
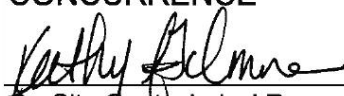






**NYE COUNTY NUCLEAR WASTE
 REPOSITORY PROJECT OFFICE**

TECHNICAL PROCEDURE

TITLE: Development of GPS Data using the Trimble® GeoXH GPS		Revision: 1 Date: 1-7-08 Page: 1 of 13
TECHNICAL PROCEDURE NUMBER: TP-9.8	SUPERSEDES: Revision 0, 8-28-02	
APPROVAL  Project Manager	CONCURRENCE  On-Site Geotechnical Representative	
Date: 1/7/08	Date: 1/7/08	
	 Principal Investigator	
	Date: 1/7/08	
	 Quality Assurance Officer	
	Date: 1/7/08	

1.0 PURPOSE

This technical procedure (TP) provides instructions for the collection and post-processing of Global Positioning System (GPS) data in support of projects conducted under the Independent Scientific Investigations Program (ISIP), on behalf of the Nye County Nuclear Waste Repository Project Office (NWRPO). The information contained in this TP is intended to ensure that GPS data developed by NWRPO personnel using the Trimble® GeoExplorer XH (GeoXH), TerraSync™, and GPS Pathfinder Office® software meet NWRPO Quality Assurance (QA) Program requirements. All NWRPO quality administrative procedures (QAPs), work plans, and test plans referred to herein shall be the most current revisions of those documents. This document has been prepared in accordance with QAP-5.2, *Preparation of Work Plans, Test Plans, and Technical Procedures*.

2.0 SCOPE

This procedure contains specific instructions for collection and post-processing of GPS data using a Trimble® GeoXH and GPS Pathfinder Office®, respectively, as well as the procedure for archival of these data (both raw and processed) at the NWRPO Quality Assurance Records Center (QARC). Projects that require support via collection of GPS data include, but are not limited to, the Early Warning Drilling Program, surface geophysical surveys, the Water Level Measurement Program, characterization of local and regional geologic features, and characterization of local and regional groundwater resources.

2.1 Applicability

This procedure applies to the principal investigator (PI) and NWRPO field personnel, including staff and contract geologists, geoscientists, engineers, and technicians who collect and post-process GPS data (both X,Y [horizontal] and X,Y,Z [horizontal and vertical] position data).

2.2 Training

NWRPO field personnel shall be trained in the use of the Trimble® GeoXH GPS, TerraSync™, GPS Pathfinder Office® software (including “hands on” training), and this procedure prior to the collection and post-processing of GPS data, and shall document that they have completed their training. NWRPO field personnel will also be trained to NWRPO Training Instruction TI-1.1, *Development of GPS Data using the Trimble® GeoXH GPS*, and will document that they have completed their training. In addition, personnel performing setup and maintenance of the GPS and post-processing software shall be trained to QAP-12.1, *Control of Measuring and Test Equipment*.

3.0 DEFINITIONS

The following definitions are compiled from Trimble® *GETTING STARTED GUIDES*, Help Files, or the Trimble® online GPS Tutorial.

- 3.1** Base Station – A base station, or reference station, is a GPS antenna and receiver positioned on a known location specifically to collect data for differential correction. Base data need to be collected at the same time data are collected with a rover unit.
- 3.2** Carrier Phase – Carrier phase is the time taken for the L1 or L2 carrier signal generated by a GPS satellite to reach the GPS receiver. Measuring the number of carrier waves between the satellite and receiver is a very accurate method of calculating the distance between them. Carrier-Phase processing is used by the GeoXH in conjunction with post-processing software to achieve accuracies of 3 to 4 centimeters.
- 3.3** Code Phase – The time difference between the pseudo-random number code (PRC) generated by the TerraSync™ software and the PRC coming in from the satellite. Code-Phase data are used to quickly compute the distance to a satellite and therefore calculate the position of the rover. Code-Phase GPS achieves accuracies of 1-2% or 3-6 meters.

