ATTACHMENT 10

ATK LAUNCH SYSTEMS
GROUND WATER SAMPLING AND ANALYSIS PLAN
FOR THE BACCHUS FACILITY

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ATK LAUNCH SYSTEMS
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1.0 PURPOSE AND SCOPE

This plan specifically addresses the sampling of ground water monitoring wells at ATK Launch Systems Bacchus, Utah-based Operations. The location, number, and description of each well have been submitted previously to the Utah DWMRC. The plan addresses procedures for taking ground water samples, shipping the samples for analysis, and methods for analyzing samples. Groundwater in many areas throughout the Bacchus facility has historically contained elevated concentrations of various solvents and explosive constituents. The goal of this plan is to describe how collect groundwater samples that are representative of in-situ groundwater conditions and to minimize changes in groundwater chemistry during sample collection and handling.

The purpose of this chapter is to present (1) techniques or procedures which are common to all sampling methods presented in this document; (2) chain of custody documentation requirements; (3) sample handling methods; (4) field quality control procedures; and (5) records management requirements. All of these topics are referred to throughout the document; thus, they are discussed here to avoid excessive repetition in each chapter.

1.1 DECONTAMINATION PROCEDURES

Decontamination of sampling equipment is a necessary and important portion of the sampling protocol. Decontamination of sampling equipment reduces the probability of cross-contaminating samples and sampling stations or monitoring wells. All equipment and instruments utilized in the sampling process must be properly decontaminated prior to collection of the first sample during a given sampling campaign, between subsequent samples, and following collection of the final sample of a given sampling campaign.

Proper decontamination cannot be overemphasized. It is critical if representative samples are to be collected and if contamination or dilution of samples is to be avoided. Improper decontamination could result in costly re-collection and re-analysis of samples.

1.1.1 Cleaning of Sensitive Equipment

The term “sensitive equipment” herein refers to scientific instruments used to measure field water quality parameters at monitoring wells. These instruments include pH and temperature meters and electrical conductivity meters. These instruments should be cleaned carefully due to their delicate construction and inability to withstand high-temperature steam cleaning.

If used at a well, sensitive equipment will be cleaned using only distilled water as the rinse. A soft cloth and a soft-bristled plastic scrub brush can be used to remove resistant surface residues. Extreme caution will be used when cleaning scientific instruments to avoid abrasion, bending, or cracking of the instrument probes, cables, and moving parts. Any physical damage to the instruments could result in incorrect readings which may not be detected until after the sampling round has been completed, thus possibly requiring re-sampling of the station.

1.2 DOCUMENTATION OF CHAIN OF CUSTODY

Water-quality sampling, preservation, shipment, and documentation must comply with the appropriate protocol to ensure that data are representative of in-situ conditions. Therefore, detailed records need to be maintained to provide both quality assurance and quality control in the sampling program. The term "chain of custody" refers to the process of ensuring the integrity of a sample from the time of collection to the time of data reporting. This includes the ability to trace the possession and handling of the sample from the point of collection in the field to the analytical laboratory, and includes the analysis and final disposition of the sample.

A sample is considered to be in a person's custody if it is (1) in a person's physical possession, (2) in view of the person after he has taken possession, (3) secured by that person so that no one can tamper with the sample, or (4) secured by that person in an area which is restricted to authorized personnel. The components of chain of custody include analysis request forms, sample labels, chain of custody forms, field-log forms, and custody seals (commercial shipments only). The procedures for their use are described in the following sections.

1.2.1 Analysis Request Forms Prior to the start of each sampling campaign, an Analysis Request Form (ARF) will be prepared for each monitoring well. A typical ARF is shown in Figure 1-1. The ARF includes information on each specific bottle. Each bottle type corresponds to a given set of analyses as defined by the laboratory. The analyses to be performed may change between sampling campaigns as required.

The ARF will specify the quantity and type of bottles to be collected from each sampling site and the chemical preservative required (if any) in each bottle. The ARF will be used to ensure that the proper sample labels are present for each sampling site. Information on the ARF includes (1) the collector's signature, (2) field sample number, and (3) date sampled. The ARF will also dictate (1) the number of each bottle type included in the sample, (2) the preservative and field treatment used for each bottle, and (3) the requested analyses to be performed on the contents in each bottle.

Blind duplicates, field blanks, and trip blanks will have individual ARFs.

