OCT 02 1992 (11) Station #21

ENGINEERING DATA TRANSMITTAL 0023948

Page 1 of 1

1 EDT 133752

2. To: (Receiving Organization)	3. From: (Originating Organization)	4 Related EDT No:
Distribution	Environmental Data Management	154196, 133751
5 Proj/Prog/Dept/Div: Waste Management	6. Cog/Proj Engr: F. M. Coony	7. Purchase Order No:
8 Originator Remarks: Approval and Release		9 Equip/Component No:
11. Receiver Remarks:		10. System/Bldg/Facility:
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1	WHC-SD-WM-CSDD-006		0	TCD Integration with HEIS	3Q	1,2	1	

16. KEY

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SUPPORTING DOCUMENT

1. Total Pages 167

2. Title	3. Number	4. Rev. No.
Tank Characterization Database Software Detailed Design	WHC-SD-WM-CSDD-006	0

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TCD, HEIS, Software, Radioactive Waste, High-level Waste, Tank Farms, Characterization, single-shell tanks, double-shell tanks, grout vaults

6. Author

F. M. Coony
Name (Type or Print)

F. M. Coony
Signature

Environmental Data Management 81260 /N451A
Organization/Charge Code

7. Abstract

The Tank Characterization Database Software Detailed Design is a representation of the software system to be placed in the Hanford Environmental Information System (HEIS). The software system will be used by waste management engineering organizations as a tool to evaluate the contents of 149 single-shell tanks, 28 double-shell tanks, and existing and proposed grout vaults.

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PNL-8056

Tank Characterization Data Integration with HEIS Software Design Description SDD - Rev 0

J.W. Brothers
J.S. Littlefield

April 1992

Prepared for
Westinghouse Hanford

Pacific Northwest Laboratory
Richland Washington 99352

9203810

Battelle
Pacific Northwest Laboratories
P.O. Box 999
Richland, Washington U.S.A. 99352
Telephone (509) 2396

May 12, 1992

Mike Coony
H4-52
Westinghouse Hanford Company
Richland, WA 99352

Dear Mike:

The purpose of this letter is to transmit the final draft of the "Tank Characterization Data Integration with HEIS Software Design Description", PNL-8056 and WHC-SD-WM-CSDD-006, Rev 0.

As has been agreed upon throughout the design phase, the design reflects changes to the Software Requirements Specification brought about by further study and analysis, as well as decisions about the scope of TCD. As is explained in the report, PNL is now in the implementation phase, with an expected Rev. 1 of this report to reflect any further changes thus documenting TCD as it will have been implemented.

Sincerely,

Joe Brothers
PNL TCD Project Manager

JWB:lk

Encls. (12)

SUMMARY

Pacific Northwest Laboratory (PNL) designed a model for the integration of tank characterization data into the Hanford Environmental Information System (HEIS) database. This report documents that initial design.

The preliminary requirements were furnished by Westinghouse Hanford Company (WHC) in the form of a Software Requirements Specification document. The integration of TCD into HEIS is being accomplished through a phased approach with this report documenting the results of the design phase. Subsequent phases will include initial implementation, changes, upgrades and enhancement of functionality. The design is expected to change as implemenation proceeds and further conclusions are drawn about the functionality of the design and the input/output requirements are further defined. The final implemented design will be documented in a subsequent revision to this one.

The TCD design resulted in the development of several new logical data design concepts that directly focus on tank characterization data, but also apply to a broader area of characterization data associated with technical data gathering and management activities similar to the Hanford cleanup work.

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Figures

Tables

Acknowledgements

This design document contains many original ideas, but without the help of those that came before and particularly those that were directly involved in the design and the review of this document the design would not be where it is today. We wish to thank all that helped but special thanks go to the people below.

Doug Hendrickson, Russ Wagner, Bob Watrous, Julian Hill and Dale Halgren provided useful comments and insight into tank data and its uses. Mike Coony provided insight into the decisions that formed the basis for the tank data management application. Paula Cowley, Wendy Nunns, Heidi Kemp and Dave Cabrey provided important peer reviews of the design. Jim Brown, Tom Olund, Bruce Kissinger and Susan White provided useful insights into the related development of the Tank Waste Information and Network System (TWINS) project. Pat Heasler provided a statisticians perspective review of the design based on his single-shell tank analyses.

1 Introduction

1.1 Purpose

This Software Design Description (SDD) depicts how the software will be structured to satisfy the requirements summarized in the Software Requirements Specification (SRS) for the Tank Characterization Database.[1] This SDD describes the components and subcomponents of the software design, including the database structure and internal interfaces for the Hanford Tank Characterization Database integration into the Hanford Environmental Information System (HEIS).

The SDD for the tank application is being prepared in two phases, a preliminary SDD reflecting the plan, and a final SDD reflecting the detailed, implemented application.

1.2 Scope

As described in the Background section below, the TCD SRS describes four distinct types of data gathering efforts:

(1) single shell tank core samples,
(2) double shell tank core samples,
(3) waste tank supernatant samples,
(4) and Grout candidate and feed tank samples.

Operational, sampling, analysis and reporting requirements vary between the four different efforts. The HEIS integration will combine common attributes and tables while accommodating the different needs of the four areas and their respective users.

The SRS was prepared assuming that the tank characterization database would be a new database independent of any others. As a result of an alternatives analysis near the end of the SRS effort, the HEIS integration alternative was chosen as the preferred implementation. Some of the SRS requirements are inconsistent or accomplished in this design in other ways than the SRS spells out.

1.3 Background

The Tri-Party Agreement is the legal commitment by the Department of Energy, Richland Operations (DOE-RL) and its contractors to comply with the Resource Conservation and Recovery Act of 1976 (RCRA) regulations at the Hanford Site. Compliance with these regulations has increased the data keeping requirements within the Waste Management Division.

Users of the data will include technical staff supporting the four different waste management areas, EPA, Ecology, WHC Safety, and others supporting the acquisition and maintenance of the data. The four different waste management areas are described in the SRS and summarized here.

1.3.1 Single Shell Tank Characterization

A decision on the final disposal form for single-shell tank waste at Hanford will be based on further characterization of the waste and a reassessment of the alternatives for disposal. The core sampling program will provide the data to support a supplemental EIS as well as provide data for technology development and closure plans.

The *Waste Characterization Plan for the Hanford Site Single-Shell Tanks*[2] is the waste analysis plan for single-shell tank waste. The waste analysis plan defines the sampling effort to characterize single-shell tank waste. Core sampling analytical results includes physical properties, radionuclides, major chemicals, and hazardous components.

The plan is for the laboratories to prepare a data package for each core sample. The data packages contain all analytical results along with raw data and quality control data, but do not attempt to interpret the data. The WHC OSM will validate the data packages. The WHC Tank Waste Characterization Technology section is chartered to prepare a report for each single-shell tank which will include the data package and the interpretation of the data.

The Supplemental Environmental Impact Statement and Closure Plan authors will use the data for performance and risk assessment. Washington State Department of Ecology will use the data for approval of the closure plan. The data will also be used by developers of disposal technologies.

1.3.2 Double Shell Tank Waste RCRA Analysis

A waste analysis plan has ben completed for storage of double-shell tank waste and the 242-A Evaporator/Crystallizer (evaporator). The interpretation of the waste analyses resulting from plan implementation is intended to meet the informational requirements of the Part B Application for both double-shell tank waste and the evaporator.

The plan outlines the approach for collecting the characterization data. The requested analyses will be scoped in a manner to assure safe treatment and storage of the waste. The objectives of the waste analyses are to verify process knowledge and to confirm the waste designation satisfying permit application requirements. Another objective is to provide analytical acceptance criteria for storage and treatment of wastes. RCRA sampling and analyses procedures apply for this sampling. The analyses are performed at the WHC 222-S laboratory.

1.3.3 Grout Candidate Tank and Feed Tank Analysis

Waste to be disposed in grout is characterized to verify that the waste can be processed safely into a form suitable for long-term disposal. Processing of waste into grout consists of

campaigns of 1 million gallons of waste, grout-free basis. Wastes considered for grout disposal are termed "candidate" wastes.

This waste characterization program consists of two stages:

- Determination of expected waste constituent concentrations
- Compliance with waste disposal characterization requirements.

During the first stage, candidate wastes are sampled, characterized, and evaluated to meet the requirements for disposal. Evaluation involves the development of simulant wastes upon which grout solidification, strength, and leachate analyses are conducted.

When the simulant wastes are demonstrated to meet the requirements, the second stage of the characterization begins. The candidate wastes are transferred to a grout feed tank where they are resampled and reanalyzed. The results of this second analysis are compared to the grout feed limits.

The reason characterization is conducted in two stages is that a 1 million gallon grout feed tank may contain up to five discrete candidate waste streams. A typical example is a feed tank that contains 1) a feed tank heel, 2) a primary candidate low-level waste tank (i. e. Double-shell Tank Slurry Feed), 3) one or two dilute waste tanks as makeup to assure that heat generating radionuclides do not exceed vault design guidelines, and 4) a secondary candidate low-level waste tank should the primary tank not have sufficient pumpable supernatant for a 1 million gallon campaign. Analyses are performed by both site laboratories (WHC 222-S and PNL 325 laboratories). RCRA sampling and analysis procedures apply although an exception has been requested for the feed tanks.

1.3.4 Double Shell Tank Characterization

DOE requires the completion of waste acceptance specifications and criteria for high-level waste forms disposed in a geologic repository prior to start-up of the Hanford Waste Vitrification Plant (HWVP). Characterization of the HWVP feed streams is currently under way. Samples are collected from the appropriate double-shell tanks by the Tank Waste Characterization section. Simulation of any pretreatment steps is conducted in the laboratory. For example, for Neutralized Current Acid Waste, the sample is centrifuged and the solids are washed to obtain a representation of the HWVP feed stream.

The composition of HWVP feed streams depends on the performance of pretreatment. As such, other technology organizations are using laboratory characterization results for use in design and safety analyses for pretreatment.

Laboratory analyses are performed at the PNL 325 laboratory. Because the data needed to support disposal of waste in a deep geological repository, RCRA sampling procedures and validations do not apply. Also, the WHC OSM does not provide validation of the data.

2 Decomposition Description

The tank characterization data has been decomposed into logical entities that support the database design, as well as aid in a discussion of the data. The SRS divided the data into four different types related to the four different characterization programs. The four characterization programs have several attributes in common, which are capitalized upon in the database design.

The first part of the design process involved assimilating all of the SRS requirements into an integrated picture of the data that provided a means of identifying common areas and sets of data. The common areas were then grouped into meaningful classes of entities that could be discussed and used to design the database. The three classes for this application are called source, sample, and analysis. The model for the data can be depicted graphically as shown in Figure 2.1.

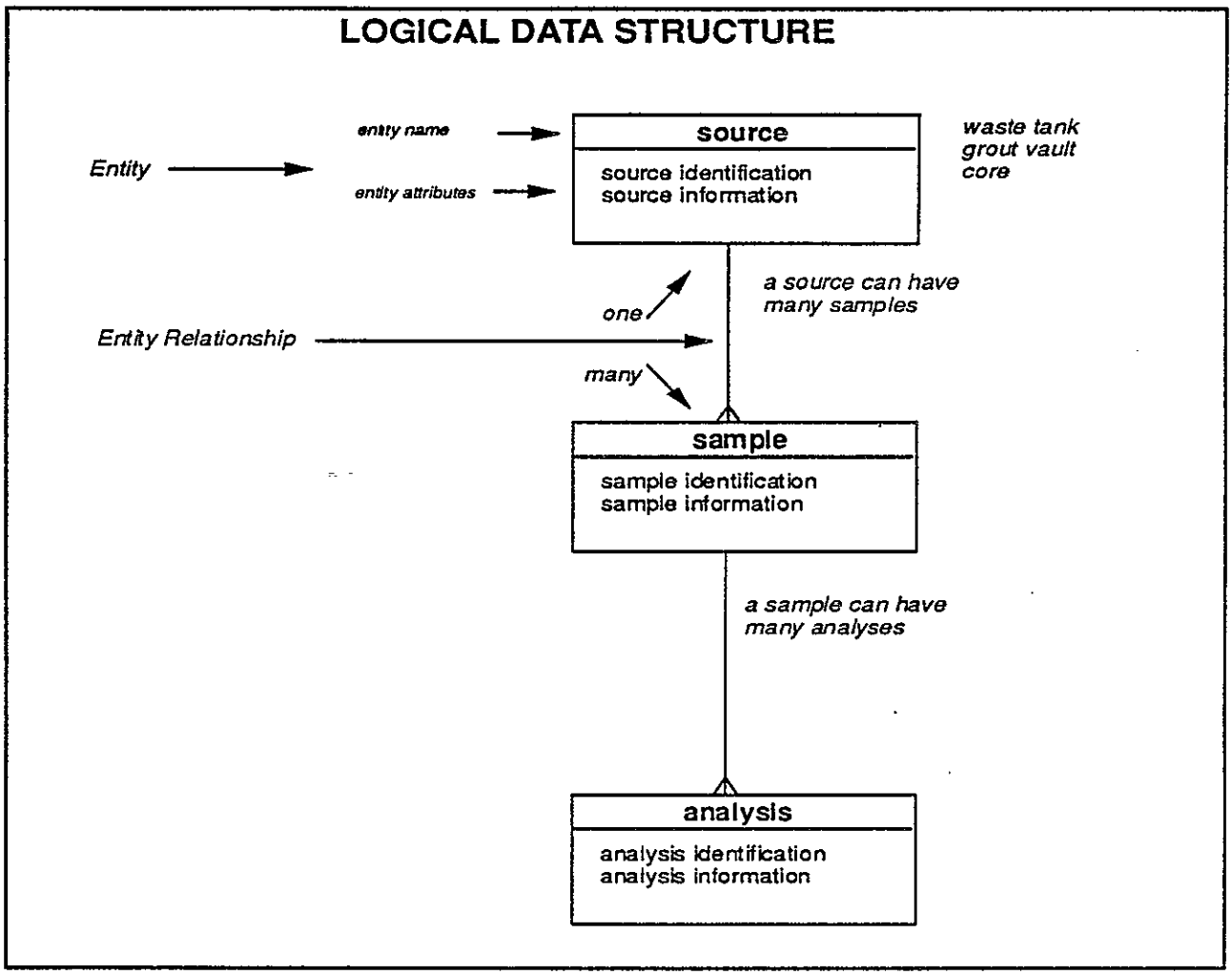

Figure 2.1 Logical Data Structure

Figure 2.1 also presents important design concepts used to describe the TCD model. The term "entity" is used to describe an element (or group of elements) of the design that is structurally and functionally distinct from other elements. An "entity" is described by its "entity name" and has "entity attributes". Entity attributes are defined as the information the design wants to associate with the entity. Entities can also be viewed as tables, with rows and columns. The table title is the entity name. Each of the entity attributes is a column in the table, and every new instance of the entity is a row in the table. In relational database terms, the entity can be viewed as the table with table name "entity name", and field names "attribute names."

Terminology

Entities are related one to the other with a design construct called an "entity relationship". The entity relationship describes which two entities are being related, and the quantities of each that can be related to the other. Those quantities are called the "cardinality" in this design. In Figure 2.1 we can say that the **sample** entity is related to the **source** entity and a **source** can have many **samples** but a **sample** can have only one source. The cardinality is depicted by the triangular shaped graphic at one end of the relationship connector. It is sometimes called a "chicken foot" because of the way it looks. The other end of the relationship doesn't have the chicken foot indicating that a **sample** can only have one **source**. It is important to understand that the cardinality is required to define how the data is going to be accessed. It is therefore defined for the purposes of the database design, not necessarily the way the world works outside the database.

In this design, entities will be denoted with bold text, while attributes will be denoted by underlining each attribute. Additional design constructs and notation will be introduced where first used in the document.

The objective of the database is to store and access results characterizing the problem. So one group of entities are those related to the sample analyses performed in the laboratory. These analyses all generate some result (usually quantitative) for a constituent* with related information such as uncertainty, quality and units. At the other end of the process, the origin or source of the samples makes up another class of entities. This class includes tank farms, both single and double shell tanks, and grout vaults. There are primarily two types of information of interest about the source. The first type includes relatively static information describing the source such as size and date of construction. The second type of information includes data that one would expect to change over time such as liquid volume or photo dates.

Between the source and the analysis we have defined another class of entities called a sample. This entity provides the connection between source and analysis for both data users and the internal functioning of the database system. The user views sample as a physical part of the item of interest (source). The database system's use of a sample is also used to group like

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* In this design constituent is the characteristic we are trying to measure and includes chemicals, nuclides, and physical properties. Constituent is also a synonym for analyte.

samples together, whether they are source samples such as segments from a core, or analysis samples such as replicates.

The decomposition of each of these classes of entities into component entities, and the description of the components provides the basis of the data dictionary and the database schema.

The entities will be discussed below. The entity names are highlighted in bold print. The entities can also be visualized as titles for tables with the attributes of the entities visualized as columns within each table. Every new instance of an entity will constitute a new record or row of the table. A ¥ symbol in front of an attribute is used as a graphical way of showing that the attribute belongs to another related entity and can be used to identify the entity that the ¥ is contained within.

2.1 HEIS Concepts

TCD is being implemented as part of the HEIS database. As a result several HEIS concepts and conventions apply. For example HEIS represents data of known quality. HEIS is designed to ensure data integrity. As a result, the TCD design includes an entity called **analysis_result_change** described in this document. The SRS did not specify how to make changes to data traceable. In this design it is accomplished by including reference attributes at several levels for different entities. This traceability may be called doc_loc, data_reference, log_id, and similar attribute names. This traceability is doubly important for information that is derived indirectly through some more subjective process where the method is not well defined.

Another HEIS feature related to integrity is the concept of data ownership. Data record stored for TCD will have associated owner and control attributes. Owner represents the HEIS computer account that owns the record. The owner can set the control level that controls how viewable the data is to different classes of users.

Other attributes that have been generally added to the design that were not specified in the SRS but are typically used in HEIS are names, descriptions, and comments. Names are alternative ways of specifying an attribute that provides more space than typical attribute identifiers. Names are typically about forty characters long. Descriptions are longer yet and provide a way of more completely describing the attribute that has an identifier and name. Comments are not meant to be descriptions but ad hoc comments or remarks deemed desirable to help explain the context of the associated data. These attributes are included with each entity (table) judged appropriate.

For additional explanations of HEIS concepts you can refer to the HEIS documentation and the Programmer's Notes section of this document.

2.2 Source Entities

Its important to have well defined terms. It minimizes misunderstandings and misuse. The **source** entity is one that we can define for the purposes of this design. The term **source** came about in this design because we have a source of samples. It is the object of interest in the remediation and characterization effort. In the case of this design it includes a waste tank, evaporator and grout vault. The term **source** can also be applied to other things such as core and layer. In some instances a source may also be a sample. One example is a core segment which is a **sample** in the respect that it is taken as a single entity and some observations or measurements are made directly on that sample. A core segment is also a **source** in the respect that new **sample** entities are derived from it. A simple example is the drainable liquid sample and a solid sample from the core segment source.

For the purposes of this design we have identified several entities that we can consider as sources. Waste tank farm (only indirectly through a tank), waste tank, tank core, and grout vault are entities we will treat as sources for the purposes of this discussion.

2.2.1 Waste Tank Farm

For the purposes of this design the importance of the **tank_farm** entity is limited to aiding in the identification of waste tank and grout vault. The SRS did not identify any other uses, although it is being identified as a separate entity in this database to be compatible with the way users may access the data. Keeping it as a separate entity rather than incorporating tank farm identification as an imbedded part of waste tank identification provides a convenient place for expansion in the future.

Attributes of the tank farm entity included in the design are the tank_farm_id, tank_farm_name, tank_farm_desc, tank_farm_comment, control, and owner. These attributes are used to store information about each tank farm. The only attribute specified by the SRS was the tank_farm_id. The remaining attributes were included because experience has shown that similar types of information are often desirable for sources and there is no penalty in the database design or implementation for including those attributes now, as opposed to trying to change the structure later when the database is populated with data that would then have to be converted. Attributes that were not part of the SRS will be noted in this design document. Tank_farm_name is the name of the tank farm, tank_farm_desc is a description of the tank farm, and tank_farm_comment accommodates any remarks deemed desirable.

Another design note related to attributes is appropriate. Some attributes are included because they are currently used in the HEIS system. Where the HEIS tables are going to be used for TCD, and/or when the attributes are desirable based on experience using the HEIS system, those attributes will be used. Their occurrence will also be noted in this design document. As previously described, control and owner reflect HEIS usage.