- 3.4** GeoXH – The GeoXH combines a Trimble® GPS receiver on a ruggedized Microsoft Windows-based handheld computer with H-Star technology for high accuracy GPS data collection.
- 3.5** Global Positioning System – A system in which high-precision orbital location and timing signals are broadcast by a constellation of satellites. Handheld units can use these signals to calculate their location, direction, speed, and time on Earth. GPS was developed by the US Department of Defense, and the satellite constellation is managed by the US Air Force.
- 3.6** GPS Constellation – The set of GPS satellites that are visible (above the horizon) to the GPS receiver at any given time.
- 3.7** GPS Elevation – Elevation above the horizon for a GPS satellite relative to a rover or base station, usually expressed as a minimum in degrees for inclusion in calculating a position.
- 3.8** GPS Pathfinder Office® – Trimble® software, together with its associated utilities, installed on an office PC that provides the functionality to differentially correct, view, and edit GPS data collected in the field, and to export it in a format suitable for use in other software.
- 3.9** H-Star – The H-Star technology, patented by Trimble®, is a combination of advanced GPS receiver, field software with sophisticated logging capabilities, and office software with post-processing capabilities that enables high-accuracy GPS data collection. The GeoXH uses this technology.
- 3.10** Position Dilution of Precision (PDOP) – Unitless measure of the total precision of the position measurement obtainable given the current GPS constellation. Note that a greater angular separation of satellites yields a lower PDOP value and indicates a better three-dimensional geometry of the satellites.
- 3.11** Rover – The GeoXH is a mobile GPS datalogger or rover that collects or updates data in the field, typically at an unknown location. Data collected on a rover can be differentially corrected relative to base station data.
- 3.12** Signal to Noise Ratio (SNR) – The signal strength of a GPS satellite is a measure of the information content of the signal, relative to the noise of the signal. The quality of a GPS position is degraded if the SNR of one or more satellites in the GPS constellation falls below a minimum. If the SNR of a GPS satellite is below a user-configured minimum it is not used to compute positions.
- 3.13** TerraSync™ – Software installed on the GeoXH that is designed for collecting and updating geographical data (Geographic Information Systems [GIS] and spatial data).

4.0 RESPONSIBILITIES

The project QA Officer is responsible for the coordination of the internal review of this procedure.

The PI is responsible for the preparation and modification of this procedure, as well as ensuring that the data collection and post-processing activities described herein are conducted in accordance with this procedure.

NWRPO field personnel are responsible for conducting the development of GPS data in accordance with this procedure, as well as submitting these data to the QARC for archival.

5.0 PROCESS

The Trimble® GeoXH and accompanying software shall be operated according to this procedure when collecting GPS positions for quality-affecting NWRPO technical program activities. When operating the Trimble® GeoXH GPS unit, and the Trimble® TerraSync™ and GPS Pathfinder Office® software, the current Trimble® Manuals and on-line help, and TI 1.1 will be used as the standard references. Specifically, these documents include:

- Trimble® *GETTING STARTED GUIDE, TerraSync™ software*
- Trimble® *GETTING STARTED GUIDE, GeoExplorer® 2005 series*
- Trimble® *GETTING STARTED GUIDE, GPS Pathfinder Office® software*
- Trimble® GPS Pathfinder Office® Help
- Trimble® TerraSync™ Help
- TI-1.1 *Development of GPS Data using the Trimble® GeoXH GPS*

Additional Trimble® support resources for the Trimble® GeoXH, TerraSync™, and GPS Pathfinder Office® are available at http://trimble.com/geoxh_ts.asp, http://trimble.com/terrasync_ts.asp, and http://trimble.com/pathfinderoffice_ts.asp, respectively.

5.1 GPS Planning

In planning to collect GPS positions, determine first whether proposed GPS data are being collected for quality-affecting NWRPO technical program activities. An affirmative determination identifies that this procedure is applicable and shall be used.