Figure 1-1

ATK LAUNCH SYSTEMS
Bacchus Facility, P.O. Box 98, Magna, UTAH 84044

ANALYSIS REQUEST FORM

SAMPLE NUMBER: _____ DATE: _____ SAMPLER:_____

ANALYTICAL LABORATORY: ATK Launch Systems Environmental Testing Laboratory

Bottle Number	No. of Containers	Preservative/ Treatment	Requested Analysis
1	1	4 degrees C	NITRATE/NITRITE (EPA 300.0)
3	1	4 degrees C	HMX/RDX (SW-846, 8330 Mod) NG/DING (SW-846, 8330 Mod)
9	1	4 degrees C	Perchlorate (EPA 314.0) Conductivity (SW-846, 9050A)
11	3	0.2 ml HCL	Volatile Organics (SW-846, 8260B)

1.3.2 Sample Labels Sample labels are prepared in advance to prevent misidentification of samples to ensure correct bottles are filled. Gummed paper labels are adequate and will include spaces for recording (1) sample number, (2) preservative information, (3) date and time of collection, and (4) name of the collector. This information will be written with an indelible marker.

As the sample is collected the date, time, and collectors name will be recorded on the sample labels. Labels are then attached to sample bottles before leaving sample site.

1.3.3 Chain of Custody Forms To establish the documentation necessary to trace sample possession from the time of collection, a chain of custody form will be filled out and accompany the samples recorded on the form. A typical chain of custody form is illustrated in Figure 1-2.

After the collected samples are recorded in the spaces provided on the chain of custody form, the collector will sign the form and place it with the samples to await transportation to the laboratory. Because the samples are in the custody of the collector, he will not leave the samples unattended at sampling sites or at other locations where the samples may be tampered with. When the samples are relinquished, the collector will have the individual taking custody of the samples sign the received by block, enter the date and document the time on the chain of custody form.

1.3.4 Custody Seals Custody seals are used to detect unauthorized tampering with the containers used to ship the samples commercially. The seal must be attached to the shipping container such that it is necessary to break the seal to open the shipping container. The custody seal must be affixed to the shipping container before the samples leave the custody of the sampling personnel. Shipping tape should be placed over the custody seal to prevent accidental breakage or removal during handling of the shipping containers. Figure 1-3 is an example of a typical custody seal.

1.3.5 Sampling Log Forms

Figure 1-4 is an example of a groundwater Hydrasleeve sampling field form to be used each time sampling operations are performed. Information to be recorded on the groundwater sampling log will include, but not be limited to:

- Identification of monitoring well
- Signatures of sampling personnel
- General observations or unusual situations
- Date and time of sampling
- Water-level data
- Total well depth
- Hydrasleeve depth sampled

When a Field blank (FB) is taken at the current well site, the sampler will annotated the sample number and time the field quality sample was taken in the comment section of the Sampling Log Form.

Figure 1-2

ENVIRONMENTAL LAB WORK REQUEST Page ____ of _____

ATK Launch Systems

Lab:	Collected by:	Company:	Title:
P.O. No:		Collection Location:	Contact:
		Material Sampled:	EMAIL:

SAMPLE INFORMATION

SAMPLE NUMBER	DATE	TIME	METHOD	# OF BOTTLES	PRESERVATIVE	ANALYSIS REQUESTED

CHAIN OF CUSTODY

RELINQUISHED BY	RECEIVED BY	DATE	TIME

Figure 1-3

Custody Seal

SAMPLED BY _____ _____

SAMPLE NUMBER

DATE _____ TIME _____

Figure 1-4
GROUNDWATER SAMPLING LOG
ATK Launch Systems Inc.
Bacchus Facility

Well # _____ Signatures (s)
Date _____
Time _____ _____

SAMPLED USING HYDRASLEEVE, DEPTH SET @ =_____

Well Depth (WD) = _____ Depth to water = _____

Blind Duplicate Collected _____ Time _____

WELL HEAD INSPECTION

Date: _____

Time:_____

Temp/Weather:_____

	Yes	No
Cracks in the concrete apron	_____	_____
Well Covered	_____	_____
Well # on Well Cover or casing	_____	_____
Lock to secure cover to casing	_____	_____
Well Cap (Cap to cover PVC)	_____	_____

Any items needing repair/replacement should be noted below. What was repaired/replaced, when it was repaired/replaced, and who made the repair/replacement should also be noted.

