Nevada Division of Environmental Protection

Why did the Nevada Brownfields Program develop a QA Program Plan?

- **Programs and projects receiving funding from EPA as extramural agreements are subject to EPA quality requirements**
- **Authorizing regulations for these requirements include 40 CFR Part 31 "Uniform Administrative Requirements for Grants and Cooperative Agreements to State and Local Governments" and Part 35, "State and Local Assistance"**

Why should I write a QA Project Plan?

- **Non-EPA organizations that receive EPA funds need to satisfy those requirements defined in the CFR**
- **Proper planning provides the framework for a successful project**

What is a QA Project Plan?

- **A document that describes the <u>technical</u> and <u>quality</u> activities that should be implemented to ensure that the results of the work performed will satisfy the data user's needs**

What is a QA Project Plan? (cont')

- A document that provides:
  - A clear definition of the problem
  - A description of the type and amount of data needed to address the stated problem
  - A list of decision rules (constructed as "if-then statements") describing actions to take, based upon the data
  - QA/QC requirements to ensure that the right quantity and quality are collected

EPA Region 9 Template: QA Project Plan

1.0 Introduction
2.0 Background
3.0 Project DQOs (using EPA's 7-step DQO process)
4.0 Sampling Rationale
5.0 Request for Analyses
6.0 Field Methods and Procedures
7.0 Sample Containers, Preservation, and Storage
8.0 Disposal (IDW)
9.0 Sample Documentation and Shipment
10.0 Quality Control
11.0 Field Variances
12.0 Field Health and Safety Procedures

Project Planning

- **Recommend that the basic principles of the EPA's process for data quality objectives (DQOs)* be followed**
- **The amount of detail will vary with the size and scope of the project**

* http://www.epa.gov/quality/qs-docs/g4-final.pdf

The DQO Process

- **The DQO process is a systematic planning process for controlling decision errors**
- **The DQO process results in a plan to collect the appropriate quantity, quality, and type of data to support defensible decision-making**

The 7 Steps of the DQO Process

Step 1 – State the Problem

Step 2 – Identify the Decision(s) to be Made

Step 3 – Identify Data Inputs Needed

Step 4 – Define Study Boundaries

Step 5 – Develop Decision

Step 6 – Specify Limits on Decision Errors

Step 7 – Optimize Design for Collecting

Table D1. Example of a Summary DQO Table for a Statistically Based Study.

STEP 1	STEP 2	STEP 3	STEP 4	STEP 5	STEP 6	STEP 7
State the Problem	**Identify the Decisions**	**Identify the Inputs to the Decisions**	**Define Study Boundaries**	**Develop Decision Rules**	**Specify Tolerable Limits on Errors**	**Optimize Sampling Design**
Areas of radioactively contaminated soils have been identified and removed from the site; however, existing data for radionuclides and radiogenic indicator parameters (gross alpha and gross beta) in samples of sitewide groundwater and soils collected at the site do not provide sufficient coverage to make defensible remedial decisions for groundwater. Data are also very limited for local background activities of specific radioisotopes. Isotope-specific data are needed to evaluate whether there is site-related radioactive contamination in groundwater at the site, and if so, to delineate the extent of the contamination.	(1) Do the levels of radionuclide species in groundwater from the site exceed regulatory limits? (2) Do the activities of radionuclide species in groundwater from background areas (including seawater) exceed regulatory limits? (3) Has groundwater in areas of radioactively contaminated soils been affected by leaching of site-related radionuclides from soils and into shallow groundwater, such that activities are significantly above background levels? (4) Are high activities of gross beta reported in the existing data set the result of naturally occurring potassium-40 derived from seawater (K-40 mean = 300 pCi/L) or are the beta activities the result of site-related radionuclides?	* New and existing analytical data (validated and defensible) for specific radionuclides in samples of shallow groundwater collected from site and background areas within and outside of the site, including seawater. * Historical documentation and personnel knowledge regarding the handling, treatment, and storage of radioactive materials at the site. * Supporting data for groundwater samples including TSS, TDS, pH, and conductivity. * Background data reported in the literature for radionuclides and radiological indicators. * Hydrogeologic information including water level, gradient, seasonal fluctuations, and flow directions. * Information on well construction, depth of screened intervals, and well production volumes. * PRGs or other regulatory screening levels for radionuclides. * Knowledge of the geochemical behavior of various radioactive elements.	The lateral boundary of the study area includes wells throughout the site and off-site areas for additional background samples. The vertical boundary of the study extends from 0 feet bgs and into shallow groundwater. The temporal boundary of the study is constrained by the period of performance, which is estimated to be 12 months.	(1a) If levels of radionuclides in site samples exceed regulatory limits, then site data will be compared with background data. (1b) If levels of radionuclides do not exceed regulatory limits, then the groundwater will not be further evaluated or remediated. (2a) If background radioactivity exceeds regulatory limits, realistic cleanup goals for radioactivity at the site will be established, such that the cleanup levels are not below background. (2b) If background radioactivity does not exceed regulatory limits, then regulatory limits or a site-specific cleanup level will be used at the site. (3a) If analytical data show statistically significant differences in the activities of radionuclides in site and background waters, then site groundwater in the area will be further evaluated and remedial action may be recommended. (3b) If analytical data show statistically indistinguishable activities of radionuclides in site and background waters, then site groundwater in the area will be considered not contaminated and remediation will not be recommended. (4a) If gross beta activity correlates strongly with naturally occurring activities of K-40 in seawater, then gross beta will not be used as an indicator for site-related effects. (4b) If gross beta activity shows no correlation with naturally occurring activities of K-40, then gross beta may be used as an indicator for site-related effects.	Measurement quality objectives (MQOs) will be established for sample analyses, and the analytical data will undergo QA/QC review to ensure that MQOs are met. Appropriate parametric or nonparametric one-sample or two-samples tests will be used to compare radionuclide activities to cleanup levels or to a background population, with a 95 percent level of confidence. In other words, a one-sample test will be used to test the null hypothesis that the site data do not exceed regulatory limits and a two-sample test will be used to compare site and background data sets. The null hypotheses state that (1) the data do not exceed the regulatory level (one-sample test) or that (2) there is no difference between site and background data sets (two-sample tests).	Groundwater sampling is limited to existing wells (at this point, no new wells will be installed for the data gap sampling). Two rounds of sampling will be collected from 37 existing monitoring wells. Five of the 37 are background wells and the remaining 32 wells include those near areas where radioactively contaminated soils have been identified, in areas downgradient of buildings where radioactive materials were handled or stored, and in other areas to provide adequate spatial coverage across the site. In addition, samples of seawater and potable water will be collected and analyzed.

