QUALITY ASSURANCE PROJECT PLAN

for

LARGE CAPACITY SEPTIC SYSTEM WASTEWATER DISPOSAL EVALUATIONS FOR SELECTED TRIBAL CASINO FACILITIES

Prepared by:

Robin A. Dalton, P.E.
Indian Health Service
Seattle District Office
2201 6th Avenue, Room 300
Seattle, WA 98121
ph: (206) 615-2793
fax: (206) 615-2793
e-mail: robin.dalton@mail.his.gov

Prepared for:

ENVIRONMENTAL PROTECTION AGENCY (EPA), REGION 10
UNDERGROUND INJECTION CONTROL (UIC) AND
GROUNDWATER PROTECTION UNIT PROGRAMS

August 2000

QAPP Management Identification and Approvals

Document Control Name: Large Capacity Septic System Wastewater Disposal Evaluations For Selected Tribal Casino Facilities

a. Responsible Official: Robin A. Dalton, P.E.

Approval Signature: _____

b. Project Quality Assurance Manager: Kelly Titensor, P.E.

Approval Signature: _____

Phone: (503) 325-3155
Address: Indian Health Service, Portland Area Office
1220 SW 3rd Avenue, Room 476
Portland, OR. 97204

Plan Coverage: This plan covers all of the field monitoring, laboratory, and measurement activities, including associated environmental data, conducted under the Environmental Protection Agency/State continuing cooperative agreement for the Underground Injection Control Program.

EPA Acceptance:

Organization Title: EPA, Region 10 Quality Assurance Unit

Address: 1200 Sixth Avenue, Seattle, WA 98101

1. Responsible Official: Jeff Kenknight
Title: Environmental Protection Specialist

Approval Signature: _____
Phone: (206) 553-0226

2. EPA Region 10 Quality Assurance Project Plan Consultant: Robert Melton

Approval Signature: _____
Phone: (206) 553-2147

TABLE OF CONTENTS

Section *Page Number*

LIST OF FIGURES

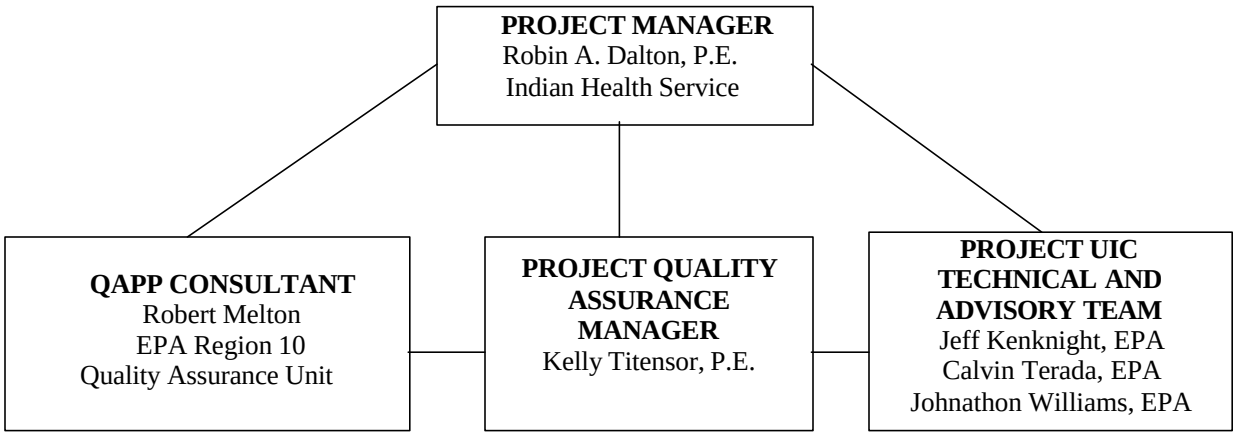
LIST OF TABLES

APPENDICES

1.0 PROJECT MANAGEMENT

1.1 Project/Task Organization

Figure 1 **ORGANIZATIONAL CHART**



Responsibilities of the project team:

Project Manager: Oversee the technical direction of the project, responsible for adherence to procedures in this plan and to work closely with the oversight team.

Quality Assurance Project Plan Consultant (QAPP Consultant): Provides the Project Manager, Project Quality Assurance Manager and Project UIC Technical and Advisory Team concerning this projects QAPP.

Project Quality Assurance Manager: Responsible for management of the Project Quality Assurance plan to insure that set technical standards, data analysis and reporting procedures are maintained.