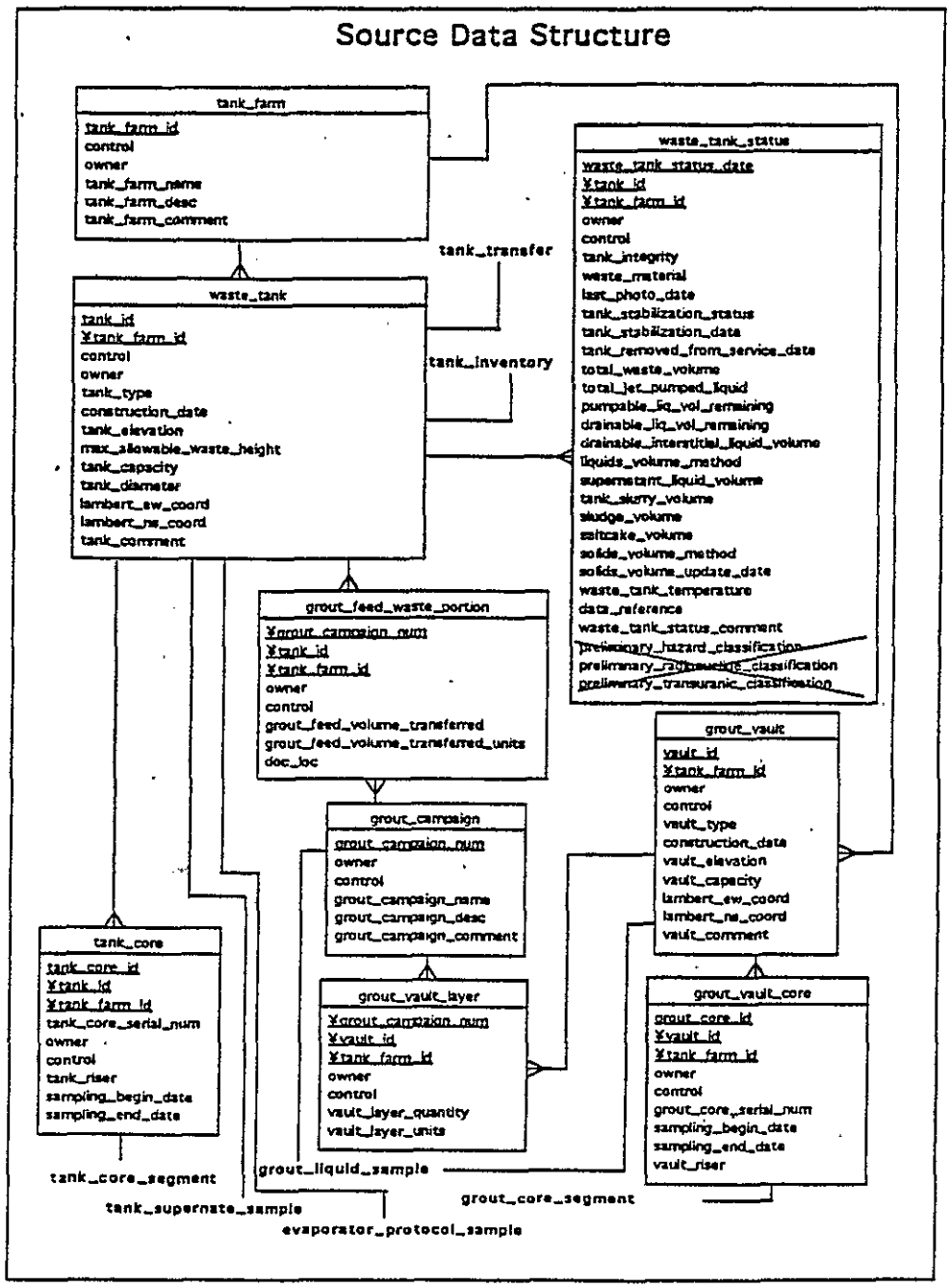

Figure 2.2 Source Data Structure

2.2.2 Waste Tank

Grout vaults and **waste_tanks** are the two primary source entities of interest in this design. Tanks are those entities that are either measured directly, or sampled to be measured later. Hanford tanks are identified by a tank number, named tank_id in this design. The combination of tank_farm_id and tank_id uniquely identify all tanks of interest. Other tank attributes of interest specified in the SRS are tank_diameter, tank_capacity, max_allowable_waste_height, construction_date, lambert_ns_coordinate, lambert_ew_coordinate, tank_elevation. tank_type, control, owner, and tank_comment are attributes added in this design.

The tank entity included in this design has been generalized to include both single- and double-shelled tanks. This generalization does not impose any additional costs other than.the extra tank_type tank attribute field. The database system is designed to minimize the impact (both storage and performance) of fields (attributes) that do not have any entry. Thus, seldom used fields do not have to be treated differently than often used fields. Of greater importance is how the user wants to access the data.

2.2.3 Waste Tank Status

This design includes a set of data (entity or table), related to the **waste_tank_status**. The purpose of this entity is to record data about the tank itself that is anticipated to change over time. Data of this type might include waste classification, volume of waste, as well as measurements or observations that can be made without requiring sampling, such as specific gravity. This entity includes the tank_stabilization_status, tank_stabilization_date, tank_removed_from_service_date, waste_material, tank_integrity, total_waste_volume, supernatant_liquid_volume, drainable_interstitial_liquid_volume, total_jet_pumped_liquid, drainable_liq_vol_remaining, pumpable_liq_vol_remaining, tank_slurry_volume, sludge_volume, saltcake_volume, liquids_volume_method, solids_volume_method, solids_volume_update_date, last_photo_date, and specific_gravity. New attributes added in this design include waste_tank_status_date, waste_tank_temperature, data_reference, and waste_tank_status_comment. Waste_tank_status_date represents the date to be associated with the current instance of **waste_tank_status**, while the other dates contained in the instance refer to particular attributes.

Review of the design by data owners indicated that two changes to the list of attributes were desirable. First, temperature was added because it adds desirable context. Second, preliminary_hazards_classification, preliminary_radionuclide_classification, and preliminary_transuranic_classification were deleted because they were more subjective attributes than the majority and did not come from the same source as the other attributes. We document them in the design only to trace their demise.

The attributes and observations that are included as part of the **waste_tank** and **waste_tank_status** entities are necessary in order for the data viewer (user) to make sense

out of the characterization data of interest. Analytical chemistry characterization results by themselves cannot be understood without considering the characteristics and current conditions of the tank. All of the tank attribute and status data is obtained from other data repositories that are primary sources. HEIS is not the primary source. Those sources should be described in the database using data_reference, doc_loc or similar fields. It is not necessary for all of the latest status to be available in HEIS, but it is important to include all data that puts the characterization information, such as analysis results, in the proper context so the risk of misinterpretation is minimized.

The stated intent is to input **waste_tank_status** data for the tank of interest when a new sample is taken from the tank. The source of the data is specified as the *Tank Farm Surveillance and Waste Status Report* published monthly.

2.2.4 Tank Core

The **tank_core** entity represents a single set of segments taken during one sampling effort. Attributes include tank_core_serial_number, sampling_begin_date, sampling_end_date, control, owner, and tank_riser. A **tank_core** is identified by tank_core_id, **waste_tank** and **tank_farm**. For the purposes of this design **tank_core** does not need to exist as a physical entity, but is considered physically as one or more core segments. For that reason the discussion of **tank_core** is treated as part of the source in this design.

2.2.5 Grout Feed Waste Portion

Grout_feed_waste_portion is an entity that correlates a grout campaign with the set of waste tanks that make up the campaign. A grout campaign can involve more than one waste tank, and a waste tank can be involved in more than one campaign. This combination of cardinalities could cause some problems when building a table to present grout vault results which need to be related back the tank and campaign of interest. The **grout_feed_waste_portion** entity provides a place to remember that correlation. Attributes of this entity are grout_feed_volume_transferred, grout_feed_volume_transferred_units, control, owner, and doc_loc, all added in this design to help describe the **grout_feed_waste_portion**.

Grout_feed_waste_portion is identified by **tank_farm**, **waste_tank** and **grout_campaign_number**.

2.2.6 Grout Campaign

Grout_campaign is an entity that is important primarily for identification purposes. As a result it includes attributes, grout_campaign_number which is a unique identification of each campaign, a grout_campaign_name, grout_campaign_desc, control, owner, and grout_campaign_comment.

2.2.7 Grout Vault Layer

Discussion of the possible grout production modes that should be anticipated include the concept of a campaign producing a layer in one or more grout vaults. Thus a **grout_campaign** can involve many **grout_vaults** and a **grout_vault** can involve many **grout_campaigns**. Therefore, we uniquely identify the source of samples through this entity called the **grout_vault_layer**. **Grout_vault_layer** attributes are vault_layer_quantity, vault_layer_units, control, and owner. Vault_layer_quantity represents the amount of material in a layer and vault_layer_units, the engineering units for vault_layer_quantity.

Grout_vault_layer inherits the identifying attributes of **grout_campaign** and **grout_vault**.

2.2.8 Grout Vault

Grout_vault is the source entity that we actually obtain grout core and/or liquid samples from. The SRS indicates that the only information of interest about grout vaults to be stored is the vault_id. A parallel has been drawn for the general types and justification for having a similar design structure to that used for the waste tanks. As a result other attributes that have been added as part of this design include vault_type, construction_date, vault_elevation, vault_capacity, lambert_ew_coordinate, lambert_ns_coordinate, control, owner, and vault_comment. The use of all of these fields is intended to parallel use of similar fields in **waste_tanks**.

2.2.9 Grout Vault Core

Grout_vault_core is similar to **tank_core** in that it represents a sampling effort, rather than merely a physical sample. It is different than a waste tank core in that it is not identified by tank but rather the **grout_vault** and grout_core_id. Other attributes include grout_core_serial_number, sampling_begin_date, sampling_end_date, vault_riser, control, and owner, in a similar way to **tank_core**.

2.2.10 Tank Inventory

Tank_inventory is an entity that provides a means for storing the inventory by constituent for each waste tank. The SRS described some computer processing that used an **analysis_result** coupled with a **waste_tank_status** volume to produce an inventory. The SRS did not adequately define which result to obtain, a description of what type of inventory the value would represent, or to what use the user might be need to use the data. As a result, a

simpler **tank_inventory** was included in this design that provides a place for either the user or future rigorously-defined processing to store **tank_inventory** data.

As minimum requirements, the design includes the date of inventory, inventory quantity, and units, control, owner, and document_location. The **tank_inventory** is identified by the date, the **tank_farm, waste_tank,** and the **constituent** of interest.

Future definition of this entity requires careful thought as to what the information is to be used for as well as the details to be stored. At a minimum the attribute names are only conceptual in nature and are bound to change to correspond to HEIS conventions.

2.2.11 Tank Transfer

Tank_transfer and **waste_transfer_analyte** entities are another type of inventory with similar characteristics as **tank_inventory** described in the previous section. **Tank_transfer** includes the transfer_volume in gallons, the transfer_date, transfer_number, transfer_source, control, owner, and document_location. It is identified by transfer_number, transfer_source, **tank_farm**, and **waste_tank**.

The **waste_transfer_analyte** inventory associated with a **tank_transfer** includes the quantity, units, control, owner, document_location and is identified by **tank_transfer, tank_farm, waste_tank,** and **constituent.**

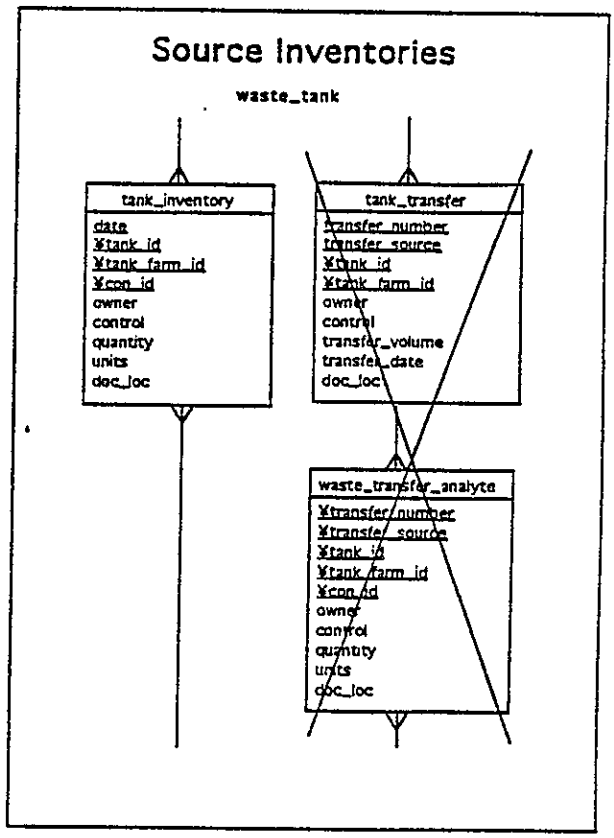

Figure 2.3 Source Inventories

Tank_transfer and **waste_transfer_analyte** were deleted from further implementation during WHC review. Reasons include the fact that they represent generator waste, not considered part of tank characterization data, they are typically not of the same pedigree as the other data, and there is no requirement to report to the Washington state Department of Ecology.

2.3 Sample Entities

The **sample** class of entities is physically that portion of the **source** that is used for the particular characterization effort. Care must be taken to separate the use of the term for the purposes of this design from the way the term may be used by the various functional groups involved in the characterization. For example, a technical coordinator may call a tank core a sample, while others may classify the core as the source of a sample. For the purposes of this design it is useful to classify sample as the thing analyzed that is associated with a source. With that definition a core is classified as a source. A segment is classified as a source if samples are taken from it and is classified as a sample if measurements are made directly on it.

A sample can be taken from some other place than the source it is identified with as long as it is to be related to the source. Examples are liquid being returned back to tanks from grout vaults and evaporator protocol samples.

As shown in Figure 2.4, the TCD has three different primary types of sources - **tanks**, the evaporator, and **grout_vaults**. Samples taken from these sources include **tank_core_segment** samples, **tank_supernate_samples**, **evaporator_protocol_samples**, **grout_core_segment** samples, and **grout_liquid_samples**.

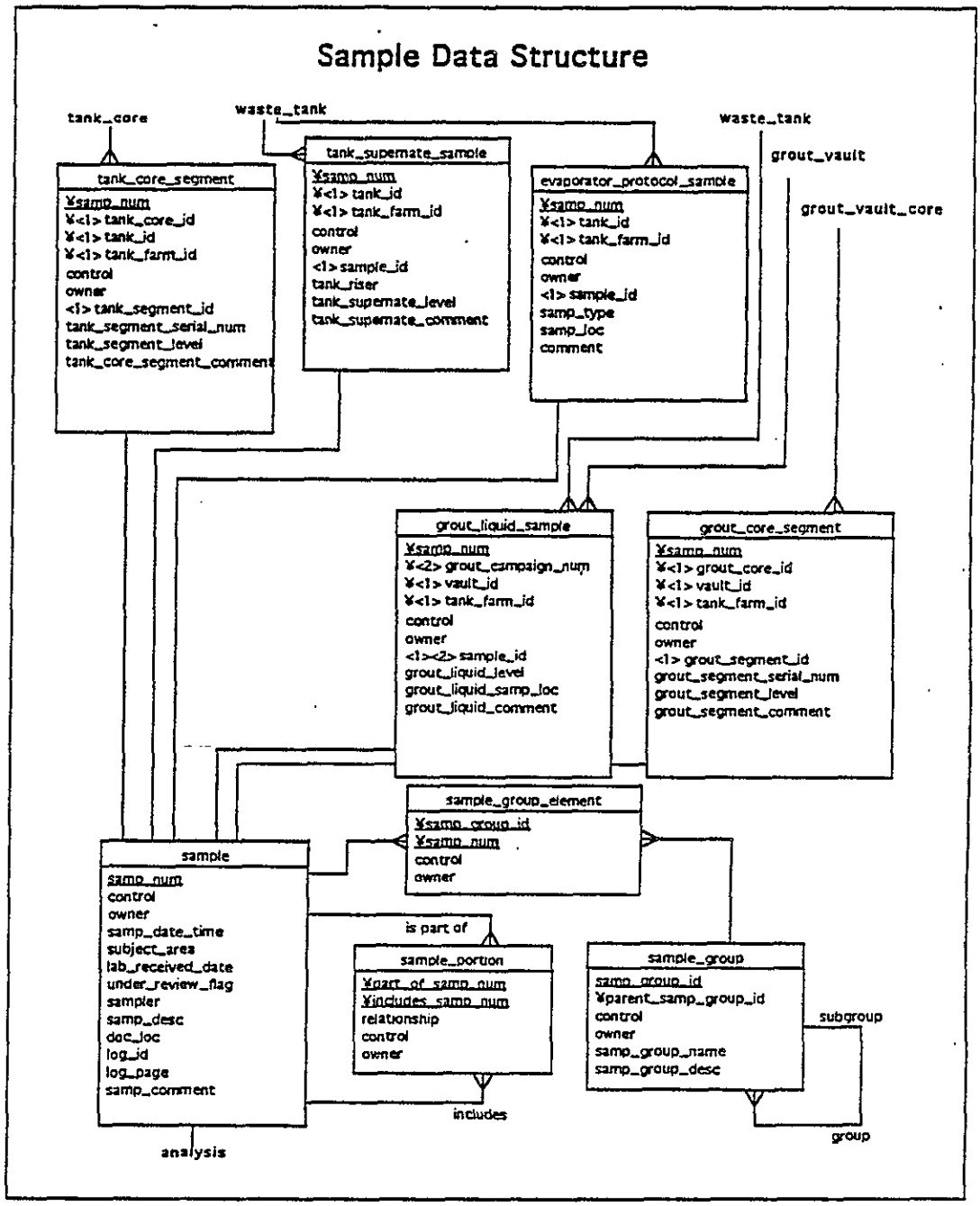

Figure 2.4 Sample Data Structure

The design of the database requires that we have a way of uniquely relating the analytical result back to the source. In the logical design this is accomplished through the **sample** and **sample_portion** entities. **Sample** is an entity we manage the data by. Usually it also corresponds to a physical sample that is managed by as part of the characterization process. The **sample_portion** is an entity that we can use to show the relation of one sample to related samples, such as when individual samples are combined into a new composite sample or when a sample is split to produce new replicate samples. **Sample_group** and **sample_group_element** are entities that provide a way for users to group samples together into sets that have a desired group characteristic not necessarily needed by other users or the system.

2.3.1 Tank Core Segment

The **tank_core_segment** sample entity represents the segment extrusion, both liquid and solid, and any future samples that may be derived from this sample when considered as a source.

Tank_core_segment has attributes tank_core_segment_id, tank_core_segment_serial_number, tank_core_segment_level, control, owner, and tank_core_segment_comment. The **tank_core_segment** identifier is **sample. Sample** here represents the entity which is uniquely identified by sample_number. Tank_core_segment_level was added as part of this design to aid in the presentation of data where the elevation is directly available rather than being derived from tank elevation and segment numbers. Other attributes that are of interest are tank_core_id, tank_id, and tank_farm_id from their respective entities. These are also used as secondary indexes to retrieve records. Secondary indexes are denoted by angle brackets around the index number - one in this case.

2.3.2 Tank Supernate Sample

Tank_supernate_sample represents the "bottle on a string" or other samples taken directly from a waste tank. Attributes are supernate sample_id, sample tank_supernate_level, the tank tank_riser number the sample was taken from, control, owner, and tank_supernate_comment. As with core segment samples, further subsamples and treatments may be created and identified below. As with core segment samples, **tank_supernate_samples** are identified by **sample.** Other attributes that are of interest are tank_id and tank_farm_id from their respective entities, and are again used as secondary indexes.

2.3.3 Evaporator Protocol Sample

Evaporator_protocol_sample represents evaporator bottoms (F2) and after filter process condensate (RC-3) that goes to the 242-AL basins. Attributes are sample_id, sample_type, sample_location, control, owner, and comment. As with core segment samples, further subsamples and treatments may be created and identified below.
Evaporator_protocol_samples are identified by **sample.** Other attributes that are of interest are tank_id and tank_farm_id from their respective entities.

This entity is not scheduled to be implemented in the first TCD implementation.

