

California State Water Resources Control Board



Survey_XYZ Guidelines & Restrictions

Electronic Deliverable Format and Data Dictionary

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Acronyms

CSV	Comma Separated Values (also known as comma/quote delimited)
EDD	Electronic Data Deliverable
EDF	Electronic Deliverable Format
GIS	Geographic Information System
GPS	Global Positioning System
LUST	Leaking Underground Storage Tank
PK	Primary Key
RP	Responsible Party
SWRCB	(California) State Water Resources Control Board
UST	Underground Storage Tank
VVL	Valid Value List

1 Introduction

AB2886 (Water Code Sections 13195-13198) requires Responsible Parties to electronically submit compliance data, such as soil or water chemistry analysis, location, and elevation data to the SWRCB Geographical Environmental Information Management System (GeoTracker). Electronic reporting of monitoring well locations and data related to monitoring well elevation data would be required as of January 1, 2002.

The GeoTracker Survey_XYZ electronic data deliverable (EDD) consists of X, Y, and Z coordinates measurement data, and groundwater well measurement data. This deliverable is intended to be produced by the Responsible Party (or their consultant) and to be imported into the GeoTracker system via Internet. The GeoTracker Survey_XYZ data, when uploaded into the SWRCB GeoTracker database, will provide essential information pertaining to groundwater and soil sampling points.

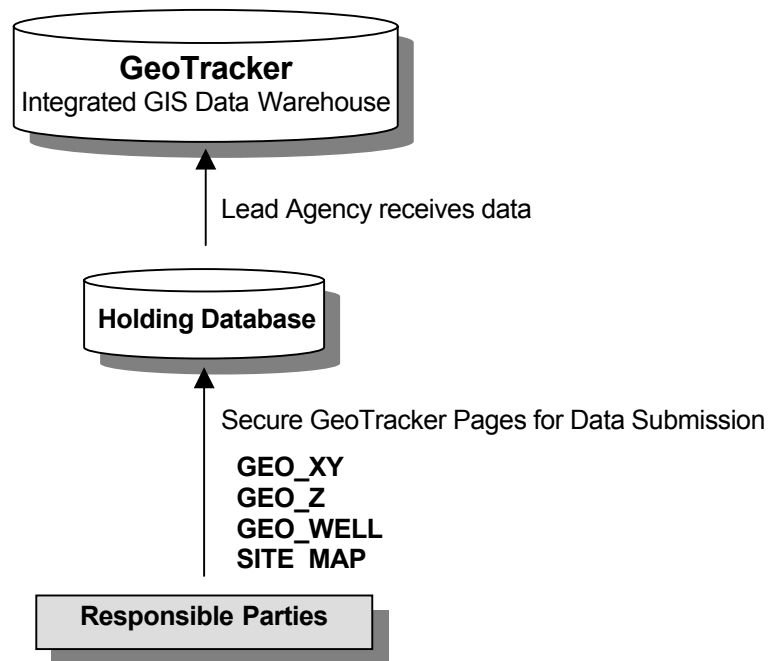


Figure 1: Data Flow for the GeoTracker Survey_XYZ Deliverable

1.1 Document Conventions

This document presents the structure and guidelines and restrictions for creating a GeoTracker Survey_XYZ electronic data deliverable. Each data file of the deliverable is discussed in a level of detail that assists the user in creating an electronic deliverable that meets the criteria of the data standard. Included is a discussion of guidelines and restrictions that apply to files and those that apply to individual fields.

1.1.1 Figure Representation of Files

Each file discussion begins with a figure representing the fields in the file. Refer to Figure 2 as an example. The fields are listed in the order in which they exist within the structure, and primary key fields are underlined. “Primary key” means a selected field (or fields in combination) that makes a record unique in a database. Refer to the Glossary in Appendix B for a technical definition of this and other terms. The order of the fields in the figure is the order expected for delivery.

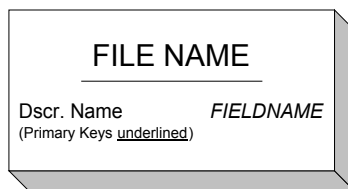


Figure 2: Example Figure Definition

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1.1.2 Table Representation of GeoTracker Survey_XYZ Files

The following table is a representation of the tables defining files of the GeoTracker Survey_XYZ.

Table [#]: [File Name]

Field Name	Attrb	VVL	RE Q	Dscr. Name	Definition	Guidelines & Restrictions
<i>FIELD1</i>	C18	Yes	Yes	Field 1		Field 1 is a character field with 18 available positions.
<i>FIELD2</i>	D10	No	Yes	Field 2		Field 2 is a date field with an expected format of MM/DD/YYYY.
<i>FIELD3</i>	N5	No	No	Field 3		Field 3 is a numeric field with a total of 5 spaces available for numbers and decimals, with no restriction on the number of digits to the right of the decimal point other than the overall field size.

The “Field Name” is the actual structural name of the field. All primary key fields are shaded within these tables (e.g., *FIELD1* and *FIELD2*). Primary key fields are identified within the tables by shading. **Fields are listed in their structural order within these tables.**

“Attrb” describes the field attributes (type and size). For example:

- C18 is an 18-character field (alphanumeric).
- D10 is a date field with an expected format of MM/DD/YYYY (i.e., 01/01/2001).
- N5 is a numeric field with a total of 5 spaces available for numbers and decimals, with no restriction on the number of digits to the right of the decimal point other than the overall field size (e.g., 12345 or 123.4 or 1.234).

