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Source/Driver: (Name & Number from ISP, IAG milestone, Mgmt. Action, Corres. Control, etc.)	Closure #: (Outgoing Correspondence Control #, if applicable)	Due Date
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Document Subject:

TRANSMITTAL OF RESPONSES TO EPA AND CEPHE COMMENTS ON THE DRAFT "C" REVISION OF THE SAMPLING AND ANALYSIS PLAN (SAP) TO SUPPORT THE SOURCE REMOVAL AT THE TRENCH 1 SITE, IHSS 108 - JEL-067-98

KH-00003NS1A April 8, 1998

Discussion and/or Comments:

Attached is a letter from DOE to the Environmental Protection Agency (EPA) and the Colorado Department of Public Health and Environment (CDPHE) in response to their comments on the "Sampling and Analysis Plan (SAP) to Support the Source Removal at the Trench 1 Site, IHSS 108." Also attached are two copies of the attachments to this letter:

- 1) Semilog scatter plot entitled "Alpha Spec Sum of Ratios vs FIDLER Measurements"
- 2) Table entitled "Alpha Spec vs. FIDLER Measurements"
- 3) Procedure 2-G32-ER-ADM-08.02, *Evaluation of ERM Data for usability in Final Reports*
- 4) 3.5" IBM formatted floppy disc containing laboratory statements of work in ".PDF" format

Please transmit the above letter with attachments to DOE for transmittal to the agencies. If you have questions regarding this transmittal please contact Hopi Salomon at extension 6627.

Attachments:
As Stated

cc:
A. C. Crawford
J. E. Law
Administrative Record
RMRS Records



DRAFT

April 7, 1998

Tim Rehder
United States Environmental Protection Agency
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RESPONSES TO EPA AND CDPHE COMMENTS ON THE DRAFT "C" REVISION OF THE SAMPLING AND ANALYSIS PLAN (SAP) TO SUPPORT THE SOURCE REMOVAL AT THE TRENCH 1 SITE, IHSS 108

This letter includes responses to both EPA and CDPHE comments received on the subject document. As part of comment resolution two teleconference calls were held, one with EPA and one with both EPA and CDPHE. Resolutions included in this letter include input from those discussions.

Colorado Department of Health and Environment Hazardous Material and Waste Management Division

- 1) *Comment: Some elements required or recommended in regulatory guidance and examples of Quality Assurance Project Plans and Sampling and Analysis Plans are inadequately addressed in this document. Examples include information on detection limits, instrument calibration, details on analytical methods, QA/QC requirements and contingency plans to be used in case unexpected problems are encountered. Some of these issues may not be resolved until an analytical contractor is selected, but approval of this document can only be partial, contingent on reviewing those additional details. The SOW for the analytical contract may provide sufficient detail if it can be released to the regulatory agencies.*

Response: RFETS uses consistent protocols established by the K-H Analytical Services Division (ASD). Line item codes cited in the analytical tables of this SAP correspond to specific analysis/detection limits in the various ASD laboratory Statements of Work (SOWs) and includes the information noted above. The laboratory SOW for the gamma spectroscopy contract is provided as an attachment with these responses. The SOWs for various chemical/radiological analyses cited by this SAP are included as a floppy disk attachment to this transmittal. These include:

RC03 Mobile Gamma Spectroscopy SOW
SS01 VOA SOW
SS02 SVOC SOW
SS05 Inorganic Metals SOW
SS08 Waste SOW

Files contained in these SOWs are in .PDF format and can be viewed using Adobe® Acrobat software, or equivalent.

- 2) *Comment: Page 3, paragraph 3: Uranium “indicative of enrichment” was not mentioned in the PAM. Significant amounts of enriched uranium could have an enormous impact on NESHAPs, and perhaps on worker Health and Safety Plans.*

Response: The results of the sample in question were noted in the PAM, though not specifically identified as being representative of enriched uranium. Because of unknowns associated with excavating a Trench like T-1, the project identified the need for rapid isotopic characterization. An on-site gamma spectroscopy unit operated by independent offsite contractors will provide that support, and will allow project personnel to rapidly identify enriched uranium or contamination by transuranic isotopes in the unlikely event that they are contained in T-1.

- 3) *Comment: Page 6, paragraph 1: Clarify whether this gamma spectroscopy refers to in situ spectrometry or work done in a laboratory. While ^{241}Am , ^{235}U and ^{238}U are detectable in large amounts by gamma spectrometry, quantification is difficult because of the low energies and emission rates, interference by naturally occurring radionuclides in soil, geometric considerations and high uncertainty. If these issues cannot be satisfactorily resolved, analysis by alpha spectrometry would be preferable. Soils returned to the trench should be verified by alpha spectrometry in any case.*

Response: The gamma spectroscopy system will be operated in a mobile on-site laboratory. This point will be clarified in the SAP. The unit will provide acceptable data quality and meet the detection level requirements established for this project in the attached SOW. Quality controls for the gamma spectroscopy system have been augmented and substantially improved over onsite gamma spectroscopy systems of the past; the statement of work dictating quality controls is included with these comment responses. Further, the gamma spectroscopy program will be implemented by a subcontractor with a well established “track record”. The quality controls will be adequate, and confirmation (re-analysis) of our samples by the agencies is acceptable.

- 4) *Comment: Pages 7-8: For floor sidewall sampling, analysis by gamma spectrometry may result in unacceptably high uncertainties as mentioned in comment No. 2. Identify what analysis will be performed if this is the case.*

Response: Gamma spectroscopy will be used to identify and quantify radionuclides remaining on the excavation floor or sidewalls. The unit will provide acceptable data quality relative to the projects DQO’s, including the detection level requirements and measurement uncertainties stated in the gamma spectroscopy SOW.

- 5) *Comment: Pages 12-13: FIDLER measurements are unreliable, subject to high uncertainties and inappropriate for comparison to RFCA action levels. Gamma*

spectrometry may be appropriate, but approval of that method should await review of analytical and QA/QC procedures. Verification by alpha spectrometry should be performed on some, if not all, soils returned to the trench.

Response: The FIDLER is capable of screening a relatively large volume of soil quickly and inexpensively and is appropriate as a screening/segregation tool for this project. As described in Sections 2.2.1 and 2.2.2, gamma spectroscopy will be used to verify the FIDLER screening/segregation.