2.3.4 Grout Core Segment

Based on the information from the SRS, **Grout_core_segment** can be treated in a way similar to **tank_core_segment.** The SRS does not describe the sampling method so we have included the attributes grout_core_id, grout_segment_serial_number, grout_segment_level, control, owner, and grout_segment_comment. It also is uniquely identified by **sample.** Other attributes that are of interest are grout_core_id, vault_id, and tank_farm_id from their respective entities.

2.3.5 Grout Liquid Sample

Grout_liquid_sample represents "bottle on a string" or similar liquid samples taken to represent liquids from a grout vault. The sample is taken from grout_liquid_samp_location, and assigned a grout sample_id. As with tank supernate samples it includes grout_liquid_level, control, owner, grout_liquid_comment and is identified by **sample.** Other attributes that are of interest are vault_id, grout_campaign_number, and tank_farm_id from their respective entities.

2.3.6 Sample

The **sample** entity represents something we want to perform an analysis on, either directly or through additional processing and preparation. If that processing includes a procedure that must be documented and produces processing information (or results), then that information can be recorded as analysis information related to the sample. If the processing is well defined, implicit, and does not generate any new results in and of itself, then there may be no need for recording analysis information. A filtration of a sample into liquid and solid fractions is an example of the former type of treatment because basically different types of information and data are generated for the liquid and solid. In most cases a "split" of a sample into two samples is an example of the latter type of treatment because the treatment (analysis) is the same and

the information of interest is only the comparison between the results for the different parts of the split. The design of the TCD does not impose a particular way of recording the information - the decision is left to the data owner, who should be guided by how the data is going to be used. Sufficient information must be included to ensure accurate interpretation of the data.

Sample includes attributes sample_number, sample_date_and time, document_location, sample_comment, sample log_id, sample log_page, under_review_flag, subject_area, sampler, lab_received_date, sample_description, control, owner and sample_comment.
Samp_date_time is the only attribute from the SRS. The others are either part of HEIS or added as part of this design.

Samp_num is an attribute added by the database system to uniquely identify **sample** entities. It is the glue the relates analysis information back to the source of the sample. Samp_num is the sole identifier of the **sample** entity. It is also used to identify both the **analysis_result** and the immediate source of the sample.

Samp_date_time represents the date and time the sample is taken. Subject_area identifies the type of source, such as waste **tank_core_segment**, or **grout_liquid_sample**. Doc_loc is the location of documentation related to this sample, whereas sample log_id and sample log_page are meant to be references to the sampler log book if any. The under_review_flag is an indicator that the sample is or has been designated as one that needs review. This is an action taken by someone to address the validity of some data related to the sample.

2.3.7 Sample Portion

The **sample_portion** entity represents both a "supersample" (one in which new samples are derived), and a "subsample" (one which was derived from samples that already exist). **Sample_portion** includes the two sample numbers. The attribute part_of_samp_num indicates the sample number representing the origin or parent. The attribute includes_samp_num indicates the sample number representing the portion or offspring. Relationship is used to describe why the two samples are related and control and owner have their usual meanings. Note that **sample_portion** does not need to be used if the simplest type of sample is taken and analyzed without further sampling or compositing.

2.3.8 Sample Group

Sample_group is an entity designed to provide a way for users to group sets of samples together into sets that include any set of samples they want grouped together. The group can be named and described for viewing and reporting with the originator retaining control over which samples are included. **Sample_group** does not alter the data associated with sample and is not required for the database, but is included because users need a way of managing sample information. A similar entity is associated with analytical results in **result_group**.

Sample_group includes an identifier attribute called samp_group_id, more detailed identification in samp_group_name and samp_group_description. The identification of the computer account who owns the **sample_group** is represented by the attribute owner and the HEIS control level is represented by control. The grouping is accomplished through the parent_samp_group_id attribute.

The connection of **sample_group** with an individual **sample** is accomplished through the **sample_group_element** entity which does not contain any attributes of its own but associates a samp_num with a samp_group_id, as well as control and owner.

2.4 Analysis Entities

Analysis is what we do to characterize a source. It can be broken into smaller entities including **analysis, analysis_result,** analysis **constituent, analysis_method,** analysis **laboratory, analysis_result_change, administrative_limits, result_group_element,** and **result_group.**

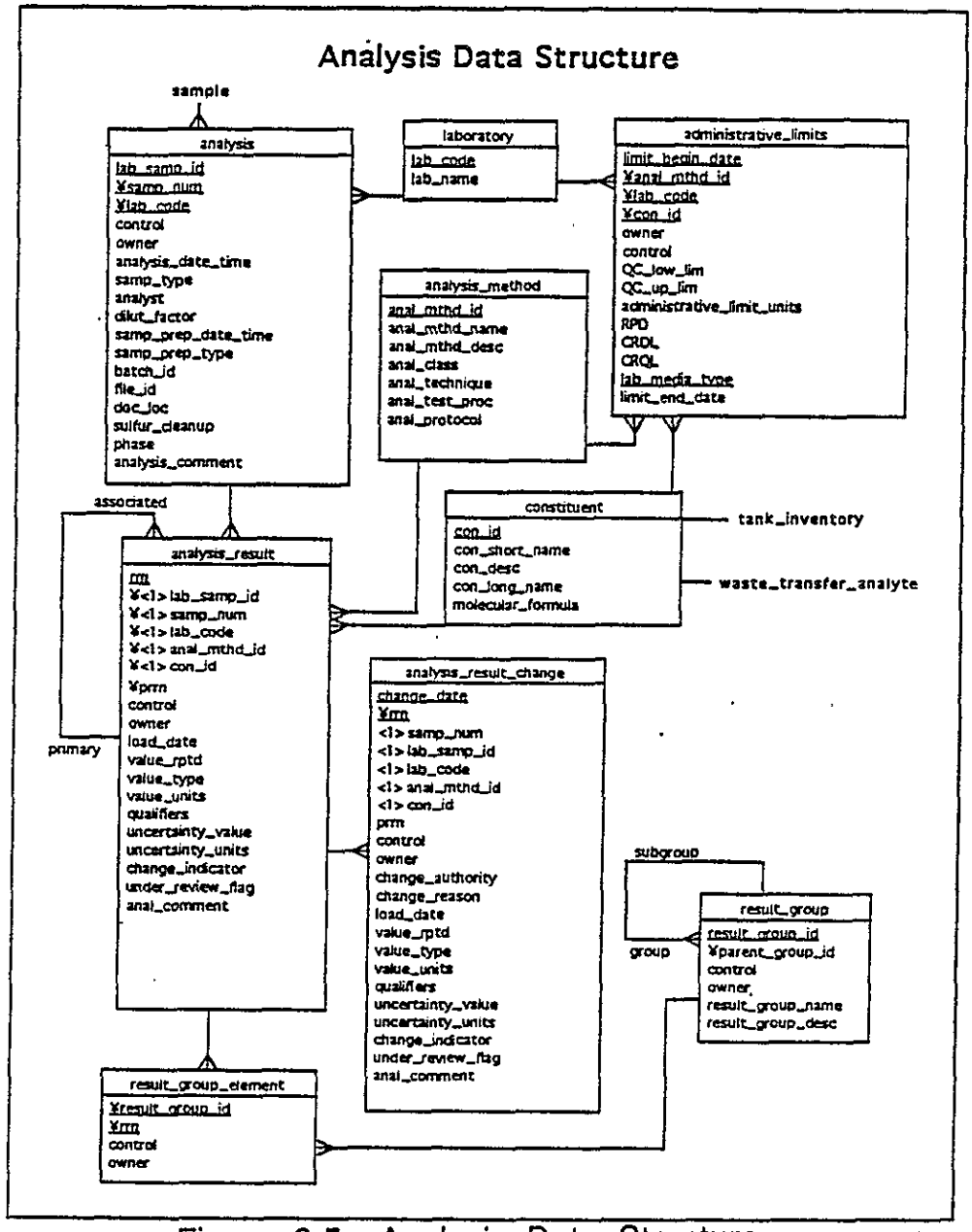

Figure 2.5 Analysis Data Structure

2.4.1 Analysis

The **analysis** entity is the thing that describes the particular analysis associated with a source and result. **Analysis** is more clearly defined by those attributes we need in order to understand how the result was obtained for a constituent of a source. These attributes are lab_sample_id, samp_type, analyst, analysis_date_time, analysis batch_id, samp_prep_type, samp_prep_date_time, dilution_factor, doc_loc, file_id, sulfur_cleanup control, owner and analysis_comment. The **analysis** entity is uniquely identified by **sample, laboratory,** and the lab_sample_id. . The sample_number from **sample** provides the connection of the **analysis** to the source. Specification of a lab_sample_id by itself could be misinterpreted because it could apply to different labs or other ways of doing business that generate identical lab_sample_id's.

Lab_samp_id represents the sample description called lab sample id in the SRS but is not limited to that use. Analysis samp_type provides a means of identifying the type of sample as liquid, solid, fused KOH, and others. Analyst is an attribute added in this design to identify the person who performed the analysis. Analysis_date_time is when the analysis was performed on this sample. Analysis batch_id provides an identification that allows the grouping of the current analysis of interest with others that were performed as part of a single work effort (or batch) and was added as part of this design. The entity samp_prep_type describes any particular sample preparations needed as part of an analysis, particularly those that are specified to be performed within a particular time frame by the protocol or method. The samp_prep_date_time is the date and time associated with that sample preparation. The analysis dilut_factor is the numeric multiplicative factor representing the amount the sample was diluted (or concentrated) before analysis. Doc_loc is the user specified location of documentation for the analysis, added by this design. Analysis_comment provide a means of including information of interest about the analysis, also added by this design.

Sulfur_cleanup is the yes/no indicator of whether or not the sulfur clean-up procedure was performed, as documented in the SRS.

2.4.2 Analysis Result

The entity **analysis_result** is one of the three most interesting portions of information associated with a characterization problem. (Source and constituent are the other two.) A result is meaningless without knowing what constituent it represents and the source being characterized. The attributes of **analysis_result** are value_rptd, value_type(this design), value_units, qualifiers, anal_comment(this design), result reference number(this design), under_review_flag(HEIS), load_date(HEIS), change_indicator(HEIS), uncertainty_value, uncertainty_units, control(HEIS), owner(HEIS) and parent result reference number(this design). A particular instance of the entity **analysis_result** is uniquely identified by rrn. The attributes lab_samp_id, samp_num, lab_code, anal_mthd_id and constituent_id are included for their interest from their respective entities and act as a secondary index for a result record.

The attribute value_rprtd represents the primary objective measure for the **constituent** or analyte of interest. The typical instance is the numeric value_rprtd for the quantity of chemical **constituent** contained within a **sample** of the source. Other examples include the quantitative measure of duplicate, blank, or check standard associated with a value_rprtd. Value_type is an attribute of **analysis_result** that describes what the particular instance is, such as standard error, duplicate, rerun, or blank. Value_units are the engineering units associated with the value_rptd. In some types of analyses the result is said to be unitless. A common example is pH where the units are implicit in the definition of the analysis. The qualifiers attribute is the code that is assigned to the value that provides an indication of the quality and acceptability of the result as defined by the protocol being used. Various qualifier codes have been defined for various protocols and analyses. The anal_comment attribute provides the owner of the data to specifically comment on each reported value.

The uncertainty_value and uncertainty_units are kept as value_reported related attributes because of the need to stress the importance of always qualifying the data with its uncertainty.

Under_review_flag(HEIS) is an indicator that the current instance of **analysis_result** is currently or ever was under review. Load_date (HEIS) represents the date the current instance was added to the database. Change_indicator(HEIS) is an indication that the current **analysis_result** is changed over the original. The original may be stored in **analysis_result_change.**

The two attributes rrn and prrn are not specified as part of the SRS, but are part of the design to provide for ease of use of the database. When a new instance of **analysis_result** is created at the time the data is entered, a new unique rrn is generated by the system. Depending on the method of input the new instance of **analysis_result** is related to other instances by indicating which instance is a parent of the current (or alternatively which **analysis_results** are offspring off the current). These two attributes of an **analysis_result** allow for the correlation of related instances when the correlation is one the system needs to know about (duplicate result to primary result). If the user wants to make a correlation between results that the system doesn't need, it is accomplished through the **result_group** entity.

2.4.3 Analysis Result Change

The **analysis_result_change** entity provides a way of recording and tracing all changes to **analysis_result** entities. The original **analysis_result** data is copied to the **analysis_result_change** entity before any changes are made. Change_date, change_authority, and change_reason attributes are added to provide the context of the change. All other attributes are duplicates of the **analysis_result.**

2.4.4 Result Group

Result_group like **sample_group** is an entity that provides a way for the user to group results together arbitrarily. The association of the group with result is accomplished through the **result_group_element** entity which includes the rrn from **analysis_result** and result_group_id from **result_group**, as well as control and owner.

Result_group includes the identifying result_group_id, a result_group_name, result_group_description, owner, control, and parent_group_id attributes similar to their counterparts in **sample_group**.

A note about the alternative approaches is probably useful at this point. One alternative is to view each instance as self-contained record associated with the constituent and sample, very similar to the adopted approach. The limitation to that design is that all the different attributes of the entity must be defined at the time of design. Whether or not the data set will or will not have duplicates, replicates, several replicates, multiple measures of uncertainty, qualifiers for all of these related attributes, varying engineering units within an analysis, have to be identified before the database is implemented. A detailed study of the SRS compared with typical sets of tank and grout results indicated that a more flexible approach was desirable. In addition, the adopted approach allows for user flexibility through the arbitrary grouping of results. Of course, the user also must take the responsibility for remembering the purpose of the grouping and maintaining its integrity as conditions change.

2.4.5 Constituent

The HEIS **constituent** entity represents the physical property, chemical or nuclear species of interest. This entity is an existing HEIS entity, identified by constituent_id, and including con_long_name, con_short_name, con_description, and molecular_formula.

Con_id is an identifier for a specific chemical, radiological species, physical property, or other observation that can be performed characterizing the sample or source. If available, the Chemical Abstract Services (CAS) number is used. Otherwise, the elemental name or other abbreviation is used. Con_long_name is the constituent name used for reporting purposes. The 40 character name comes from the CAS listing if possible. Con_short_name is a 7 character name used for the **constituent**. Con_desc is a description of the **constituent** up to 240 characters long.

It is important to remember that **constituent** here carries a definition for the purposes of using the database, and should not be construed as being limited to a strict dictionary definition. It is intended to include analytes and physical measurement or observations.

2.4.6 Analysis Method

Analysis_method is a HEIS entity we use to describe the information about the procedures used for the analysis that generated the result(s) of interest. **Analysis_method** includes attributes analysis_method_id, analysis_technique, analysis_protocol, analysis_class, analysis_method_description, analysis_method_name, and anal_test_procedure. These are all attributes that allow the user to obtain the related information from documentation or other sources. This entity is uniquely identified by the attribute anal_mthd_id. **Analysis_method** and all of its attributes are part of this design. The SRS treated each method as a separate entity.

Anal_mthd_id is a 10 character HEIS attribute identifying a unique combination of anal_protocol, anal_class, anal_technique, and anal_test_proc. Anal_technique is a particular technique used for analyzing for a particular **constituent.** An example is gas chromatography. Anal_protocol is a name or acronym of a protocol defined by an agency or other group. This protocol may be a national protocol such as ASTM, CLP, or SW-846, or it may be defined by an individual laboratory whose internal methods have been approved for use in lieu of one of the national methods. Anal_class is the name or acronym of the major analysis grouping. This grouping is based on the characteristics of the compounds. Examples are VOA for volatile organic and INORG for inorganic. Anal_mthd_name is a 30 character commonly accepted name for the analysis method. Anal_mthd_desc is a description of the method up to 240 characters.

2.4.7 Laboratory

Laboratory is a HEIS entity including a lab_code attribute that uniquely identifies the laboratory performing the analysis and lab_name for the name of the lab corresponding to the lab_code. For the purposes of the tank data only two laboratories were defined; 222S and PNL.

A word of caution is appropriate. The **laboratory** entity is used to help identify a result uniquely. If there were two labs within 222S that could produce results with all other identifying conditions held constant there would be no way to separate them without further defining the laboratory. Therefore it might be useful to consider the level and type of laboratory identification that tank (and other HEIS) users need to use.

2.4.8 Administrative Limits

Administrative_limits is an entity consisting of various parameters associated with the **analysis_method, laboratory,** and **constituent** that constituted the guidance for the analysis. This entity is identified by a combination of **analysis_method, constituent,** and **laboratory** and limit_begin_date, and lab_media_type. Other attributes of **administrative_limits** include limit_end_date, administrative_limit_units, QC_upper_limit, QC_lower_limit, RPD (Relative Percent Difference), CRQL (Contract Required Quantation Limit), and CRDL (Contract Required Detection Limit), owner and control.

Administrative_limits are not required to identify anything else, so it only has to be used when the user requires it. This entity satisfies the SRS analysis quality control requirements. The dates and lab_media_type are part of the current design. The SRS specified separate limits for solid and liquid medias. This design generalizes to the lab_media_type attribute and halves the number of subsequent limit value attributes.

2.5 The Integrated Model

The three divisions of the model have been presented. Figure 2.6 puts them back together in an integrated view showing the interrelationships between source, sample and analysis.

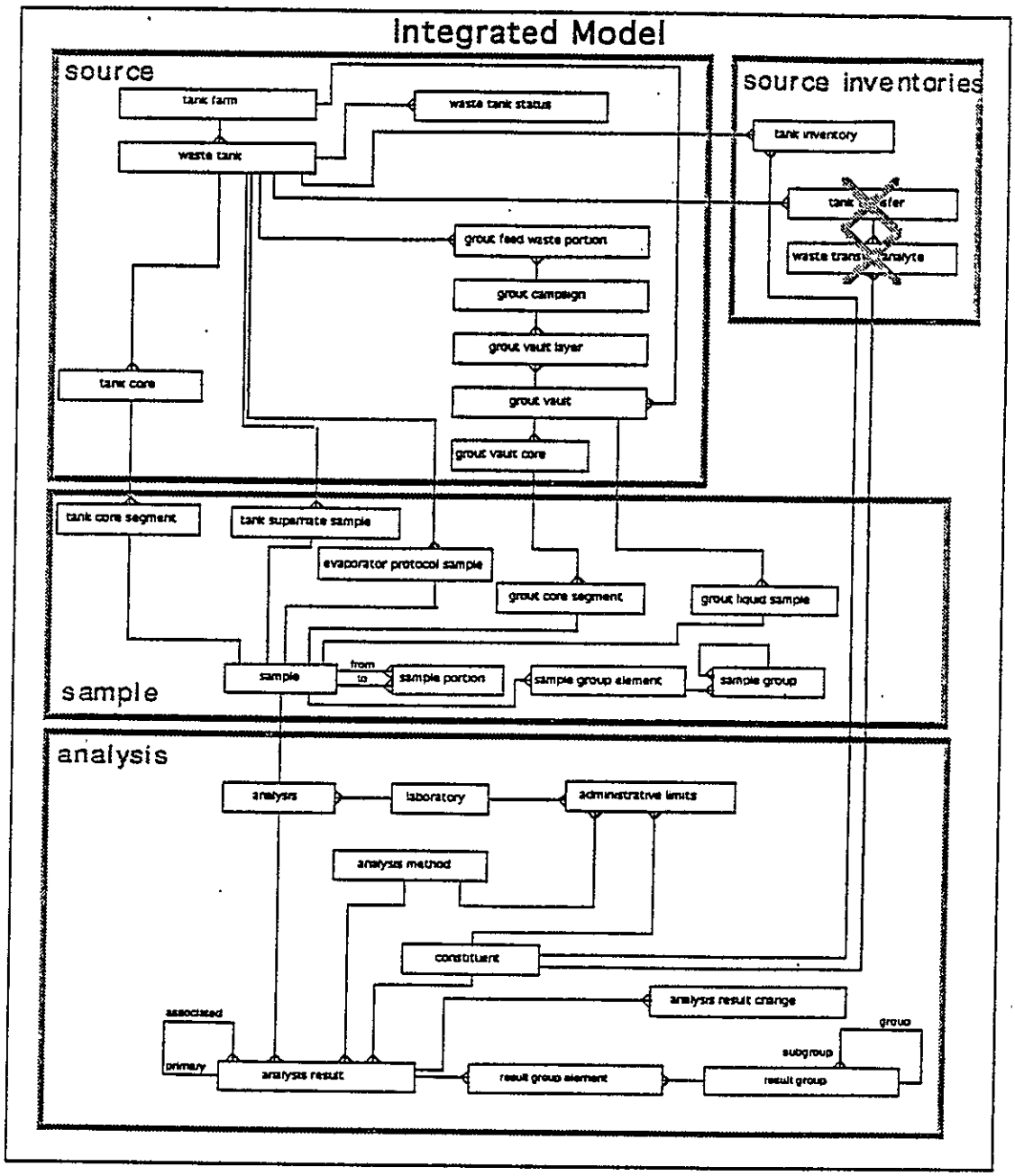

Figure 2.6 Integrated Model

3 Data Input

The first phase of the design process is explicitly directed to the database design rather than a specific data input design. Secondly, neither the SRS nor WHC have identified the process of tank and grout characterization sufficient to produce an appropriate data input design. In addition, the undefined data input process complicates the matter. As a result only general considerations based on current information available is discussed.