The “VVL” column indicates with a “Yes” or “No” whether the data field requires a valid value code.

The “REQ” column indicates with a “Yes” or “No” whether entry into a field is required.

The “Dscr. Name” column gives the descriptive name of the field.

The “Definition” is a brief definition and/or explanation of the field.

The “Guidelines & Restrictions” describe expectations for entry into the field.

1.1.3 Conventions for Text

Throughout this document, file names are capitalized (e.g., the GEO_XYZ file), and field names are capitalized and italicized (e.g., the *GLOBAL_ID* field). The words “file” and “table” are used interchangeably. The description of each file includes such information as which fields require valid values, which fields require entry for submission, and the file’s primary keys.

1.2 Valid Values (VVLs)

Various data fields in the GeoTracker Survey_XYZ electronic deliverable require entry of valid values. Valid values are built-in codes that the format requires for certain fields, such as datum and survey method. The reason for using specific values for these fields is to standardize the data entry, to ensure data consistency, and to help prevent errors. Freely entered data might contain extra spaces, commas, or dashes that would make meaningful data manipulation and thorough or accurate data searches impossible.

Most valid values are abbreviations of common or proper names; hence selecting the correct code is generally straightforward. A list of codes is provided for all fields requiring valid values within each file format sections 3.1.3, 3.2.3, and 3.3.3.

2 Data Deliverable Description

The GeoTracker system relies on a relational database consisting of files related to one another through common (key) fields. These data files are described as relational because the information in one file is related to information in other files, linked through a group of fields called the primary key. The primary key fields in one file record must be identical to the same fields in the linking file record in order to “relate” the data records in both files.

The GEO_XY and GEO_Z files contain information pertaining to the exact location (survey point) from which a sample is collected. The GEO_WELL file contains some of the fields of the GeoTracker database pertaining to wells. The GEO_XY, GEO_Z, and GEO_WELL files are related to each other and the EDF analytical data files through the primary keys fields of *GLOBAL_ID* and *FIELD_PT_NAME*.

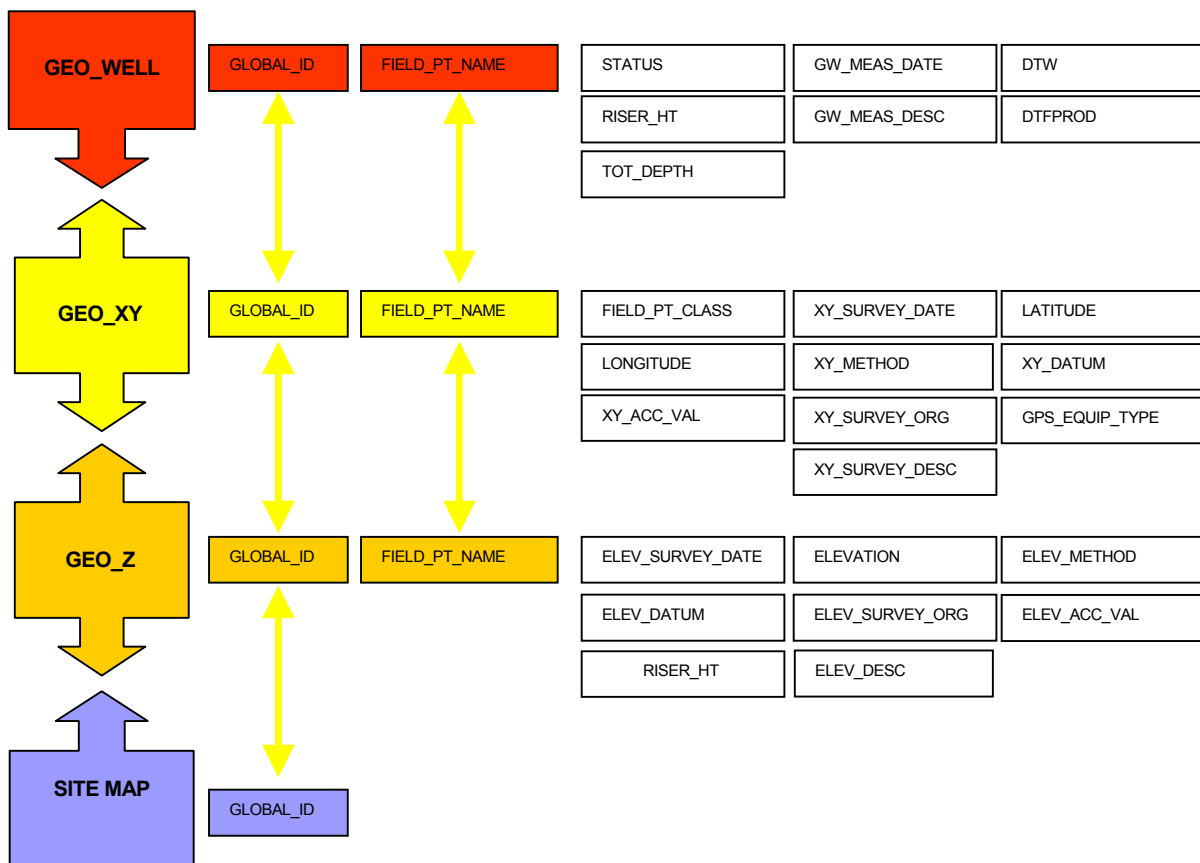


Figure 3. Relational Structure for GeoTracker Survey_XYZ files

3 Relational Files Format

The following Chapter describes the format, data dictionary and guidelines and restrictions associated with each of the data files of the GeoTracker Survey_XYZ electronic deliverable.