Comments:

_____
_____
_____
_____

1.4 SAMPLE HANDLING PROCEDURES

When samples are collected, those requiring the removal of particulate matter and the addition of chemical preservatives will be treated as described in the following sections. Also discussed are methods pertaining to sample packaging and shipping.

1.4.1 Sample Preservation The Analysis Request Form (ARF) (Figure 1-1) indicates the types of preservatives required for each sample bottle. All samples will be cooled to °C or less, but not frozen upon collection regardless of their chemical preservation unless advised otherwise.

Chemical preservatives are listed on the ARF by type and amount of preservative required. Chemical preservatives may include sulfuric acid (H_2SO_4, 50%), nitric acid (HNO_3, 50%), and hydrochloric acid (HCL, 50%). All of the chemical preservatives are corrosive and must be treated with caution. Sampling personnel will avoid skin or eye contact with the preservatives and wear safety glasses and disposable waterproof gloves for protection at all times during handling. Sample preservation will be performed in an area where large quantities of water are available for irrigation; should skin or eye contact occur. The sample preservation will be conducted in a well-ventilated area to prevent buildup of dangerous fumes produced by chemical reactions.

Chemical preservatives will be added to bottles prior to sample collection, if practical, to facilitate mixing of the preservative with the sample and to allow immediate "fixing" of the samples following collection. The sample collection bottles will have a minimum amount of preservative solutions as specified on the ARF. Preservative solutions will be transferred from storage bottles to sample collection bottles by using dedicated pipettes. One pipette will be used for each type of liquid preservative and under no circumstances will they be used to transfer more than one type of compound. Only one preservative solution will be open at any given time during bottle preservation to prevent accidental mixing of preservative solutions.

1.4.2 Sample Shipping Procedures Immediately following the collection of samples, the bottles will be placed in ice chest or refrigerator for storage and subsequent transport to the analytical laboratory. Prior to shipment, bottles and shipping containers will be prepared in a manner which will enable sample bottles to arrive undamaged and suitable for accurate analysis. Sample bottles will be shipped to the analytical laboratory to ensure that holding times may be satisfied.

1.4.2.1 Sample Packing and Shipping Container Preparation Samples collected during each day's sampling operations will be placed in ice chest shipping containers with crushed ice and or ice packs assembled in a central area prior to shipment.

Glass bottles will be placed in protective foam sleeves and all bottles will be checked for cap tightness. Caps will be tightened as necessary to prevent any sample leakage during transport. Sampling personnel will inventory the sample bottles from each sampling site prior to shipment to ensure that all samples listed on the ARF are present.

If containers are broken during shipment replacement samples will be collected within 3 days. ATK may also contact the Division regarding the need for replacement samples based on data needs.

1.4.2.2 Shipping Instructions Each shipping container will contain an ARF listing required analyses for each sample bottle within the container. After entering all required information on the form, sampling personnel will send the ARF to the laboratory along with samples.

A Chain of Custody form will accompany each shipment of samples. Sampling personnel will enter all necessary information on to the form. Sampling personnel will sign their name and the time relinquished in the proper location on the form. Following completion of the form, sampling personnel will obtain a copy of the Chain of Custody for subsequent filing.

The appropriate copies of the analysis request and chain of custody forms will be placed inside a waterproof plastic bag and then placed inside the shipping container prior to sealing of the container when shipping commercial. Care will be taken to ensure that the correct forms are included in each cooler.

An adhesive shipping label addressed to the analytical laboratory and containing the return address of the shipper will be securely affixed to the top center of the shipping container when shipping commercially. The container will be securely closed and latched, and an adhesive custody seal completed by the shipper with his signature and the date will be placed across the transition between the container body and lid in such a way that it cannot be opened without breaking the seal. This will notify the analytical laboratory if samples have been tampered with during shipment. After applying address and custody labels, clear plastic sealing tape will be applied liberally to the container to secure the lid to the body to prevent it from opening during shipment. Tape will also be used to secure the address label and custody seal to the shipping container.

1.5 FIELD QUALITY CONTROL

A fundamental part of a water-quality monitoring program is the establishment of quality control programs to ensure the reliability and validity of field data. Quality control procedures will include the collection of field blanks, trip blanks, and blind duplicates. These samples are collected as an aid in determining sample biases introduced by bottle handling, laboratory procedures, transportation procedures, and random errors.

