with local and State agencies. Well destruction records are required by state law.
Are the outcome indicators adequate to evaluate change resulting from this project?	Yes, Well destruction records certify that the well is no longer a conduit for pollution.

Describe the importance of outcome indicators to evaluate change resulting from the project	Destruction of problem wells eliminates them as a potential avenue for degradation of high quality aquifer zones that are the source of DAC water supply.
Is it feasible to meet the targets within the life of the proposal?	Yes. Well destruction techniques are well developed and reflected in existing industry standards as well as the state standards for well destruction..

6.4.4 Reporting

Reporting for Project 4 will contain a description of the parameters used in the well assessment process, the parties involved in selecting and evaluating each well, and a documentation of the well destruction process. Water quality data will be compiled and evaluated in an annual report to be prepared by Semitropic that will be available to DWR and the public. The key elements of the Project 4 reporting are summarized in Exhibit 6.4-3.

Exhibit 6.4-3
Project 4 Summary of Monitoring Plan

Monitoring Plan Features	Monitoring Plan Details
Monitoring Parameters	Document identification and subsequent destruction of problem wells. Problem wells may be identified using instruments to measure flow between aquifer levels
Location of facilities to be monitored and entity.	Well destruction activities will be focused near DACs in the Poso Creek IRWM Region.
Measures to remedy or react to problems encountered during monitoring.	Semitropic will monitor the Well Destruction program and provide reports to DWR pursuant to the IRWM grant requirements..
Monitoring Frequency	The well destruction team will report progress monthly to Semitropic.
Frequency of performance evaluation and reporting.	Reporting will be accomplished through monthly reports to Semitropic.

6.5 Project 5– On-Farm Mobile Lab for Water Use Efficiency in support of Nutrient Management

The On-Farm Mobile Lab for Water Use Efficiency in Support of Nutrient Management project (Project) will expand the Mobile Lab services to an estimated 12,000 acres of irrigated farmland primarily within the North West Kern Resource Conservation District (NWKRCD) service area. Information generated from irrigation system evaluations will be compiled and presented in the NWKRCD annual report.

6.5.1 Baseline Condition

The existing Poso Creek IRWM Region comprises about 500,000 acres and includes 350,000 acres of irrigated agriculture. The Mobile Lab is operated by the North West Kern Resource Conservation District (NWKRCD) and has successfully served the Region for several years; the additional funding would provide specific on-site evaluations of irrigation system performance to enable the water users to improve water application efficiency and support their ability to achieve optimum nutrient application. The evaluation or assessment process involved in observing a working irrigation system includes monitoring various components of the system. The NWKRCD summarizes its Mobile Lab operations annually in reports to its Board of Directors and water districts where the evaluations occur.

6.5.2 Project Performance

Project 4 would provide on-farm Mobile Lab evaluations of irrigation systems through its Irrigation Water Management Services. Overall they will provide irrigation efficiency assessments to at least 12,000 acres in the Region. The Mobile Lab will provide Water Management information to allow landowners to reduce applied water while protecting crop yield and support reduced water movement below the root zone, thus reducing NO_3 entering production zones used for DAC supply. Assistance will be provided to agricultural landowners in the Region and other portions of Kern County that consists of on-farm irrigation system evaluations and would be available to farms of all sizes. Contact will be made directly with growers that might benefit from an on-farm analysis within water districts of Kern County. On-site follow-up assessments are made to evaluate the increase in efficiency due to implementation of recommended measures.

6.5.3 Assessment

Each benefit requires a slightly different assessment of the deliveries as described below.

Improve Water Use Efficiency – To evaluate the efficiency of each on-farm irrigation application system, experienced personnel perform an on-site evaluation of the irrigation system. Using established criteria, a distribution uniformity and efficiency rating is determined for the system in its current condition. Recommendations are made for any

needed system improvements. The actual improvement in water use efficiency is based on historical/measured efficiency compared to the modified system.

Support Nutrient Management – Changes in water use efficiency may reduce water supply application costs and supports reduction and per-unit costs of the applied nutrient.

With regard to quantification of actual project benefits "upon completion of the project", project benefits will be evaluated annually and contained in the annual report to the NWKRCD Board of Directors.

Exhibit 6.5-1
Project 5 Summary of Monitoring, Assessment, and Performance Measure

Project Goal	Desired Outcome	Output Indicators	Outcome Indicators	Measurement Tools and Methods	Targets
Increase water use efficiency.	Optimize water use by improved application system efficiency.	Reduced deep percolation. Number of acres evaluated.	Increase in irrigation application system efficiency.	Depending on system type: Per acre application and application distribution uniformity	5% reduction in applied water in areas of inefficient systems.
Support water quality	Reduced deep percolation of salts, fertilizers and pesticides.	Water quality measurements of water delivered for irrigation.	Compare irrigation water quality to ground water quality with historic records.	Direct samples of irrigation water and water from monitoring wells.	Improvement in Groundwater Quality, insufficient background studies are available to quantify a target.