Table D2. Example of a Summary DQO Table for a Non-Statistically Based Study.

STEP 1	STEP 2	STEP 3	STEP 4	STEP 5	STEP 6	STEP 7
•State the Problem	**Identify the Decisions**	**Identify the Inputs to the Decisions**	**Define Study Boundaries**	**•Develop Decision Rules**	**Specify Tolerable Limits on Errors**	**Optimize Sampling Design**
Five geophysical anomalies thought to be buried metallic objects were noted at the site during an airborne geophysical survey in 1994. These anomalies are immediately upgradient of a VOC plume in groundwater and may indicate the presence of buried drums or tanks that are the source of VOCs in downgradient groundwater. A ground-based geophysical survey and soil gas sampling are needed to evaluate the geophysical anomalies as the potential source of VOC contaminants in groundwater. Additionally, excavation and soil sampling may be needed to further characterize and delineate the extent of contamination.	1) Can the locations and signatures of the geophysical anomalies be determined with certainty, using the ground-based EM-31 and magnetometer surveys? 2) Does soil gas in the area of the anomalies contain elevated levels of VOCs? 3) Are subsurface soils around the buried objects contaminated with VOCs? That is, do these soils contain significant amounts of VOCs?	Historical analytical data for contaminants at each site. Validated defensible chemical data for soil samples collected at each site. Land survey and GPS location data. Toxicological and risk management data, in the form of site-specific action levels.	The proposed lateral boundaries of each site are shown in Figures X, Y, and Z. Lateral boundaries may be extended based on step-out sampling. The vertical boundaries extend from the land surface to the water table The temporal boundary of the study is anticipated to be 18 months.	1a) If the locations and signatures of the geophysical anomalies can be determined with certainty, using the ground-based EM-31 and magnetometer surveys, then plot exact locations of anomalies on contoured maps of the site and use these to direct future sampling. 1b) If the locations and signatures of the geophysical anomalies cannot be determined with certainty, using the ground-based EM-31 and magnetometer surveys, then conduct exploratory excavations to locate anomalies. 2a) If samples of soil gas contain elevated concentrations of VOCs near the anomalies, then collect subsurface soil samples for analysis and pursue investigation of anomalies as the sources of VOC contamination. 2b) If samples of soil gas do not contain elevated concentrations of VOCs near the anomalies, then pursue investigation of other possible sources. 3a) If subsurface soils around the buried objects contain significant amounts of VOCs, then these soils, along with any potential source (e.g., leaking drum), will be excavated and disposed of at an appropriate disposal facility. Additional step-out samples will be collected to delineate the lateral and vertical extent of the contamination. 3b) If subsurface soils do not contain significant amounts of VOCs, then the study will pursue investigation of other possible sources for the VOC plume in downgradient groundwater.	The number of samples to be collected is not statistically based and will depend on the number of step-out samples needed to delineate the areal extent of contamination. The location and number of samples collected will be based on professional judgment. MQOs established for analytical data are described in the SAP.	The number and type of samples to be collected at the site will be based on professional judgment using the results from the previous survey/ sampling activity conducted during this project. The number and type of samples will also consider budget and schedule constraints for this project.

NDEP website links for the Nevada Brownfields Program (NBP)

- http://ndep.nv.gov/bca/brownfld.htm
- http://ndep.nv.gov/bca/brownfield_state-grant.htm
- http://ndep.nv.gov/bca/brownfiled_qa07.htm

  (yep, there's a typo here, but until our webmaster fixes it, this is the link!)

EPA Region 9 Quality Assurance

- http://www.epa.gov/region9/qa/index.html
- http://www.epa.gov/region9/qa/pdfs/sap_ot6_pvt_v2.pdf