Project UIC Technical and Advisory Team: Provide project technical and oversight review and input for UIC program requirements and considerations.

1.2 Problem Definition/Background

The EPA directly implements the UIC Program for Region 10 Indian Lands which was established under the Safe Drinking Water Act (SDWA) of 1974. Recent field work by EPA staff to inventory active injection wells on Indian Lands, as well as reports from other sources,

have identified several Class V injection wells, Subclass 5W32, Septic Systems (Drainfield Disposal Method), that serve more than 20 persons/day, that warrant an engineering review of the system design, construction plans and performance to-date, to determine whether or not these injection wells pose a threat to ground water.

Several of the Tribes within Region 10 have developed tribal enterprises on their reservations that are served by large capacity septic systems designed to receive and treat wastewater generated from these facilities. These enterprises are typically casinos that can include restaurant, hotel and other service facilities that generally serve a large transient population and can generate wastewater flows of up to 200,000 gallons/day (gpd).

The EPA, Region 10 is interested to determine whether or not these wells pose a threat to ground water quality and has requested technical engineering assistance from the Indian Health Service (I H S) to provide an engineering evaluation and review of a number of Tribally owned enterprises that utilize large capacity septic systems, or Class V, subclass 5W32 injection wells. The site evaluations are intended to provide information, data and recommendations to EPA to assist with the development of UIC Program policy.

1.3 Project/Task Description and Schedule

Project/Task Description: This project intends to provide an engineering evaluation of Tribally owned enterprises that use Class V, subclass 5W32 (Drainfield Disposal Method) injection wells for wastewater disposal and to report evaluation findings and recommendations to the EPA Region 10.

The proposed process for this project is to work through the first facility with an injection well to be evaluated in accordance with the project tasks identified below, and to then reassess our process, make refinements as necessary, and apply those refinements to the remaining injection wells to be evaluated.

Project tasks include the following items:

a. For each injection well to be evaluated, assemble any available pertinent information such as design data, soils reports, ground water information, injection well construction plans, or system monitoring information such as actual flows and/or water or wastewater quality testing.

b. Evaluate injection well design and engineering assumptions to determine system adequacy for facility(s) being served.

c. Evaluate injection well performance to-date and test as applicable with injectate, or soil, groundwater or wastewater sampling, or other tests that may be determined as necessary to determine injection well treatment performance.

d. Prepare a report for each injection well evaluated that presents the findings, identifies any threats to public health, and identifies possible corrective actions that the owner could undertake to address short and long term performance issues.

Schedule: The EPA is currently working to obtain the participation of eight to ten tribes within Region 10 to evaluate the performance of their respective Class V injection wells. The EPA has provided sufficient funding to the I H S for engineering staff and project support to accomplish the project evaluations within the next two years. The EPA will schedule meetings with each Tribe that will be participating in the injection well evaluation work in support of managing the UIC Program once the Tribe has agreed to participate. Due to the nature of this project, a detailed schedule as to which Tribal facility will be evaluated first, second and so on, is not realistic. Seasonal groundwater conditions and storm water runoff will also potentially affect the evaluation schedule. Therefore, a detailed schedule for the project within the two years of available funding will not be presented.

It is anticipated that sampling activity will first occur in August 2000 for the first injection well to be evaluated. It is estimated that additional injection well sampling will occur on average, once every two months for other injection wells to be evaluated.

1.4 Quality Objectives and Criteria for Measurement Data

Quality Objectives: Sample collection and testing data will be reviewed for: 1) collection of adequate representative sample, 2) comparability to the design expectations and/or background data, 3) precision, 4) accuracy (or bias), and 5) completeness.

Representative Sample: The sample volumes will be grab samples, with a sample volume as noted in Table 1.

Data Comparability: Data will be reported according to established Regional State Certified Laboratory data reporting protocols. Samples will be analyzed according to approved analytical procedures under the 40 CFR Part 136.

Precision and Accuracy: Selected field measurements will be made in duplicate by collecting co-located field duplicate samples and analyzing both samples separately. Field duplicates will be collected as defined in section 2.5.

The relative percent differences (RPDs) and the percent recovery will be calculated and reported for each parameter by the laboratory performing the tests.

Data Completeness: All samples collected are to be analyzed with appropriate supportive documentation. A completeness goal of 100% is desired but it is recognized that accidents or sample matrix problems may preclude achievement of this goal.

