

# HGA Environmental Data Model

## Legend:

- Description
- Geologic Description
- Well Construction
- Soil Testing
- Soil Sampling
- Monitoring Event
- Mining / Exploration
- Geophysics
- Well History

| vane_shear_test |   | spt                |   |
|-----------------|---|--------------------|---|
| PK,FK1<br>PK    | Station<br>depth  | PK,FK1<br>PK<br>PK | Station<br>from_<br>to_   |
|                 | vane_size<br>initial_torque<br>initial_shear_strength<br>remolded_torque<br>remolded_shear_strength |                    | spt_1st_counter<br>spt_2nd_counter<br>spt_3rd_counter<br>spt_4th_counter<br>n_value<br>recovery |

| aquifer_test |   | filters      |   |
|--------------|---|--------------|---|
| PK,FK1<br>PK | Station<br>test_id  | PK,FK1<br>PK | Station<br>depth  |
|              | test_type<br>date_<br>tester<br>reason<br>analyzed_by<br>analysis_method<br>comment<br>radius |              | treatment_start<br>treatment_end<br>type_of_treatment<br>pumping_rate_improvement |

| Station |   |
|---------|---|
| PK      | ID  |
|         | Type<br>Name<br>X<br>Y<br>Zone<br>TAG<br>Elevation<br>TOC<br>Depth<br>Export<br>str_type<br>geo_point |

| neutron_porosity |                  | short_normal |                  | lat_shallow_res |                  | x_caliper    |                  |
|------------------|------------------|--------------|------------------|-----------------|------------------|--------------|------------------|
| PK,FK1<br>PK     | Station<br>depth | PK,FK1<br>PK | Station<br>depth | PK,FK1<br>PK    | Station<br>depth | PK,FK1<br>PK | Station<br>depth |
|                  | value            |              | value            |                 | value            |              | value            |

| fluid_resistivity |                  |
|-------------------|------------------|
| PK,FK1<br>PK      | Station<br>depth |
|                   | value            |

| alteration         |   | mineralization     |  |
|--------------------|---|--------------------|--|
| PK,FK1<br>PK<br>PK | Station<br>from_<br>to_                     | PK,FK1<br>PK<br>PK | Station<br>from_<br>to_                      |
|                    | intensity<br>occurrence<br>type_<br>comment |                    | percentage<br>occurrence<br>type_<br>comment |

| pump               |   | pumping_rate       |                                   | toc                |                                       |
|--------------------|---|--------------------|-----------------------------------|--------------------|---------------------------------------|
| PK,FK1<br>PK<br>PK | Station<br>from_<br>to_   | PK,FK1<br>PK<br>PK | Station<br>start_date<br>end_date | PK,FK1<br>PK<br>PK | Station<br>period_start<br>period_end |
|                    | operation_start<br>operation_end<br>pump_type<br>pump_model<br>powered_by<br>amps |                    | id<br>rate<br>comment             |                    | casing_height<br>elevation<br>comment |

| rock_coring        |  | soil_vapor         |                                 | soil_sample  |   |
|--------------------|--|--------------------|---------------------------------|--------------|---|
| PK,FK1<br>PK<br>PK | Station<br>from_<br>to_                          | PK,FK1<br>PK<br>PK | Station<br>from_<br>to_         | PK,FK1<br>PK | Station<br>sample_id  |
|                    | core_recovery<br>core_run<br>rqd<br>water_return |                    | result_value<br>analysis_method |              | sample_name<br>start_depth<br>end_depth<br>sample_date<br>sample_time<br>chain_cust<br>collection_quarter<br>comment<br>composite<br>composite_desc<br>laboratory<br>delivery_method<br>parent<br>date_sent<br>date_received<br>samp_matrix<br>samp_reason<br>samp_technique<br>sample_class<br>sample_type<br>sampler_name<br>source |