Based upon the type of positioning data to be collected, whether high accuracy vertical positions are required, and the horizontal accuracy required, Table 1 shall be used to identify whether use of the Trimble® Planning Software is required, and the method of GPS data collection.

Type of Position to Collect	High Accuracy Elevation Positions Required	Planning Required	Horizontal Accuracy Required (centimeters [cm])	GPS Data Collection Method
Point	No	No	20	<i>H-Star Static</i>
Line, Area, or any combination of two types	No	Yes	20	<i>H-Star Dynamic</i>
Point	Yes	Yes	1-10	<i>Carrier-Phase Static</i>

Table 1. When to use Trimble® Planning Software, and GPS data collection type.

The Trimble® Planning Software will be used to determine the optimal day(s) and time(s) of day for collection of GPS positions based upon the method of GPS data collection, and the minimum requirements for the set of five parameters shown in Table 2. The key parameter is the minimum number of GPS satellites. The minimum number of satellites must be maintained in order to collect GPS positions for the minimum continuous carrier lock time. If the number of GPS satellites observed falls below the required minimum before continuous carrier lock time is achieved then loss of lock occurs. Any positions collected during the time carrier lock was lost may have less than the required precision, and must be recollected.

Planning Parameters vs. GPS Data Collection Method	H-Star Static	H-Star Dynamic	Carrier-Phase Static
Minimum number of satellites	4	5	4
Maximum PDOP	6.0	6.0	6.0
Minimum SNR	39	39	39
Minimum GPS Elevation	15°	15°	15°
Minimum continuous carrier lock time (minutes)	2	2	10

Table 2. Minimum planning parameters for use in the Trimble® Planning Software based upon GPS data collection method.

Static data collection refers to a rover unit that collects stationary point positions. Dynamic data collection refers to a rover unit that collects line or area positions while moving. Note that the estimated time needed to collect positions for all planned features must also be considered. For example, if three hours are needed to collect the required GPS positions then a three hour block of time that supplies the minimum number of satellites is needed.

Successful carrier-phase data collection requires that a base station must be within 75 kilometers (km) of the rover GPS unit (i.e., the base line), and it is strongly recommended that the base line be no more than 50 km (31 miles). This must be determined before collecting field data.

The Trimble® Support Note *Trimble® Planning Software: Setup and Configuration* provides step-by-step usage instructions. All data acquisition parameters (as well as any deviation from this TP) shall be documented in the scientific notebook corresponding to the appropriate project, in accordance with QAP-3.2, *Documentation of Technical Investigations*.

5.2 GeoXH and TerraSync™ Software Setup

5.2.1 GeoXH Setup

Prior to each field session, the GeoXH and TerraSync™ software configurations must be verified to ensure that GPS positions collected meet QA requirements. Collecting GPS positions requires the proper setup of the hardware, firmware and software. The necessary information to complete these configurations is provided in TI-1.1 and The Trimble® *GETTING STARTED GUIDES for the TerraSync™ software* and *GeoExplorer® 2005 series*. When collecting GPS data for quality-affecting NWRPO technical program activities, the Zephyr™ antenna is required, and must be mounted on a range pole of known height or in some other configuration with a known height. The PI is responsible for maintaining current Trimble® firmware and software, including versions, patches, and updates, for the GeoXH, TerraSync™ and for the GPS Pathfinder Office® software.

5.2.2 GPS Pathfinder Office® and TerraSync™ Software Setup

The TerraSync™ software on the GeoXH requires initialization of a data collection configuration that reflects the requirements documented in Tables 1 and 2.

Within the GPS Pathfinder Office® software a new Project Folder will be created for a GPS data collection project. Provide a Project Name in the format “X_MMDDYY,” where X is a brief project name (e.g., Geophones), MM is the month, DD is the day, and YY is the year for the planned GPS data collection date. The default comment may be accepted or modified to provide an additional description for the GPS data collection project. Default folder names for Backup Folder, Export Folder, and Base File Folder are accepted in order to provide consistent naming conventions for GPS Pathfinder Office® processing activities.