- 6) *Comment: Page 25 Samples for non-volatile analysis, bullet 3, Page 30, bullet 2: Homogenization of soils for any radionuclide analysis will require much more than "turning over the bag...between 30 seconds and one minute". Such homogenization is usually done mechanically, for several hours, to ensure accurate results.*

Response: Collection of composite samples for non-volatile analyses are more representative than single grab type samples from the excavation bucket. Significant logistical issues were taken into consideration when determining the appropriate homogenization method. The method chosen will provide a relatively representative sample of the soil in the bucket and will greatly minimize the logistical issues associated with decontaminating stainless steel splitters or other equipment within a posted high contamination area environment. This is especially practical when considering that over 40 areas will be sampled from the excavation periphery. Field duplicates will also be analyzed to quantify overall (field) precision. Also, as agreed in the April 2, 1998 conference call with CDPHE and EPA, the SAP will be modified to increase homogenization time to between one and two minutes.

- 7) *Comment: Page 29; 3.2.1, paragraph 3: The PAM refers to "three times background", but does not mention FIDLER surveys. Background, and activity in soils, should be determined isotopically.*

Response: The PAMs reference to "three time background" was in relation to quantification by field screening equipment, not quantification by radiochemistry. The PAM describes using the FIDLER as a guide during excavation activities. The use of FIDLER for scanning soil is common at RFETS and has been used on many of the previous Source Removals. It is the most efficient means of segregating soil available, and has been used with great success in segregating soils which are contaminated from soils that have little or no radionuclide contamination. As stated in Sections 2.2.1 and 3.2.1, verification sampling/analysis will be performed to confirm the FIDLER assumptions. In addition, empirical data was referenced in the SAP that corroborates these background screening levels.

Finally, the latest data set from the RFETS that supports use of a (FIDLER) 5000 cpm field measurement threshold for segregating process streams into "above" and "below" Tier II action levels (relative to radionuclides) is presented herein. The data is given in the following attachments (a semilog scatter plot and table, respectively) entitled "Alpha Spec Sum of Ratios vs FIDLER Measurements" and "Alpha Spec vs. FIDLER Measurements." These data were taken from the 903 Pad Project (subsurface) currently in progress at the RFETS. The Tier I action levels represent the Buffer Zone hypothetical resident scenario at 85 mrem annual radiation dose. The Tier II action levels represent the Buffer Zone hypothetical resident scenario at 15 mrem annual radiation dose.

FIDLER survey measurements were taken directly over the sample materials later analyzed by alpha spectrometry. Following the collection of soil cores, the cores were placed into a core box. The cores were segregated into 6" intervals and a FIDLER instrument was placed directly on the core for measurement. The soil core was subsampled for alpha spec analysis at an offsite laboratory.

The attached scatter plot displays the 76 data points provided in the associated table; 38 points of alpha spec results were reduced in the RFCA sum of ratios equation, for both Tier I and Tier II levels, and plotted against FIDLER field measurement results. Note that all FIDLER measurements ≤ 5000 cpm (also $\leq 30k$ cpm) predicted actinide concentrations less than Tier I levels while only 2 FIDLER measurements ≥ 5000 cpm exceeded Tier II levels. For the purposes of application in the T-1 project, the values exceeding Tier II levels could be considered false negatives when using the FIDLER to predict actinide concentrations. However, for FIDLER readings < 5000 cpm, this translates to a 94% success rate, consistent with confidence levels typically accepted for the risk of false negatives in environmental decision-making.

The presented data is preliminary and partial, as the data set continues to develop; we plan to update the data set as more lab results become available.

- 8) *Comment: Pages 38-39; 5.3 Quality Assurance: This section mentions PARCC parameters, but only briefly discusses two. The referenced Administrative Procedures may contain sufficient detail, but has not been available to the regulatory agencies. A summary of how each of the PARCC parameters will be used to evaluate the analytical data should be included and a copy of the referenced document provided to the agencies.*

Response: We will provide a copy of the SOP.

- 9) *Comment: Appendix I, Plutonium to Americium Ratios...: The methods for making these calculations are correct, but use of the ratio for decision making requires two assumptions. First, that there has been no chemical separation of AM and PU in the time since these materials were placed in the trench, and second, that there was no Am in the materials at the time they were placed there. The second can be ignored since any additional Am would result in an overestimate of the ^{239}Pu activity. The first is more serious, since any movement of Am away from the Pu would result in an underestimate of the Pu activity, and could result in Tier I action levels being unknowingly exceeded. While the form and condition of any plutonium in the trench is unknown, the chemical behavior of Am is different from that of Pu, and measurements of both nuclides by alpha spectrometry in buffer zone soils show large variations in the Pu/Am ratio, implying that given enough time these nuclides will separate. A suggested resolution is to establish a project-specific ratio using the 95% UCL as is currently being done for the 603 (903?) Pad characterization project.*

Response: Significant separation between Am and Pu is improbable. Litaor et al., 1996, indicated that "...that Am-241 does not move faster than Pu-239+240 in the soils of the Site". Therefore, direct correlations between Am-241 and Pu isotopes are reasonable.

Litaor, M. Iggy, Barth, G. R., Zika, E. M., *Fate and Transport of Plutonium-239+240 and Americium-241 in the Soil of Rocky Flats, Colorado*, Journal of Environmental Quality, Vol. 25, July-August 1996.

- 10) *Comment: During this project, the agencies may request split samples to be analyzed at a CDPHE and /or EPA lab.*

Response: Analysis of split samples by either agency is acceptable. RFETS will require that the agencies laboratories have the appropriate radioactive materials license and DOT hazmat employees (49 CFR 1 72, Subpart H), as appropriate, prior to sample transfer.

Environmental Protection Agency Region VIII

- 1) *Comment: Page 7, third paragraph: This paragraph discusses the statistical confidences of the proposed confirmation sampling that have been calculated based up hot spots of 19' and 17' in diameter. However, neither this test or nor Table 2-1, Statistical Parameters Used to Determine Excavation Boundary Sample Approach, provide the variance that was assumed in arriving at the statistical confidences. This needs to be provided in order to evaluate the validity of the calculations.*

Also on this page, it is stated that DU is presumed to be present pervasively throughout the trench volume. The EM/GPR surveys that were conducted do not support this presumption, but instead indicate that only the ends of the trench have large concentrated areas of drums or metal objects, whereas the central portion shows more variability. For this reason, it is necessary to test the variability of the excavation boundaries based upon information gathered during the excavation process. To do this, the trench contents need to be diligently recorded and mapped throughout the excavation process. This will provide the information needed to then section the trench into areas of similar contents. Once this is done, each area having similar contents would then need to be sampled more than once to determine the variability present within the section. Only after the variability is determined can the grid size be accurately calculated.

Response: The calculations used to produce the Table were taken from Gilbert (1987), Chapter 10. Our results were based on use of type-curves relative to grid sizes, grid geometries, contamination (areal) geometries, and Beta error, but did not include variance as an input parameter. Our understanding of Gilbert's application is that of detecting hot spots relative to geometry and scale, but not relative to contaminant (composing the hot spot) variance. Assumptions relevant to this approach are also itemized at the beginning of Gilbert's Chapter 10.