In order to assure that Project 5 meets appropriate criteria for monitoring and reporting, a series of questions, as provided in the PSP are addressed in Exhibit 6.5-2.

Exhibit 6.5-2
Questions Based on Criteria Provided in Proposal Solicitation Package

Items	Explanation
Is the project contained in the proposal consistent with the Basin Plan?	Yes, the Tulare Lake Regional Basin Plan has objectives to decrease groundwater level declines and associated water quality degradation. Improved water conservation through improvement of irrigation system efficiency helps accomplish both objectives.
Are the identified monitoring targets appropriate for the benefits claimed?	Yes. Fertilizers have been identified as a source of NO_3 in the Region's drinking water. Reduction of water movement past the root zone supports reduction of NO_3 leaching into the aquifer.
Do the output indicators effectively track output? List the output indicators and describe relevance of indicators to track output of the project.	Yes, the NWKRCD is responsible for operating the Mobile Lab have been doing so and tracking results for many years. Mobile lab reports are presented Annually to the NWKRCD Board of Directors and contributing water districts. These reports contain summaries of services provided and estimated improvement in water use efficiency.

Are the outcome indicators adequate to evaluate change resulting from this project? Describe the importance of outcome indicators to evaluate change resulting from the project	Yes, there is a significant technical and scientific basis for the Mobile Lab evaluation techniques and judging their results through follow-up evaluations. Parameters used to evaluate irrigation systems are well documented in the literature. The outcome indicators are the same as those used on a regular basis to document efficient water management in the Southern San Joaquin Valley.
Is it feasible to meet the targets within the life of the proposal?	Yes, the capabilities and cost of the Mobile Lab operation are well established and well documented.

6.5.4 Reporting

Reporting for Project 5 will contain a description of the assessment techniques used, the number of sites and acreage evaluated and the estimated amount of water conserved.

Program data will be compiled and evaluated in an annual report to be prepared by NWKRCD that will be provided to Semitropic. The key elements of the Project 5 reporting are summarized in Exhibit 6.5-3.

Exhibit 6.5-3
Project 5 Summary of Monitoring Plan

Monitoring Plan Features	Monitoring Plan Details
Monitoring Parameters	Number of growers/acres evaluated Amount of water applied per acre
Location of facilities to be monitored and entity	Each district participating in the Project has an opportunity for growers within their district to be evaluated. District managers will coordinate with Mobile Lab operator who contacts growers directly.
Measures to remedy or react to problems encountered during monitoring	Mobile Lab operators will contact growers if measuring devices are not operational.
Monitoring Frequency	Mobile Lab– Daily when operating
Frequency of performance evaluation and reporting	Annually by Mobile lab operator and reported district boards by the NWKRCD

6.6 Project 6 – Smith Corner Sewer – Planning and Design

This project would fund planning and design of a wastewater collection system and trunk line that will connect the DAC community of Smith Corner to the City of Shafter/North of the River regional wastewater system. Monitoring of this project would comprise documenting that design of the system has progressed to the appropriate level of engineering development needed to replace failing septic systems so as to eliminate a source of groundwater contamination and health risk. No formal monitoring plan would be develop as the project does not include construction of operation phases. Reporting would be provided from the County of Kern to the Semitropic District for inclusion with Semitropic's reporting for other Projects.

6.6.1 Baseline Condition

The DAC community of Smith Corner is located south of the City of Shafter. The residents of Smith Corner currently rely on septic systems, most of which are quite old, with failing leach fields that have been identified as a source of groundwater contamination. Smith Corner is in the unincorporated area of Kern County and has no special district serving the residents' wastewater treatment needs. These communities have no funding to develop an engineering description of a project to connect them with the nearby City of Shafter/North of the River regional wastewater system. The engineering description is needed as a basis to seek funding for construction. The preliminary design performed some years ago demonstrated that a system serving Smith Corner could be readily extended to serve an additional five DAC communities. Monitoring of Project 6 would comprise independent verification that the design prepared conformed to accepted engineering practice for this kind of project.

6.6.2 Project Performance

Project 6 would allow planning and design of a wastewater collection system and trunk line that will connect Smith Corner to the City of Shafter/North of the River regional wastewater system. The project would be performed by the County of Kern under a sub-grantee agreement with Semitropic WSD in collaboration with the affected DAC s and community interest groups.