The number of quality control samples to be collected during a groundwater sampling campaign will be equal to ten percent of the total number of monitoring wells (rounded to the nearest whole number). For example, if there are 73 monitoring wells, 7 quality control samples of each type listed below will be collected. Wells with specific sampling problems or issues may be selected for quality control or the wells selected for quality control wells may be selected randomly. The random selection process will be accomplished by drawing numbers from a container or by using random number generator. The method used during each event and the well(s) selected will be documented in the sample report.

1.5.1 Field Blanks Each time a quality control sample is collected, a field blank will also be collected. The field blank consists of distilled water collected directly from the distilled water containers. The field blank is submitted for analyses to confirm the purity of the commercially obtained distilled water and thus monitor the possibility of false positive results in the equipment blank and to evaluate possible contamination of the water in ambient air by VOCs during sampling. Distilled water for a field blank will be collected from the group of bottles of distilled water used for the equipment blank. The same types and number of sample bottles used for the equipment will be used for the field blank. Field blanks will be labeled FB-001 for the first blank, FB-002 for the second blank, etc. Field blank pH, electrical conductivity, and temperature will be recorded on the field log along with other information as appropriate.

1.5.2 Trip Blanks Trip Blanks will be included with each shipping container of samples to be analyzed for VOC's. Analysis of trip blanks shows whether a sample bottle was contaminated during

shipment from the manufacturer, while in bottle storage, in shipment to the laboratory, or during analysis at the lab. Trip blanks consist of three 40 ml vials preserved with 0.2 ml of HCL and filled with distilled water sealed in a sample bottle. One trip blank set will accompany each cooler of samples sent for VOC analysis. Trip blanks will be labeled TB-001 for the first blank, TB-002 for the second blank, etc. Appropriate information will be recorded on the chain of custody for each trip blank.

1.5.3 Blind Duplicates A blind duplicate consists of a duplicate sample collected from a monitoring well. These samples are used to evaluate laboratory precision. This duplicate is provided with an arbitrary sample number and is, therefore, submitted "blind" to the laboratory without their knowledge of which station the sample was obtained from. The dual set of samples from the same sampling location allows detection of possible laboratory bias.

During each annual sampling campaign, ATK will randomly select ten percent of the monitoring wells being sampled and collect a blind duplicate from those wells. Specific wells may also be selected based on data needs. Each blind duplicate will be given a false identification number (e.g., GW-124) which will appear to correspond to an actual monitoring well. This method of numbering will be used to prevent laboratory personnel from knowing the source of the duplicate sample.

A suite of sample bottles identical to those used at the monitoring well being duplicated will be used for each blind duplicate. Both the blind duplicate and "real" sample bottles will be filled at the same time and in an identical manner according to standard sampling procedures. Both sets of sample bottles will be handled, packed, preserved, and shipped in the same manner and in the same or similar shipping container(s).

Blind duplicates will be labeled using a "GW" heading and a number which is greater than those used for "real" samples. Table 1 lists numbers historically used (through December 1986) for blind duplicates and corresponding "real" samples. Successively higher three-digit numbers will be used to denote blind duplicate collected at monitoring wells. Sampling personnel will document all blind duplicates collected and the "real" samples that they correspond to. This will allow subsequent correlation of the water chemistry data.

Table 1

Groundwater Blind Duplicate Summary

Blind Duplicate Number	Sample Number	Date (Mo/Yr)
GW-101	GW-11	12/85
GW-102	GW-36	12/85
GW-103	GW-37	12/85
GW-104	GW-28	12/85
GW-105	GW-09	01/86
GW-106	GW-13	02/86
GW-107	GW-04	02/86
GW-108	GW-14	03/86
GW-109	GW-06	03/86
GW-110	GW-24	03/86
GW-111	GW-33	03/86
GW-112	GW-07	06/86
GW-113	GW-12	06/86
GW-114	GW-25	06/86
GW-115	GW-34	06/86
GW-116	GW-14	09/86
GW-117	GW-15	09/86
GW-118	GW-36	09/86
GW-119	GW-05	09/86
GW-120	GW-10	12/86
GW-121	GW-35	12/86
GW-122	GW-38	12/86
GW-123	GW-26	12/86

1.6 ACQUISITION AND ORDERING OF SAMPLING SUPPLIES

Prior to beginning a sampling campaign, sampling personnel will check all equipment to ensure it is in proper working order. Personnel will also inventory all disposable sampling supplies and ensure that quantities required to complete the upcoming sampling campaign are available. Equipment will be maintained and repaired by sampling personnel in accordance with the manufacturer's instructions.