Contents removed from the trench will be logged sequentially for traceability to their original relative locale within the trench. The trench, as a whole, is currently viewed as one population (relative to radionuclides) and sampling is planned accordingly. Any samples exhibiting results above action levels will trigger additional remediation of the associated individual "panel " within the trench (SAP Figure 3-1), which ensures satisfactory remediation to the scale and confidences noted in the SAP.

During a March 31, 1998 conference call, EPA asked that the trench be further divided into three approximately equal areas and that one cell within each area be sampled in three areas instead of one as proposed in the original (Draft Rev C) revision of the SAP. This would allow for a partial evaluation of variability within individual cells. The SAP will be modified to reflect this request.

The SAP will also be modified to include that the variance in sample results will be evaluated based on guidance provided in EPA QA/G-4D, Data Quality Objectives Decision Error Feasibility Trials (DEFT). Use of this guidance will allow the variance to be evaluated relative to the mean value of the sample results and its comparison with action levels (RFCA Tier I). Using the sample results, QA/G4 will compute the required minimum number of samples necessary to make a statistically valid decision; if the predicted number of samples is greater than the number actually taken, variance within the sample set is "extreme" and more samples must be taken. Conversely, if the number of samples predicted by G4 is less than or equal to the number specified in the sampling plan, variance is not extreme, and the number of samples specified in the sampling plan is adequate. Logarithmic transformations will be performed as necessary for those contaminants that are logarithmically distributed (e.g., radionuclides) based on site historical data.

- 2) *Comment: Table 2-1: This table does not agree with Figure 3-1 regarding the number of samples that would be collected. Figure 3-1 shows 20 samples from the trench floor assuming 200' length; Table 2-1 lists 22 samples for the trench floor. Figure 3-1 shows 10 samples taken from the long trench walls; Table 2-1 lists 11 from the long trench walls. This also results in differences in the total numbers of samples collected of 46 in Table 2-1 versus 42 shown in figure 3-1. Table 2-1 should be corrected accordingly, as should Table 3-1 and various pages in the text.*

Response: The Tables and text will be modified to agree with the Figure 3-1.

- 3) *Comment: Section 2.1.2 DQOs to evaluate VOCs in excavation boundaries: Some of the assumptions made regarding VOCs will need additional sampling for verification. The first assumption is that VOCs are localized, with only a small number of drum of still bottoms present in the entire trench. This could be incorrect, VOCs might be much more widespread than anticipated., and if so, sampling for VOCs would need to be much more pervasive. Another assumption is that still bottom wastes will be easily identified and subsequent sampling will occur only in the grid cells immediately adjacent to this location. If this is indeed the case, it will still need to be tested by sampling in at least one other area of the trench floor. Finally, if no still bottom drums are identified, sampling for VOCs must still occur in at least 2 locations that are most likely to be near former sources.*

Response: Unlike many of the previous Source Removals at RFETS, VOCs are not suspected of being a major component of the T-1 contents. If this is not the case (e.g., indication of wide spread VOC contamination from field screening, or widespread solvent containing drums), VOC sampling will be reevaluated. Per the plan, additional sampling/analysis for VOCs is still anticipated on radiologically contaminated soil being evaluated for offsite disposition (See analytical suite in Table 3-2). The fundamental rationale for the VOC sampling approach is process knowledge. VOCs were not a prominent component of the wastestream contributing to this IHSS (only one drum of still bottoms have been documented). During a March 31, 1998 conference call, EPA requested that in the event that no VOCs are detected during the excavation activities, that two samples should still be collected from the excavation bottom in areas more likely to be VOC contaminated.

Though this would be difficult since it would be assumed that if no VOCs were detected by field screening, still bottom identification, or the VOC sampling of the excavated drummed waste (per the subcontractors SAP), that VOCs were not present in the trench. Therefore, locating a biased sampling location would be difficult to justify. However, project personnel will use professional judgement and collect two VOC samples per EPA request. The SAP will be modified to reflect this change.

- 4) *Comment: Section 2.1.3 DQOs to evaluate cyanide in excavation boundaries: Ten drums of cemented cyanide waste are expected to be present in the trench and these might be easier to identify than the above mentioned VOC sources, but some additional sampling should be performed as described above to test the validity of the assumptions made. This would include sampling in at least one location other than where cemented cyanide waste is found and alternately, if none is identified, sampling in at least two suspect locations.*

Response: Cyanide is only a COC on this project because of the suspected presence of the 10 drums containing cemented cyanide waste in T-1. Because of the nature of the cemented waste, and the high Tier I Subsurface Soil Action Level for cyanide (154,000 mg/kg), concentrations of cyanide in soil in excess of the Tier I action levels are improbable. Therefore, soil sampling for cyanide will be confined to localized areas surrounding drums or drum carcasses which contain cemented cyanide waste, and only if the drums themselves (the source) contain cyanide above the RFCA action levels. This is the most reasonable approach to evaluate cyanide.

- 5) *Comment: Section 2.2 DQOs to evaluate disposition of soils: Using 25 ppm as the concentration from the OVA for determining whether soils should be segregated for possible VOC treatment may not be low enough to screen soils that have VOCs above the RFCA action levels (11.5 mg/kg for PCE and 9.27 mg/kg for TCE). The screening action level must either be dropped below the soil action levels or justification must be provided that establishes 25 ppm as an acceptable screening level.*

Soils in stockpile #1 (<5000 cpm FIDLER) are proposed to be sampled only 3 times for confirmation and if found to be below the soil action levels, would be returned to the trench as specified in the PAM. No rationale or statistical basis is given for the number of samples, and there is no correlation between number of samples and the volume of soils. The same scheme that is proposed for soils going to stockpile #2 (>5000 and <10000 cpm) should be applied to the soils going to stockpile #1, so that there is a sound statistical basis for determining the disposition of these soils.

Response: Determining a direct correlation between VOC screening levels and concentrations of VOCs in the soil is not practical because of the number of variables involved. However, professional judgement from other VOC cleanups at RFETS indicate that 25 ppm may be a reasonable screening level. However, in light of the comment, VOC samples will now be collected from soil screened below this level to validate the assumption that 25 ppm is an appropriate screening level.