3.1 GEO_XY: The Location Measurement File

The GEO_XY file provides sub-meter field location measurements data for import into the GeoTracker system. Each field point sampling location (X,Y) for each groundwater monitoring well should only be reported once for a site.

The SWRCB has received a legal opinion from the State of California – State and Consumer Services Agency on behalf of the California Board for Professional Engineers and Land Surveyors as to the use of licensed professionals for collection of GeoTracker XY&Z data. In summary, the collection of information related to the exact location of groundwater wells, required by Title 12, California Code of Regulations §§2729-2729.1, constitutes "land surveying," as the term is defined in section 8726 of the Business and Profession Code and the collection of data is restricted to those who are licensed to practice land surveying in California. (See GeoTracker Tip#3 for more details, <http://www.swrcb.ca.gov/cwphome/ust/docs/ab2886/tips.html#tip3>)

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<u>GEO_XY FILE</u>	
<u>Global ID</u>	<u>GLOBAL_ID</u>
<u>Field Point Name</u>	<u>FIELD_PT_NAME</u>
<u>Field Point Class</u>	<u>FIELD_PT_CLASS</u>
<u>XY Survey Date</u>	<u>XY_SURVEY_DAT</u>
<u>Latitude</u>	<u>E LATITUDE</u>
<u>Longitude</u>	<u>LONGITUDE</u>
<u>XY Survey method</u>	<u>XY_METHOD</u>
<u>XY Datum</u>	<u>XY_DATUM</u>
<u>XY Accuracy Value</u>	<u>XY_ACC_VAL</u>
<u>XY Survey Organization</u>	<u>XY_SURVEY_ORG</u>
<u>GPS Survey Equipment Type</u>	<u>GPS_EQUIP_TYPE</u>
<u>XY Survey Description</u>	<u>XY_SURVEY_DESC</u>

3.1.1 File Guidelines and Restrictions:

- Primary key fields: *GLOBAL_ID*, *FIELD_PT_NAME*, and *XY_SURVEY_DATE* comprise the primary keys.
- Required fields: *GLOBAL_ID*, *FIELD_PT_NAME*, *FIELD_PT_CLASS*, *LATITUDE*, *LONGITUDE*, *XY_METHOD*, *XY_DATUM*, *XY_ACC_VAL*, *XY_SURVEY_ORG*, *GPS_EQUIP_TYPE* require entry.
- Valid Value fields: *FIELD_PT_CLASS*, *XY_METHOD*, *XY_DATUM*, *GPS_EQUIP_TYPE*, require valid value entries.
- *XY_SURVEY_DESC* may be left blank.

3.1.1.2 The GEO_XY File Format

Table 1: GEO_XY Format

Field Name	Attrb	VVL	REQ	Dscr. Name	Definition	Guidelines & Restrictions
<i>GLOBAL_ID</i>	C12	Yes	Yes	Global ID	The unique identifier for a regulated facility or site.	Obtain from GeoTracker web pages.
<i>FIELD_PT_NAME</i>	C15	Yes	Yes	Field Point Name	The field name or common name of the location where the field measurement has been collected (i.e., Well 01).	Obtain from GeoTracker web pages. Add new field point names via GeoTracker AB2886 electronic reporting interface.
<i>FIELD_PT_CLASS</i>	C5	Yes	Yes	Field Point Class	The code representing the type of survey point.	
<i>XY_SURVEY_DATE</i>	D10	No	Yes	XY Survey Date	The date on which the latitude & longitude coordinates were measured.	Date format is MM/DD/YYYY.
<i>LATITUDE</i>	N15	No	Yes	Latitude	The latitude (Y coordinate) of the survey point, measured in decimal degrees, and reported to 7 decimal points.	Determined with Third Order methods using a minimum of 2 reference points: California Spatial Reference System-Horizontal (CSRS-H) or 2 horizontal geodetic control points derived from the California Spatial Reference System-Horizontal (CSRS-H).
<i>LONGITUDE</i>	N15	No	Yes	Longitude	The longitude (X coordinate) of the survey point, measured in decimal degrees, and reported to 7 decimal points.	Determined with Third Order methods using a minimum of 2 reference points: California Spatial Reference System-Horizontal (CSRS-H) or 2 horizontal geodetic control points derived from the California Spatial Reference System-Horizontal (CSRS-H).
<i>XY_METHOD</i>	C5	Yes	Yes	XY Survey Method	The code representing the survey method by which the latitude/longitude measurements were collected.	Required for all surveys
<i>XY_DATUM</i>	C5	Yes	Yes	XY Datum	The code representing the datum from which the latitude/longitude coordinates were	Required NAD 83 Datum

					determined.	
<i>XY_ACC_VAL</i>	N15	No	Yes	XY Accuracy Value	The accuracy range (+/-) of the latitude and longitude reported in centimeters at a 95% confidence interval.	The least accurate measurement should be reported, regardless if it is for latitude or longitude. Values must be >0 and <100cm
<i>XY_SURVEY_ORG</i>	C35	No	Yes	XY Survey Organization Name	The name of the organization who collected the latitude/longitude coordinates.	A legal opinion from the California Board for Professional Engineers and Land Surveyors requires these organizations to be licensed to practice land surveying in California.
<i>GPS_EQUIP_TYPE</i>	C100	Yes	Yes*	GPS Survey Equipment	The name of the GPS unit used to determine the latitude/longitude coordinates.	*Leave null if survey method did not involve GPS. To add a GPS unit name to the valid value list, please contact the help desk at geotracker@cwpswreb.ca.gov
<i>XY_SURVEY_DESC</i>	C240	No	No	XY Survey Description	General description information pertaining to the survey of latitude/longitude. May describe offset azimuth, distance and slope	