Source data can be separated into the different types of sources (tanks and grout), and the different types of data associated with those sources (static data describing the source, and changing data like **waste tank status** data. Thus it seems reasonable that one type of input process would focus on describing the source. In other words, an input process (or screen) would provide for the **tank farm** and tank static parameters which would probably only be entered into the system once. Another input process (or screen) would focus on the **waste tank status** data and would be used frequently (up to once per month).

Sample related processing would focus on the production of a sample from a **source** and would thus provide for the entry of "field sample" data associated with a particular sampling event and a particular source.

Another data input process would be associated with the **analysis** process including all of the entities and data discussed above under **analysis**. This type of input is probably going to be accomplished by a computer compatible "loader" program that imports the data from some other system. As stated above, this first phase of the design explicitly excluded design of that portion of the processing.

As a result of the preceding considerations, the implementation is planned to proceed with internal testing using whatever data input means is most expedient, and data input prototypes to be developed based on the above guidance.

4 Data Output

Data output processing is intended to follow the SRS report guidance with minor exceptions. First, at least one report format was excluded and has not yet been defined. Second, a thorough analysis of the report forms to determine if sufficient data and processing are specified and available has not yet been performed.

At the present time no significant problems are anticipated.

5 Detailed Design

This design document is meant to serve as a single design document for the TCD. The first phase of the design does not include a detailed design. Therefore this section will be filled in as the design evolves.

5.1 Module Detailed Design

5.2 Data Detailed Design

6 Design Definitions

Important design concepts are used to describe the TCD model. Put together they are called the Logical Data Design (LDD). The primary purpose of the LDD is to describe the data in a way that defines the data and all of the data relationships. These definitions must satisfy the original user requirements, database and system requirements, performance and access requirements. The logical data design is used to describe the definitions used to create the relational database, in this case ORACLE.

A description of logical data design and relational database designs are included here so data users can understand the concepts that drove the design process for the TCD.

6.1 Logical Data Design

The logical data design provides a way of visualizing the data and its interrelationships in a way that is independent of the particular type of database system or computer. The logical data design is a particular type of entity-relationship model that focuses on the data itself.

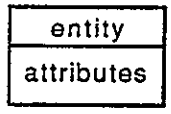

Figure 6.1 Entity

The term "entity" is used to describe an element (or group of elements) of the design that is structurally and functionally distinct from other elements. An "entity" is described by its "entity name" and has "entity attributes". Entity attributes are defined as the information the design wants to associate with the entity. Graphically, this design uses a rectangle with the entity name first and separated from attributes. Entities can also be viewed as tables, with rows and columns. The table title is the entity name. Each of the entity attributes is a column in the table, and every new instance of the entity is a row in the table.

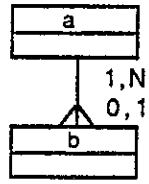

Figure 6.2 Relationship

Entities are related one to the other with a design construct called an "entity relationship". The entity relationship describes which two entities are being related, and the quantities of each that can be related to the other. Those quantities are called the "cardinality" in this design. The cardinality is depicted by the triangular shaped graphic at one end of the relationship connector. It is sometimes called a "chicken foot" because of the way it looks. It is important to understand because the cardinality is required to define how the data is going to be accessed. The diagram would be read as "entity a can have from 1-to-N instances of entity b and entity b can have from 0-to-1 instances of entity a".

A ¥ symbol in front of an attribute is used as a graphical way of showing that the attribute belongs to another related entity. If the attribute is underlined then it is said to be used as an identifier of the entity. An identifier provides a way of uniquely identifying a particular instance of an entity.

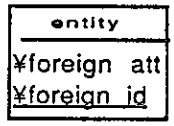

Figure 6.3 Foreign Attributes

An example of a logical data design might be a model of the data information about the books possessed by a family. The first entity would be that representing the family members. The second entity is one to represent their books.

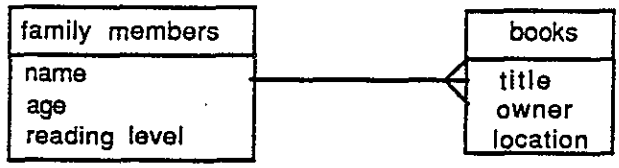

Figure 6.4 Family Books Logical Data Design

In the family members table the identifying attribute is name, while in the books table each instance of the book entity is uniquely identified by the combination of book title (identifier attribute), and owner (foreign identifier attribute)

6.2 Tables

As mentioned in the discussion of logical data design, entities can also be viewed as tables, with rows and columns.

table name			
field	key field	¥foreign field	¥foreign key field

Figure 6.5 Table

The table title is the entity name. Each of the entity attributes is a column in the table, and every new instance of the entity is a row in the table. In relational database terms, the entity can be viewed as the table with table name "entity name", and field names "attribute names." The logical data design concept of an identifier attributes translates to a key field; foreign attribute to foreign field, and foreign identifier to foreign key field.

An example of an implementation might be an information management system organizing information about the books possessed by a family. The first table would be that about the family members. The second table name is about their books. One might want to tabulate family member's name, age, and reading level in the first table and book title, owner, and location in the second table.

family member table		
name	age	reading level
joe	14	7
jim	5	4
sue	10	15

book table		
title	owner	location
Hardy Boys 1	joe	bedroom
Capt Marvel 26	jim	library
Capt Marvel 26	sue	library

Figure 6.6 Family Books Tables

7 Programmer's Notes

This section describes notes to the software engineers that have to work with this design.

7.1 HEIS Field Name Abbreviations

During the design descriptive attribute names based on common usage and/or the SRS were used. Oracle requires finite length field names with no embedded spaces. In addition, it was felt that field names need to be short enough to be used frequently in queries. Therefore the design team changed spaces to underscores and shortened common terms to abbreviations when creating field names based on attribute names.

The list of common abbreviations is included here so future changes and/or additions can be made consistently, or at least realizing what the impact to the design will be.

HEIS Field Name Abbreviations

Name	Abbreviation	Name	Abbreviation
amplitude	amp	location	loc
analysis	anal	longitude	lon
associated	assoc	maximum	max
average	avg	method	mthd
averaged	avgd	minimum	min
(bottom)	bottom	number	num
chemical	chem	occurance	occurence
classification	class	operating	op
coefficients	coef	percent	pcnt
comments	comment	percentage	pcnt
company	co	photograph	photo
const	co	previous	pre
constituent	con	product	prod
coordinate	coord	program	pgm
coordinates	coord	ranking	rank
date-time	date	record	rec
definition	def	reference	ref
description	desc	references	ref
destination	dest	report	rpt
diameter	diam	reported	rptd
dilution	dilut	reporting	rptng
dilutions	dilut	sample	samp
distance	dist	schedule	sched
duplicate	dup	sequence	seq
elevation	elev	source	src
facility	fac	standard	std
frequency	freq	structure	struct
geologic	geo	(surface)	surface
geophysical	geophys	survey	survey
hydraulic	hyd	temperature	temp
hydrostratigraphic	hydrosg	tmp	temp
identification	id	volume	vol
information	info	weight	wt
initial	init	date time	date
instrument	instr	(rad zone)	rad zone
latitude	lat	validation	valid
liquid	liq		

Table 2.1 HEIS Field Name Abbreviations

7.2 Data Modelling Tool

A logical data modeling tool was used for the first phase of the TCD design. Attribute names are synonymous with field names.

The object alias name was used only to indicate an alternative name for an object. It is not necessary for the schema or even to understand the model.

In most cases, properties were ordered within each object in the following order:

primary identifier - first
primary foreign identifier - second
foreign object - third
not null - fourth
frequency of use - fifth
probable empty field - sixth
long fields - seventh

Of course there are some conflicts and the consideration of an order was also based on satisfying a category from the top down. Thus a seldom used field might come before a long comment field even though the comment field was frequently used.

7.3 Names from the model

The first phase data dictionary was generated from the model. Attribute or property names were created with the intent of using them as HEIS/Oracle field names. As a result they have underscores instead of blanks between words. The model field name is not used.

The model alias name is used for two purposes. First, any suggested alternative names are included under alias. Second, the alias is also used to generate a list of alternate forms that can be included in the index of this document and thus help the reader in tracing where a property might be located.

Attribute names were used from the model to generate the schema script field names for HEIS/Oracle. The reason was because neither model field name nor alias allowed for a duplicate within the model.

7.4 Comment Naming Conflict

The TCD comment field name conflicts with the Oracle comment that can be attached to a table. Therefore it is left to the implementor to change the comment field to something new and unique or go back and change the model to make the comments unique or at least different from the Oracle command.

7.5 HEIS Control Level as of 2/5/92

0	owner
1	
2	
3	
4	
5	
6	
7	field screening data (analyzed in mobile lab)
8	historic data (QA on data is not as high as current data QA)
9	fully validated and verified

7.6 Preliminary Hazards Classifications

Three preliminary hazard classification attributes originally specified in the SRS were later deleted from the design because the data does not have the same pedigree as the other data in the **waste_tank_status** entity.

7.7 Tank Transfer and Waste Transfer Analytes

These entities were deleted from the design because they do not represent the same type of data and do not have the same quality associated with them.

7.8 Priorities

Tank inventory was questioned as to whether or not it was appropriately part of a TCD set of data during the review process. As a result, implementation was postponed until all other parts have been implemented.

Evaporator protocol samples were identified late in the design review process. As a result implementation will be postponed.

Grout was set at an implementation priority less than tank core or supernate samples. Grout will be implemented immediately after tank core and supernate samples.

7.9 HEIS Field Names

The following fields have been adopted from HEIS. No change to the definition was required.

anal_class
anal_mthd_desc
anal_mthd_id
anal_mthd_name
anal_protocol
anal_technique
analyst
analysis_date
change_authority
change_date
change_indicator
change_reason
con_desc
con_id
con_long_name
con_short_name
control
lab_code
lab_media_type
lab_name
lab_samp_id
lambert_ew_coord
lambert_ns_coord
load_date
molecular_formula
owner
samp_comment
samp_num
under_review_flag
value_rptd

The following fields have been adopted from HEIS but with an enhancement of the existing HEIS definition.

anal_comments

dilut_factor
doc_loc
lab_received_date
limit_begin_date
limit_end_date
sample_date_time
sampler

7.10 HEIS Issues

In HEIS, the "units" fields should be modified to support char(10) not char(5). This will allow for the expanded set of units known to be needed for TCD.

The field "Qualifiers" is used in both TCD and HEIS. There is a difference between the qualifiers used by TCD and HEIS. An open issue for the implementation is to either combine the sets of qualifiers or to create two different field names.

The Sample table as described in this document can not be directly integrated with the existing HEIS. A negotiated resolution to the incompatibilities will be generated as part of the detailed design of TCD. There are two issues. HEIS has a concept of a subject area sample table. Using the HEIS development strategy most field in the TCD Sample table would reside in a subject area sample table. The second issue is conflicts between fields in the HEIS and TCD versions. The fields are listed below.

- The TCD fields "Log ID" and "Log Page" are used. In HEIS the fields "Field Log ID" and "Field Log Page" are used. The naming was based on the usage at the time and needs to be expanded to reflect the wider scope of HEIS.

- The TCD field "Subject Area" and the HEIS field "Media" address the same concept. A resolution will be found.

The HEIS table Laboratory Contractual Limits is very close conceptually to the TCD table Administrative Limits. The issue of having two tables or combining these tables will be worked out as part of the detailed design.

7.11 TCD Assumptions

Coded fields:

Many fields in TCD will have coded values, i.e., you enter a code for a longer concept. For example, we will be an abbreviation for the laboratory name or a Chemical Abstract Registry Number for a constituent.

The codes valid for a given field will be centrally controlled. A person wishing to add a code will contact the person who has responsibility to change the codes. The requested change will be reviewed and if necessary a solution will be negotiated.

Engineering Units:

When a result is reported, that result will have an associated "units". The "units" must be supplied even for thing such as pH which is nominally unitless. The units field will have a code look-up and any value entered in the field must be in this code look-up list.

All "units" fields will select from the same code look-up list for acceptable units.

Dates:

All dates will be entered as MM/DD/YYYY. Dates and times will be entered as MM/DD/YYYY HH:MM (24-hour clock).

HEIS currently uses MM/DD/YY. As part of moving to the new user interface, HEIS will be converting to MM/DD/YYYY also.

In HEIS, the "units" fields should be modified to support char(10) not char(5). This will allow

TCD Design Document:

The tables which will not be included in the original release of TCD are not as developed as those tables which will be in the original release. The method for designing TCD was to develop a good logical design using field names and concepts known to the data users and the TCD developers. A final step in this initial design was to revise the field names to reflect HEIS. This included using HEIS standard field name abbreviations and using existing HEIS field names for known concepts.

The tables for which this last step was not taken are: Waste Tank Status, Evaporator Protocol Sample, Tank Inventory, Tank Transfer, Waste Transfer Analyte.

8 Definitions and Acronyms

¥. a symbol used in this design to denote that an attribute was inherited from another entity. If the attribute is also underlined then it denotes that the attribute is also an identifying attribute.

AA. atomic absorption.

ABA. alpha beta analysis.

AEA. alpha energy analysis.

analysis. an observation resulting in the identification of a constituent and/or the quantity of a constituent, constituents, or property.

analysis sample. a sample that one or more results corresponding to observed properties or constituents can be associated to.

analytical blank. An aliquot of analyte free water or solid matrix prepared internally in the laboratory and analyzed with the analytical batch. Analytical blanks are used to determine the existence and magnitude of any laboratory contamination problems.[3]

analyte. synonym: constituent

associated data/results. All data or results related to a particular QC check or analysis. Association may be sample or compound specific, or a combination of both.[3]

BDAT. best demonstrated available technology.

bounding source term. concentrations used for design analyses, safety analyses, etc. Based on mean, sample standard deviation, and probability factors which describe observed data distribution and tolerance limits that quantify the likelihood that source-term concentrations measured in subsequent sampling events will not exceed those previously observed at a particular confidence interval.[4]

CAA. Clean Air Act.

calibration. Calibration establishes that an instrument is capable of producing acceptable quantitative data. Initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an analysis run, and continuing calibration documents that the level of performance is maintained.[3]

cardinality. A term used in the design to describe how many of one type of entity are associated with another entity. Part of the **entity relationship.**

case. A finite, usually predetermined number of samples collected over a given time period for a particular site. A case consists of one or more sample delivery groups.[3]

CC. complexant concentrate waste - contains organic complexing agents introduced to the waste during strontium recovery processing in B-plant.

CERCLA. Comprehensive Environmental Response, Compensation, and Liability Act.

CFR. Code of Federal Regulations.

characteristic waste classification. a classification for regulation - includes toxicity, persistence, and carcinogenicity; ignitability, corrosivity, and reactivity.

characterization. facility or site sampling, monitoring, and analysis activities to determine the extent and nature of the waste problem at a site. Characterization provides the basis for getting the technical information required to develop, screen, analyze, and select appropriate cleanup technologies.[5]

CLP. contract laboratory program.

COC. Chain of Custody.

constituent. synonym: analyte.

design entity. An element (component) of a design that is structurally and functionally distinct from other elements and that is separately named and referenced.[6]

design view. A subset of design entity attribute information that is specifically suited to the needs of a software project activity.[6]

DMF. dry materials facility - part of grout.

DOE-RL. Department of Energy - Richland Field Office.

DSC. differential scanning calorimetry.

DST. double-shelled tank.

duplicate analysis. An internal laboratory QC analysis intended to provide an indication of laboratory precision based on a given sample matrix.[3]

DW. dangerous wastes - e.g., Washington state toxicity code WT02. e.g., cured grout wastes. see also EHW.

ECO. environmental compliance officer.

EDTA. ethylene diaminetetraacetic acid.

EHW. extremely hazardous wastes - e.g., Washington state toxicity code WT01. see also DW.

EIS. environmental impact statement.

entity. see **design entity**, object and database tables are synonyms.

entity attribute. A named characteristic or property of a design entity. It provides a statement of fact about the entity. Property and database field names are synonyms.[6]

entity relationship. a description of which two entities are being described, and descriptive information such as the cardinality and names of the relationship.

EPTOX. extraction procedure toxicity.

field. a database term used to denote the placeholder for an particular kind of data with a field name. In terms of common tables, a field can be visualized as a column in the table.

field blank. Field blanks are taken to the field in sealed containers and may be opened in the field (Equipment Blank), or left sealed (Trip Blank), then transported to the laboratory with the sample containers for analysis. Field blanks are intended to identify any contaminants that may have been introduced in the field.[3]

field name. a database term used to denote the name of a field in a record. In terms of the data model a field name corresponds to an attribute, also called a property. In terms of common tables, a field name can be viewed as a column heading.

field sample. a sample delivered to a laboratory for analysis.

GDF. grout disposal facility

GPF. grout processing facility

GTF. grout treatment facility

HEIS. Hanford Environmental Information System. HEIS is used to store, manipulate, and retrieve data that are gathered from many types of samples at the Hanford site. HEIS provides forms-based data entry, menu-driven user access software, data browsing facilities, and ad hoc querying.[7]

HFW. Hanford facilities waste.

HLW. high level wastes - feed material to HWVP

holding time. For validation purposes the time from sample collection to laboratory analysis.[3]

HWVP. Hanford waste vitrification facility - also called the Glass Plant.

ICP. Inductively coupled plasma.

ICS. Interference check sample.[3]

IS. Internal standards.[3]

LCS. Laboratory control sample.[3]

LDR. land disposal restrictions.

LLW. low level waste - waste that contains radioactivity and is not classified as high level waste, TRU waste, mill tailings, or spent nuclear fuel. Hanford LLW is stored in DSTs.

matrix. the predominant material of which the sample to be analyzed is composed. Matrix is not synonymous with phase (liquid or solid).

matrix spike. aliquot of a sample fortified with known quantities of specific constituents and subjected to the entire analytical procedure in order to indicate the appropriateness of the method for the matrix by measuring recovery.

method. the procedures and/or equipment used to perform an analysis.

minimum detection limit (MDL). The minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix containing the analyte.[3]

mixed waste. solid waste that contains both a radioactive component and a hazardous (per RCRA) or dangerous (per WAC) component.

NCAW. neutralized current acid waste - aqueous high-salt waste from the first-cycle solvent extraction column at the PUREX plant. contains TRU elements and strontium.

NCRW. neutralized cladding removal waste - neutralization of dissolved N-reactor spent fuel Zircaloy cladding resulting in precipitated zirconium hydrated oxide with entrained plutonium particles resulting in TRU waste classification.

NEPA. National Environmental Policy Act.

NESHAPs. CAA regulations for releases of hazardous pollutants to the air.

NPH. normal paraffin hydrocarbon.

object. a synonym for a data model entity or database table.

operable unit. a discrete portion of a site consisting of one or more release sites considered together for assessment and cleanup activities. The major reasons to place release sites together in an operable unit include geographic proximity, similarity of waste characteristics and site type, and the possibilities of economy of scale.[5]

OSM. The WHC Office of Sample Management - responsible for coordinating laboratory analysis activities for TCD.

performance assessment. a term used to denote all activities (qualitative and quantitative) carried out to (1) determine the long-term ability of a site/facility to effectively isolate the waste and ensure the long-term health and safety of the public and (2) provide the basis for demonstrating regulatory compliance. Performance assessment serves as a focal point for site characterization, model development, and uncertainty analysis research activities.[5]

PFP. plutonium finishing plant - aqueous waste from conversion of plutonium nitrate to oxide or metal and includes TRU laboratory wastes - disposed of in grout following separation of solids.

PNL. Pacific Northwest Laboratory - the DOE laboratory at Hanford that prepared this design and performs some of the analysis of tank characteristics.