Based on process-knowledge (<1 55-gal drum of VOC-contaminated media in the trench) and groundwater sample results peripheral to the trench, it can qualitatively be concluded that VOCs are not a widespread or prominent contaminant within the trench. Screening in the field will further rule out any concentrated VOC deposits in the trench on a semi-quantitative basis. Similar to the rationale provided for the minimal radionuclide sampling (stated below), where probability of radionuclides is

low based on process knowledge and field screening, 3 VOC samples will be added for confirmation sampling in contrast to sampling for unknowns. Three (3) samples provide quantitative laboratory data to be used for confirmation, that can be evaluated relative to an average value, a confidence interval, and associated variance. In summary, the various types of data listed herein are adequate for determination of the presence or absence of VOC contamination in the trench.

The 5,000 CPM screening level has been used on several RFETS Source Removals, as referenced in the SAP. Three samples have been stipulated for the primary purpose of *confirmation*, in contrast to a comprehensive characterization of bulk material (e.g., 5,000 - 10,000 CPM) with essentially unknown radiological concentrations (unlike <5,000 CPM segregations, past projects have not segregated soil in the 5,000-10,000 CPM range). Based on the field screening, we can conclude, semi-quantitatively, that the probability of radionuclide contamination is very low in the soil below 5,000 CPM. However, three (3) samples provide quantitative laboratory data that can be evaluated relative to an average value and associated variance.

The SAP will also be modified to include that variance in sample results will be evaluated based on guidance provided in EPA QA/G-4D, Data Quality Objectives Decision Error Feasibility Trials (DEFT). Use of this guidance will allow the variance to be evaluated relative to the mean value of the sample results and its comparison with action levels (either RFCA Tier I or Tier II action levels). Using the sample results, QA/G4 will compute the required minimum number of samples necessary to make a statistically valid decision; if the predicted number of samples is greater than the number actually taken (i.e., 3) variance within the sample set is "extreme" and more samples must be taken. Conversely, if the number of samples predicted by G4 is less than or equal to the number specified in the sampling plan, variance is not extreme, and the number of samples specified in the sampling plan is adequate. Logarithmic transformations will be performed as necessary for those contaminants that are logarithmically distributed (e.g., radionuclides), based on site historical data.

- 6) *Comment: Section 2.3.1, Page 18, Testing for pyrophoricity: This section discusses testing for pyrophoricity if oxidized DU is encountered, presumably in order to determine whether additional stabilization of the DU is needed prior to disposal. Due to the difficulty is determining accurately whether the oxidized DU is pyrophoric and the likelihood that it will still be pyrophoric, it might make more sense to ship all identified DU to Starmet for stabilization. Also, what criteria will be used to determine whether the DU encountered is oxidized? In addition, what are the criteria to be used in determining the frequency of testing for pyrophoricity?*

The number of samples to test for pyrophoricity is stated as being a minimum of 3. This number should be correlated with the volume of oxidized DU and the variability found in the results.

Response: The Pyrophoricity Evaluation Section is included in the plan so that material that is not pyrophoric may be excluded from unwarranted treatment, as appropriate. Some of the DU encountered in the trench may no longer be pyrophoric. If the original drums have been breached or the DU is no longer enveloped by cimcool, it is likely that the material has been oxidized and is no longer pyrophoric. Material will be a candidate for further testing if the DU no longer contains a "metallic luster" and rather appears to have a yellow or blackish coating indicative of an oxide

coating (the text will be modified to reflect this). Material that is no longer pyrophoric does not justify the significant costs associated with the treatment of this material.

There is no information available as to the percentage or distribution of any oxidized DU within T-1. As specified in the plan, a minimum of three samples are specified for pyrophoricity testing. The sampling strategy for pyrophorics is judgmental, not statistical, based on the conservative biases stated in this section; sample selection is based on the most conspicuous material present, as opposed to pulling random samples that would include native bulk soil materials that we already know are not pyrophoric. In summary, the number of pyrophoric samples is not statistically based because of the sampling goals (i.e., to confirm non-pyrophoricity) and the known information about the bulk material. This approach allows for flexibility to increase the number of samples depending on field conditions.

- 7) *Comment: Section 5.3, Quality Assurance, page 38: This section states that data validation will not be performed until after the data is used for its intended purpose. This is very risky and could result in remobilizing for further excavation after the trench has been backfilled. Since the trench will be covered by the temporary structure, it seems more reasonable to perform all data validation on soils that will be returned to the trench and all samples from the excavation floor and walls prior to actually backfilling the trench.*

Response: All laboratories must first pass a pre-award quality audit, followed by annual surveillance audits. The laboratories typically used have had very few analytical problems. The risks associated with using unvalidated data are understood. Data validation will be performed as soon as possible (days to weeks) following completion of data packages in the field. However, if project data have not been validated before scheduled project decisions and actions, validation results will either serve as confirmation of the decisions, or corrective actions will be taken should significant data problems arise from the data validation. Considering the standby costs incurred between data production and validation are also a significant factor that the project must consider, the project has determined that it is appropriate to proceed as planned.

- 8) *Comment: Radiological Analysis by HPGe: Table 3-1 and appendix 1 both list the HPGe as an instrument and analytical method to be used for this project. Several samples (3 to 5) should be split and also analyzed by alpha spectrometry in order to correlate and verify the gamma analysis by HPGe. This is especially important when trying to determine the presence and concentration of Plutonium.*

Response: Quality controls for the gamma spectroscopy system have been augmented and substantially improved over onsite gamma spectroscopy systems of the past; the statement of work dictating quality controls is available from K-H Analytical Services Division. Further, the gamma spectroscopy program will be implemented by a subcontractor with a well established "track record". The proposed quality controls are adequate. Confirmation (re-analysis) of the T-1 gamma spectroscopy samples by the agencies is acceptable.

- 9) *Comment: This plan does not mention data management, but probably should since this falls to the responsibility of the Analytical Services Division. The analytical results and sample locations for the confirmation samples collected from the trench floor and walls should be entered into the Soil/Water Database, so that they may be easily accessed in the future if necessary.*

Response: A discussion on electronic data management was added to Section 5.2, Documentation, noting that data shall be entered into the Soil and Water Database.