Disposable sampling supplies will be ordered in sufficient quantity to provide an excess of each item required to complete the sampling round. Disposable supplies include sample bottles, shipping containers and packing material, required forms and labels, chemical preservatives, buffer and calibrating solutions for pH and conductivity meters, filters, disposable gloves and other safety equipment, distilled water, and disposable paper towels. Sample bottles and supplies will be obtained in adequate time to ensure that the materials will be available, and stored in a secure location.

1.7 RECORDS MANAGEMENT

The original signed and dated chain of custody forms (Figure 1-2), sample logs (Figure 1-4), or an electronic equivalent logs are considered the legal sampling record for groundwater monitoring wells at the Bacchus Facility. All logs will be kept on file for future program auditing and analysis review for at least three years. All monitoring data, field logs, and maintenance records, will be recorded and archived for future reference.

2.0 SAMPLE COLLECTION

2.1 WATER LEVEL MEASUREMENT

The protocols set forth in this chapter were prepared by means of guidelines present in the Utah Administrative Code (Utah Admin. Code) Section R315-264-97, and the September 1992 edition of the RCRA TEGD. These regulations and guidance documents should be reviewed when updated to ensure that procedures are conducted in a manner that is in keeping with current regulatory requirements.

Static water levels will be collected from all monitoring wells and piezometers on an annual basis at the Bacchus Facility. This data will be collected from all wells annually within the sample collection period (approximately 4 months) so it can be used to produce an accurate potentiometric map(s). This information will also be used to determine possible changes in horizontal and vertical flow gradients on an annual basis. This chapter describes procedures used in collecting water-level measurements from the monitoring wells. A determination of the ground-water surface elevation will be conducted each time ground water is sampled as stipulated in R315-264(f) of the Utah Admin. Code.

2.1.1 Equipment Water-level measurements will be obtained by means of an electronic water level indicator. The water level indicator consists of a probe sheathed in plastic, 300 feet or more of plastic-coated transmitting cable, and a light/buzzer. The system operates by means of an open electronic circuit which is closed upon contact with the water surface in the well casing. The light and buzzer at the ground surface indicates when the electrical circuit is closed.

2.1.2 Quality Control Upon arrival at each well site, proceed to complete the wellhead inspection checklist shown on Figure 1-4. The locking cover of the protective outer well casing will be carefully removed and visually inspected for cleanliness. To avoid contamination during the static water level measurement process, or cross-contamination between wells, the probe and cable of the measuring unit will not be allowed to contact the ground surface or other potential sources of contaminants. The immersed portion will be thoroughly rinsed with distilled water after measurements are completed at each

well. The probe and cable will be visibly inspected during each use for foreign materials (e.g., soil, oil, etc). If present, these materials will be removed to reduce the chance of anthropogenic contamination of the wells.

2.1.3 Measurement Procedure The water-level indicator will be checked in accordance with manufacturer's instructions to ensure that it is working properly prior to measuring the wells. Care will be taken to lower the cable of the water level indicator such that the cable does not rub on the edge of the well casing and thus damage footage markers on the cable which are used for measurement.

The sampling personnel will review previous water-level measurements that were recorded to define an approximate depth to the water surface. Knowledge of previous water levels allows the sampling personnel to anticipate the approximate depth at which the probe will encounter the water surface. The cable can then be lowered into the well at an efficient rate and the rate can be reduced near the depth of anticipated contact.

As soon as the probe contacts the water surface, the circuit will be completed and the light and buzzer flash and beep. The sampling personnel will then carefully raise and lower the cable in reference to the top of the protective outer casing to precisely determine the depth to water. The cable will then be read directly to the nearest 0.01 foot and recorded on the appropriate field data sheet.

After the probe is retrieved from the well the probe will be rinsed with distilled water. The protective cap will then be carefully replaced on the inner well casing. Care will be taken to ensure that the locking cap of the protective outer well casing is secured to preclude unauthorized access to the inner well casing.

2.2 WELL SAMPLE COLLECTION

2.2.1 Pre-sampling Operations Prior to the use of equipment at a well, any equipment that is reused and comes in contact with the well will be cleaned as specified in Section 1.1. All bottles will be prepared for sampling, and the paperwork will be prepared so that paperwork effort in the field can be minimized.