PQL (practical quantitation limit). The lowest level that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions.[3]

property. a synonym for an entity attribute or field name.

protocol. a compilation of the procedures to be followed with respect to sample receipt and handling, analytical methods, data reporting, and deliverables, and document control. Used synonymously with statement of work by the EPA.

PSW. phosphate and sulphate waste - decontamination waste and ion exchange regeneration waste streams from the N-reactor.

PUREX. Plutonium-Uranium Extraction (Plant).

PVC. polyvinyl chloride.

qualifier. a code or description of qualification that is to be placed on the related item. It explains any caveats that the person who determined the qualifier wished to put on the item itself. There are two general types of qualifiers, reporting qualifiers placed on an item by the organization generating the report, and validation qualifiers placed on an item be a reviewer.

query. a request to the database system to retrieve records from tables based on query arguments.

RCRA. Resource Conservation and Recovery Act

record. a database term for one instance of a set of data items. In terms of common tables, a record can be visualized as a row in the table.

RPD. relative percent difference.

RSD. Relative standard deviation.[3]

salt well pumping program. residual liquid from retired SSTs were transferred to DSTs.

sample. liquid, solid or mixture of material analyzed for specified constituents. Types of samples include:

core segment
supernatant
slurry
sludge
field
laboratory
analysis
duplicate
replicate
spike
method blank

sample quantitation limit (SQL). multiply contract required quantitation limit (CRQL) by factor to account for percent moisture and dilution corrections.[3]

sample source. where a sample for analysis is taken from. Examples are tank and grout vault. A secondary source would be segment sample taken from core of tank.

software design description (SDD). A representation of a software system created to facilitate analysis, planning, implementation, and decision making. A blueprint or model of the software system. The SDD is used as the primary medium for communicating software design information.[6]

software design specification (SDS). A synonym for software design description.

software requirements specification (SRS). A document that clearly and precisely describes each of the essential requirements (functions, performances, design constraints, and attributes) of the software and external interfaces. Each requirement is defined such that its achievement is capable of being objectively verified and validated be a prescribed method; for example, inspection, analysis, demonstration, or test.[8]

source sample. a sample directly after taken from a source.

SST. Single-shelled tank.

SVOA. Semivolatile organic analysis.

table. a relational database table that usually corresponds to the data model entity, which is also called an object.

TCL. Target compound list.

TCLP. toxicity characteristic leaching procedure.

TIC. Tentatively identified compound.**

TIC. total inorganic carbon.

** The duplicate TIC is included here only to show the potential confusion that could occur unless the reader takes the acronym in the context in which it is presented. TIC is probably not the only acronym for which TCD users could potentially apply two definitions.

TOC. total organic carbon.

TOX. total organic halide.

TRU. transuranic.

TSS. total suspended solids.

validation. the process of analyzing an item, usually an analytical result, to determine if it meets specific standards of quality. Examples are proper holding times and other procedures, reasonableness of result when compared with method and instrument capabilities. For characterization data it usually does not imply that the subject area expert (such as waste tank engineer) has validated the item based on his knowledge and expertise.

VOA. Volatile organic analysis.

WAC. Washington Administrative Code.

WHC. Westinghouse Hanford Corporation - responsible for execution of tank characterization programs in addition to operation of the Hanford site.

wastewater. wastes that contain less than 1% TOC and less that 1% TSS with some exceptions.

9 Data Dictionary

Name : 3/3/92 TCD
File Name : 03/02/92 tcd
Version : 1
Creator : janis/joe
Creation Date : 11/22/91
Last Modification Date : 3/2/92
Nb of modifications : 51
Project : tcd
Organization : pnl/csd

Comment :
using attribute names for schema script generation

ordered by primary key
primary foreign key
not null
frequency of access
empty field frequency
comments

reflects new grout info
reflects new evaporator sample

added specific gravity 3/3/92

9.1 Entities

Each entity (a table in a relational database), is described in alphabetic order by its name, followed by a comment describing the entity, a list of field names (or property or attribute) with its associated data type. Relationships of this entity to other neighboring entities is listed next.

The following paragraphs are primarily for programmer's use and are as a result sometimes rather cryptic but should convey adequate meaning. They are also subject to change as the implementation proceeds.

9.1.1 administrative_limits

Comment :
called contract limits by some people - but generalized here so you would not think a contract was required for use.

Properties

Name	Data Type
limit_begin_date	date
lab_media_type	char
owner	char
control	number
QC_low_lim	number
QC_up_lim	number
administrative_limit_units	char
RPD	number
CRDL	number
CRQL	number
limit_end_date	date

Connectors

Name	Neighboring Object
/	analysis_method
/	laboratory
/	constituent

9.1.2 analysis

Comment :
In this design we define analysis as an observation resulting in the identification of a constituent and/or the quantity of a constituent, constituents, or property.

The analysis entity has properties associated with the analysis, but not properties primarily associated with other entities in the design.

EPA defines an analytical sample as any solution or media introduced into an instrument on which an analysis is performed excluding instrument calibration, initial calibration verification, initial calibration blank, continuing calibration verification and continuing calibration blank. Note the following are all defined as analytical samples: undiluted and diluted samples, predigestion spike samples, duplicate samples, serial dilution samples, analytical spike samples, post digestion spike samples, interference check samples (ICS), CRDL standard for AA (CRA), CRDL standard for ICP (CRI), laboratory control sample (LCS), preparation blank (PB) and liniar range analysis sample (LRS).

Properties

Name	Data Type
lab_samp_id	char
owner	char
control	number
analysis_date_time	date/time
samp_type	char
analyst	char
dilut_factor	number
samp_prep_date_time	date/time
samp_prep_type	char
batch_id	char
file_id	char
doc_loc	char
sulfur_cleanup	char
analysis_comment	char
phase	char

Connectors

Name	Neighboring Object
/	analysis_result
/	sample
/	laboratory

9.1.3 analysis_method

Comment :
In this design we define analysis method as the procedures and/or equipment used to perform an analysis.

The analysis method entity includes those properties that identify the methods, procedures, and/or protocols that describe how the results were obtained from the sample.

Properties

Name	Data Type
anal_mthd_id	char
anal_mthd_name	char
anal_mthd_desc	char
anal_class	char
anal_technique	char
anal_test_proc	char
anal_protocol	char

Connectors

Name	Neighboring Object
/	analysis_result
/	administrative_limits

9.1.4 analysis_result

Comment :
Analysis result is that entity that contains the actual quantitative value obtained for a constituent of a sample of a source via a particular method. The analysis result entity also has properties related to the value or its status. The result reference number and parent result reference number properties provide a way for a group of results to be related such as uncertainty values, blanks, and standard checks.

Properties

Name	Data Type
rrn	number
owner	char
control	number
load_date	date
value_rptd	number
value_type	char
value_units	char
qualifiers	char
uncertainty_value	number
uncertainty_units	char
change_indicator	char
under_review_flag	char
anal_comment	char

Connectors

Name	Neighboring Object
/	analysis_method
/	constituent
/	analysis
primary/associated	analysis_result
primary/associated	analysis_result
/	analysis_result_change
/	result_group_element

9.1.5 analysis_result_change

Comment :
provides a way of remembering the fact that a previously recorded instance of an analysis result was changed. In other words, any changes to a result are traceable.

Properties

Name	Data Type
change_date	date/time
samp_num	char
lab_code	char
con_id	char
anal_mthd_id	char
lab_samp_id	char
owner	char
control	number
change_authority	char
change_reason	char
load_date	date
value_rptd	number
value_type	char
value_units	char
qualifiers	char
uncertainty_value	number
uncertainty_units	char
change_indicator	char
under_review_flag	char
anal_comment	char
prrn	number

Connectors

Name	Neighboring Object
/	analysis_result

9.1.6 constituent

Comment :
constituent is an entity that describes what the sample is being analyzed for. A good synonym is analyte (local usage). A definition specific to HEIS is that constituent can include properties as well as actual constituents. For the purposes of tank characterization data, we intend for constituent to include any thing the user wants to produce a quantitative single number for. In this respect one may determine that some properties of the entity waste tank status could be stored in the analysis result entity with constituent as the waste tank status field name.

Properties

Name	Data Type
con_id	char
con_short_name	char
con_desc	char
con_long_name	char
molecular_formula	char

Connectors

Name	Neighboring Object
/	analysis_result
/	administrative_limits
/	tank_inventory
/	waste_transfer_analyte

9.1.7 evaporator_protocol_sample

Comment :
February 13, 1992 this entity came into existance as the only instance of a sample related to a tank that doesn't come from the tank. There are two types; condensate (off the top of the evaporator) and slurry (off the bottom).

This sample is associated with the tank that it is destined for but is not obtained from the tank and therefore is not representative of the tank contents but rather is representative of material being added to the tank.

The samples are obtained from a continuous flow proportional sampler

Properties

Name	Data Type
sample_id	char
owner	char
control	number
samp_type	char
samp_loc	char
comment	char

Connectors

Name	Neighboring Object
/	sample
/	waste_tank

9.1.8 grout_campaign

Comment :
Grout campaign is an entity that provides a way of discriminating which waste tanks make up a particular part of vault layers.

Properties

Name	Data Type
grout_campaign_num	number
owner	char
control	number
grout_campaign_name	char
grout_campaign_desc	char
grout_campaign_comment	char

Connectors

Name	Neighboring Object
/	grout_feed_waste_portion
/	grout_vault_layer
/	grout_liquid_sample

9.1.9 grout_core_segment

Comment :
Grout core segment is a core drilling (usually 19 inches) from a grout vault.

Properties

Name	Data Type
grout_segment_id	number
grout_segment_serial_num	char
owner	char
control	number
grout_segment_level	number
grout_segment_comment	char

Connectors

Name	Neighboring Object
/	sample
/	grout_vault_core

9.1.10 grout_feed_waste_portion

Comment :
The grout feed waste portion is a description of which waste tanks make up a grout campaign.

Properties

Name	Data Type
owner	char
control	number
grout_feed_volume_transferred	number
grout_feed_volume_transferred_units	char
doc_loc	char

Connectors

Name	Neighboring Object
/	grout_campaign
/	waste_tank

9.1.11 grout_liquid_sample

Comment :
A grout liquid sample is assumed to be a sample taken from a grout vault from some identifying location. In waste tanks the location is called a riser. The SRS did not specify a location descriptor for grout vault samples so the location of this entity is kept general.

In February 1992 we determined that grout liquid samples could come from a variety of places so should be kept general. The sample is supposed to represent liquids that came from the grout vault and are being returned to a tank. In this case the sample can also be considered a "generator" type of sample.

Properties

Name	Data Type
sample_id	char
owner	char
control	number
grout_liquid_level	number
grout_liquid_samp_loc	char
grout_liquid_comment	char

Connectors

Name	Neighboring Object
/	sample
/	grout_campaign
/	grout_vault

9.1.12 grout_vault

Comment :
A grout vault is that source where grout samples are taken from for analysis.

There are three necessary components for characterization data - a source, sample, and analysis result. Grout vaults represent one type of source.

Properties

Name	Data Type
vault_id	number
owner	char
control	number
vault_type	char
construction_date	date
vault_elevation	number
vault_capacity	number
lambert_ew_coord	number
lambert_ns_coord	number
vault_comment	char

Connectors

Name	Neighboring Object
/	grout_vault_layer
/	grout_liquid_sample
/	grout_vault_core
/	tank_farm

9.1.13 grout_vault_core

Comment :
A grout vault core is the result of a core drilling on a vault and is treated similar to a tank core.

Properties

Name	Data Type
grout_core_id	number
owner	char
control	number
grout_core_serial_num	char
sampling_begin_date	date
sampling_end_date	date
vault_riser	number

Connectors

Name	Neighboring Object
/	grout_vault
/	grout_core_segment

9.1.14 grout_vault_layer

Comment :
A grout vault layer is assumed to be the result of a single campaign. For the purposes of this design the layer entity provides a way of accommodating multiple vaults per campaign and multiple campaigns per vault.

Properties

Name	Data Type
owner	char
control	number
vault_layer_quantity	number
vault_layer_units	char

Connectors

Name	Neighboring Object
/	grout_campaign
/	grout_vault

9.1.15 laboratory

Comment :
Organization performing the analysis.

Properties

Name	Data Type
lab_code	char
lab_name	char

Connectors

Name	Neighboring Object
/	administrative_limits
/	analysis

9.1.16 result_group

Comment :
Result group is a set of results that for some reason are grouped together. It is a convenient way of managing sets of results. The grouping can be controlled by users. The grouping can include any results that use the result reference number as identifying property.

Result group can be hierarchical, with a parent or root and zero to many member result groups. Of course a member result group can also be a parent of another group. A member group cannot be a parent of itself. That doesn't make sense and will cause perpetual and eternal problems.

Properties

Name	Data Type
result_group_id	char
owner	char
control	number
result_group_name	char
result_group_desc	char

Connectors

Name	Neighboring Object
/	result_group_element
subgroup/group	result_group
subgroup/group	result_group

9.1.17 result_group_element

Comment :
A result group element represents that pair of result reference number and result group id that correlates analysis result with result group.

Since this entity is used only to pair a group with a result this entity does not have any attributes (properties) of its own.

Properties

Name	Data Type
owner	char
control	number

Connectors

Name	Neighboring Object
/	result_group
/	analysis_result

9.1.18 sample

Comment :
For this design, sample is defined as a liquid, solid or mixture of material analyzed for specified constituents. See the description of the analysis entity for EPA's description of an analysis sample.

The sample entity not only represents the samples taken from a source and analyzed. It includes sample portions and composites. It could be used to represent a tank layer if the layer composite sample is created before any analyses are performed and a record of its parts is not required to be saved in the database. If that is not true then layer can be represented by the sample portion and sample group entities.

Sample is important because it is the connecting link between source (such as tank) and result. Result doesn't have to know which source, just which sample. Source doesn't have to know about result, just sample.

Properties

Name	Data Type
samp_num	char
owner	char
control	number
samp_date_time	date/time
subject_area	char
lab_received_date	date
under_review_flag	char
sampler	char
samp_desc	char
doc_loc	char
log_id	char
log_page	char
samp_comment	char

Connectors

Name	Neighboring Object
/is part of	sample_portion
/includes	sample_portion
/	analysis
/	grout_core_segment
/	grout_liquid_sample
/	tank_supernate_sample
/	tank_core_segment
/	sample_group_element
/	evaporator_protocol_sample

9.1.19 sample_group

Comment :
Sample group is that entity that provides for an arbitrary grouping of samples in a way that makes sense to either the user or the system. This entity is not required to store analytical results for samples, but is helpful in management of data.

Sample groups can have parent sample groups and offspring of their own. A sample group cannot be a parent of itself.

See a similar discussion about analysis result group.

Properties

Name	Data Type
samp_group_id	char
owner	char
control	number
samp_group_name	char
samp_group_desc	char

Connectors

Name	Neighboring Object
/	sample_group_element
subgroup/group	sample_group
subgroup/group	sample_group

9.1.20 sample_group_element

Comment :
Sample group element is that connector that correlates a sample with a sample group.

It has no attributes or properties of its own but inherits the group id and sample number.

Properties

Name	Data Type
owner	char
control	number

Connectors

Name	Neighboring Object
/	sample_group
/	sample

9.1.21 sample_portion

Comment :
Sample portion is an entity used to connect or relate two samples together. It is usually used by the more automated portions of the system such as data loaders. An example of the concept is a set of segment samples used to make up a core composite. Each of the segment samples existed as an independent entity or part of one, and now make up a new entity called the core composite. The sample portion entity relates them together.

Properties

Name	Data Type
relationship	char
owner	char
control	number

Connectors

Name	Neighboring Object
/is part of	sample
/includes	sample

9.1.22 tank_core

Comment :
Tank core is an entity representing the sampling process that generated a set of core segments. It is classified as a source rather than a sample because most of the time there are no results that can be associated with the whole core and not a sample. An exception might be the drill pressure readings taken during the drilling process and that is not specified as part of this set of data. It could be accommodated by creating another instance of sample that represents the whole core for the purpose of recording the pressure results.

Tank core represents one of the three parts of the design that is mandatory - a source.

Properties

Name	Data Type
tank_core_id	number
tank_core_serial_num	number
owner	char
control	number
tank_riser	number
sampling_begin_date	date
sampling_end_date	date

Connectors

Name	Neighboring Object
/	waste_tank
/	tank_core_segment

9.1.23 tank_core_segment

Comment :
Tank core segment is the first entity from a tank core sampling process that we classify as a sample because some analyses are performed on the core itself. Core segment can also be classified as a source because other samples may be derived from it.

Core segment may later be divided up and combined with other samples to form composites and layers that are accounted for int he sample portion and sample group entities.

Tank core segments don't have a level associated with them because the level is supposed to be obtainable from the segment number.

Properties

Name	Data Type
tank_segment_id	number
tank_segment_serial_num	char
owner	char
control	number
tank_segment_level	number
tank_core_segment_comment	char

Connectors

Name	Neighboring Object
/	tank_core
/	sample

9.1.24 tank_farm

Comment :
At Hanford tank farms contain sets of tanks that are physically and logically grouped together into tank farms. For the purposes of this design a vault is also treated as a tank for identification purposes and therefore resides in a tank farm. Current requirements do not include storing any data associated with tank farm but rather using it as part of tank and vault identification.

This design treats tank farm as a separate entity so farm-wide data can be easily incorporated into the system should the need arise.

Properties

Name	Data Type
tank_farm_id	char
owner	char
control	number
tank_farm_name	char
tank_farm_desc	char
tank_farm_comment	char

Connectors

Name	Neighboring Object
/	waste_tank
/	grout_vault

9.1.25 tank_inventory

Comment :
Tank inventory represents the quantity of constituents in an entire tank.

For this design, tank inventory is not directly connected with analytical results obtained through the characterization process. It is data obtained through an undefined process and entered independently.

Properties

Name	Data Type
date	date/time
owner	char
control	number
quantity	number
units	char
doc_loc	char

Connectors

Name	Neighboring Object
/	waste_tank
/	constituent

9.1.26 tank_supernate_sample

Comment :
A tank supernate sample represent a "bottle on a string" type of sample taken directly from a tank. It is not the liquid portion of a core segment sample - that is accommodated in the sample portion and sample group entities.

Properties

Name	Data Type
sample_id	char
owner	char
control	number
tank_riser	number
tank_supernate_level	number
tank_supernate_comment	char

Connectors

Name	Neighboring Object
/	sample
/	waste_tank

9.1.27 tank_transfer

Comment :
Tank transfer is an entity that provides a way of correlating a transfer inventory with a tank. The transfer inventory is described under the waste transfer analyte entity.

February 13, 1992 this table and the related waste transfer analyte table were deleted in terms of any further consideration.

Likewise any transfer samples taken to support this transfer were also deleted.

Properties

Name	Data Type
transfer_number	number
transfer_source	char
owner	char
control	number
transfer_volume	number
transfer_date	date/time
doc_loc	char

Connectors

Name	Neighboring Object
/	waste_tank
/	waste_transfer_analyte

9.1.28 waste_tank

Comment :
Waste tank is the primary source entity in this design. It is the source of tank core and supernatant samples.

Waste tank should not be confused with grout vault. Grout vaults are treated as waste tanks for the purposes of identifiers only, not physically or functionally the same. As a result, the database design is separate for grout vault data than for waste tanks.

Properties

Name	Data Type
tank_id	number
owner	char
control	number
tank_type	char
construction_date	date
tank_elevation	number
max_allowable_waste_height	number
tank_capacity	number
tank_diameter	number
lambert_ew_coord	number
lambert_ns_coord	number
tank_comment	char

Connectors

Name	Neighboring Object
/	grout_feed_waste_portion
/	waste_tank_status
/	tank_farm
/	tank_supernate_sample
/	tank_core
/	tank_inventory
/	tank_transfer
/	evaporator_protocol_sample

9.1.29 waste_tank_status

Comment :
Waste tank status is an entity that provides a way of retaining information related to tank observations that are not usually associated with samples and analyses.

The properties of waste tank status are planned to be obtained from the monthly waste tank status reports. The data may also be available from WIDS.