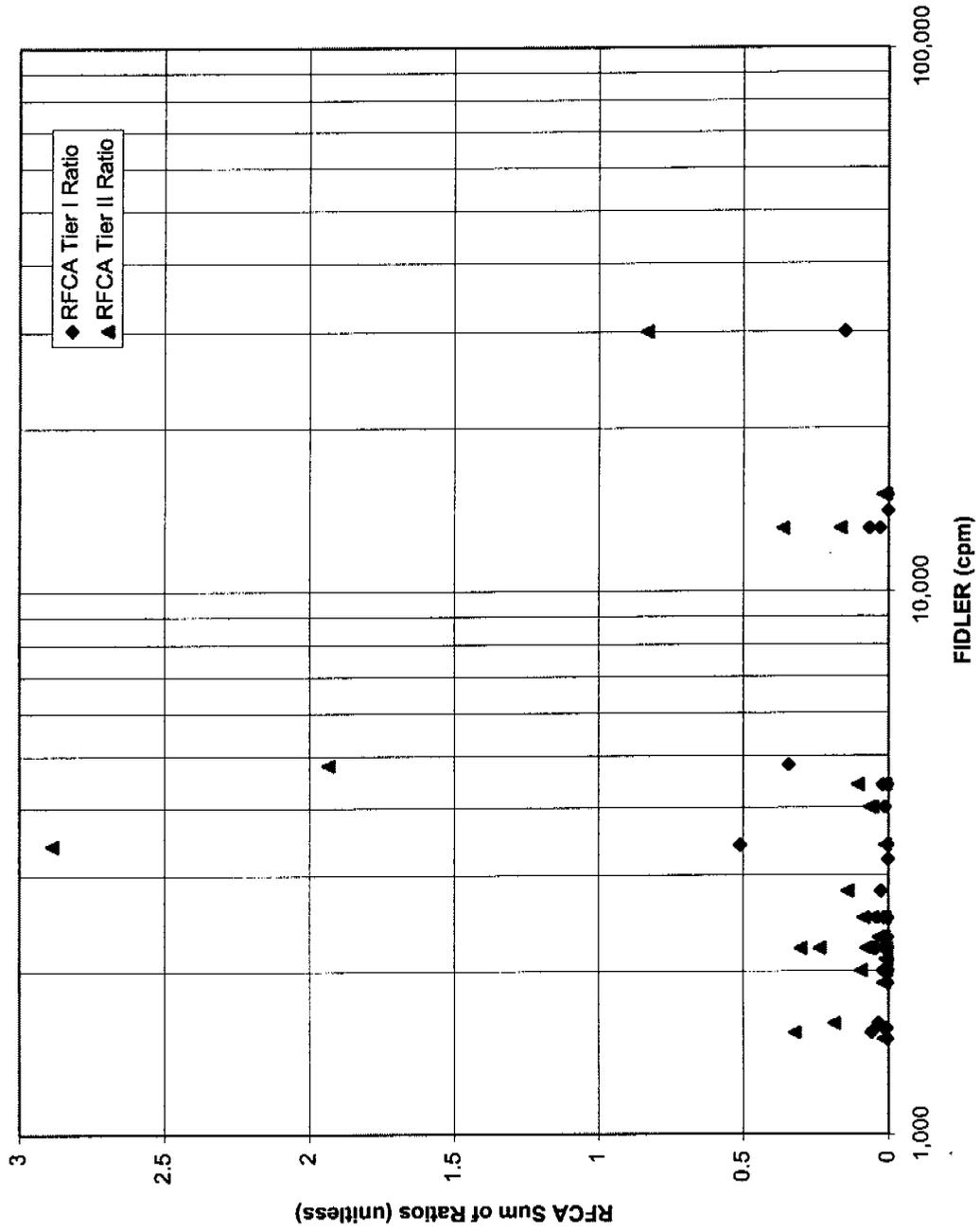
Timely approval of these comment responses and the Sampling and Analysis Plan will greatly assist RMRS in meeting a May 14, 1998 excavation start date. If you have any questions, please call me at (303) 966-4839 or Norma Castaneda of my staff at (303) 966-4226.

Steve Slaten
Manager, Regulatory Liaison

Attachments:

- 1) Semilog scatter plot entitled "Alpha Spec Sum of Ratios vs FIDLER Measurements"
- 2) Table entitled "Alpha Spec vs. FIDLER Measurements"
- 3) Procedure 2-G32-ER-ADM-08.02, *Evaluation of ERM Data for usability in Final Reports*
- 4) 3.5" IBM formatted floppy disc containing laboratory statements of work in ".PDF" format

Alpha Spec Sum of Ratios vs. FIDLER Measurements (RFETS 903 Pad Project, 1998)



**Alpha Spec vs. FIDLER Measurements
(RFETS 903 Pad Project, 1998)**

U233/234	U235	U238	Pu239/240	Am241	FIDLER	RFCA	RFCA
pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	(cpm)	Tier I Ratio	Tier II Ratio
1.00	0.07	1.20	34.00	6.43	1544	0.06	0.32
0.76	0.03	0.87	18.00	3.88	1,605	0.03	0.19
0.96	0.04	1.00	1.79	0.28	1569	0.01	0.03
1.06	0.04	1.22	0.02	0.02	1500	0.00	0.02
1.22	0.07	1.18	4.36	0.80	4,000	0.01	0.06
0.54	0.05	0.77	5.98	1.08	4,000	0.01	0.06
0.38	0.02	0.52	5.13	1.10	4,000	0.01	0.06
0.67	0.04	0.60	0.00	0.05	2,100	0.00	0.01
1.12	0.07	1.24	7.45	1.41	2,500	0.02	0.09
0.80	0.07	1.51	242.00	36.30	4,800	0.34	1.94
0.28	0.01	0.32	1.49	0.23	1,900	0.00	0.02
0.37	0.02	0.40	1.50	0.32	1,900	0.00	0.02
0.50	0.02	0.52	0.07	0.28	1,900	0.00	0.02
0.86	0.04	0.85	0.01	0.05	2,500	0.00	0.01
0.82	0.05	0.69	0.04	0.04	2,500	0.00	0.01
1.08	0.08	1.08	8.13	1.70	2,000	0.02	0.09
0.97	0.13	1.91	260.00	69.50	3,400	0.51	2.89
0.36	0.02	0.40	6.22	0.92	2,500	0.01	0.05
0.36	0.02	0.46	0.20	0.11	2,200	0.00	0.01
0.31	0.01	0.33	2.65	0.67	2,300	0.01	0.03
0.67	0.04	0.61	0.00	0.02	4,400	0.00	0.01
0.96	0.04	1.21	0.69	0.01	15,000	0.00	0.02
0.38	0.02	0.39	12.30	1.89	4,400	0.02	0.10
0.51	0.03	0.53	0.23	0.07	15,000	0.00	0.01
1.06	0.05	1.24	20.50	5.21	2,200	0.04	0.24
1.63	0.11	3.50	25.00	6.02	2,200	0.05	0.30
1.68	0.10	4.00	3.23	0.56	2,200	0.01	0.08
0.58	0.05	0.63	0.75	0.25	2,200	0.00	0.02
0.97	0.18	1.15	93.60	16.70	30,001	0.15	0.83
0.73	0.03	0.83	14.80	2.64	2,800	0.02	0.14
0.81	0.04	0.89	0.94	0.20	2,200	0.00	0.02
0.59	0.02	0.54	0.84	0.15	2,300	0.00	0.02
0.49	0.02	0.53	0.61	0.07	3,400	0.00	0.01
0.43	0.02	0.46	0.02	0.02	2,000	0.00	0.01
0.38	0.03	0.40	0.06	0.04	2,200	0.00	0.01
0.35	0.03	0.44	0.03	-0.01	2,100	0.00	0.01
0.67	0.04	0.77	19.20	2.96	13,000	0.03	0.17
0.52	-0.05	1.11	54.00	5.25	13,000	0.06	0.36