A new GPS Data Collection and Post-Processing shall be used for each GPS data collection project Log (see Section 8.0 for a description of the record; see Attachment A for an example of the record). At this step in the process the User Name, Pathfinder Project Name, and TerraSync™ Configuration File Used will be completed.

A TerraSync™ Configuration File (*.tcf) defines a configuration for the TerraSync™ software on the GeoXH. The PI shall use the Trimble® Configuration Manager software to create three TerraSync™ configuration files that meet the requirements of Tables 1 and 2. These three configuration files are: HStar_Static.tcf, HStar_Dynamic.tcf, and Carrier_Phase.tcf.

NWRPO Field Personnel will select appropriate TerraSync™ configuration files created by the PI that meet the requirements of Tables 1 and 2. **For a GPS data collection project, the selected TerraSync™ configuration file shall be saved to the project folder as a QA record.** It shall also be uploaded to the GeoXH GPS unit and installed using TerraSync™, overwriting any existing TerraSync™ configuration file.

Should a quality affecting GPS data collection project require an alternate TerraSync™ configuration file, the PI may develop a new TerraSync™ configuration file. NWRPO Field Personnel will likewise save it to the project folder for which it is being used, and upload to the GeoXH for installation using TerraSync™. Usage of this alternate configuration shall be documented in the appropriate scientific notebook, in accordance with QAP-3.2, along with the reason for the alternate configuration.

5.3 GPS Data Collection

Operation of the Trimble® GeoXH GPS unit requires use of the installed TerraSync™ software. GPS positions will be collected in accordance with:

- Trimble® *GETTING STARTED GUIDE, TerraSync™ software*
- Trimble® *GETTING STARTED GUIDE, GeoExplorer® 2005 series*
- Trimble® TerraSync™ Help
- TI-1.1, *Development of GPS Data using the Trimble® GeoXH GPS*

The minimum QA training document required is TI-1.1 (along with hands-on training) for NWRPO Field Personnel. Additional resources on how to operate and troubleshoot the GeoXH and TerraSync™ software are available at http://trimble.com/geoxh_ts.asp and http://trimble.com/terrasync_ts.asp, respectively.

When collecting GPS positions the Trimble® naming convention will be used for Rover files collected by the GeoXH and TerraSync™. The rover filename is “RMMDDHHX,” where “R” signifies a Rover file, “MM” signifies the month of data collection, “DD” signifies the day of data collection, “HH” signifies the hour of data collection, and “X” increments from “A” to “Z” for separate and successive files collected on the same month, day, and hour.

The GPS Data Collection and Post-Processing Log (Attachment A) should have its Data Collection Date and Rover filename entries completed.

5.4 GPS Data Transfer, Post-Processing, and Export

After completing a data collection session and returning to a PC on which the Trimble® GPS Pathfinder Office® Software is installed, the Rover files are downloaded and post-processed using differential correction. Only then may the corrected GPS positions be exported for use in other software programs.

5.4.1 Data Transfer

Transfer the data collected in the field from the GeoXH to the office computer, using the methods described in:

- Trimble® *GETTING STARTED GUIDE, GPS Pathfinder Office® software*
- Trimble® GPS Pathfinder Office® Help
- TI-1.1, *Development of GPS Data using the Trimble® GeoXH GPS*

Additional Trimble® support resources for the GPS Pathfinder Office® are available at http://trimble.com/pathfinderoffice_ts.asp.

For data transfer the Rover files must be downloaded to the same Project file established at the beginning of the data collection project, as described in Section 5.2.2. Upon download (using GPS Pathfinder Office®) the Rover files will be automatically converted to SSF files. These have the same name as the Rover files, but with an *.ssf file extension (i.e., RMMDDHHX.ssf). **These Rover files shall be maintained as QA records.**

5.4.2 Post-Processing

Data collected by the GeoXH are subject to various errors. The vast majority of these errors can be removed from the data by differential correction. Differential correction improves the accuracy of GPS positions to the specified accuracy of the receiver when used under recommended conditions. Two types of post-processing are possible, H-Star and Standard.