3.1.3 Valid Value Lists for GEO_XY

Table 2: *FIELD_PT_CLASS* valid values

Code	Description
MW	Remediation/ Groundwater Monitoring well
CENT	Location of facility/site surveyed at the centroid of UST field
BH	Borehole
FL	Fuel Line Sampling Point
FUST	Former Underground Storage Tank, Tank Pit Location
SUR	Surface Sampling Point
TRS	Transient Subsurface Sampling Point (i.e. geoprobe...)
UST	Underground Storage Tank, Tank Pit Location
AGT	Above Ground Tank Location
FAGT	Former Above Ground Tank Location
AMB	Ambient drinking water aquifer monitoring well (NOT a remediation well)
PRIW	Domestic/Private Drinking Water Well
PUBW	Public Drinking Water Well
RES	Lake or Reservoir Sampling Point
RIV	River Sampling Point
SP	Spring
STR	Stream or Creek Sampling Point
WSFI	Water System Facility Intake
BM	Benchmark
AGIR	Agriculture/irrigation well

Table 3: XY_METHOD valid values

Note: **California Spatial Reference System-Horizontal (CSRS-H) includes HPGN, HPGN-D and other geodetic control that have been determined by Global Positioning System survey methods in accordance with first order or better FGCS standards and specifications and whose coordinates are published by the NGS, CSRC or its successor. For a listing of CSRS-H control points most recently observed, please see <http://csrc.ucsd.edu/cgi-bin/csrsCoords.cgi>.

Code	Description
CONV	Conventional survey technique (Federal Geodetic Control Subcommittee, Third Order - Class II, Triangulation or Traverse). Minimum of 2 geodetic control points: California Spatial Reference System-Horizontal (CSRS-H) or 2 horizontal control points derived from the CSRS-H**.
CGPS	Conventional survey technique (Federal Geodetic Control Subcommittee, Third Order - Class II, Triangulation or Traverse) in combination with GPS survey techniques (RTK, static, & rapid/fast static). Minimum of 2 geodetic control points: California Spatial Reference System-Horizontal (CSRS-H) or 2 horizontal control points derived from CSRS-H**.
RTK	Real-Time Kinematic (RTK) GPS survey technique using a minimum of 2 geodetic control points based on California Spatial Reference System-Horizontal (CSRS-H)**. Data collected in real-time.
STAT	Static (or rapid/fast static) GPS survey technique using a minimum of 2 reference points based on California Spatial Reference System-Horizontal (CSRS-H)**. Data post processed.

Table 4: XY_DATUM valid values

Code	Description
NAD83	NAD 83 Datum

Table 5: GPS_EQUIP_TYPE valid values

- The State Water Resources Control Board does not ensure the accuracy of the GPS units listed below. This listing includes the manufacturer stated accuracy (typically for real-time static). **For any given measurement, the position accuracy will depend on the equipment utilized as well as the skill and knowledge of the user.** The position accuracy will vary with GPS receiver configuration (receiver and antenna), location (surrounding objects possibly blocking reception or causing multi-path reception), satellite constellation, and atmospheric conditions.
- The State Water Resources Control Board does not advocate use or preference for any of the listed manufacturers or GPS units.
- The GPS unit list is not all inclusive. To add a GPS unit name to the valid value list, please contact the help desk at geotracker@cwpswrcb.ca.gov.

Code	Manufacturer	Model Number	Manufacturer Stated Real-Time Static Accuracy (68% confidence)	Reference
AZX	Ashtech	Z-Extreme	10mm + 1ppm	http://www.ashtech.com/
AZS	Ashtech	Z-Surveyor	5mm + 1ppm	http://www.ashtech.com/
AGG	Ashtech	GG-Surveyor	2cm + 1.5ppm	http://www.ashtech.com/
AZ12	Ashtech	Z12	5mm + 1ppm	http://www.ashtech.com/
APM	Ashtech	ProMark2	5mm + 1ppm	http://www.ashtech.com/
AXCM	Ashtech	PromarkX-CM	15mm + 3ppm	http://www.ashtech.com/
CZ33	CMT	Z33	1.7cm + 1ppm	http://www.cmtinc.com/nav/frprod.html
CL4	CMT	HP-GPS-L4	1cm + 1ppm	http://www.cmtinc.com/nav/frprod.html
CALT	CMT	Alto-G12	2cm + 2ppm	http://www.cmtinc.com/nav/frprod.html
CMAR	CMT	March-II-E	2.5cm + 2ppm	http://www.cmtinc.com/nav/frprod.html
CMC	CMT	MCGPS	2.5cm + 2ppm	http://www.cmtinc.com/nav/frprod.html
L50	Leica	GS50	40cm	http://www.leica-geosystems.com/gps/product/gs50_brochure.pdf
L399	Leica	SR399	<1cm	http://www.leica-geosystems.com/gps/product/gps300.htm
L510	Leica	SR510	5 – 10mm + 2ppm	http://www.leica-geosystems.com/gps/product/sr510.htm
L520	Leica	SR520	3mm + 0.5ppm	http://www.leica-geosystems.com/gps/product/sr520.htm
L530	Leica	SR530	5mm + 2ppm	http://www.leica-geosystems.com/gps/product/sr530.htm