Properties

Name	Data Type
waste_tank_status_date	date/time
owner	char
control	number
tank_integrity	char
waste_material	char
last_photo_date	date
tank_stabilization_status	char
tank_stabilization_date	date
tank_removed_from_service_date	date
total_waste_volume	number
total_jet_pumped_liquid	number
pumpable_liq_vol_remaining	number
drainable_liq_vol_remaining	number
drainable_interstitial_liquid_volume	number
liquids_volume_method	char
supernatant_liquid_volume	number
tank_slurry_volume	number
sludge_volume	number
saltcake_volume	number
solids_volume_method	char
solids_volume_update_date	date
waste_tank_temperature	number
data_reference	char
waste_tank_status_comment	char
preliminary_hazard_classification	char
preliminary_radionuclide_classification	char
preliminary_transuranic_classification	char
tank_specific_gravity	number

Connectors

Name	Neighboring Object
/	waste_tank

9.1.30 waste_transfer_analyte

Comment :
Waste transfer analyte is an inventory of quantities of constituents associated with a particular tank transfer. It is not meant to be directly derivable from particular analytical results, but is rather input as an independent set of data.

On February 13, 1992 this table and its parent table were deleted from further implementation in the tank characterization data.

Properties

Name	Data Type
owner	char
control	number
quantity	number
units	char
doc_loc	char

Connectors

Name	Neighboring Object
/	tank_transfer
/	constituent

9.2 Attributes

Attributes (field names within a relational database table) are described below in alphabetical order including an alias, size in bytes or characters, number of places past the decimal, an X if null values are allowed, the data type, the entity (object or table) that the attribute belongs to, and a comment that includes anything we know about the attribute to date. This should eventually include a description, derivation rule, limitations, desk instructions, and remarks.

Field sizes of zero are meant to indicate that a default database size will be utilized that satisfies a general use of the data type specified.

9.2.1 administrative_limit_units

Alias :
Size : 10
Nb of Decimals : 0
Null Value : X
Data Type : char
Object Name : administrative_limits

Comment :
Units for this limit. Examples are:
microCi/l
kgal
gal
l
g
microgram
dps
rpd
percent
ppm
feet
inches
specific gravity
pH
M (molar)
psi
dynes/sq cm
g/ml
degrees Centigrade
cal/g
microns
micrometers
ft/sec
gal/min
Reynolds number
microgram/liter
MicroCuries/gram

MicroCuries/liter
ratio
microgram/kilogram

9.2.2 analysis_comment
Alias :
Size : 240
Nb of Decimals : 0
Null Value : X
Data Type : char
Object Name : analysis

Comment :
ad hoc remarks to be associated with the analysis.

9.2.3 analysis_date_time
Alias : analysis date
Size : 0
Nb of Decimals : 0
Null Value : X
Data Type : date/time
Object Name : analysis

Comment :
HEIS: The date and time the sample was analyzed, in MM/DD/YY HH:MM (24-hour clock) format.

9.2.4 analyst
Alias : analyst person
Size : 20
Nb of Decimals : 0
Null Value : X
Data Type : char
Object Name : analysis

Comment :
HEIS: First and middle initials and last name of the person who analyzed the sample.

9.2.5 anal_class
Alias : analysis_class
Size : 10
Nb of Decimals : 0
Null Value :
Data Type : char
Object Name : analysis_method

Comment :
HEIS: name or acronym of the major analysis grouping. This grouping is basded on the characteristics of the compounds. Examples are VOA for volatile organic and INORG for inorganic.

9.2.6 anal_comment
Alias : analysis result comment
Size : 240
Nb of Decimals : 0
Null Value : X
Data Type : char
Object Name : analysis_result

Comment :
Comment about this result.

9.2.7 anal_comment
Alias : original analysis result comment
Size : 240
Nb of Decimals : 0
Null Value : X
Data Type : char
Object Name : analysis_result_change

Comment :
copy of original analysis result value comment

9.2.8 anal_mthd_desc
Alias : method description
Size : 240
Nb of Decimals : 0
Null Value : X
Data Type : char
Object Name : analysis_method

Comment :
HEIS: a description of the analysis method.

9.2.9 anal_mthd_id
Alias : method_id
Size : 10
Nb of Decimals : 0
Null Value :
Data Type : char
Object Name : analysis_method

Comment :
HEIS: a system -assigned identifier for a unique combination of analysis protocol, analysis class, analysis technique and test procedure that is a shorter identifier used in the results data.

The following are Brothers' candidates for method which may be located in any one of the fields that help describe the analysis method entity. It is probably important to have a convention for use of all analysis method properties (fields) to avoid confusion and provide for queries in the future.

weight percent solids
inductively coupled plasma atomic emission spectroscopy (ICP)
gamma energy (GEA)
total alpha
total beta
uranium
anion
total organic carbon
pH
TOX
cyanide
nickel-63
mass
volume
density
penetration

9.2.10 anal_mthd_id
Alias :
Size : 10
Nb of Decimals : 0
Null Value :
Data Type : char
Object Name : analysis_result_change

Comment :
Copy of the original analysis method id.

9.2.11 anal_mthd_name
Alias : method name
Size : 30
Nb of Decimals : 0
Null Value : X
Data Type : char
Object Name : analysis_method

Comment :
HEIS: the commonly accepted name for the analysis method.

9.2.12 anal_protocol
Alias : protocol
Size : 6
Nb of Decimals : 0
Null Value :
Data Type : char
Object Name : analysis_method

Comment :
HEIS: name or acronym of a protocol defined by an agency or other group. This protocol may be a national protocol such as ASTM, CLP, or SW-846 or it may be defined by an individual laboratory whose internal methods have been approved for use in lieu of one of the national methods.

9.2.13 anal_technique
Alias : analysis technique
Size : 10
Nb of Decimals : 0
Null Value :
Data Type : char
Object Name : analysis_method

Comment :
HEIS: Unique identifier (within a specific "Analysis Protocol" and "Analysis Class") for a particular technique used in analyzing a sample for a certain constituent. Use "NA" if technique is completely described by the combination of "Analysis Protocol" and "Analysis Class".

Examples: ANO-3565
9010

9.2.14 anal_test_proc
Alias : analytical test procedure
Size : 10
Nb of Decimals : 0
Null Value :
Data Type : char
Object Name : analysis_method

Comment :
HEIS: specific test procedure that is performed. In HEIS "NA" is supposed to be entered if the test procedure is completely described by other properties (fields).

In this design we don't care. As mentioned before, it is to the database user's benefit to have some well understood conventions for all fields in the analysis method entity.

9.2.15 batch_id
Alias : analysis control group id
Size : 20
Nb of Decimals : 0
Null Value : X
Data Type : char
Object Name : analysis

Comment :
an identification of a group of analyses that were performed together and having something in common such as time of analysis or instrument.

9.2.16 change_authority
Alias :
Size : 20
Nb of Decimals : 0
Null Value : X
Data Type : char
Object Name : analysis_result_change

Comment :
HEIS: the person or organization that performed the change on the record. The system inserts this data from the user account of the process that started the change.

9.2.17 change_date
Alias :
Size : 0
Nb of Decimals : 0
Null Value :
Data Type : date/time
Object Name : analysis_result_change

Comment :
HEIS: the date and time the change record was inserted into the database. The current systyem date and time are inserted into this field when the change is made. Format is MM/DD/YY HH:MM (24-hour clock)

9.2.18 change_indicator
Alias :
Size : 1
Nb of Decimals : 0
Null Value : X
Data Type : char
Object Name : analysis_result

Comment :
HEIS: flag used to indicate that the record has been changed. Set to "Y" if a change has been made to the record. If appropriate, a copy of the old record will be in the associated change table.

9.2.19 change_indicator
Alias : original_change_indicator
Size : 1
Nb of Decimals : 0
Null Value : X
Data Type : char
Object Name : analysis_result_change

Comment :
HEIS: flag used to indicate that the record has been changed. Set to "Y" if a change has been made to the record. If appropriate, a copy of the old record will be in the associated change table.

9.2.20 change_reason
Alias :
Size : 60
Nb of Decimals : 0
Null Value : X
Data Type : char
Object Name : analysis_result_change

Comment :
HEIS: A user-supplied explanation why the record was changed.

9.2.21 comment
Alias : evaporator protocol sample comments
Size : 240
Nb of Decimals : 0
Null Value : X
Data Type : char
Object Name : evaporator_protocol_sample

Comment :
remarks to be associated with evaporator protocol sample

9.2.22 construction_date
Alias :
Size : 0
Nb of Decimals : 0
Null Value : X
Data Type : date
Object Name : waste_tank

Comment :
date the tank was constructed

9.2.23 construction_date
Alias : grout vault construction date
Size : 0
Nb of Decimals : 0
Null Value : X
Data Type : date
Object Name : grout_vault

Comment :
grout vault construction date

9.2.24 control
Alias : farm control level
Size : 1
Nb of Decimals : 0
Null Value :
Data Type : number
Object Name : tank_farm

Comment :
HEIS: Code to facilitate access security. Assigned by project to allow different levels of read access to the data.

9.2.25 control
Alias : waste tank control level
Size : 1
Nb of Decimals : 0
Null Value :
Data Type : number
Object Name : waste_tank

Comment :
tank data record read access control level

9.2.26 control
Alias : waste tank status control level
Size : 1
Nb of Decimals : 0
Null Value :
Data Type : number
Object Name : waste_tank_status

Comment :
tank status data record read access control level

9.2.27 control
Alias : tank core control level
Size : 1
Nb of Decimals : 0
Null Value :
Data Type : number
Object Name : tank_core

Comment :
tank core read access data record control level

9.2.28 control
Alias : grout campaign control level
Size : 1
Nb of Decimals : 0
Null Value :
Data Type : number
Object Name : grout_campaign

Comment :
grout campaign data record read access control level

9.2.29 control
Alias : grout vault layer control level
Size : 1
Nb of Decimals : 0
Null Value :
Data Type : number
Object Name : grout_vault_layer

Comment :
grout vault layer data record read access control level

9.2.30 control
Alias : grout vault control level
Size : 1
Nb of Decimals : 0
Null Value :
Data Type : number
Object Name : grout_vault

Comment :
grout vault data record read access control level

9.2.31 control
Alias : grout vault core control level
Size : 1
Nb of Decimals : 0
Null Value :
Data Type : number
Object Name : grout_vault_core

Comment :
grout core data record read access control level

9.2.32 control
Alias : tank inventory control level
Size : 1
Nb of Decimals : 0
Null Value :
Data Type : number
Object Name : tank_inventory

Comment :
tank inventory datarecord read access control level

9.2.33 control
Alias : tank transfer control level
Size : 1
Nb of Decimals : 0
Null Value :
Data Type : number
Object Name : tank_transfer

Comment :
tank transfer datarecord read access control level

9.2.34 control
Alias : waste transfer analyte control level
Size : 1
Nb of Decimals : 0
Null Value :
Data Type : number
Object Name : waste_transfer_analyte

Comment :
waste transfer analyte data record read access control level

9.2.35 control
Alias : tank core segment control level
Size : 1
Nb of Decimals : 0
Null Value :
Data Type : number
Object Name : tank_core_segment

Comment :
tank core segment data record read access control level

9.2.36 control
Alias : tank supernate sample control level
Size : 1
Nb of Decimals : 0
Null Value :
Data Type : number
Object Name : tank_supernate_sample

Comment :
tank supernate sample data record read access control level

9.2.37 control
Alias : grout core segment control level
Size : 1
Nb of Decimals : 0
Null Value :
Data Type : number
Object Name : grout_core_segment

Comment :
grout core segment data record read access control level

9.2.38 control
Alias : grout liquid sample control level
Size : 1
Nb of Decimals : 0
Null Value :
Data Type : number
Object Name : grout_liquid_sample

Comment :
grout liquid sample record data read access control level

9.2.39 control
Alias : sample control level
Size : 1
Nb of Decimals : 0
Null Value :
Data Type : number
Object Name : sample

Comment :
sample data record read access control level

9.2.40 control
Alias : sample group control level
Size : 1
Nb of Decimals : 0
Null Value :
Data Type : number
Object Name : sample_group

Comment :
code to facilitate access security. assigned by the project to allow different levels of read access to the data record. set by the owner.

9.2.41 control
Alias : analysis control level
Size : 1
Nb of Decimals : 0
Null Value :
Data Type : number
Object Name : analysis

Comment :
analysis data record read access control level

9.2.42 control
Alias : administrative limits control level
Size : 1
Nb of Decimals : 0
Null Value :
Data Type : number
Object Name : administrative_limits

Comment :
HEIS administrative limits data record read access control level

9.2.43 control
Alias : analysis result change control level
Size : 1
Nb of Decimals : 0
Null Value :
Data Type : number
Object Name : analysis_result_change

Comment :
result change data record read access control level

9.2.44 control
Alias : analysis result control level
Size : 1
Nb of Decimals : 0
Null Value :
Data Type : number
Object Name : analysis_result

Comment :
HEIS analysis result data record read access control level

9.2.45 control
Alias : result group control level
Size : 1
Nb of Decimals : 0
Null Value :
Data Type : number
Object Name : result_group

Comment :
HEIS: a code to facilitate access security. Assigned by the project to allow different levels of read access to the data. Control is a characteristic of the particular HEIS project account that created the group and thus is set by the system when the group is created.

9.2.46 control
Alias : grout feed waste portion control level
Size : 1
Nb of Decimals : 0
Null Value :
Data Type : number
Object Name : grout_feed_waste_portion

Comment :
grout feed portion data record read access control level

9.2.47 control
Alias : group element control level
Size : 1
Nb of Decimals : 0
Null Value :
Data Type : number
Object Name : result_group_element

Comment :
result group element data record read access control level

9.2.48 control
Alias : evaporator protocol sample control level
Size : 1
Nb of Decimals : 0
Null Value :
Data Type : number
Object Name : evaporator_protocol_sample

Comment :
evaporator protocol sample data record read access control level

9.2.49 control
Alias : sample_portion_control
Size : 1
Nb of Decimals : 0
Null Value :
Data Type : number
Object Name : sample_portion

Comment :
sample portion data record read access control level

9.2.50 control
Alias : group_element_control
Size : 1
Nb of Decimals : 0
Null Value :
Data Type : number
Object Name : sample_group_element

Comment :
sample group element data read/write control level

9.2.51 con_desc
Alias : desc
Size : 240
Nb of Decimals : 0
Null Value : X
Data Type : char
Object Name : constituent

Comment :
HEIS: a description of the particular constituent or physical property.

9.2.52 con_id
Alias : constituent id
Size : 10
Nb of Decimals : 0
Null Value :
Data Type : char
Object Name : constituent

Comment :
HEIS: identifier for a specific chemical compound or radiological or physical property. If available, the Chemical Abstract Services (CAS) number is used. Otherwise the elemental name or an abbreviation is used.

9.2.53 con_id
Alias :
Size : 10
Nb of Decimals : 0
Null Value :
Data Type : char
Object Name : analysis_result_change

Comment :
Copy of the original constituent identifier.

9.2.54 con_long_name
Alias : long name
Size : 40
Nb of Decimals : 0
Null Value : X
Data Type : char
Object Name : constituent

Comment :
HEIS: name used for reporting purposes. The name comes from the Chemical Abstract Services (CAS) if possible.

9.2.55 con_short_name
Alias : short name
Size : 7
Nb of Decimals : 0
Null Value : X
Data Type : char.
Object Name : constituent

Comment :
HEIS: A 7-character name for the constituent. For constituents currently in the Hanford Ground-Water Database, the existing 7-character name is used.

9.2.56 CRDL
Alias : contract required detection limit
Size : 0
Nb of Decimals : 0
Null Value : X
Data Type : number
Object Name : administrative_limits

Comment :
Contract Required Detection Limit - an EPA term - minimum level of detection acceptable under the contract statement of work.

9.2.57 CRQL
Alias : contract required quantation limit
Size : 0
Nb of Decimals : 0
Null Value : X
Data Type : number
Object Name : administrative_limits

Comment :
Contract Required Quantation Limit - an OSM definition

9.2.58 data_reference
Alias :
Size : 240
Nb of Decimals : 0
Null Value : X
Data Type : char
Object Name : waste_tank_status

Comment :
The document that was used to enter this data. This is a complete bibliographic reference.

9.2.59 date
Alias : tank inventory date
Size : 0
Nb of Decimals : 0
Null Value :
Data Type : date/time
Object Name : tank_inventory

Comment :
the date and time the inventory is supposed to be associated with.

not when the data was loaded in the database but the time the inventory is supposed to be most representative of.

9.2.60 dilut_factor
Alias : analysis dilution factor
Size : 14
Nb of Decimals : 7
Null Value : X
Data Type : number
Object Name : analysis

Comment :
HEIS: If a sample has been diluted for analysis, "Dilution Factor" is the multiplicative factor by which the raw analytical result could be multiplied to obtain the amount of the constituent in the sample. It is entered as a single number, such as 100 for a 1 to 100 dilution of the sample. For a concentration of 10 to 1 enter 0.1. If a sample was not diluted, either the field is left blank or a 1 is entered.

9.2.61 doc_loc
Alias : grout feed waste portion document location
Size : 80
Nb of Decimals : 0
Null Value : X
Data Type : char
Object Name : grout_feed_waste_portion

Comment :
HEIS: Indicates where the documentation for this item is located.

9.2.62 doc_loc
Alias : sample document location
Size : 150
Nb of Decimals : 0
Null Value : X
Data Type : char
Object Name : sample

Comment :
HEIS: Indicates where the documentation for this item is located.

9.2.63 doc_loc
Alias : analysis document location
Size : 150
Nb of Decimals : 0
Null Value : X
Data Type : char
Object Name : analysis

Comment :
HEIS: Inidcates where the documentation for this item is located.

9.2.64 doc_loc
Alias : tank inventory document location
Size : 80
Nb of Decimals : 0
Null Value : X
Data Type : char
Object Name : tank_inventory

Comment :
HEIS: Indicates where the documentation for this item is located.

9.2.65 doc_loc
Alias : tank transfer document location
Size : 80
Nb of Decimals : 0
Null Value : X
Data Type : char
Object Name : tank_transfer

Comment :
HEIS: Indicates where the documentation for this item is located.

9.2.66 doc_loc
Alias : waste transfer analyte document location
Size : 80
Nb of Decimals : 0
Null Value : X
Data Type : char
Object Name : waste_transfer_analyte

Comment :
HEIS: Indicates where the document for this item is located.

9.2.67 drainable_interstitial_liquid_volume
Alias :
Size : 4
Nb of Decimals : 0
Null Value : X
Data Type : number
Object Name : waste_tank_status

Comment :
the amount of drainable liquid remaining after jet pumping the tank in thousands of gallons (kgal).

9.2.68 drainable_liq_vol_remaining
Alias :
Size : 3
Nb of Decimals : 0
Null Value : X
Data Type : number
Object Name : waste_tank_status

Comment :
the amount of drainable liquid remaining after jet pumping in the tank in thousands of gallons (kgal)

9.2.69 file_id
Alias : analysis disk file name
Size : 240
Nb of Decimals : 0
Null Value : X
Data Type : char
Object Name : analysis

Comment :
the disk file identification of where the analysis data is stored. This can include full path name such as network node name, directory heirarchy, file name and type.

9.2.70 grout_campaign_comment
Alias : campaign comment
Size : 240
Nb of Decimals : 0
Null Value : X
Data Type : char
Object Name : grout_campaign

Comment :
Comments about the grout campaign.

9.2.71 grout_campaign_desc
Alias : description
Size : 240
Nb of Decimals : 0
Null Value : X
Data Type : char
Object Name : grout_campaign

Comment :
a description associated with the grout campaign.

9.2.72 grout_campaign_name
Alias : grout campaign name
Size : 80
Nb of Decimals : 0
Null Value : X
Data Type : char
Object Name : grout_campaign

Comment :
a campaign name associated with the campaign number.

9.2.73 grout_campaign_num
Alias : campaign number
Size : 3
Nb of Decimals : 0
Null Value :
Data Type : number
Object Name : grout_campaign

Comment :
An identifier (ID) for a grout campaign.

9.2.74 grout_core_id
Alias : grout core number id
Size : 3
Nb of Decimals : 0
Null Value :
Data Type : number
Object Name : grout_vault_core

Comment :
like waste tank core numbers, grout vault core numbers are ascending numbers starting at one for the first core from each vault.

9.2.75 grout_core_serial_num
Alias : grout core serial number id
Size : 6
Nb of Decimals : 0
Null Value :
Data Type : char
Object Name : grout_vault_core

Comment :
like tank core serial id this is supposed to be the 2 digit year followed by a dash followed by a serial number starting at one for entire characterization project.