Table 1

Analyte/Sample Testing, Container and Handling Specifications

Parameter	Number of Samples	Matrix	Minimum Detection Limits	Method	Container (1)	Preservation	Sample Volume	Holding Time
Ammonia as Nitrogen (3)		Water	0.05 mg/l	350.1	P	H2SO4 to pH=2, 4°C	500ml	28 days
Coliform, Total & Fecal		Water		SM 9221E/9222 D	P,G	Na2S2O3, Cool, 4°C	120ml	6 hours (2)
5 Day BOD		Water	2 mg/l	405.1	P,G	4°C	1 Liter	24 hours (2)
Total Suspended Solids (4)		Water	2 mg/l	160.2	P,G	4°C	500ml	7 days
Total Kjeldahl Nitrogen (TKN), (3)		Water	0.1 mg/l	351.2	P	H2SO4 to pH<2 @ 4°C	500ml	28 days
Nitrate as Nitrogen (4)		Water	0.1 mg/l	300.0	P	4°C	500ml	24 hours (2)
Nitrite as Nitrogen (4)		Water		354.1	P	4°C	500ml	24 hours (2)
Total Oil & Grease		Water		413.1/413.2	G	HCL	1 Liter	28 days
Non Polar Oil & Grease		Water		413.2	G	HCL	1 Liter	28 days

(1) Key: P (plastic), G (glass)
(2) Time in which samples must be received by the Laboratory after collection.
(3) Both analyte tested from one 500ml sample volume.
(4) All three analyte tested from one 500ml sample volume.

1.5 Special Training Requirements/Certification

No specialized training is required. The Project Manager will work the laboratory selected to perform testing to obtain any basic sample collection knowledge required to accomplish sample collection and transportation to a testing facility. For on-site testing equipment for tests as noted in Table 2, manufacturers instructions will be followed as to the proper operation of any equipment.

1.6 Documentation and Records

All documentation and records regarding sample collection, handling and transporting to a testing facility will be maintained in a field log for each site evaluated. This information will be incorporated into a trip report written by the Project Manager. All trip reports will be appended to a final report that covers the overall engineering review findings, conclusions and recommendations for each injection well evaluated. Documentation and records kept in the field notes will include the following items with regard to sample collection, handling and transportation:

- Collection dates, time, the conditions on-site, method of collection, storage and transportation will be documented. Pertinent information for collected samples will be logged on the Chain-of-Custody form.

- Weather conditions on-site during sample collection.

- Define any mitigating factors that occurred on-site and may have affected the collection process.

The final Report for each site evaluation along with all attachments will be submitted to EPA Region 10 for use in managing the UIC Program and for filing.

2.0 MEASUREMENT / DATA ACQUISITION

2.1 Sampling Process Design (Experimental Design)

To evaluate the performance and treatment from Class V, subclass 5W32 (Drainfield Disposal Method) injection wells for wastewater disposal as discussed in section 1.3, the general approach to be used will be to collect background data for existing groundwater quality and from the vadose zone around the injection well to determine contaminant levels that are associated with wastewater from the injection wells to be evaluated.

Additional sampling of wastewater quality will be obtained from the end-of-the-pipe of the treatment portion of the wastewater system from observation tubes in the drainfield or valve boxes if available, to provide information as to how well the treatment system is working prior to disposal by the injection well.

Table 2 lists the contaminate samples to be collected and tested for with respect to where samples will be collected from to evaluate the injection well.

Table 2
Injection Well Sample Collection Plan & Analyte Tests

Analyte samples to assess existing groundwater quality and injection well wastewater quality from vadose zone (Up & Down Stream from the Injection Well):

Laboratory Analyte	Field Analyte
Total Kjeldahl Nitrogen (TKN)	Conductivity
Ammonia as Nitrogen	pH
Nitrite & Nitrate as Nitrogen	Dissolved Oxygen
Fecal Coliform	Temperature (^{o}C)
Oil & Grease	

Laboratory analyte samples to assess wastewater treatment system performance (Effluent from the Treatment System Prior to Percolation):

- Laboratory and Field Analytes as noted above.
- Five-day Biological Oxygen Demand (BOD_5).
- Total suspended solids (TSS).

Analyte samples to assess existing groundwater quality and injection well wastewater quality from vadose zone:

To assess any impacts to groundwater from the injection well, a water sample will be collected from the on-site water source well (if one exists, or is within a reasonable distance) for testing in accordance with analyte as shown under the above heading in Table 2. In addition, any previous well water samples will be collected and reviewed for baseline information regarding the local groundwater quality.