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Refer to 1-A01-PPG-001 for Processing Instructions.
 Print or Type All Information (Except Signatures)

1. Date
 9/16/94
 25. DMR No. 94-DMR- 001986 *lme*
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2. Existing Document Number/Revision 2-G32-ER-ADM-08.02 <i>RE</i>		3. New Document Number or Document Number if it is to be changed with this Revision N/A	
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8. Item	9. Page	10. Step	11. Proposed Modifications
1	18 of 20	5.2	Add columns to Table 7 which indicates the laboratory detection limit and threshold value for each sample.

12. Justification (Reason for Modification. EJO#, TP#, etc.)
 The report limit provided by each laboratory varies from facility to facility. Obtaining a detect in the blank may solve nothing without the reported detection limit and without a threshold value, therefore these must be added to the table.

If modification is for a new procedure or a revision, list concurring disciplines in Block 13, and enter N/A in Blocks 14 and 15. If modification is for any type of change or a cancellation, organizations are listed in Block 13, then Concurror prints, and signs in Block 14, and dates in Block 15.

13. Organization	14. Print and Sign (if applicable)	15. Date (if applicable)
QS	Steve Luker <i>Steve Luker</i>	9-20-94
ED	Laura Tyler <i>Laura Tyler</i>	9-21-94
DM&RS	Kaye Bentzen <i>K. Bentzen</i>	9-21-94

16. Originator's Supervisor (print/sign/date)
 Kaye Bentzen *K. Bentzen* 9-21-94

17. Assigned SME/Phone/Page/Location
 Steve Luker/8625/7451/080 *Steve Luker*

18. Cost Center

19. Charge Number

20. Requested Completion Date

21. Effective Date
 10/21/94

22. Accelerated Review?
 Yes No

23. ORC Review
 N/A

24. Responsible Manager (print, sign, date)
 Steve Luker *Steve Luker* S. LUKER 9-20-94

REVIEWED FOR CLASSIFICATION/UNCLASSIFICATION
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DOCUMENT MODIFICATION REQUEST (DMR)

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1. Date
 9/16/94
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 DMR No. 94-DMR- 001986 *lme*
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2. Existing Document Number/Revision 2-G32-ER-ADM-08.02 <i>RE</i>		3. New Document Number or Document Number if it is to be changed with this Revision N/A	
4. Originator's Name/Phone/Page/Location Paul Gomez/8614/080		5. Document Title Evaluation of ERM Data for Usability in Final Reports	

6. Document Type <input checked="" type="checkbox"/> Procedure <input type="checkbox"/> Other	7. Document Modification Type (Check only one) <input type="checkbox"/> New <input type="checkbox"/> Revision <input type="checkbox"/> Intent Change <input checked="" type="checkbox"/> Nonintent Change <input type="checkbox"/> Editorial Correction <input type="checkbox"/> Cancellation
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8. Item	9. Page	10. Step	11. Proposed Modifications
1	18 of 20	5.2	Add columns to Table 7 which indicates the laboratory detection limit and threshold value for each sample.

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13. Organization	14. Print and Sign (if applicable)	15. Date (if applicable)
QS	Steve Luker <i>[Signature]</i>	9-20-94
ED	Laura Tyler <i>[Signature]</i>	9-21-94
DM&RS	Kaye Bentzen <i>[Signature]</i>	9-21-94

16. Originator's Supervisor (print/sign/date)
 Kaye Bentzen *[Signature]* 9-21-94

17. Assigned SME/Phone/Page/Location Steve Luker/8625/7451/080 <i>[Signature]</i>	18. Cost Center	19. Charge Number	20. Requested Completion Date	21. Effective Date 10/21/94
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22. Accelerated Review? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	23. ORC Review N/A
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24. Responsible Manager (print, sign, date)
 Steve Luker *[Signature]* S. LUKER 9-20-94

REVIEWED FOR CLASSIFICATION/
 BY NA
 DATE NA

ROCKY FLATS PLANT
2-G32-ER-ADM-08.02

REVISION 0

**EVALUATION OF ERM DATA
FOR USABILITY IN FINAL REPORTS**

APPROVED BY: A.R. Keith (for SGS) IS.R. KEITH 9-15-94
Associate General Manager, Print Name (for Date
EG&G Environmental Restoration Management SGS)

[Signature] LUKER 9-15-94
Quality Assurance Program Manager, Print Name Date
EG&G Environmental Restoration Management

States that to the best of my knowledge, the necessary and sufficient
Requirements, Codes, and Standards are met.

CONCURRENCE BY: NA / /
Assistant Manager, Print Name Date
Environmental Restoration Division
DOE, Rocky Flats Field Office

Environmental Protection Agency Approval Required: Yes No

Responsible Organization: Environmental Restoration Effective Date: 10/21/94

CONCURRENCE BY THE FOLLOWING DISCIPLINES WILL BE DOCUMENTED IN THE
PROCEDURE HISTORY FILE:

Data Management and Reporting Services
Environmental Documentation
ERM Solar Pond Projects

USE CATEGORY 4

ORC review not required

Periodic review frequency: 1 year from effective date

LIST OF EFFECTIVE PAGES

<u>Pages</u>	<u>Effective Date</u>	<u>Change Number</u>
1-20	10 /21/94	94-DMR-000404
18	10 /21/94	94-DMR-001986

TOTAL NUMBER OF PAGES: 20

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1. PURPOSE

The purpose of this procedure is to provide a means by which a final evaluation of data quality at the project level can be performed before use in a final Environmental Restoration Management (ERM) report. Subsequent to the validation of the laboratory data, this protocol will evaluate final usability of the project data. Use of this procedure will ensure that the level of compliance with Data Quality Objectives (DQOs) is clearly communicated in final ERM reports.

2. SCOPE

This procedure applies to all EG&G Rocky Flats, Inc. (EG&G) employees and subcontractors who use data collected at the project level to support environmental decision documents. This procedure is based on the relationship of data to the DQOs. Stated simply, the data are usable without qualification if project-specific DQO criteria are met; otherwise, use of data must be qualified. Within the context of this procedure, *usability* is synonymous with *adequacy* when evaluating radiochemistry data.