9.2.76 grout_feed_volume_transferred
Alias : grout feed transfer volume
Size : 5
Nb of Decimals : 0
Null Value : X
Data Type : number
Object Name : grout_feed_waste_portion

Comment :
the quantitative amount transferred from a waste tank for a particular grout campaign..

9.2.77 grout_feed_volume_transferred_units
Alias : grout feed transfer units
Size : 10
Nb of Decimals : 0
Null Value : X
Data Type : char
Object Name : grout_feed_waste_portion

Comment :
units associated with volume of waste tank transferred for grout campaign. Typically in thousands of gallons (kgal).

9.2.78 grout_liquid_comment
Alias : grout liquid sample comments
Size : 240
Nb of Decimals : 0
Null Value : X
Data Type : char
Object Name : grout_liquid_sample

Comment :
Comments about the grout liquid sample.

9.2.79 grout_liquid_level
Alias : grout_liquid_sample_level
Size : 5
Nb of Decimals : 0
Null Value : X
Data Type : number
Object Name : grout_liquid_sample

Comment :
The level, measured in inches above the bottom of the vessel, from which the supernate sample was taken.

9.2.80 grout_liquid_samp_loc
Alias : grout_liquid_sample_location
Size : 60
Nb of Decimals : 0
Null Value : X
Data Type : char
Object Name : grout_liquid_sample

Comment :
this a way of identifying where in a grout vault the sample was taken. It is meant to parallel the riser of a waste tank, but since we don't know that grout vaults have risers we will simply call it the sample location.

9.2.81 grout_segment_comment
Alias : grout core segment comments
Size : 240
Nb of Decimals : 0
Null Value : X
Data Type : char
Object Name : grout_core_segment

Comment :
Comments about the grout core segment.

9.2.82 grout_segment_id
Alias : grout core segment number
Size : 2
Nb of Decimals : 0
Null Value :
Data Type : number
Object Name : grout_core_segment

Comment :
ascending number beginning with 1 for the first segment obtained in each grout core. A higher segment number implies greater depth of sample.

9.2.83 grout_segment_level
Alias : grout segment level
Size : 0
Nb of Decimals : 0
Null Value : X
Data Type : number
Object Name : grout_core_segment

Comment :
the level representing the elevation from the bottom of the grout_vault of the center of the segment in inches.

9.2.84 grout_segment_serial_num
Alias : grout core segment serial #
Size : 6
Nb of Decimals : 0
Null Value : X
Data Type : char
Object Name : grout_core_segment

Comment :
a log number of the core segment including a 2-digit year followed by dash followed by an ascending number beginning with 1 for the first segment obtained in any given year.

9.2.85 lab_code
Alias :
Size : 6
Nb of Decimals : 0
Null Value :
Data Type : char
Object Name : laboratory

Comment :
HEIS: unique code for the laboratory performing the analyses.

9.2.86 lab_code
Alias :
Size : 6
Nb of Decimals : 0
Null Value :
Data Type : char
Object Name : analysis_result_change

Comment :
Copy of the original lab_code.

9.2.87 lab_media_type
Alias : lab media - soil or water
Size : 1
Nb of Decimals : 0
Null Value :
Data Type : char
Object Name : administrative_limits

Comment :
HEIS: Identifies the medium that the limit applies to. Choices are "S" for solid and "L" for liquid.

9.2.88 lab_name
Alias :
Size : 25
Nb of Decimals : 0
Null Value : X
Data Type : char
Object Name : laboratory

Comment :
HEIS: currently used name of the laboratory.

9.2.89 lab_received_date
Alias : date
Size : 0
Nb of Decimals : 0
Null Value : X
Data Type : date
Object Name : sample

Comment :
HEIS: Date sample was received at laboratory, in MM/DD/YYYY format.

9.2.90 lab_samp_id
Alias : lab serial number
Size : 12
Nb of Decimals : 0
Null Value :
Data Type : char
Object Name : analysis

Comment :
Internal lab identifier (ID) assigned by lab that analyzed sample.

9.2.91 lab_samp_id
Alias :
Size : 15
Nb of Decimals : 0
Null Value :
Data Type : char
Object Name : analysis_result_change

Comment :
Copy of the original lab sample id.

9.2.92 lambert_ew_coord
Alias : grout vault lambert east/west coordinate
Size : 9
Nb of Decimals : 1
Null Value : X
Data Type : number
Object Name : grout_vault

Comment :
HEIS: Lambert NAD83 east-west coordinate in meters.

9.2.93 lambert_ew_coord
Alias : lambert east/west coordinate
Size : 9
Nb of Decimals : 1
Null Value : X
Data Type : number
Object Name : waste_tank

Comment :
HEIS: Lambert NAD83 east-west coordinate in meters.

9.2.94 lambert_ns_coord
Alias : grout vault north/south coordinate
Size : 9
Nb of Decimals : 1
Null Value : X
Data Type : number
Object Name : grout_vault

Comment :
HEIS: Lambert NAD83 north-south coordinate in meters.

9.2.95 lambert_ns_coord
Alias : lambert north/south coordinate
Size : 9
Nb of Decimals : 1
Null Value : X
Data Type : number
Object Name : waste_tank

Comment :
HEIS: Lambert NAD83 north-south coordinate in meters.

9.2.96 last_photo_date
Alias :
Size : 0
Nb of Decimals : 0
Null Value : X
Data Type : date
Object Name : waste_tank_status

Comment :
the month, day, and year date the last photograph was taken of the tank waste.

9.2.97 limit_begin_date
Alias :
Size : 0
Nb of Decimals : 0
Null Value :
Data Type : date
Object Name : administrative_limits

Comment :
HEIS: Date at which this limit was superseded by another limit. In HEIS, if the begin date is not known, a default date of January 01, 1901 is used. Format is MM/DD/YYYY.

9.2.98 limit_end_date
Alias :
Size : 0
Nb of Decimals : 0
Null Value : X
Data Type : date
Object Name : administrative_limits

Comment :
HEIS: The date at which this limit was superseded by another limit. A missing limit end date means the limit is still in effect. Format is MM/DD/YYYY.

9.2.99 liquids_volume_method
Alias : liquids_vol_method_code
Size : 2
Nb of Decimals : 0
Null Value : X
Data Type : char
Object Name : waste_tank_status

Comment :
a code to specify which method was used to determine the amount of liquids in the tank.

9.2.100 load_date
Alias : analysis result load date
Size : 0
Nb of Decimals : 0
Null Value : X
Data Type : date
Object Name : analysis_result

Comment :
HEIS: The date this record was originally added to the database. Format is mm/dd/yy.

9.2.101 load_date
Alias : analysis result change load date
Size : 0
Nb of Decimals : 0
Null Value : X
Data Type : date
Object Name : analysis_result_change

Comment :
copy of original analysis result load date

9.2.102 log_id
Alias :
Size : 20
Nb of Decimals : 0
Null Value : X
Data Type : char
Object Name : sample

Comment :
The identifier for the log book that notes were taken in for this sample.

9.2.103 log_page
Alias :
Size : 10
Nb of Decimals : 0
Null Value : X
Data Type : char
Object Name : sample

Comment :
the page of the log book that contains the log book entry of information related to this sample.

9.2.104 max_allowable_waste_height
Alias : maximum allowable waste height
Size : 4
Nb of Decimals : 1
Null Value : X
Data Type : number
Object Name : waste_tank

Comment :
maximum height waste is allowed to fill the tank in feet.

9.2.105 molecular_formula
Alias :
Size : 50
Nb of Decimals : 0
Null Value : X
Data Type : char
Object Name : constituent

Comment :
HEIS: molecular formula of the constituent.

looks like someone may want to state the conventions for specifying formulas in a way that properly denotes sub- and super-scripts.

9.2.106 owner
Alias : farm owner
Size : 8
Nb of Decimals : 0
Null Value :
Data Type : char
Object Name : tank_farm

Comment :
HEIS id of project account that owns this farm data record

9.2.107 owner
Alias : waste tank owner
Size : 8
Nb of Decimals : 0
Null Value :
Data Type : char
Object Name : waste_tank

Comment :
HEIS computer project id that owns tank data record

9.2.108 owner
Alias : waste tank status owner
Size : 8
Nb of Decimals : 0
Null Value :
Data Type : char
Object Name : waste_tank_status

Comment :
HEIS computer account of tank status data record owner

9.2.109 owner
Alias : tank core owner
Size : 8
Nb of Decimals : 0
Null Value :
Data Type : char
Object Name : tank_core

Comment :
HEIS computer account tank core data record owner

9.2.110 owner
Alias : grout campaign owner
Size : 8
Nb of Decimals : 0
Null Value :
Data Type : char
Object Name : grout_campaign

Comment :
HEIS computer account that owns grout campaign data record

9.2.111 owner
Alias : grout vault layer owner
Size : 8
Nb of Decimals : 0
Null Value :
Data Type : char
Object Name : grout_vault_layer

Comment :
HEIS computer account grout vault layer data record owner

9.2.112 owner
Alias : grout vault owner
Size : 8
Nb of Decimals : 0
Null Value :
Data Type : char
Object Name : grout_vault

Comment :
HEIS computer account grout vault data record owner

9.2.113 owner
Alias : grout vault core owner
Size : 8
Nb of Decimals : 0
Null Value :
Data Type : char
Object Name : grout_vault_core

Comment :
HEIS computer account grout core data record owner

9.2.114 owner
Alias : tank inventory owner
Size : 8
Nb of Decimals : 0
Null Value :
Data Type : char
Object Name : tank_inventory

Comment :
HEIS computer account tank inventory data record owner

9.2.115 owner
Alias : tank transfer owner
Size : 8
Nb of Decimals : 0
Null Value :
Data Type : char
Object Name : tank_transfer

Comment :
HEIS computer account tank transfer data record owner

9.2.116 owner
Alias : waste transfer analyte owner
Size : 8
Nb of Decimals : 0
Null Value :
Data Type : char
Object Name : waste_transfer_analyte

Comment :
HEIS computer account waste transfer analyte data record owner

9.2.117 owner
Alias : tank core segment owner
Size : 8
Nb of Decimals : 0
Null Value :
Data Type : char
Object Name : tank_core_segment

Comment :
HEIS computer account tank core segment data record owner

9.2.118 owner
Alias : tank supernate sample owner
Size : 8
Nb of Decimals : 0
Null Value :
Data Type : char
Object Name : tank_supernate_sample

Comment :
HEIS computer account tank supernate sample data record owner

9.2.119 owner
Alias : grout core segment owner
Size : 8
Nb of Decimals : 0
Null Value :
Data Type : char
Object Name : grout_core_segment

Comment :
HEIS computer account grout core segment data record owner

9.2.120 owner
Alias : grout liquid sample owner
Size : 8
Nb of Decimals : 0
Null Value :
Data Type : char
Object Name : grout_liquid_sample

Comment :
HEIS computer account grout liquid sample data record owner

9.2.121 owner
Alias : sample owner
Size : 8
Nb of Decimals : 0
Null Value :
Data Type : char
Object Name : sample

Comment :
HEIS computer account sample data record owner

9.2.122 owner
Alias : analysis owner
Size : 8
Nb of Decimals : 0
Null Value :
Data Type : char
Object Name : analysis

Comment :
HEIS computer account analysis data record owner

9.2.123 owner
Alias : administrative limits owner
Size : 8
Nb of Decimals : 0
Null Value :
Data Type : char
Object Name : administrative_limits

Comment :
HEIS administrative limit data record owner

9.2.124 owner
Alias : result change owner
Size : 8
Nb of Decimals : 0
Null Value :
Data Type : char
Object Name : analysis_result_change

Comment :
HEIS computer account result change data record owner

9.2.125 owner
Alias : analysis result owner
Size : 8
Nb of Decimals : 0
Null Value :
Data Type : char
Object Name : analysis_result

Comment :
HEIS computer project account analysis result data record owner

9.2.126 owner
Alias : result group owner
Size : 30
Nb of Decimals : 0
Null Value :
Data Type : char
Object Name : result_group

Comment :
the name of the user that created the group and thus owns it.

for HEIS it is an identification of the computer project account that owns the result group data record.

9.2.127 owner
Alias : grout feed waste portion owner
Size : 8
Nb of Decimals : 0
Null Value :
Data Type : char
Object Name : grout_feed_waste_portion

Comment :
HEIS computer account that owns grout feed waste portion data record

9.2.128 owner
Alias : group element owner
Size : 8
Nb of Decimals : 0
Null Value :
Data Type : char
Object Name : result_group_element

Comment :
HEIS computer account result group element data owner

9.2.129 owner
Alias :
Size : 8
Nb of Decimals : 0
Null Value :
Data Type : char
Object Name : evaporator_protocol_sample

Comment :
HEIS computer account evaporator protocol sample data record owner

9.2.130 owner
Alias : sample_portion_owner
Size : 8
Nb of Decimals : 0
Null Value :
Data Type : char
Object Name : sample_portion

Comment :
HEIS comptuer account sample portion data record owner

9.2.131 owner
Alias : sample group owner
Size : 8
Nb of Decimals : 0
Null Value :
Data Type : char
Object Name : sample_group

Comment :
the user who owns the sample group record. doesn't own the samples in the group, just the group name and the set of samples it represents.

9.2.132 owner
Alias : group_element_owner
Size : 8
Nb of Decimals : 0
Null Value :
Data Type : char
Object Name : sample_group_element

Comment :
HEIS computer account sample group element data owner

9.2.133 phase
Alias : physical media of sample
Size : 10
Nb of Decimals : 0
Null Value : X
Data Type : char
Object Name : analysis

Comment :
Type of sample. Choices are "IL" for liquid or "S" for solid.

9.2.134 preliminary_hazard_classification
Alias :
Size : 3
Nb of Decimals : 0
Null Value : X
Data Type : char
Object Name : waste_tank_status

Comment :
this field deleted because it does not have same pedigree as rest of data in waste_tank_status January 1992

9.2.135 preliminary_radionuclide_classification
Alias :
Size : 2
Nb of Decimals : 0
Null Value : X
Data Type : char
Object Name : waste_tank_status

Comment :
this field deleted January 1992 because it doesn't have same pedigree as rest of data in waste_tank_status table

9.2.136 preliminary_transuranic_classification
Alias :
Size : 8
Nb of Decimals : 0
Null Value : X
Data Type : char
Object Name : waste_tank_status

Comment :
this field deleted January 1992 because it doesn't have same pedigree as rest of data in waste_tank_status table.

9.2.137 prrn
Alias : parent result reference number
Size : 0
Nb of Decimals : 0
Null Value : X
Data Type : number
Object Name : analysis_result_change

Comment :
Copy of the original parent result reference number.

9.2.138 pumpable_liq_vol_remaining
Alias :
Size : 3
Nb of Decimals : 0
Null Value : X
Data Type : number
Object Name : waste_tank_status

Comment :
the amount of pumpable liquid rtemaining after jet pumping in the tank in thousands of gallons (kgal)

9.2.139 QC_low_lim
Alias : QC low lim
Size : 0
Nb of Decimals : 0
Null Value : X
Data Type^@: number
Object Name : administrative_limits

Comment :
HEIS: The specified analysis laboratory must be able to detect concentrations of the constituent that are greater than or equal to this limit.

For tanks the SRS calls this the quality control limit as specified by the EPA.

9.2.140 QC_up_lim
Alias : QC up lim
Size : 0
Nb of Decimals : 0
Null Value : X
Data Type : number
Object Name : administrative_limits

Comment :
HEIS: see lower limit

TCD SRS defines as QC upper limit as defined by EPA.

9.2.141 qualifiers
Alias : analysis result qualifiers
Size : 6
Nb of Decimals : 0
Null Value : X
Data Type : char
Object Name : analysis_result

Comment :
HEIS: selected from tables in the HEIS user manual.

my definition - an indication of the quality of the value. could also indicate a problem and type of problem with the value. As I understand the process, it could be reported by the analytical lab, added by an independent data validator and/or set by some other person.

synonyms: data qualifier
report flags (EPA)

9.2.142 qualifiers
Alias : analysis result change qualifiers
Size : 6
Nb of Decimals : 0
Null Value : X
Data Type : char
Object Name : analysis_result_change

Comment :
copy of original analysis result validation qualifier

9.2.143 quantity
Alias : tank inventory quantity
Size : 0
Nb of Decimals : 0
Null Value :
Data Type : number
Object Name : tank_inventory

Comment :
the amount of constituent or analyte in the tank at the given time and in units specified by the inventory units.

9.2.144 quantity
Alias : waste_transfer_analyte_quantity
Size : 0
Nb of Decimals : 0
Null Value :
Data Type : number
Object Name : waste_transfer_analyte

Comment :
the amount of constituent with units defined in waste transfer analyte quantity units.

9.2.145 relationship
Alias : sample_relationship
Size : 60
Nb of Decimals : 0
Null Value : X
Data Type : char
Object Name : sample_portion

Comment :
A relationship to help in the interpretation of why two samples are to be associated together.

9.2.146 result_group_desc
Alias : result group description
Size : 240
Nb of Decimals : 0
Null Value : X
Data Type : char
Object Name : result_group

Comment :
a description of the result group that provides a rather complete reasoning why the group exists.

9.2.147 result_group_id
Alias :
Size : 20
Nb of Decimals : 0
Null Value :
Data Type : char
Object Name : result_group

Comment :
an identifier chosen by the user to use as the primary unique identifier of the group of results.

9.2.148 result_group_name
Alias : result group name
Size : 60
Nb of Decimals : 0
Null Value : X
Data Type : char
Object Name : result_group

Comment :
the name the user wants to associate with a result group - can be descriptive of the group so others can understand it.

9.2.149 RPD
Alias : relative percent difference limit
Size : 3
Nb of Decimals : 0
Null Value : X
Data Type : number
Object Name : administrative_limits

Comment :
Relative percent difference limit as defined by EPA.

9.2.150 rrn
Alias : result reference number
Size : 34
Nb of Decimals : 0
Null Value :
Data Type : number
Object Name : analysis_result

Comment :
An analysis result instance (record) will have a unique result reference number associated with it. Its intent is to provide a single unique identifier, as well as to provide a convenient way of relating results together in ways that make sense.

9.2.151 saltcake_volume
Alias :
Size : 4
Nb of Decimals : 0
Null Value : X
Data Type : number
Object Name : waste_tank_status

Comment :
the amount of saltcake in the tank in thousands of gallons (kgal)

9.2.152 sampler
Alias : sampler person
Size : 20
Nb of Decimals : 0
Null Value : X
Data Type : char
Object Name : sample

Comment :
the person who took the sample (or the person who will be held responsible for the taking of the sample)

9.2.153 sample_id
Alias : tank supernate sample id
Size : 10
Nb of Decimals : 0
Null Value :
Data Type : char
Object Name : tank_supernate_sample

Comment :
the log book identification of the supernate sample.

9.2.154 sample_id
Alias : grout supernate sample id
Size : 7
Nb of Decimals : 0
Null Value :
Data Type : char
Object Name : grout_liquid_sample

Comment :
sample identification for a grout supernate sample. According to the SRS this is an ascending sample number starting at one for each tank.

9.2.155 sample_id
Alias :
Size : 10
Nb of Decimals : 0
Null Value :
Data Type : char
Object Name : evaporator_protocol_sample

Comment :
the log book identification of the evaporator protocol sample

9.2.156 sampling_begin_date
Alias : core sampling begin date
Size : 0
Nb of Decimals : 0
Null Value : X
Data Type : date
Object Name : tank_core

Comment :
The date this sampling activity started.

9.2.157 sampling_begin_date
Alias : grout sampling begin date
Size : 0
Nb of Decimals : 0
Null Value : X
Data Type : date
Object Name : grout_vault_core

Comment :
The date this sampling activity was started.

9.2.158 sampling_end_date
Alias : core sampling end date
Size : 0
Nb of Decimals : 0
Null Value : X
Data Type : date
Object Name : tank_core

Comment :
The date this sampling activity was completed.

9.2.159 sampling_end_date
Alias : grout sampling end date
Size : 0
Nb of Decimals : 0
Null Value : X
Data Type : date
Object Name : grout_vault_core

Comment :
The date this sampling activity was completed.

9.2.160 samp_comment
Alias : sample comment
Size : 240
Nb of Decimals : 0
Null Value : X
Data Type : char
Object Name : sample

Comment :
remarks that someone wants associated with the sample

9.2.161 samp_date_time
Alias : sample date and time
Size : 0
Nb of Decimals : 0
Null Value : X
Data Type : date/time
Object Name : sample

Comment :
HEIS: Date and time sample was collected or created. Format is MM/DD/YYYY HH:MM (24-hour clock).