5.4.2.1 H-Star Post-Processing

The Trimble® GeoXH utilizes H-Star technology, and is equipped with a dual-frequency Zephyr™ antenna. Its data can be H-Star processed, using base data from a group of base station providers, or standard processed using a single base station.

Providing the GPS data were collected while carrier lock was maintained on the required number of satellites, with a maximum PDOP of 6, differentially correcting the GPS data using H-Star processing will result in features that have accuracy values equal to the Predicted Post-Processed Accuracy indicated by the GeoXH when they were collected. H-Star processing can achieve accuracies of 20 cm or better for positions logged in static mode using a dual-frequency antenna (i.e., the Zephyr™ antenna), or below 30 cm for positions logged in static mode using the internal single-frequency antenna. A minimum of 3 dual-frequency base station providers within 200 km of the field location are required to ensure 30 cm accuracy when H-star processing.

Selecting more base station providers will ensure that at least three base stations provide sufficient data. However, selecting a very large number does **not** increase accuracy but does increase processing time. Six stations should be sufficient.

Use the Correct Settings screen of the Differential Correction Wizard to ensure that the “Expanded Audit File Contents” is selected. This will ensure a complete Audit File for troubleshooting post-processing, if needed. This **Expanded Audit file shall become a QA Record.**

When preparing the setup for H-Star post-processing, the “Use reference position from base providers” option should be selected unless a reference position for a base station provider is known to be incorrect. If a reference position is known to be incorrect, use the “Use reference position from base files” option. This will allow calculation of an estimated position.

Within the Reference Position window of the Differential Correction Wizard, specify that the “Confirm base data and position before processing” option is selected to ensure that the selected base files provide coverage for the rover files and that the reference position is correct. Preferred is 100% coverage by at least three base stations with the distance from base provider at less than 1 meter (this value is a comparison between the base station position, as calculated during differential correction, with the surveyed base station location). If fewer than three base stations have 100% coverage, reselect base station providers until 90-100% coverage is achieved. If distance from base provider is more than 1 meter, then an alternate base station provider should be selected. Alternatively, the “Use reference position from base files” option may be used.

Review the Differential Correction Summary when the Differential Correction Wizard indicates that differential correction is complete. The summary reports on the percentage of selected positions that are corrected by post-processing. This should be 100%. Estimated accuracies are also reported. The range of estimated accuracies achieved by post-processing should meet the requirement for the GPS position collection project. If the desired estimated accuracies are achieved, close the Differential Correction Wizard. One or more COR files will have been created. At this time, record the COR Files Created, Correction Filenames, and Rover Audit Filenames in the corresponding fields on the GPS Data Collection and Post-Processing Log. **The COR, “Correct,” and “Audit” files are automatically generated and are saved in the Project folder and shall be archived as QA Records.**

If differential correction does not meet the desired estimated accuracy, review the “Audit” and the “Correct” text files. These files will likely provide clues as to how to alter post-processing settings in order to achieve the desired accuracy. The Help File entries for the Differential Correction Wizard provide many considerations on Troubleshooting. The major options are to rerun post-processing with different base station providers or different processing parameters selected, or recollecting the position data under better GPS constellation conditions (e.g., lower PDOP, higher SNR, longer occupation times, longer carrier lock), or better environmental conditions (ensure that the antenna is not obstructed from a complete view of the sky).

If alternative post-processing parameters result in successful differential corrections, then the alternate methods shall be documented in the appropriate scientific notebook, in accordance with

QAP-3.2. The final “Correct” and “Audit” files and the corrected data (i.e. the COR files) are maintained as QA Records.