This procedure includes the consideration of laboratory qualifiers and codes assigned during the validation process but is more robust and includes evaluation of all project-specific DQOs. Data validation is performed by an independent, third-party subcontractor to ensure that the proper chemistry laboratory protocols are followed.

This procedure is based on requirements set forth in the Quality Assurance Project Plan (QAPjP) Manual (EG&G 1989), Department of Energy (DOE) Data Management Requirements (DOE 1993), and Environmental Protection Agency (EPA) Guidelines (EPA, 1980, 1987, 1989, 1993a, 1993b). Specifically, precision, accuracy, representativeness, completeness, and comparability (PARCC) parameters are required based on the QAPjP (EG&G 1989), DOE Data Management Requirements (DOE, 1993), and EPA Guidelines (EPA, 1987). The 7-Step Process, which is the latest EPA guidance on the DQO process, is addressed in EPA 1993a and EPA 1993b.

3. DEFINITIONS AND ACRONYMS

3.1 Definitions

Accuracy. A quantitative measure of data quality that refers to the degree of difference between measured or calculated values and the true value of a parameter. The closer the measurement to the true value, the more accurate the measurement.

Comparability. A qualitative measure defined by the confidence with which one data set can be compared to another. Statistical tests may be used for quantitative comparison between sample sets (populations).

3.1 Definitions (continued)

Completeness. A quantitative measure of data quality expressed as the percentage of valid or acceptable data obtained from a measurement system.

Data Quality Objectives (DQOs). Statements that outline the decision-making process and specify the type, quality, and quantity of data required to support decisions.

Data Validation. The total process of determining adequacy and usability of the data obtained.

Duplicate. One of two homogenous samples taken from the same source at the same time and analyzed under identical conditions.

Field Replicate. One of two contiguous grab samples taken from the same source at the same time and analyzed under identical conditions [such as a volatile organic compound (VOC) sample of soil].

Precision. A quantitative measure of data quality that refers to the reproducibility or degree of agreement among replicate or duplicate measurements of a parameter. The closer the numerical values of the measurements are to each other, the lower the relative percent difference and the greater the precision.

Relative Percent Difference (RPD). A measure of precision, which is based upon the mean of two values from related analyses and is reported as a percentage (the equation is given in Step 5.1.1[2], as Equation 1). The RPD requirements are stated in the Work Plan before field sampling occurs.

Representativeness. A qualitative characteristic of data quality defined by the degree to which the data absolutely and exactly represent the characteristics of a population. Reproducibility is accomplished by obtaining an adequate number of samples from appropriate spatial locations within the medium of interest.

Subject-matter Expert (SME). An identified person who is knowledgeable in a specific field of interest.

3.2 Acronyms

DOE	United States Department of Energy
DQOs	Data Quality Objectives
EG&G	EG&G Rocky Flats, Inc.
EPA	United States Environmental Protection Agency
ER	Environmental Restoration
ERM	Environmental Restoration Management

3.2 Acronyms (continued)

Ft BGS	Feet Below Ground Surface
GRRASP	General Radiochemistry and Routine Analytical Services Protocol
MDL	Method Detection Limit
µg/L	Micrograms Per Liter
PARCC	Precision, Accuracy, Representativeness, Completeness, and Comparability
PCE	Perchloroethene (tetrachloroethene)
PM	Project Manager
QAPjP	Quality Assurance Project Plan
QC	Quality Control
RFEDS	Rocky Flats Environmental Database System
RPD	Relative Percent Difference
SAP	Sample Analysis Plan
SME	Subject-matter Expert
SOPs	Standard Operating Procedures
TCE	Trichloroethene
VOC	Volatile Organic Compound

4. RESPONSIBILITIES

4.1 Project Manager (PM), Subject-matter Expert (SME), or Designee

Is responsible for the implementation of this procedure.

5. INSTRUCTIONS

NOTE *The process described in these instructions is illustrated in Appendix 1, Process Flow for Evaluation of Data for ERM Usability.*

PM, SME, or Designee

- [1] Ensure that a peer reviewer documents verification of the calculations addressed in this procedure on the Document Review Sheet prepared in accordance with procedure 2-E02-ERM-ADM-05.05, Document Review Process.

5.1 Data Validation Process

5.1.1 Determining Precision

PM, SME, or Designee

- [1] For analytical data, assemble all results for field-duplicate and replicate samples, and the results from the corresponding real samples.
- [2] Calculate RPD values for the sample sets (identified above), using Equation 1.

$$\text{Relative Percent Difference} = \frac{[C_1 - C_2]}{(C_1 + C_2)/2} \times 100 \quad (\text{EQUATION 1})$$

where:

- C_1 = Concentration of the analyte in the real sample
- C_2 = Concentration of the analyte in the duplicate

- [3] Summarize the RPD values in a tabular format with results broken out by matrix type and analytical suite.

[A] Include the following in the summary:

- Calculated RPD values
- Overall percentages of sample sets that comply with the established precision DQOs

Some examples of matrix types and analytical suites are listed in Table 1, Common Examples of Matrix Types and Analytical Suites. An example of the calculated RPD values is provided in Table 2, Calculated RPD Values. An example of the summary is provided in Table 3, Summary of RPDs.

5.1.1 Determining Precision (continued)

PM, SME, or Designee (continued)

- [4] State the precision of each field or physical measurement type that ultimately influences project decisions.

Examples of field and physical measurements include the following:

- Flow rate
- Temperature
- Displacement
- Pressure
- Mass

NOTE *Typical RPD values for water are $\leq 30\%$, for soil $\leq 40\%$. At least 85% of all quality control samples are required to comply with the established precision, or RPD, goals.*

- [5] **IF** the calculated RPD or the overall precision values for the collected samples do **NOT** fall within the accepted control limits for Precision,
THEN:

- [A] Indicate how precision does not comply with DQO specifications.
- [B] Explain and justify the deficiencies.
- [C] Determine if additional sampling is required based on direction from DOE.