| features     |                                    | lithology          |   | hydrogeology       |  | modeling           |   |
|--------------|------------------------------------|--------------------|---|--------------------|--|--------------------|---|
| PK,FK1<br>PK | Station<br>depth                   | PK,FK1<br>PK<br>PK | Station<br>from_<br>to_   | PK,FK1<br>PK<br>PK | Station<br>from_<br>to_  | PK,FK1<br>PK<br>PK | Station<br>from_<br>to_   |
|              | feature<br>comment<br>description_ |                    | soil_type<br>form_desc<br>consistency<br>structure<br>matgsc<br>colour<br>odor<br>formation_name<br>formation_unit<br>moisture<br>comment |                    | description_<br>formation_name<br>transmissivity<br>specific_storage<br>kx<br>ky<br>kz<br>porosity<br>efficiency<br>saturated_thickness<br>storage_coefficient |                    | layer_name<br>transmissivity_<br>transmissivity<br>specific_storage<br>kx<br>ky<br>kz<br>porosity |

| diver_data   |  | parameter_result           |   |
|--------------|--|----------------------------|---|
| PK,FK1<br>PK | Station<br>date  | PK,FK1,FK2<br>PK,FK1<br>PK | Station<br>sample_id<br>chemical_name   |
|              | screen_id<br>ph<br>conductivity<br>temperature<br>do_<br>comments<br>water_level |                            | result_value<br>result_unit<br>reporting_detection_limit<br>sampling_precision<br>fraction_code<br>analysis_method<br>qualifier<br>outlier<br>comment<br>analysis_date<br>dilution_factor |

| parameter_sample |  |
|------------------|--|
| PK,FK1<br>PK     | Station<br>sample_id   |
|                  | lab_id<br>quality_code<br>sample_date<br>sample_time<br>chain_cust<br>collection_quarter<br>comment<br>composite<br>composite_desc<br>laboratory<br>delivery_method<br>parent<br>date_sent<br>date_received<br>samp_matrix<br>samp_reason<br>samp_technique<br>sample_class<br>sample_type<br>sampler_name<br>static_wl<br>purge_method<br>purge_volume<br>purge_wl<br>watertype<br>batch_id |