For sampling in and around subclass 5W32 injection wells, this project is planning to install monitoring wells to allow collection of the analyte listed under the above heading in Table 2. For this project, the sampling frequency will be a one time event, representing a snapshot in time as to how the injection well is performing and affecting the groundwater. It is anticipated that each injection well evaluated will have eight (8) monitoring wells installed for use in collection of groundwater samples within the saturated zone at the top of the water table, and within the groundwater table, in and around the injection well. Consideration of the surface topography and expected natural groundwater flow will be considered in the placement of the monitoring wells.

The monitoring wells will allow for additional future monitoring of groundwater quality which may change due to seasonal factors, changing groundwater depths and wastewater flow variations which may occur during the year.

Depending on the performance of the monitoring wells, other sampling methods for collection of groundwater may need to be considered and the budget constraints therein.

Laboratory analyte samples to assess wastewater treatment system performance:

To assess the wastewater treatment system performance prior to discharging wastewater into the ground through the injection well, analyte as shown under the above heading in Table 2 will be tested from wastewater effluent collected at the end of the pipe prior to discharge to the injection well.

All samples identified for laboratory testing, as noted in Table 2, will be accomplished by a State certified, licensed laboratory. Field testing will be accomplished by the Project Manager with appropriate field test equipment.

For a listing of the sampling equipment planned for use, see Appendix D.

2.2 Sampling Methods Requirements

Water source well sample collection for analytes (If one exists and is reasonable)

Sample collection should occur immediately after the well has been purged to minimize sample chemistry alteration caused by exchange of gases with the atmosphere and/or interaction with well casing material. The rate at which a well is sampled should not exceed the rate at which the well was purged. Ideally, the rate of sample collection should be approximately the same as the

actual groundwater flow rate or well yield. If a well is purged to dryness or purged such that it takes two hours for recovery, the well should be sampled as soon as a sufficient volume of groundwater has entered the well. The process for well purging and sampling actions will be documented as discussed under section 1.6 Documentation and Records.

To obtain the representative sample, the steps presented below should be followed:

- Collect the sample in the appropriate sample container for the analytes of concern. Use only the containers for analytes that have been provided by or approved by the laboratory doing the testing. Follow all instructions provided by the laboratory for the collection, handling and storing of the samples.
- Do not try to sterilize the tap/collection point.
- Collect raw water directly from the tap after removing any appurtenances, such as a hose, aerators or a diverter, leaking faucets that permit water to run over the outside of the faucet, or faucets that supply water treatment equipment or storage tanks. The sample point should be selected to allow a good sample of raw untreated water.
- After purging of the well, adjust the tap flow, taking into account the type of sample being collected and to avoid splashing.
- Hold the container at the base, keeping hands away from the container neck. Be sure that the inside of the container cap is protected and does not touch anything.
- After sample collection, record all pertinent information on the "Chain of Custody" form and sample container labels.
- Package samples for transport to the lab. Sample collection time must consider timing for delivery such that samples can be tested within the respective timeframes.

Injection Well Sampling Methods

Various types of on-site sewage wastewater treatment with injection well disposal will be evaluated as part of this project. Each treatment system should have one or more of the basic components listed below (depending on the design) followed by a Class V, subclass 5W32 (Drainfield Disposal Method) injection well:

- Septic Tank
- An aerobic component made of various media
- Anoxic component such as an upflow filter

Sampling procedures for the treatment system are as follows:

- Record in the field notebook all information as discussed in section 1.6.
- Remove lids covering the treatment system components for influent and effluent sampling as discussed in section 2.1.
- Use dedicated bailers for each component of the treatment system being sampled.
- Starting at the least contaminated component of the treatment system, collect a sample from the component sampling port to measure field parameters.
- Record the field parameters in the field notebook.
- Starting with the least contaminated component, collect the effluent sample from the bailer into the appropriate sample container as identified on the Chain-of-Custody form. Follow all

instructions provided by the laboratory for the collection, handling and storing of the samples.
- Replace all sample point access covers and leave the site as it was found.

Sampling procedures for the injection wells are as follows:

- Record in the field notebook all information as discussed in section 1.6.
- Collect samples from the monitoring wells using a peristalic pump with new tubing for each sample collected.
- Collect the sample in the appropriate sample container for the analytes of concern. Use only the containers for analytes that have been provided by or approved by the laboratory doing the testing. Follow all instructions provided by the laboratory for the collection, handling and storing of the samples.
- Complete the Chain-of-Custody form.
- Secure and protect the monitoring well after sample collection.