Code	Manufacturer Stated Real-Time Static Accuracy (68% confidence)			
	Manufacturer	Model Number	Reference	
L1103	Leica	TCRA1103	2mm + 2ppm	http://www.fltgeosystems.com/Catalog/Surv/it050004.html
NRT2	Novatel	DL-RT2 with L1/L2 or GPS-600 antenna	2cm + 1ppm	http://www.novatel.com/Products/productmanuals.html
SA3	Sokkia	Axis3	<1m	http://www.sokkia.com/Products/Axis3.htm
SS	Sokkia	Stratus	10mm + 2ppm	http://www.sokkia.com/Products/Stratus.htm
SL	Sokkia	Locus	10mm + 2ppm	http://www.sokkia.com/Products/Locus.htm
SR	Sokkia	Radian	2cm + 2ppm	http://www.sokkia.com/Products/Radian.htm
SRIS	Sokkia	Radian IS	2cm + 1ppm	http://www.sokkia.com/Products/radianis.htm
LEG	Topcon Positioning Systems	Legacy	3-5mm + 1ppm	http://www.topconps.com/
GPT6000	Topcon Positioning Systems	GPT6000 Series	<1cm + 1ppm	http://www.topconps.com/
HIP	Topcon Positioning Systems	Hiper GPS	<1cm + 1ppm	http://www.topconps.com/
REG	Topcon Positioning Systems	Regency	3-5mm + 1ppm	http://www.topconps.com/
ODY	Topcon Positioning Systems, Inc	Odyssey	3-5mm + 1ppm	http://www.topconps.com/
TXR	Trimble	PathfinderProXR	<1m + 2ppm	http://www.trimble.com/pathfinderproxr.html
TXRS	Trimble	PathfinderProXRS	<1m + 2ppm	http://www.trimble.com/pathfinderproxrs.html
TPOW	Trimble	PathfinderPower	<1m + 2ppm	http://www.trimble.com/pathfinderpower.html
T47	Trimble	TotalStation4700	10mm + 1ppm	http://www.trimble.com/products/pdf/4700sp.pdf
T48	Trimble	TotalStation4800	5mm + 1ppm	http://www.trimble.com/products/pdf/4800ss.pdf
T57	Trimble	TotalStation5700	5mm+1ppm	http://www.trimble.com/totalstation5700.html
T40	Trimble	4000RSi/DSi	<0.5m	http://www.trimble.com/products/specs/ms03.htm
T40S	Trimble	4000 SSi	20cm + 1ppm	http://www.geoinvest.cz/TRIMBLEA/4000ssi.htm
T46	Trimble	4600LS	10mm + 2ppm	http://www.trimble.com/4600ls.html

3.1.4 Limitations of Several XY Data Collection Methods

Differential GPS (DGPS)

DGPS units cannot be used to meet GeoTracker Survey XYZ Restrictions & Guidelines.

For example, the NAVCEN operates the Coast Guard Maritime Differential GPS (DGPS) Service and the developing Nationwide DGPS Service which broadcasts correction signals on marine radiobeacon frequencies to improve the accuracy of and integrity to GPS-derived positions. Accuracy is dependant on relative position to the radiobeacon as well as other factors. Typically the positional error of a DGPS position is 1 to 3 meters which does not meet GeoTracker guidelines for sub-meter data. Further, the Coast Guard radiobeacons only enable differential correction of data to one CORS within the CSRS-H, which is not consistent with GeoTracker guidelines that require a minimum of 2 reference points based on California Spatial Reference System-Horizontal (CSRS-H). Although limited areas of California have coverage by two radiobeacons, no receivers on the market will receive signals from two separate beacons simultaneously. Thus, this method is not acceptable for data collection for the SWRCB database.

Single Frequency GPS Equipment

Use of single frequency GPS equipment, commonly known as mapping grade GPS, requires use of a “relative positioning method” and a minimum of two GPS units is required to tie into a CSRS-H control station. One unit (the base station) would be set at the control monument, which could be a CORS (provides continuous GPS data that is publicly available). The second unit would collect data simultaneously at the survey point. The distance of the site from the control monument will control the amount of time needed for data collection. The data can be collected real-time (unless using a CORS monument) or post-processed. This simultaneous data collection would need to be performed at a minimum of two CSRS-H reference points to meet GeoTracker guidelines.

3.2 GEO_Z: The Elevation Measurement File

The GEO_Z file provides field elevation measurements data for import into the GeoTracker system. Elevation data should be submitted every time a new survey is performed.

The SWRCB has received a legal opinion from the State of California – State and Consumer Services Agency on behalf of the California Board for Professional Engineers and Land Surveyors as to the use of licensed professionals for collection of GeoTracker XY&Z data. In summary, the collection of information related to the collection of data required by Title 12, California Code of Regulations §§2729-2729.1, constitutes "land surveying," as the term is defined in section 8726 of the Business and Profession Code and requires a license issued by the Board. (See GeoTracker Tip#3 for more details, <http://www.swrcb.ca.gov/cwphome/ust/docs/ab2886/tips.html> - tip3)