9.2.162 samp_desc
Alias : sample_description
Size : 150
Nb of Decimals : 0
Null Value : X
Data Type : char
Object Name : sample

Comment :
a description of the sample

9.2.163 samp_group_desc
Alias : sample group desc
Size : 240
Nb of Decimals : 0
Null Value : X
Data Type : char
Object Name : sample_group

Comment :
A description of the sample group.

9.2.164 samp_group_id
Alias : sample_group_id
Size : 30
Nb of Decimals : 0
Null Value :
Data Type : char
Object Name : sample_group

Comment :
an identification of a group of samples that satisfies the user's need for a unique identifier of a set. It may also be descriptive of the reason for the grouping but that explanation could also be found in the name and description fields.

9.2.165 samp_group_name
Alias : sample_group_name
Size : 80
Nb of Decimals : 0
Null Value : X
Data Type : char
Object Name : sample_group

Comment :
The name the user wishes to associate with the group of samples. Typically appears in reports. More descriptive than group id but less descriptive than group description.

9.2.166 samp_loc
Alias : evaporator protocol sample location
Size : 60
Nb of Decimals : 0
Null Value : X
Data Type : char
Object Name : evaporator_protocol_sample

Comment :
the location the sample was obtained from

9.2.167 samp_num
Alias : tcd_sample_number
Size : 12
Nb of Decimals : 0
Null Value :
Data Type : char
Object Name : sample

Comment :
Unique number used to identify a sample.

9.2.168 samp_num
Alias :
Size : 12
Nb of Decimals : 0
Null Value :
Data Type : char
Object Name : analysis_result_change

Comment :
Copy of the original sample number.

9.2.169 samp_prep_date_time
Alias : sample prep date&time
Size : 0
Nb of Decimals : 0
Null Value : X
Data Type : date/time
Object Name : analysis

Comment :
the date and time the sample preparation took place.

9.2.170 samp_prep_type
Alias : sample prep
Size : 20
Nb of Decimals : 0
Null Value : X
Data Type : char
Object Name : analysis

Comment :
includes such sample prep options as
filtered solids
filtrate
extraction
fusion
water leach
acid leach

and other types of sample preparation that may be useful in understanding the analysis and associated results.

9.2.171 samp_type
Alias : analysis sample matrix?
Size : 20
Nb of Decimals : 0
Null Value : X
Data Type : char
Object Name : analysis

Comment :
solid
liquid
acid leach
water leach
KOH fused
composite
filtered
centrifuged solids
bulk slurry
centrifuged supernate
dissolved solid
undissolved solids

combinations of the above

9.2.172 samp_type
Alias : evaporator protocol sample type
Size : 10
Nb of Decimals : 0
Null Value : X
Data Type : char
Object Name : evaporator_protocol_sample

Comment :
type of evaporator protocol sample - either condensate or slurry

alternatives from Mike Coony are evaporator bottom and process condensate

9.2.173 sludge_volume
Alias :
Size : 4
Nb of Decimals : 0
Null Value : X
Data Type : number
Object Name : waste_tank_status

Comment :
the amount of sludge in the tank in thousands of gallons (kgal)

9.2.174 solids_volume_method
Alias : solids_vol_method_code
Size : 2
Nb of Decimals : 0
Null Value : X
Data Type : char
Object Name : waste_tank_status

Comment :
a code to specify which method was used to determine the amount of solids in the tank.

9.2.175 solids_volume_update_date
Alias :
Size : 0
Nb of Decimals : 0
Null Value : X
Data Type : date
Object Name : waste_tank_status

Comment :
the month, day, and year the solids volume was updated.

9.2.176 subject_area
Alias : media
Size : 30
Nb of Decimals : 0
Null Value :
Data Type : char
Object Name : sample

Comment :
the place the sample was taken from - usually a HEIS subject area or source. For TCD this could be
waste tank
tank core
tank core segment
tank supernate sample
grout core segment
grout liquid sample

If blank then it probably means that one would never need to know source information given all the other sample information. The only time that inference is reasonable is when the sample is derived from another sample that does have its source identified.

9.2.177 sulfur_cleanup
Alias : sulfur_cleanup_flag
Size : 1
Nb of Decimals : 0
Null Value : X
Data Type : char
Object Name : analysis

Comment :
Indicates whether or not the sulfur cleanup procedure was performed prior to this analysis. Set to "Y" if so, else blank.

9.2.178 supernatant_liquid_volume
Alias : supernate liquid volume
Size : 4
Nb of Decimals : 0
Null Value : X
Data Type : number
Object Name : waste_tank_status

Comment :
the supernatant liquid volume of waste in the tank in thousands of gallons (kgal)

9.2.179 tank_capacity
Alias :
Size : 4
Nb of Decimals : 0
Null Value : X
Data Type : number
Object Name : waste_tank

Comment :
the capacity of the tank in thousands of gallons (kgal).

9.2.180 tank_comment
Alias : waste tank comment
Size : 240
Nb of Decimals : 0
Null Value : X
Data Type : char
Object Name : waste_tank

Comment :
Comment about the tank.

9.2.181 tank_core_id
Alias : core number id
Size : 2
Nb of Decimals : 0
Null Value :
Data Type : number
Object Name : tank_core

Comment :
Identifies the specific core collected from a tank. Ascending number starting at one for the first core from each tank.

must be unique when combined with tank id and tank farm id.

9.2.182 tank_core_segment_comment
Alias : core segment comment
Size : 240
Nb of Decimals : 0
Null Value : X
Data Type : char
Object Name : tank_core_segment

Comment :
Comments about the tank core segment.

9.2.183 tank_core_serial_num
Alias : core serial number id
Size : 4
Nb of Decimals : 0
Null Value : X
Data Type : number
Object Name : tank_core

Comment :
log number of the core from which the sample was obtained. ascending number beginning with the very first core obtained as part of the SST waste characterization project (SRS).

9.2.184 tank_diameter
Alias :
Size : 5
Nb of Decimals : 0
Null Value : X
Data Type : number
Object Name : waste_tank

Comment :
tank diameter in feet

9.2.185 tank_elevation
Alias : tank bottom elevation from sea level
Size : 22
Nb of Decimals : 0
Null Value : X
Data Type : number
Object Name : waste_tank

Comment :
elevation of bottom of tank from mean sea level in feet.

9.2.186 tank_farm_comment
Alias : tank farm comment
Size : 240
Nb of Decimals : 0
Null Value : X
Data Type : char
Object Name : tank_farm

Comment :
Comment about the tank farm.

9.2.187 tank_farm_desc
Alias : tank farm description
Size : 240
Nb of Decimals : 0
Null Value : X
Data Type : char
Object Name : tank_farm

Comment :
a description of the tank farm.

9.2.188 tank_farm_id
Alias : tank farm
Size : 3
Nb of Decimals : 0
Null Value :
Data Type : char
Object Name : tank_farm

Comment :
Hanford tank farm id

A, AN, AP, AQ, AW, AX, AY, AZ, B, BX, BY, C, S, SX, SY, TY, TX, TY, U
implies tank farm, 241-xx, xx being one of the above codes.

E16 implies grout waste vault 218-E-16

tanks are then like 241-AQ-101 and
vaults are like 218-E-16-102

9.2.189 tank_farm_name
Alias : tank farm name
Size : 30
Nb of Decimals : 0
Null Value : X
Data Type : char
Object Name : tank_farm

Comment :
a name given to the tank farm.

9.2.190 tank_id
Alias : tank id
Size : 3
Nb of Decimals : 0
Null Value :
Data Type : number
Object Name : waste_tank

Comment :
A Hanford Waste Tank - Grout Vaults are handled separately.

This entity is meant to represent the cylindrical Hanford waste tanks, both single shell and double shell. These tanks were considered for the purposes of characterization as defined in the Software Requirements Specification (SRS).

As such, they are considered to have risers that either liquid supernate samples are taken from, or solid core samples are taken from. If other characterization samples are taken from the tanks in some other way the database is not designed to handle them.

9.2.191 tank_integrity
Alias :
Size : 1
Nb of Decimals : 0
Null Value : X
Data Type : char
Object Name : waste_tank_status

Comment :
a code to describe the integrity of the tank:
Assumed Leaker
Confirmed Leaker
Sound

9.2.192 tank_removed_from_service_date
Alias :
Size : 0
Nb of Decimals : 0
Null Value : X
Data Type : date
Object Name : waste_tank_status

Comment :
the month, day, and year date the tank was removed from service.

9.2.193 tank_riser
Alias : tank riser number id
Size : 2
Nb of Decimals : 0
Null Value : X
Data Type : number
Object Name : tank_core

Comment :
The riser on a waste tank that provided access for collecting the sample(s).

9.2.194 tank_riser
Alias : tank supernate riser number
Size : 2
Nb of Decimals : 0
Null Value : X
Data Type : number
Object Name : tank_supernate_sample

Comment :
The riser on the waste tank that provided access for collecting the sample(s).

9.2.195 tank_segment_id
Alias : segment number id
Size : 2
Nb of Decimals : 0
Null Value :
Data Type : number
Object Name : tank_core_segment

Comment :
an ascending number beginning with one for the first segment obtained in each tank core. A higher segment number implies greater depth of sample.

9.2.196 tank_segment_level
Alias : segment level
Size : 0
Nb of Decimals : 0
Null Value : X
Data Type : number
Object Name : tank_core_segment

Comment :
the elevation within the tank measured from the bottom representing the center of the segment in inches.

9.2.197 tank_segment_serial_num
Alias : tank core segment serial number id
Size : 7
Nb of Decimals : 0
Null Value : X
Data Type : char
Object Name : tank_core_segment

Comment :
log number of the tank core from which the sample was obtained. the first number identifies the year followed by a dash followed by an ascending number beginning with the very first segment obtained in any given year.

9.2.198 tank_slurry_volume
Alias : tank slurry volume (DST)
Size : 4
Nb of Decimals : 0
Null Value : X
Data Type : number
Object Name : waste_tank_status

Comment :
the amount of slurry in a double shell tank in thousands of gallons (kgal)

9.2.199 tank_specific_gravity
Alias :
Size : 0
Nb of Decimals : 0
Null Value : X
Data Type : number
Object Name : waste_tank_status

Comment :
a specific gravity measurement made at the tank - not on a sample

9.2.200 tank_stabilization_date
Alias :
Size : 0
Nb of Decimals : 0
Null Value : X
Data Type : date
Object Name : waste_tank_status

Comment :
the month, day, and year date the tank was stabilized.

9.2.201 tank_stabilization_status
Alias :
Size : 7
Nb of Decimals : 0
Null Value : X
Data Type : char
Object Name : waste_tank_status

Comment :
7 character code describint the status of the tank.

9.2.202 tank_supernate_comment
Alias : tank supernate sample comment
Size : 240
Nb of Decimals : 0
Null Value : X
Data Type : char
Object Name : tank_supernate_sample

Comment :
Comments about the tank supernate sample.

9.2.203 tank_supernate_level
Alias : tank supernate sample level
Size : 3
Nb of Decimals : 0
Null Value : X
Data Type : number
Object Name : tank_supernate_sample

Comment :
The level, measured in inches above the bottom of the tank, from which the sample was taken.

9.2.204 tank_type
Alias :
Size : 20
Nb of Decimals : 0
Null Value : X
Data Type : char
Object Name : waste_tank

Comment :
tank type:
single shell
or
double shell

9.2.205 total_jet_pumped_liquid
Alias :
Size : 3
Nb of Decimals : 0
Null Value : X
Data Type : number
Object Name : waste_tank_status

Comment :
the amount of liquid jet pumped from the tank in thousands of gallons (kgal)

9.2.206 total_waste_volume
Alias :
Size : 4
Nb of Decimals : 0
Null Value : X
Data Type : number
Object Name : waste_tank_status

Comment :
the total volume of waste in the tank in thousands of gallons (kgal).

9.2.207 transfer_date
Alias :
Size : 0
Nb of Decimals : 0
Null Value : X
Data Type : date/time
Object Name : tank_transfer

Comment :
the date and time the transfer took place.

9.2.208 transfer_number
Alias : tank transfer number
Size : 6
Nb of Decimals : 0
Null Value :
Data Type : number
Object Name : tank_transfer

Comment :
number assigned by the waste generator? to identify the transfer batch being sent to the DSTs.

9.2.209 transfer_source
Alias :
Size : 6
Nb of Decimals : 0
Null Value :
Data Type : char
Object Name : tank_transfer

Comment :
the origin of the waste transferred to the DSTs.

9.2.210 transfer_volume
Alias :
Size : 5
Nb of Decimals : 0
Null Value :
Data Type : number
Object Name : tank_transfer

Comment :
the volume of waste transferred from a generator to a DST in gallons.

9.2.211 uncertainty_units
Alias : analysis result change uncertainty units
Size : 10
Nb of Decimals : 0
Null Value : X
Data Type : char
Object Name : analysis_result_change

Comment :
copy of the original uncertainty engineering units

9.2.212 uncertainty_units
Alias : analysis result uncertainty units
Size : 10
Nb of Decimals : 0
Null Value : X
Data Type : char
Object Name : analysis_result

Comment :
the engineering units of the uncertainty value.

As agreed upon with the client this is a must fill field because if not it often does not get entered and the uncertainity value is in eality useless without units.

Examples are % standard error
standard deviation
variance
95% confidence interval upper limit

9.2.213 uncertainty_value
Alias : analysis result uncertainty value
Size : 0
Nb of Decimals : 0
Null Value : X
Data Type : number
Object Name : analysis_result

Comment :
the primary measure of uncertainty the owner wants to associate with the value. Other measures of uncertainty associated with the analysis result value can be added as separate records where the uncertainty is stored in value and value type is set appropriately.

9.2.214 uncertainty_value
Alias : analysis result chage uncertainty value
Size : 0
Nb of Decimals : 0
Null Value : X
Data Type : number
Object Name : analysis_result_change

Comment :
original uncertainty value

9.2.215 under_review_flag
Alias : sample under review flag
Size : 1
Nb of Decimals : 0
Null Value : X
Data Type : char
Object Name : sample

Comment :
HEIS: Set to "Y" if this data record is currently or was ever under review.

9.2.216 under_review_flag
Alias : analysis result under review flag
Size : 1
Nb of Decimals : 0
Null Value : X
Data Type : char
Object Name : analysis_result

Comment :
HEIS: set to "Y" if this data record is currently or was ever under review.

9.2.217 under_review_flag
Alias : analysis result change under review flag
Size : 1
Nb of Decimals : 0
Null Value : X
Data Type : char
Object Name : analysis_result_change

Comment :
copy of original analysis result under review flag

9.2.218 units
Alias : tank inventory units
Size : 30
Nb of Decimals : 0
Null Value :
Data Type : char
Object Name : tank_inventory

Comment :
the engineering units associated with the quantity, constituent and tank.

9.2.219 units
Alias : waste_transfer_analyte_units
Size : 30
Nb of Decimals : 0
Null Value :
Data Type : char
Object Name : waste_transfer_analyte

Comment :
the engineering units for quantity.

9.2.220 value_rptd
Alias : result change value
Size : 0
Nb of Decimals : 0
Null Value :
Data Type : number
Object Name : analysis_result_change

Comment :
copy of original analysis result value

9.2.221 value_rptd
Alias : analysis result value
Size : 0
Nb of Decimals : 0
Null Value :
Data Type : number
Object Name : analysis_result

Comment :
HEIS: The result associated with the analysis for this constituent.

9.2.222 value_type
Alias : analysis result change value type
Size : 20
Nb of Decimals : 0
Null Value :
Data Type : char
Object Name : analysis_result_change

Comment :
copy of original analysis result value type

9.2.223 value_type
Alias : analysis result value type
Size : 20
Nb of Decimals : 0
Null Value :
Data Type : char
Object Name : analysis_result

Comment :
Indication of what the numeric value in the "Value Reported" field represents. Examples are:

primary result - what we started out to do
duplicate - a duplicate of something (lab, field, ...)
split - ?
solids fraction
liquids fraction
method blank
hot cell blank
field blank
transportation blank
matrix spike (recovery?)
surrogate spike (recovery?)
mean
average
mode
median
not measured
less than
less than or equal to

9.2.224 value_units
Alias : analysis result change value units
Size : 10
Nb of Decimals : 0
Null Value :
Data Type : char
Object Name : analysis_result_change

Comment :
copy of original analysis result value units

9.2.225 value_units
Alias : analysis result units
Size : 10
Nb of Decimals : 0
Null Value :
Data Type : char
Object Name : analysis_result

Comment :
the units (engineering units) that apply to the value reported.

As agreed upon with the client this is a must fill field because if not it often does not get entered and the value is in reality useless without units.

9.2.226 vault_capacity
Alias : grout vault capacity
Size : 0
Nb of Decimals : 0
Null Value : X
Data Type : number
Object Name : grout_vault

Comment :
grout vault capacity thousands of gallons

9.2.227 vault_comment
Alias : grout vault comment
Size : 240
Nb of Decimals : 0
Null Value : X
Data Type : char
Object Name : grout_vault

Comment :
Comment to be associated with grout vault.

9.2.228 vault_elevation
Alias : grout vault elevation
Size : 0
Nb of Decimals : 0
Null Value : X
Data Type : number
Object Name : grout_vault

Comment :
elevation of bottom of vault in feet above sea level.

9.2.229 vault_id
Alias :
Size : 3
Nb of Decimals : 0
Null Value :
Data Type : number
Object Name : grout_vault

Comment :
The vault identifier for this grout vault. Uses same nomenclature as tank numbers in that vaults have numbers and belong to tank farms.

9.2.230 vault_layer_quantity
Alias : quantity of grout vault layer
Size : 0
Nb of Decimals : 0
Null Value :
Data Type : number
Object Name : grout_vault_layer

Comment :
amount of material in grout vault layer

9.2.231 vault_layer_units
Alias : grout layer quantity units
Size : 10
Nb of Decimals : 0
Null Value :
Data Type : char
Object Name : grout_vault_layer

Comment :
engineering units for quantity of material in grout vault layer

9.2.232 vault_riser
Alias : grout vault riser id
Size : 2
Nb of Decimals : 0
Null Value : X
Data Type : number
Object Name : grout_vault_core

Comment :
The riser on the grout value that provided access for collecting the sample(s).

9.2.233 vault_type
Alias : grout vault type
Size : 20
Nb of Decimals : 0
Null Value : X
Data Type : char
Object Name : grout_vault

Comment :
an indication of the type of vault - similar to tank type

9.2.234 waste_material
Alias :
Size : 6
Nb of Decimals : 0
Null Value : X
Data Type : char
Object Name : waste_tank_status

Comment :
a code to describe the waste present in the tank.

9.2.235 waste_tank_status_comment
Alias : waste tank status comment
Size : 240
Nb of Decimals : 0
Null Value : X
Data Type : char
Object Name : waste_tank_status

Comment :
Comment that pertain to the current record of waste tank status values

9.2.236 waste_tank_status_date
Alias :
Size : 0
Nb of Decimals : 0
Null Value :
Data Type : date/time
Object Name : waste_tank_status

Comment :
date and time that the status information was taken or is supposed to be accurate for. Since this data can vary over time it is important to know what time the data was applicable.

9.2.237 waste_tank_temperature
Alias : waste tank temperature
Size : 0
Nb of Decimals : 0
Null Value : X
Data Type : number
Object Name : waste_tank_status

Comment :
temperature as reported in monthly waste tank surveilance report.

10 References

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11 Index

(Back cover)

5.5

Date Received: 6/10/92 NS	**INFORMATION RELEASE REQUEST**	Reference: WHC-CM-3-4

Complete for all Types of Release

Purpose

- [ ] Speech or Presentation
  - [ ] Full Paper
  - [ ] Summary
  - [ ] Abstract
  - [ ] Visual Aid
  - (Check only one suffix)
- [ ] Speakers Bureau
- [ ] Poster Session
- [ ] Videotape
- [ ] Reference
- [ ] Technical Report
- [ ] Thesis or Dissertation
- [ ] Manual
- [ ] Brochure/Flier
- [X] Software/Database
- [ ] Controlled Document
- [ ] Other

ID Number (include revision, volume, etc.) WHC-SD-WM-CSDD-006 Rev 0

List attachments. PNL-8056

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Impact Level: 3Q

New or novel (patentable) subject matter? [X] No [ ] Yes
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