2.3 Sample Handling and Custody Requirements

Sampling Containers, Preservation and Logistics

All sampling containers, preservation and holding times will be in accordance with Table 1. All sampling containers will be provided by the laboratory that will perform the tests, and managed in accordance with laboratory instructions. All container identification shall correspond to the container identification in the Chain-of-Custody form.

The project manager is responsible for sample collection and transport coordination and logistics.

Samples are anticipated to be transported by ground transportation by the project manager. To meet time constraints (as noted in Table 1), testing facilities may be selected for location within the vicinity of each site evaluated to meet test timing requirements. If the non-bacteria samples are not transported on the day they were collected, they must be stored in a designated refrigerator maintained at 4 ^{o}C (39.2 F) until shipped. All samples should be shipped in the ice chests provided by the laboratory and in accordance with protocols and instructions from the certified laboratory performing the tests. The samples should be packed in ice (or "blue ice") to maintain a temperature of 4 ^{o}C during the shipping period.

The completed Chain-of-Custody form will accompany the samples at all times.

2.4 Analytical Methods Requirements

The Project Manager will obtain the documents listed below from each lab used for testing:

1. Laboratory Quality Assurance (QA) Plan which meets EPA Region 10 guidelines.
2. Standard Operating Procedures (SOPs) for each measurement procedure and for sample and document control in the lab.

Each laboratory that is utilized for this projects testing needs will provide analytical and data quality objectives for the analytes to be tested for under this project.

2.5 Quality Control Requirements

Objectives for precision, accuracy, representative sample, comparability and completeness were previously summarized in section 1.4. These Data Quality Objectives (DQOs) are established to ensure the project meets it's quality objectives. Project DQOs may be revised if future funding allows increased number of tests and testing episodes. Changes in DQOs will be submitted to EPA for approval before implementation should additional testing become necessary.

Quality Control (QC) procedures for each sample analysis, or measurement technique will be in accordance with protocols and instructions from the certified laboratory performing the tests. Each laboratory performing tests will be asked for the QC procedures that they will be following that are included with the test costs.

Any changes to the sample collection protocols will be documented as per section 1.6, or via the Sample Alteration Form appended to this QAPP.

Due to the limited scope of test events to be accomplished under this project, the frequency of analysis for each type of QC check will be minimal.

Field duplicate samples will be collected as noted below. Duplicate samples will only be provided for TKN and Fecal Coliform.

- From the "upstream" and "downstream" monitoring well placed for each injection well.
- From the end-of-the-pipe wastewater flow, prior to the injection well.
- From the groundwater well (if one exists or is used based on proximity to injection well).

2.6 Instrument/Equipment Testing, Inspection, and Maintenance Requirements

This project will use instruments and/or testing equipment to measure the field analytes noted in Table 2. Instruments/equipment will be operated, calibrated and maintained in accordance with the manufacturers instructions prior to each use as required. The project manager will operate the instruments and/or equipment necessary for collection of field samples in accordance with the correct operation, calibration and maintenance procedures.

Each testing laboratory used will follow the calibration, testing and preventive maintenance procedures specified in their approved QA plan and SOPs for work performed by the lab as noted under section 2.4, and for QC as noted under section 2.5.

2.7 Inspection/Acceptance Requirements for Supplies and Consumables

The project Manager will be responsible for the inspection and acceptance of all supplies used under this project. Supplies include but are not limited to, sampling equipment and

appurtenances as noted in Appendix D, and for sample containers received from laboratories for use in sample collection.

2.8 Data Acquisition Requirements (Non-direct Measurements)

Data necessary for project implementation or decision making that are obtained from non-measurement sources is described under section 1.3a. Acceptance criteria for the use of such data is for the purpose of conducting an engineering evaluation of existing facilities and their performance to date. Some of the data may be used in the project for support of background data we intend to collect through sample collection. Discussion of limitations for the use of the data resulting from uncertainty in its quality would be presented in the evaluation report to be prepared for each site.

Required longitude and latitude information for each site will be derived using USGS topographic maps or by GPS coordinates taken on site by the project manager. Location information will be used later to identify respective injection well sites.

2.9 Data Management

The project manager is responsible to collect and report data on the various sites evaluated. All observational data and field measurements will be recorded at the time of sampling and analysis.

Data collected will be attached or incorporated into each sites evaluation report and reviewed by the Project UIC Technical and Advisory Team as defined under section 1.1.