The final method to ensure that quality positions have been collected is to compare the corrected positions in the COR file(s) to other data of known quality. This may be done by viewing the corrected data in the GPS Pathfinder Office[®] Map window in conjunction with loaded background data of known quality. The geographic positions of the corrected data in the COR file are then compared for accurate relative location.

Where differential correction is producing problematic results, the “Feature Properties,” “Position Properties,” and “Time Line” windows may be used to inspect all positions. Some feature positions may meet the accuracy requirement while others do not. Use this information to identify inadequate feature positions that will be recollected in the field. Those features that meet positioning requirements may be exported. These mixed results shall be documented in the scientific notebook, in accordance with QAP-3.2.

The Trimble[®] *GETTING STARTED GUIDE, GPS Pathfinder Office[®] software* and the GPS Pathfinder Office[®] Help files provide information on loading “Background” files, using the “Map,” “Feature Properties,” “Position Properties,” and “Time Line” windows (as detailed in TI-1.1).

5.4.2.2 Standard Post-Processing

Standard processing should only be selected when carrier-phase post processing is required. The difference from H-Star processing is that only one base station is used, not a group of base stations. For carrier phase post-processing to succeed the base line must be less than 75 km and preferably within 50 km. If the base line is more than 75 km do not post-process using standard carrier-phase. Alternatively, use H-Star processing or recollect the positions when a base station is available within 75 km and preferably 50 km. The above H-Star processing description applies otherwise.

5.4.3 Data Export

The Trimble[®] Export utility in the GPS Pathfinder Office[®] software converts COR files to formats that can be read by GIS, Computer Aided Drafting, database, or other software. The PI shall create Export Setups using the Export utility. These setups will be created to ensure standardized data export with position and data quality attributes.

A user will then select a standard data export setup for exporting from a COR file(s). The default Export directory will be used to receive the exported data. This directory will also contain an ASCII Export file (e.g. expMMDDX.txt) and an ASCII Info file (e.g., RMMDDHHX.inf). The Export file identifies the COR file exported, the export files created, and the name of the Info file. The Info file identifies all the parameter settings used in the selected Export Setup.

The Export and Info files shall be archived as QA records. The GPS Data Collection and Post-Processing Log should have its entries for Exported Files Created, and Export Setup Used completed.

5.4.4 Project Archive

The final step for the development of GPS data is to archive the work. The files identified in Section 8.0 are compiled and submitted to the QA Records Center.

5.4.5 Reprocessing

In the event that the raw GPS data need to be reprocessed and exported, the processing steps outlined in this document and in TI-1.1 will be followed, a new GPS Data Collection and Post-Processing Log (Attachment A) completed, and the new files archived at the QARC (either superseding the old ones, or as a new version), as appropriate.

6.0 DATA COLLECTION LIMITATIONS

GPS data must be developed in compliance with requirements and guidelines provided by this TP, TI-1.1, Trimble[®] documentation and help files, and as provided in the documented training.

Specific data collection limitations are described in Section 5.0.

7.0 REFERENCES

QAP-3.2, *Documentation of Technical Investigations*, Quality Administrative Procedure: Nye County Nuclear Waste Repository Project Office (NWRPO). Pahrump, Nevada.

_QAP-5.2, *Preparation of Work Plans, Test Plans, and Technical Procedures*.

_QAP-12.1, *Control of Measuring and Test Equipment*.

TI-1.1, *Development of GPS Data using the Trimble[®] GeoXH GPS*, Training Instructions: Nye County NWRPO. Pahrump, Nevada.

Trimble[®] *GETTING STARTED GUIDE, TerraSync[™] software*, Version 3.00, Revision A.
March 2007: Trimble[®].

Trimble[®] *GETTING STARTED GUIDE, GeoExplorer[®] 2005 series*, Version 1.10, Revision A.
April 2007: Trimble[®].

Trimble[®] *GETTING STARTED GUIDE, GPS Pathfinder Office[®] software*
(<http://trl.trimble.com/docushare/dsweb/Get/Document-8750/GSGuide.pdf>), accessed 12-20-07.