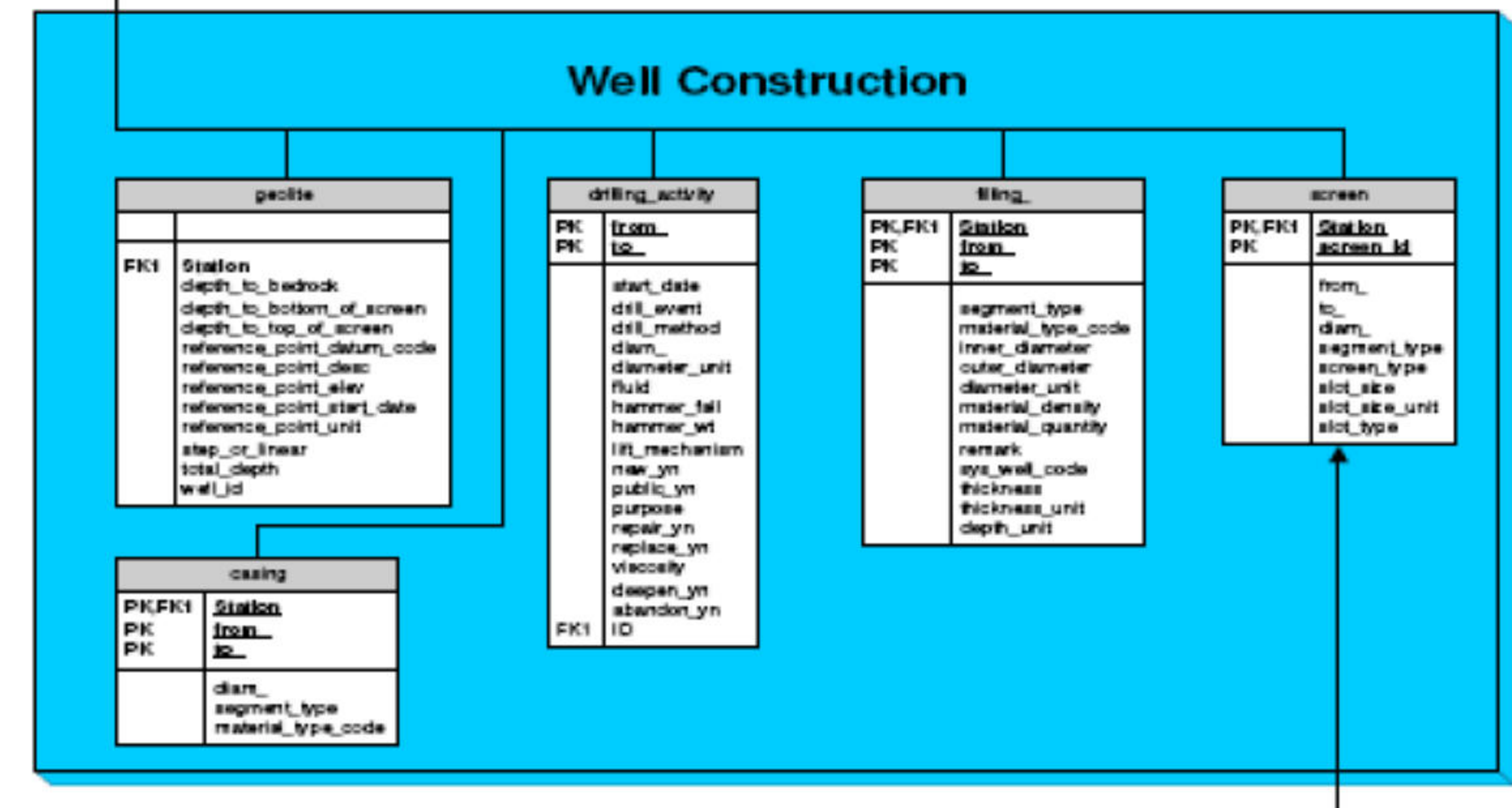
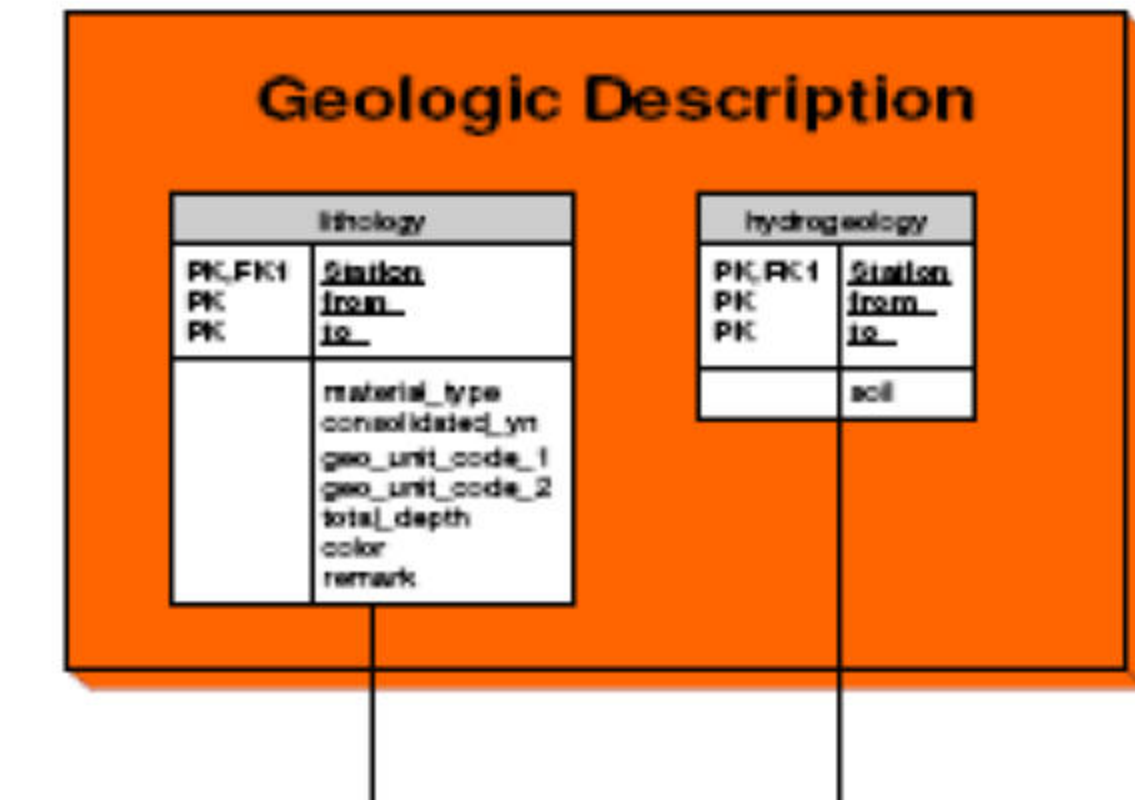
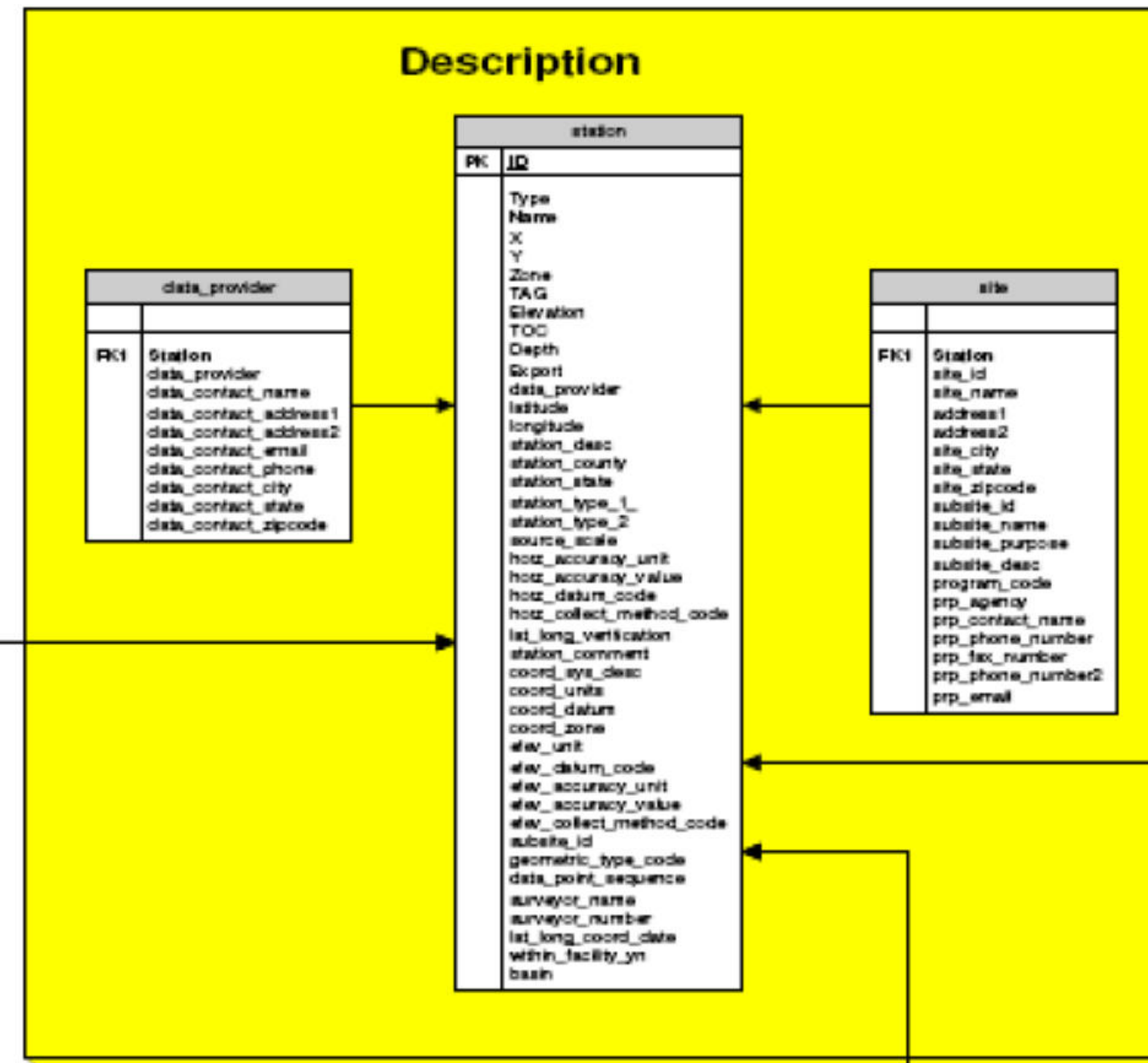
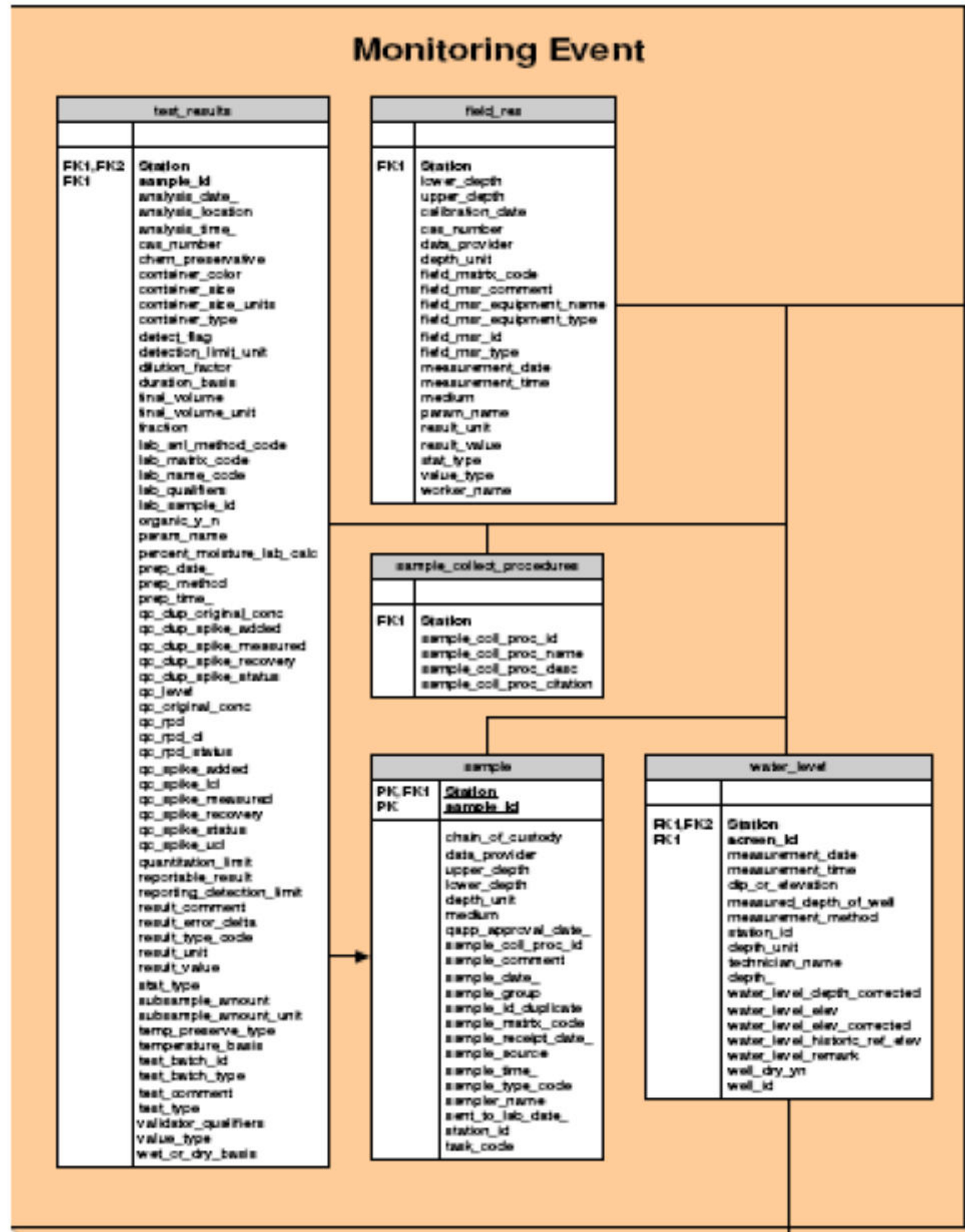
| odometer_consolidation |  | atterberg          |  | moisture_content   |                         | grain_size_samples |   |
|------------------------|--|--------------------|--|--------------------|-------------------------|--------------------|---|
| PK,FK1<br>PK<br>PK     | Station<br>from_<br>to_                  | PK,FK1<br>PK<br>PK | Station<br>from_<br>to_                                      | PK,FK1<br>PK<br>PK | Station<br>from_<br>to_ | PK,FK1<br>PK<br>PK | Station<br>from_<br>to_   |
|                        | compression_index<br>recompression_index |                    | liquid_limit<br>plastic_limit<br>organic<br>plasticity_index |                    | value                   |                    | description_<br>total_weight<br>aquifer_temperature<br>roughness<br>kinematic_viscosity<br>characteristic_grainsize<br>uniformity_coefficient |