<u>GEO_Z FILE</u>	
<u>Global ID</u>	<u>GLOBAL_ID</u>
<u>Field Point Name</u>	<u>FIELD_PT_NAME</u>
<u>Elevation Survey Date</u>	<u>ELEV_SURVEY_DATE</u>
<u>Elevation</u>	<u>ELEVATION</u>
<u>Elevation Method</u>	<u>ELEV_METHOD</u>
<u>Elevation Datum</u>	<u>ELEV_DATUM</u>
<u>Elevation Accuracy Value</u>	<u>ELEV_ACC_VAL</u>
<u>Elevation Survey Organization</u>	<u>ELEV_SURVEY_ORG</u>
<u>Riser height</u>	<u>RISER_HT</u>
<u>Elevation Survey Description</u>	<u>ELEV_DESC</u>

3.2.1 File Guidelines and Restrictions:

- Primary key fields: *GLOBAL_ID*, *FIELD_PT_NAME* and *ELEV_SURVEY_DATE*, comprise the primary keys.
- Required fields: *GLOBAL_ID*, *FIELD_PT_NAME*, *ELEVATION*, *ELEV_METHOD*, *ELEV_DATUM*, *ELEV_SURVEY_ORG*, require entry.
- Valid Value fields: *ELEV_METHOD*, *ELEV_DATUM*, require valid value entries.
- *ELEV_ACC_VAL*, *RISER_HT* and *ELEV_DESC* may be left blank.

3.2.2 The GEO_Z File Format

Table 6: GEO_Z Format

Note: The relative elevations of locations on the site (intersite well elevations) are to be measured within 0.01 ft. The accuracy of the absolute elevation, the value referenced to a vertical datum, may exceed 0.1 ft, primarily due to the distance to valid benchmark(s) and the methods used to bring elevation on site. The absolute accuracy is to be reported in the *ELEV_ACC_VAL* field.

Field Name	Attrb	VVL	REQ	Dscr. Name	Definition	Guidelines & Restrictions
<i>GLOBAL_ID</i>	C12	Yes	Yes	Global ID	The unique identifier for a regulated facility or site.	Obtain from GeoTracker web pages.
<i>FIELD_PT_NAME</i>	C15	Yes	Yes	Field Point Name	The field name or common name of the location where the field measurement has been collected (i.e., Well 01).	Obtain from GeoTracker web pages. Add new field point names via GeoTracker AB2886 electronic reporting interface.
<i>ELEV_SURVEY_DATE</i>	D10	No	Yes	Elevation Survey Date	The date on which the elevation was measured.	Date format is MM/DD/YYYY. Day and month may be estimated for historical data.
<i>ELEVATION</i>	N15	No	Yes	Elevation	The elevation of the survey point measured to top of well casing to a hundredth of a foot between well locations within the site.	Enter elevation in feet. The relative elevations of locations on the site (intersite well elevations) are to be measured within 0.01 ft. The accuracy of the absolute elevation (tied to the vertical datum) may be greater than 0.1 ft.
<i>ELEV_METHOD</i>	C5	Yes	Yes	Elevation Survey Method	The code representing the method by which the elevation measurement was collected	Required for all surveys.
<i>ELEV_DATUM</i>	C5	Yes	Yes	Elevation Datum	The code representing the datum from which the elevation was determined.	NAVD88 is preferred.

Field Name	Attrb	VVL	REQ	Dscr. Name	Definition	Guidelines & Restrictions
<i>ELEV_ACC_VAL</i>	N15	No	Yes	Elevation Accuracy Value	The accuracy range (+/-) of the absolute elevation measurement reported in centimeters at the 95% confidence interval.	Required for all surveys.
<i>ELEV_SURVEY_ORG</i>	C35	No	Yes	Elevation Survey Organization Name	The name of the organization collecting the elevation measurement.	A legal opinion from the California Board for Professional Engineers and Land Surveyors requires these organizations to be licensed to practice land surveying in California.
<i>RISER_HT</i>	N15	No	No	Riser Height	The measured distance from ground surface to top of well casing reported as a positive or negative value to a hundredth of a foot.	Optional field
<i>ELEV_DESC</i>	C240	No	No	Elevation Survey Description	General description information pertaining to the survey.	If a publically available city, county or state benchmark was used, describe here.

3.2.3 Valid Value Lists for GEO_Z

Table 7: *ELEV_METHOD* valid values

Code	Description
DIG	Conventional differential leveling, digital or non-digital, (Federal Geodetic Control Subcommittee, Third Order) based on minimum of 2 geodetic control points.
TRIG	Trigonometric leveling using total stations (Federal Geodetic Control Subcommittee, Third Order) based on minimum of 2 geodetic control. (May not achieve 0.1 foot accuracy; may not be compliant with AB2886. Results will vary with length of line and accuracy of equipment utilized.)
CGPS	Conventional elevation survey technique (Federal Geodetic Control Subcommittee Third Order) based on minimum of 2 GPS-derived control points (RTK, static, & rapid/fast-static) established from HPGN or HPGN-Densification geodetic control points.

Table 8: *ELEV_DATUM* valid values

Note:

- “Mean Sea Level” is not a datum, see Appendix A: Glossary of Terms
- NGS no longer supports the NGVD29 datum- does not guarantee that any formerly published NGVD29 value is correct, and no longer publishes in that datum.

Code	Description
29	NGVD29
88	NAVD88 (Preferred for all new surveys)
LOC	Publicly available local datum from city, county or state agency; enter name in survey description

3.3 GEO_WELL: Groundwater Well Measurement File

The GEO_WELL file provides field measurements from groundwater wells for import into the GeoTracker system. GEO_WELL data should be submitted after every sampling event.