Trimble[®] *RELEASE NOTES, GPS Pathfinder Office[®] software*, Version 4.00, Revision A.
March 2007: Trimble[®].

Trimble[®] GPS Pathfinder Office[®] Help

8.0 RECORDS

All data and metadata associated with planning, collection, post-processing, and export of GPS positions will be submitted to the NWRPO QARC following the conclusion of a GPS data collection project. A GPS Data Collection and Post-Processing Log (Attachment A) will be generated for each GPS Project. This will minimally identify the following:

1. Name of the person that collected the GPS data,
2. Trimble[®] GPS Pathfinder Office[®] Project Name (DescriptiveName_MMDDYY, for example, Geophones_010108),
3. TerraSync[™] Configuration File Name (Filename.tcf, for example HStar_Static.tcf),
4. GPS data collection date,
5. Name of Trimble[®] Rover SSF files collected. (e.g., RMMDDHHX.ssf, where "R" signifies a rover file, MM signifies the month of data collection, DD signifies the day of data collection, HH signifies the hour of data collection, and "X" increments from "A" to "Z" for successive files collected on the same month, day, and hour.),
6. Name of Trimble[®] Differential Correction COR files created. These use the same name as the Rover files but with a *.cor extension (e.g., RMMDDHHX.cor),
7. Name of the Correction file that contains the record of rover files being corrected, base stations reference data with base files used, percent coverage by the base station files with respect to rover files, differential correction settings used, number of positions processed, number of positions successfully corrected, and a Differential Correction Summary with an estimated accuracy for the corrected positions (e.g., Correct_YYYY-MM-DD_HH-MM.txt),
8. Name of Rover Audit File that contains the software version, processing date, and processing controls (e.g., RoverAudit_RMMDDHHX-SSF_YYYY-MM-DD_HH-MM.txt),
9. Name of the exported files created (e.g., ExportFilename.shp/txt/dbf/mdb/dxf),
10. Name of the Export metadata files, including the export information (e.g., expMMDDX.txt) and export settings used (e.g., RMMDDHHX.inf),
11. Other Comments relevant to developing the GPS data.

The Project Folder created per Section 5.2.2 automatically includes all the files identified above and in Attachment A. The Project Folder shall be archived to the QARC in whole, including all files and subdirectories. The relevant pages of the scientific notebook associated with a GPS data collection project will be archived to the QARC in *.pdf format.

9.0 ATTACHMENTS

Attachment A

GPS Data Collection and Post-Processing Log

Required Record Information	Entry
1. User Name of Data Collector	NWRPO Field Person's Name
2. Pathfinder Project Name	DescriptiveName_MMDDYY
3. TerraSync™ Configuration File	Filename.tcf
4. Data Collection Date	MMDDYY
5. SSF File(s) - Uncorrected rover files collected	RMMDDHHX.ssf
6. COR File(s) - Differentially corrected files created	RMMDDHHX.cor
7. Correction Filename	Correct_YYYY-MM-DD_HH-MM.txt
8. Rover Audit Filename	RoverAudit_RMMDDHHX -SSF_YYYY-MM-DD_HH-MM.txt
9. Exported Filename(s)	ExportFilename.shp/txt/dbf/mdb/dxf
10. Export Metadata Files ("exp" and "inf")	expMMDDX.txt RMMDDHHX.inf
11. Comments	

MMDDYY - Month, Day, and Year of GPS data collection.

RMMDDHHX -Rover file collected on a given Month, Day, and Hour (24hr clock) incremented alphabetically from A to Z for successive files.

YYYY-MM-DD_HH-MM - Year, Month, Day, Hour, and Minute when differential correction occurred.

expMMDDX.txt - metadata file that identifies the COR file used for export, the export file(s) created, and the name of the Info file.

RMMDDHHX.inf - metadata file that file identifies all the parameter settings used in the selected Export Setup.