| abandonment  |                                | drilling_protocol  |  | annular_fill       |   | casing             |  | monitoring         |   | screen       |   |
|--------------|--------------------------------|--------------------|--|--------------------|---|--------------------|--|--------------------|---|--------------|---|
| PK,FK1<br>PK | Station<br>date                | PK,FK1<br>PK<br>PK | Station<br>from_<br>to_                            | PK,FK1<br>PK<br>PK | Station<br>from_<br>to_                 | PK,FK1<br>PK<br>PK | Station<br>casing_id<br>from_<br>to_   | PK,FK1<br>PK<br>PK | Station<br>from_<br>to_                                     | PK,FK1<br>PK | Station<br>screen_id                                |
|              | reason<br>abandonment_material |                    | diam_<br>drilling_method<br>inclination<br>azimuth |                    | filling_type<br>filling_volume<br>descr |                    | parent_id<br>diam_<br>material<br>slot_number<br>construction_type<br>change_explanation |                    | interval_type<br>interval_name<br>geologic_layer<br>comment |              | from_<br>to_<br>diam_<br>screen_type<br>slot_number |

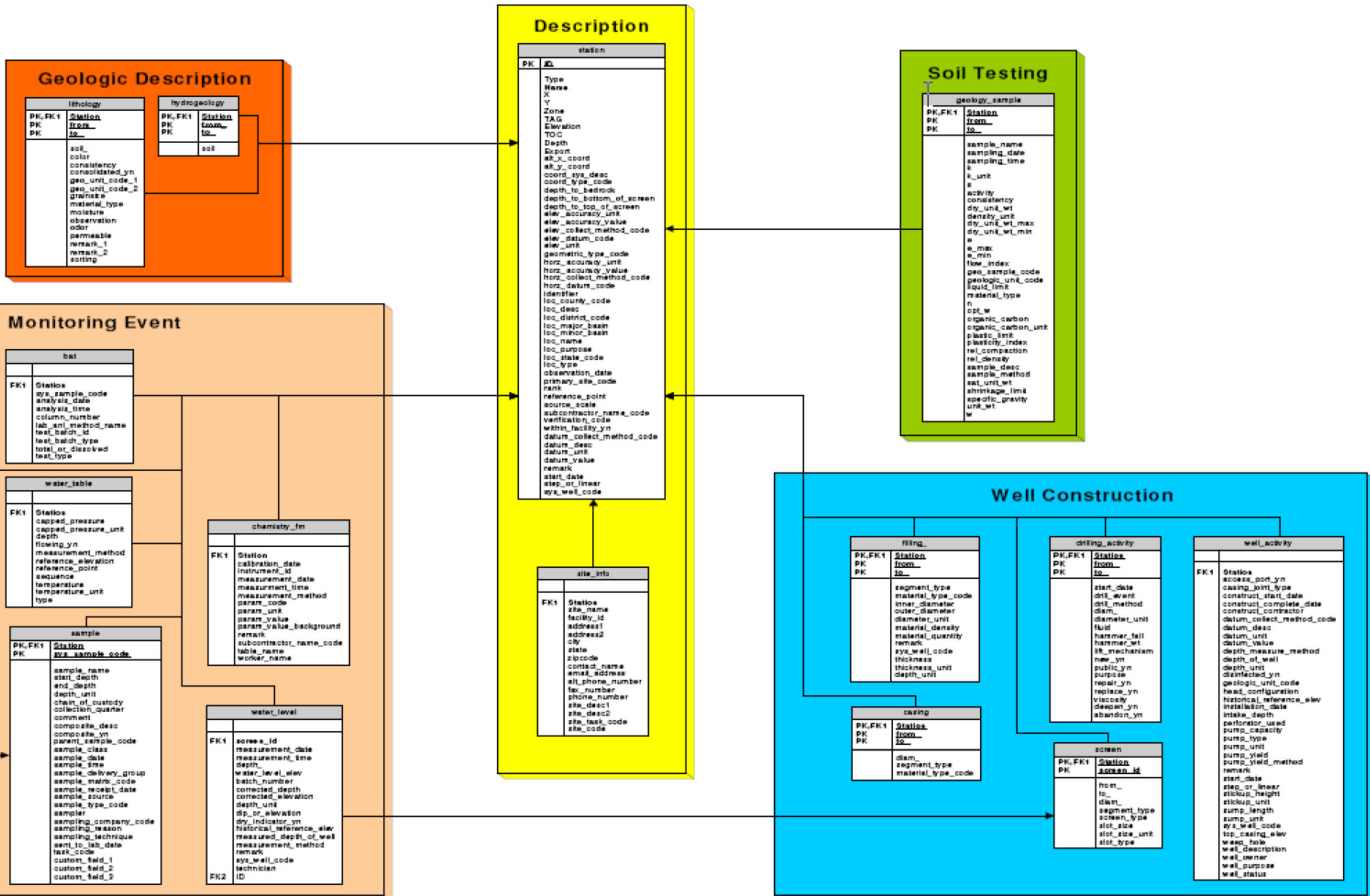
| divers       |  | field_measurements |   | meteorology  |  |
|--------------|--|--------------------|---|--------------|--|
| PK,FK1<br>PK | Station<br>serial_number   | PK,FK1<br>PK       | Station<br>fm_date  | PK,FK1<br>PK | Station<br>date  |
|              | screen_id<br>diver_name<br>diver_type<br>date_installed<br>date_removed<br>comment |                    | total_organic_carbon<br>dissolved_oxygen<br>ph<br>eh<br>conductivity<br>temperature<br>colour<br>total_dissolved_solids<br>measurement_method<br>fm_comment |              | air_temperature<br>air_humidity<br>air_pressure<br>wind_direction<br>wind_speed<br>solar_radiation<br>total_precipitation<br>comment |

**Note:**  
ALL tables are related to the Station table, but to simplify this diagram only additional relationships are shown with arrows.

# HGA US EPA Region 2 Data Model



# HGA US EPA Region 5 Data Model



# HGA MOE-WWIS Data Model