<u>GEO_WELL FILE</u>	
<u>Global ID</u>	<i>GLOBAL_ID</i>
<u>Field Point Name</u>	<i>FIELD_PT_NAME</i>
<u>Status</u>	<i>STATUS</i>
<u>Groundwater Measurement Date</u>	<i>GW_MEAS_DATE</i>
<u>Depth to Free Product</u>	<i>DTFPROD</i>
<u>Depth to Groundwater Surface</u>	<i>DTW</i>
<u>Riser Height</u>	<i>RISER_HT</i>
<u>Total depth</u>	<i>TOT_DEPTH</i>
<u>Groundwater Measurement Description</u>	<i>GW_MEAS_DESC</i>

3.3.1 File Guidelines and Restrictions:

- Primary key fields: *GLOBAL_ID*, *FIELD_PT_NAME* and *GW_MEAS_DATE* comprise the primary keys.
- Required fields: *GLOBAL_ID*, *FIELD_PT_NAME*, *STATUS*, *DTFPROD*, *DTW*, require entry.
- Valid Value fields: *STATUS* requires valid value entries.
- *RISER_HT*, *TOT_DEPTH*, and *GW_MEAS_DESC* may be left blank.

3.3.2 The GEO_WELL File Format

Table 9: GEO_WELL Format

Field Name	Attrb	VVL	REQ	Dscr. Name	Definition	Guidelines & Restrictions
<i>GLOBAL_ID</i>	C12	Yes	Yes	Global ID	The unique identifier for a regulated facility or site. Identifies facility/site name , address, regulatory program etc.	Obtain from GeoTracker web pages.
<i>FIELD_PT_NAME</i>	C15	Yes	Yes	Field Point Name	The field name or common name of the location where the field measurement has been collected (i.e., Well 01).	Obtain from GeoTracker web pages. Add new field point names via GeoTracker AB2886 electronic reporting interface.
<i>STATUS</i>	C5	Yes	Yes	Well Current Status	The code representing the current status of well.	
<i>GW_MEAS_DATE</i>	D10	No	Yes	GW Measurement Date	The date that the depth to groundwater was measured.	Date format is MM/DD/YYYY.
<i>DTFPROD</i>	N15	No	Yes**	Depth to Floating Product	The measured depth from top of well casing to floating product surface reported to hundredth of a foot.	**Leave null if free product is not present.
<i>DTW</i>	N15	No	Yes**	Depth to groundwater surface	The measured depth from top of well casing to groundwater surface reported to hundredth of a foot.	**Leave null if groundwater cannot be sampled
<i>RISER_HT</i>	N15	No	No	Riser Height	The measured distance from ground surface to top of well casing reported as a positive or negative value to a hundredth of a foot.	
<i>TOT_DEPTH</i>	N15	No	No	Total Depth	Depth of well measured in the field during the sampling event from top of well casing to "bottom" of well reported to hundredth of a foot.	
<i>GW_MEAS_DESC</i>	C240	No	No	DTW Description	General description	

3.3.3 Valid Value Lists for GEO_WELL

Table 10: STATUS valid values

Code	Description
ACT	Groundwater well currently used for monitoring
INACT	Groundwater well is NOT included in groundwater monitoring program
DRY	Groundwater well is dry and cannot be sampled
NOACC	Presently no access to groundwater well
AB	Groundwater well is abandoned, but not yet destroyed
DEST	Groundwater well has been properly and legally destroyed; no longer is conduit to the subsurface

3.4 GEO_MAP: The Site Map File

The GEO_MAP file is an electronic image of the site for import into the GeoTracker system. The maps are to include all groundwater well locations, boreholes, transient sampling points (i.e. direct push subsurface or surface sampling points) or any other field points utilized for soil or groundwater sampling. The maps are also to include the locations of underground storage tanks, former underground storage tanks, dispenser islands, buildings, roads. A number of site map formats may be submitted including:

- GIF
- TIFF
- JPEG
- PDF

4.0 Submittal File, Record, and Data Field Requirements

It is mandatory that the file, record, and data field requirements identified below be adhered to in order to generate acceptable upload file.

4.1 Submittal File Requirements

An EDD may be submitted as a fixed length or tab-delimited format including: ASCII *.TXT file, Microsoft Excel™ tab delimited *.XLS file, or comma separated value (CSV) delimited ASCII *.TXT file (also known as “comma/quote delimited”).

Each line of data is equivalent to a single record in the data submission. Each record is made up of distinct fields of information. Listed below are the file and record specifications for entering each record of data in its specified file.

- The column heading or field name is not part of the file and should be omitted. Only the data being entered should be in the upload file. Inclusion of column headers (i.e. the field names) in the upload document will cause errors. (Specific instructions for use of Microsoft Excel™ and Microsoft Access™ are detailed below).
- If entering the data via a spreadsheet, such as Microsoft Excel™, enter the first field's data in the A1 cell. Each cell following A1 should be an additional field of data. When the document is saved as tab-delimited text, excel will save it in the proper format for entry (see instructions below).
- If the record is being created in a text-editor program, there should be no margins and no word-wrapping. (Text-editor programs include Notepad™ and Wordpad™). In each file, every record starts in the farthest left position of “position number 1.”
- Empty rows (records) are not allowed. The first record or row in the file, and every subsequent record or row, must contain valid data.

- Every record within a file must be unique. If, for each key field, a record's data appears exactly the same in another record, these two records are considered to be duplicate records.

4.2 Submittal Data Field Requirements

When producing the fixed or tab delimited formats, data element formats (attributes) must be strictly followed.