2.2.2 Sample Collection A new HydraSleeve® sampler (US patents #6,481,300 and #6,837,120), manufactured by GeoInsight (www.hydrasleeve.com) will be used to collect a representative groundwater sample in each well without the need for purging. Water is collected from a defined interval within the well screen without mixing fluid from other intervals. The empty sampler will be weighted at the bottom, attached to a line, and then lowered to the depth within the well screen. Prior to activation, the sampler remains in a collapsed (i.e., empty) state and therefore takes up minimal space within the well. Therefore, sampler deployment results in only very slight water displacement but it is typically left in the well for a period of time to assure the well is re-equilibrated. To activate, the sampler will be pulled up a distance equal to 1 to 2 times the sampler length (2.5 to 5 feet for a 30-inch-long sampler). As the sampler rises through the water column, the reed valve opens, allowing the sampler to "core" the water column through which it is being raised. Once full, the reed valve closes, which prohibits any more water from entering the sampler.

2.2.3 Sample Withdrawal The HydraSleeve will be withdrawn from the well for sample collection. Water-proof disposable gloves will be worn during sampling. These gloves will be disposed of after sampling activities are completed at each well. All bottles will be appropriate to the sample and EPA analytical method.

Bottles will be filled in the following order:

1. Volatile organics (VOA);
2. Explosives (e.g. NG, HMX);
3. Perchlorate;
4. Nitrate/Nitrite;

Bottles used for the collection of volatile organic compounds, will be collected first and filled gently from the bottom up and immediately capped so that no free air remains in the headspace of the bottle. To check for free air in the headspace, the bottle will be turned up-side-down after it is capped. If bubbles appear at the bottom of the bottle, the bottle must be uncapped and additional liquid must be added to eliminate all free air from the bottle.

After collection of each sample, the time of collection will be recorded in the field log, on the sample label, and on the chain of custody form (Figure 1-2). The collector will then initial or sign the forms and field logs as appropriate to certify that sampling of that particular well is complete. Each sample bottle will be affixed with a sample label after sample collection (see Section 1.3.2 of Chapter 1 for discussion).

2.2.4 New Monitoring Wells ATK periodically installs new monitoring wells to refine the understanding of contaminant migration on and offsite of the Bacchus Facility. In the event that a new monitoring well is installed, ATK proposes to collect four sets of quarterly groundwater samples for the constituents listed in Figure 1-1. This list of analytes will be used for the baseline chemistry at the Bacchus Facility. Once the four quarterly sampling events have been accomplished and analytical data evaluated, the new monitoring well will revert to annual sampling unless otherwise agreed upon with the Division.

2.2.5 Sample Handling Refer to Section 1.4 of Chapter 1 for discussion of sample preservation and sample shipping procedures.

2.2.6 Field Quality Control Refer to Section 1.5 of Chapter 1 for discussion of sample blanks and duplicates.

2.2.7 Records Refer to Sections 1.7.

2.3 SAMPLE COLLECTION SCHEDULE

ATK will notify the Division at least 10 days prior to the beginning of the annual groundwater sampling campaign. The ground water monitoring wells will be sampled in accordance with the sampling protocol identified in Table 2. Wells will be sampled during an annual ground water campaign between the months of May and August of each year. If conditions in a particular area change or concentrations at a specific well are in question, the sampling frequency and parameters may be modified to allow for sample collection. Any request for additional sampling or change to the sampling frequency or parameters for a particular well will be made in consultation with the Division.

3.0 ANALYSIS OF GROUNDWATER SAMPLES

All samples will be analyzed by a Utah certified laboratory, using the analytical methods described in the ATK approved QAPP. If there is not an established EPA or State approved analytical method in the QAPP for a certain parameter, the Utah DWMRC will be notified of the proposed analytical method.

If the laboratory does not have Utah certification for a specific analysis, the laboratory will subcontract a qualified Utah certified laboratory to do the analysis. Table 2 lists the wells to be sampled and sampling frequency for each well at the Bacchus Facility. .