Forms and checklists appended to this QAPP are as follows:

Appendix A: Chain of Custody Form
Appendix B: Sample Alteration Form
Appendix C: Corrective Action Checklist
Appendix D: Sample Collection Equipment List

Data management for this project is the responsibility of the project manager.

3.0 ASSESSMENT / OVERSIGHT

3.1 Assessments and Response Actions

The EPA is currently working to obtain the participation from tribes within Region 10 to evaluate the performance of their respective Class V injection wells.

Except for the initial coordination and closeout meeting with the participating tribes, the project manager will be solely responsible for the completion and coordination of all activities associated with the engineering evaluation of the systems to be reviewed, compilation of the data collected, and the preparation of an evaluation report for each site reviewed.

This project is being approached as a cooperative process where participating Tribes have agreed to review their UIC related facilities and work with EPA to address any deficiencies that may place them in non-compliance with the UIC program.

Appended to the QAPP are a Sample Alteration Form as Appendix B, and a Corrective Action Checklist as Appendix C. These will be used to report problems that occur in the field or laboratory, and to document changes in the location of nature of samples collected in the field. In addition, each laboratory will provide a Case Narrative with the Lab Data Report which will specify any problems which occur during the measurement of project samples.

3.2 Reports to Management

The Project Manager is responsible for report production and distribution. One report will be prepared for each injection well evaluated and copies provided to EPA, I H S and the respective Tribe reported on.

4.0 DATA VALIDATION AND USABILITY

4.1 Data Review, Validation, and Verification Requirements

All data is subject to review by the Project UIC Technical and Advisory Team as defined under section 1.1, and the QAPP consultant. Decisions to reject or qualify data are made by the Project UIC Technical and Advisory Team with concurrence of the QAPP consultant.

4.2 Validation and Verification Methods

The project manager is the primary source for validating and verifying data, including the chain of custody for data throughout the project. The project manager is responsible to address any concerns with respect to the validity of methods with the Project UIC Technical and Advisory Team to the degree possible within the time and budget constraints of the project.

4.3 Reconciliation with User Requirements

Evaluation results and completeness with regard to collected data will be undertaken by the QAPP consultant and EPA Responsible Official during the initial data sheet review process.

APPENDIX A

Chain of Custody Form

APPENDIX B

Sample Alteration Form

Sample Alteration Form

Project Name: _____

Material to be Sampled: _____

_____

Measurement Parameter: _____

_____

Standard Procedure for Field Collection & Laboratory Analysis (cite reference):

_____
_____
_____

Reason for Change in Field Procedure or Analysis Variation:

_____
_____
_____
_____

Variation from Field or Analytical Procedure:

_____
_____
_____

Special Equipment, Materials or Personnel Required:

_____
_____
_____

Initiators Name: _____ Date: _____

Project Manager: _____ Date: _____

Project QA Manager: _____ Date: _____

APPENDIX C

Corrective Action Checklist

Corrective Action Checklist

Project Name: _____

Sample Dates Involved: _____

Measurement Parameter: _____

_____

Acceptable Data Range: _____

_____

Problem Areas Requiring Corrective Action:

_____
_____
_____
_____
_____

Measures Required to Correct Problem:

_____
_____
_____
_____
_____
_____

Means of Detecting Problems and Verifying Correction:

_____
_____
_____
_____
_____

Initiators Name: _____ Date: _____

Project Officer: _____ Date: _____

QA Officer: _____ Date: _____

APPENDIX D

Sample Collection Equipment List

Sample Collection Equipment List

General	Safety	Emergency
• **Field Notebook.** • **Digital Camera.** • **Handheld GPS.** • **Clipboard.** • **Flashlight & Spare Batteries.** • **Sampling Equipment.** • **Sample containers.** • **Ice Chest w/cool packs.** • **Disinfectant solutions and equipment.** • **Tape Measure (100' rag, 25', & pipe dia. Tape).** • **Hand Level.** • **Compass.** • **Shovel.** • **Machete.** • **Mirror.** • **Pole for Septic Tank sediment and scum measurements.** • **Testing equipment for pH, temp., conductivity & dissolved oxygen.** • **Misc. wrenches, screw drivers & pliers.** • **Well sounder.** • **Peristalic Pump.** • **Duct Tape**	• **Rubber Boots.** • **Rain gear.** • **Rubber & work gloves.** • **Soap, towels, and water for Washing hands.** • **Eye protection.**	• **First Aid Kit.** • **Phone numbers.** • **Cell Phone.**