6.6.3 Assessment

The benefits of Project 6 would be assessed as described below.

Reduced Risk of Pollution of Existing DAC Water Supply –The County will document the number of households that would connect to the sewer system based on the system design. The County will compile the number of failures and pump-outs with in the expanded service area.

Maintain Reasonable Sewer Costs in a DAC – Smith Corner residents report that many are forced to have their septic tanks pumped regularly. The pump outs would decrease as households are connected to the sewer system. Avoided costs of septic system maintenance would be estimated.

With regard to quantification of actual project benefits "upon completion of the project", it is noted that direct benefits will not occur upon completion of project design, but rather funding of an actual project could be pursued with a design in hand. Upon completion of the actual project, it could take several more years, depending on a number of factors, to obtain a meaningful measure of Project benefits. The relationship among Project 6 goals and various elements of the assessment process are shown in Exhibit 6.6-1, below.

Exhibit 6.6-1
Project 6 Summary of Monitoring, Assessment, and Performance Measure

Project Goal	Desired Outcome	Output Indicators	Outcome Indicators	Measurement Tools and Methods	Targets
Reduced risk of pollution of existing DAC water supply.	Complete design of a project to connect Smith Corner to the municipal sanitary sewer system.	Design for connection to sewer system completed	All households connected to sewer system	Completion of design consistent with good engineering practice..	Sufficient design to pursue grants or other funding sources.
Maintain reasonable sewer costs in a DAC.	Minimize installation costs while improving waste disposal process.	Monthly bills to customers. Direct cost of connection to homeowners	Affordable monthly customer bills. Connections at minimal cost to homeowners.	Monthly billings. Service connection costs.	Affordable customer bills. 100 % connections in new service area.
Protect water quality in a DAC supply.	100% of samples meet water quality standards.	Water quality measurements of water delivered.	Consistently meet water quality standards.	Direct samples of delivered water.	100% of samples meet water quality standards

In order to assure that Project 6 meets appropriate criteria for monitoring and reporting, a series of questions, as provided in the PSP are addressed in Exhibit 6.6-2.

Exhibit 6.6-2
Questions Based on the Criteria Provided in Proposal Solicitation Package

Items	Explanation
Is the project contained in the proposal consistent with the Basin Plan?	Yes, the Tulare Lake Regional Basin Plan has goals to eliminate sources of pollution form septic systems. The connection of all homes in the new service area helps accomplish that goal.
Are the identified monitoring targets appropriate for the benefits claimed?	Yes. Preliminary engineering design documents are typically used as a basis for grant or other funding applications.
Do the output indicators effectively track output? List the output indicators and describe relevance of indicators to track output of the project.	Yes, design for expanding and operating sewage collection systems is standardized criteria. Design will provide for connection of all potential users. Connection to all homes in the new service area will allow discontinuance of septic system use and removal of outdated facilities. Sewer service costs and water quality sampling are indicators that are subject to clear legal standards.
Are the outcome indicators adequate to evaluate change resulting from this project? Describe the importance of outcome indicators to evaluate change resulting from the project	Yes, there is a significant historic record of failure of outdated facilities. Future operations will be subject to ongoing measurements. The outcome indicators are the same as those used on a regular basis by sewer service systems throughout the state. Adequate sewer service is essential to protect public health.
Is it feasible to meet the targets within the life of the proposal?	Yes, issues surrounding sewage collection systems design, new connections and septic system removal are well understood and are subject to well established design criteria and management techniques.

6.6.4 Reporting

Reporting for Project 6 will contain a description of the number of properties to be served by the sewer expansion, the estimated annual cost of existing septic systems (including maintenance) and engineering design progress. This information will be compiled and evaluated in an annual report to be prepared by Kern County that will be provided to Semitropic. The key elements of the Project 6 reporting are summarized in Exhibit 6.6-3.

Exhibit 6.6-3
Project 6 Summary of Monitoring Plan

Monitoring Plan Features	Monitoring Plan Details
Monitoring Parameters	Document progress in design. Completion of design to a proscribed level.
Location of facilities to be monitored and entity.	Smith Corner located south of the City of Schafer new connection facilities. County of Kern will monitor development of the design.
Measures to remedy or react to problems encountered during monitoring.	County will employ standard project management techniques to complete the project on time and within budget. The project will be designed using standard engineering design.
Monitoring Frequency	The County will provide monthly progress reports.
Frequency of performance evaluation and reporting.	Reporting will be accomplished through regular progress reports to Semitropic and the City of Shafter.