4.0 LABORATORY QUALITY ASSURANCE/CONTROL

Laboratory quality assurance and control checks will be performed according to C.3.7.2 of the RFI Work Plan QAPP (ATK, 2010). A Sample Narrative and Level III data quality audit will be provided by a qualified independent contractor. A Sample Narrative will be prepared for each sample group and signed by the laboratory QA Officer. A Level III data validation will be conducted on a minimum of 10% of the samples of record. Data validation shall follow *the USEPA Contract Laboratory Program National Functional Guidelines for Organic Superfund Methods Data Review,* January 2017 and *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Methods Data Review, January 2017*. . If the validation report shows significant issues of concern, an additional 10% of the laboratory data will undergo the validation process. The level III data validation will include a review of:

- Dates of Preparation/Extraction/Analysis
- Sample Receipt
- Holding times
- Method and field blanks
- Surrogates (if applicable to the method)
- Control Samples
- Matrix Spikes
- Matrix Spike Duplicates
- Reporting Limits

Table 2
Groundwater Analytes and Sampling Frequency

Well	Volatiles	Nitrate/ Nitrite	Perchlorate	HMX/RDX	NG
GW-1	Annual		Annual		
GW-2			Annual		
GW-3			Annual		
GW-4	Annual		Annual		
GW-5	Annual		Annual		
GW-6	Annual		Annual		
GW-7			Annual		
GW-8			Annual		
GW-9			Annual		
GW-10	Annual	Annual	Annual	Annual	
GW-11			Annual		
GW-12	Annual		Annual	Annual	
GW-13	Annual	Annual	Annual		
GW-14	Annual		Annual		
GW-15	Annual		Annual		
GW-16			Annual		
GW-17			Annual	Annual	
GW-18			Annual	Annual	
GW-19	Annual		Annual	Annual	
GW-20	Annual		Annual	Annual	
GW-21			Annual	Annual	
GW-22					
GW-23					
GW-24			Annual	Annual	
GW-25			Annual	Annual	Annual
GW-25A			Annual	Annual	Annual
GW-25B			Annual	Annual	Annual
GW-26	Annual		Annual		
GW-27					
GW-28	Annual		Annual		
GW-29	Annual		Annual		
GW-30	Annual		Annual	Annual	
GW-31			Annual	Annual	
GW-32			Annual		
GW-33	Annual		Annual		
GW-34	Annual		Annual		
GW-35	Annual		Annual		
GW-36			Annual		
GW-37			Annual		
GW-38			Annual	Annual	
GW-39			Annual	Annual	

Table 2 (Continued)

Well	Volatiles	Nitrate/ Nitrite	Perchlorate	HMX/RDX	NG
GW-40			Annual	Annual	
GW-41			Annual		
GW-42			Annual	Annual	
GW-43	Annual		Annual		
GW-44			Annual	Annual	
GW-45			Annual		
GW-46			Annual	Annual	
GW-47			Annual	Annual	
GW-48			Annual		
GW-49	Annual		Annual		
GW-50	Annual		Annual		
GW-51	Annual		Annual		
GW-52					
GW-53		Annual	Annual		
GW-54	Annual		Annual		
GW-54A	Annual		Annual		
GW-56	Annual		Annual		
GW-57	Annual		Annual		
GW-58	Annual				
GW-59			Annual		
GW-60	Annual		Annual		
GW-61	Annual		Annual		
GW-62	Annual		Annual	Annual	
GW-63	Annual		Annual	Annual	
GW-64	Annual		Annual	Annual	
GW-65	Annual		Annual	Annual	
GW-66	Annual	Annual	Annual	Annual	
GW-67	Annual		Annual	Annual	
GW-68	Annual		Annual	Annual	
GW-69	Annual		Annual	Annual	
GW-70	Annual		Annual	Annual	
GW-71			Annual		
GW-72	Annual		Annual		
GW-73		Annual	Annual		
GW-74			Annual		
GW-75		Annual	Annual		
GW-76	Annual		Annual		
GW-77			Annual	Annual	
GW-78			Annual		

Table 2 (Continued)

Well	Volatiles	Nitrate/ Nitrite	Perchlorate	HMX/RDX	NG
GW-791	Annual		Annual		
GW-792	Annual		Annual		
GW-801	Annual		Annual		
GW-802	Annual		Annual		
GW-803	Annual		Annual		
GW-811	Annual		Annual		
GW-812	Annual		Annual		
GW-082	Annual		Annual		
GW-083	Annual		Annual		
GW-085	Annual		Annual		
GW-086	Annual		Annual		
GW-087	Annual		Annual		