- Only authorized codes from the valid value list should be keyed into fields requiring valid values.
- Valid data must always be entered for all required fields.
- Do not add or delete any fields.
- Optional fields where data is not being reported should be left blank (will be converted to unknown).

4.2.1 Tab Delimited Formats

Creating a tab delimited file from a Microsoft Excel™ spreadsheet:

In order to create a file for submittal, create an Excel™ spreadsheet with column headings that match the fields and order required for the GEO_XY, GEO_Z, GEO_WELL files (specified in this document). Enter valid data for each LUST case in a single row, with each field occupying one cell. Enter the first field's data in the A1 cell. Each cell following A1 should be an additional field of data. Save the spreadsheet as a text document (tab delimited), which is one of the options under file>save as> save as type. At this point, Excel™ will generate a message warning that some formatting may be lost by saving your document in this format. Simply click the "Yes" button, and save the file. By saving as "text (tab delimited)", Excel™ omits the column headers and margins from the document as required for upload. This is the "formatting" that Excel™ warns will be lost when saving the document. This file can be uploaded through the GeoTracker Web-based system.

Creating a tab delimited file from Microsoft Access™

In order to create a file for submittal, first create a database consistent with the GEO_XY, GEO_Z, GEO_WELL file guidelines. To export data as a tab delimited file, go to file>Export, and set the "Save as type" as "Text Files" and press the "Save All" button. In the new window that will appear, select the "Delimited" option, press "Next", and choose tab delimited. Press "Next" again, and then press "Finish". The new tab-delimited text document will be saved in the directory that was chosen during export.

4.2.2 Comma Delimited Format

CSV delimited format:

For the CSV delimited format, the value entered must be equal to or shorter than the field's length and followed by a comma. For example, when entering a *GLOBAL_ID*, which is a C12 field, if the value to be entered is only C5, in the CSV delimited format it would look like:

“12345”, “next field entry”

4.2.3 Fixed Length Format

The fixed length format:

Data fields in a file are limited to a certain number of spaces and the data must be in a specific position. Character data must be left justified within a field. Numeric data must be right justified within a field. If the information to be entered is shorter than the field width, insert blank spaces in the field's remaining positions. If the data to be entered is longer than the allowed field width, the data must be shortened to a unique identifier or significant value.

The start- and end-position numbers indicate the exact character locations where the applicable data must be placed in the file. There are some cases where the field is a single character wide. It, therefore, has the same start- and end-position number. The single character of data must be put in that position of the record. For example, when entering a *GLOBAL_ID*, which is a C12 field, if the value to be entered is only C5, in the fixed length format, it would look like:

12345.....next field entry
(where the dots represents 7 blank spaces before the next field).

4.3 Procedure for EDD Submittal

Files may be error checked and submitted to the GeoTracker Web-based system at <http://geotracker.swrcb.ca.gov/ab2886>. Dynamic error reports will be generated to inform the user of any data format issues that must be resolved. The files must pass the error-checking program before the data will be submitted to the lead regulatory agency and the GeoTracker database.

Appendix A: Glossary of Terms

Attributes - The format and size attributes of a database field. A field type of C8 is a field that can hold up to eight alphanumeric characters. An N5 field type has a total of 5 spaces available for numbers and decimals, with no restriction on the number of digits to the right of the decimal point other than the overall field size (e.g., 12345 or 123.4 or 1.234). A D10 field type is a date field, and is formatted as MM/DD/YYYY ([month]/[day]/[year]).

Database - A collection of information arranged into records (rows) and fields (columns) for ease of sorting and manipulation within a table or related tables.

Deliverable - A report, data, etc., that is “delivered” to another party, either electronically, or in hard copy format.

EDD (Electronic Data Deliverable) - Information stored in a defined format, accessible via a computer (e.g., stored on diskette, internal hard drive, CD ROM, magnetic tape, etc.).

Field - An area of a table (a column) that contains a particular piece of information. One or more fields make a record. Fields are defined by the attributes of format and size.

File - A named group of electronic data in a defined format.

Guidelines and Restrictions - Information provided to the user regarding data entry, data performance, and data delivery expectations.

National Geodetic Vertical Datum of 1929 (NGVD 29) - A fixed reference adopted as a standard geodetic datum for elevations determined by leveling. The geodetic datum is fixed and does not take into account the changing stands of sea level. Because there are many variables affecting sea level, and because the geodetic datum represents a best fit over a broad area, the relationship between the geodetic datum and local mean sea level is not consistent from one location to another in either time or space. For this reason, the National Geodetic Vertical Datum should not be confused with mean sea level which is only applicable in the vicinity of a tide gage. This datum was superseded in 1991 by NAVD88.

North American Vertical Datum of 1988 (NAVD 88) - A fixed reference for elevations was originally defined by geodetic leveling. This datum was derived from a general adjustment of the first-order terrestrial leveling nets of the United States, Canada, and Mexico. NAVD88 is a vertical reference framework for elevations that are determined either by leveling or by a combination of precise methods of GPS surveying and utilization of a geoid model.

Primary Key - A field or set of fields that uniquely identify a record within a table. Key fields within a table define the primary key. Each database record can be uniquely identified using the combination of data fields that make up the primary key.

Record - A line of data (a row) in a table or file made up of distinct fields of information.

Responsible Party- The individual or organization legally responsible for the assessment, monitoring and/or remediation of a contaminated site.

Table - A format for data that allows for data manipulation within a database. Tables are organized with columns and rows of information.

Valid Value - Specially assigned, standardized coded value designating an approved (i.e., “valid”) value for entry into a field in the database.