TABLE 1
COMMON EXAMPLES OF MATRIX TYPES AND ANALYTICAL SUITES

<u>Matrix Type</u>	<u>Analytical Suites</u>
Air	Volatile Organic Compounds
Biota	Semi-Volatile Organic Compounds
Groundwater	Metals (inorganics)
Sediment	dissolved
Soil	total
Surface Water	Cyanide
	Radionuclides
	dissolved
	total
	Pesticides/Polychlorinated Biphenals (PCBs)
	Water Quality
	total dissolved solids (TDS)
	nitrates/nitrites
	other anions
	field parameters
	pH
	temperature
	specific conductivity
	dissolved oxygen

TABLE 2
CALCULATED RPD VALUES

	Media	Detected Analyte	QC Sample Type	Associated Real Sample ID	QC Sample Result	Real Sample Result	RPD Value
QC Sample ID							
GW02479IT	Water	TCE	DUP	GW02437IT	110 µg/l	100 µg/l	9.5%
GW02586IT	Water	TCE	DUP	GW02440IT	84 µg/l	54 µg/l	43%
GW02603IT	Water	TCE	DUP	GW02601IT	250 µg/l	281 µg/l	11.3%

TABLE 3
SUMMARY OF RPDs

Analyte	Medium	Required RPD Value	Total Duplicates Collected	Number of Duplicates within the RPD	Overall Precision Compliance
TCE	Water	≤ 30%	3	2	67% ^A
Vinyl Chloride	Soil	≤ 40%	15	13	86%

^A 28 of the 32 RPD values were within the 30% tolerance; $28/32 \times 100 = 88\%$

5.1.2 Determining Accuracy

PM, SME, or Designee

- [1] For analytical data, compare the required analytical method and detection limit with the actual method used and its detection limit for each medium and analyte.

Table 4, Comparison of Detection Limits, serves as an example for volatile organic analytes; Required Detection Limits (RDLs) for radiochemicals are given in the General Radiochemistry and Routine Analytical Services Protocol (GRRASP) Manual, Part B.

5.1.2[1] EXAMPLE—Analytical Method and Detection Limit Comparison

The Sampling Analysis Plan (SAP) requires that method 502.2 be used for analyzing VOCs in water at an Operable Unit. For vinyl chloride, the data from RFEDS indicate that the actual analytical method used was not the same as the required analytical method, and therefore, does not meet the method detection limit (MDL) requirement as identified in the GRRASP Manual, Part A. Therefore, the analytical results for vinyl chloride must be qualified as having an actual MDL of 0.18 µg/L (EPA Method 601) in contrast to the planned EPA Method 502.2 (MDL of 0.01 µg/L).

TABLE 4
COMPARISON OF DETECTION LIMITS

Analyte	Required Analytical Method	Actual Analytical Method	Required MDL ^A (µg/L)	Actual MDL (µg/L)
PCE	502.2	502.2	0.02	0.02
TCE	502.2	502.2	0.03	0.03
Vinyl Chloride	502.2	601	0.01	0.18

^A In this example, the MDL is the Required Detection Limit.

5.1.2 Determining Accuracy (continued)

PM, SME, or Designee (continued)

- [2] For field or physical measurements, state the accuracy of each measurement type that ultimately influences project decisions.

Examples of field and physical measurements include the following:

- Flow rate
- Temperature
- Displacement
- Pressure
- Mass

NOTE *Accuracy is based on detection limits such as from GRRASP specifications, manufacturer's specifications, standard operating procedures, or instrument-specific calibration data. Table 5, Water Level Results, serves as an example.*

- [3] Evaluate the correct resolution of all reported results as well as the number of significant figures, and report all of the corresponding measurements or calculation results (for example, numerical model output) consistently.

5.1.2[3] EXAMPLE—Appropriate Resolution and Significant Figures

According to the 5-21000-OPS-GW.1, Rev.2, water levels are to be measured within 0.01 ft. The results obtained through the use of a *Solinst* Water-Level Probe, from a sampling round of water-level measurements for six monitoring wells, are listed in Table 5. The data will be used for modeling the potentiometric surface of a shallow aquifer.

The data reported for MW-80 must be qualified for further use in data reduction and analysis because it does not reflect the required measurement resolution (0.01 ft) or accuracy (0.05 ft). Likewise, the MW-83 data must be rounded to the appropriate resolution and significant figures because it reflects measurement capabilities to 0.001 ft, which is not within the resolution of the water-level measuring device.

5.1.2 Determining Accuracy (continued)

TABLE 5
 WATER LEVEL RESULTS

Monitoring Well Number	Date Measured	Top of Water (Ft BGS)	Bottom of Well (Ft BGS)
MW-78	12/05/93	16.34	22.81
MW-79	12/05/93	18.01	24.22
MW-80	12/05/93	15.9	21.4
MW-81	12/05/93	16.02	22.69
MW-82	12/05/93	16.32	23.66
MW-83	12/05/93	17.230	25.450

PM, SME, or Designee (continued)

[4] IF any accuracy tolerance does NOT comply with DQO specifications, THEN:

[A] Indicate how accuracy does not comply with DQO specifications.

[B] Explain and justify the deficiencies.

[C] Determine if additional sampling is required based on direction from DOE.

5.1.3 Determining Representativeness

PM, SME, or Designee

[1] Compare the actual sample types and quantities collected with those stated in the Work Plan per media type and analytical suite and/or per physical measurement type.

A tabular format is recommended to clearly communicate this information. An example is shown in Table 6, Sample Comparison (Required-vs-Actual).

5.1.3 Determining Representativeness (continued)

TABLE 6
SAMPLE COMPARISON (REQUIRED-VS-ACTUAL)

	Required Number of Samples per Sampling-Plan Specifications	Actual Number of Samples	Deviation	Justification
Surface Soils				
Radionuclides	30	35	+5	Extra samples within budget; DOE approved
Metals	20	20	0	
Semi-Volatile Organic Compounds	25	25	0	
Groundwater				
Metals	12	10	-2	Not enough sample medium to fulfill requirements
Radionuclides	12	12	0	

PM, SME, or Designee (continued)

[A] IF a particular analyte within an analytical suite is NOT collected or measured, BUT the bulk of the analytes was collected or measured, THEN footnote those analytes NOT collected and explain in the summary.

For example, *gross alpha/beta* are analytes within the radionuclide analytical suite, which may additionally contain ^{239/240}Pu, ^{233/234,235,238}U, ³H, ^{230/232}Th, and ²⁴¹Am.

5.1.3 Determining Representativeness (continued)

PM, SME, or Designee (continued)

[2] IF actual sample types and quantities do NOT follow associated sample-controlling documents (such as the Work Plan),

THEN:

[A] Indicate how representativeness does not comply with DQO specifications.

[B] Explain and justify the deficiencies.

[C] Determine if additional sampling is required based on direction from DOE.

5.1.4 Determining Completeness

[1] Review analytical data with respect to matrix type and analytical suite, specifically:

- For real samples.
- For Quality Control samples.

[2] Use Equation 2 to calculate completeness for all data types that contribute to project decisions, including the following:

- Water-level measurements
- Periodic flowrates
- Temperatures

$$\text{Completeness} = DP_u = \frac{DP_t - DP_n}{DP_t} \times 100 \quad (\text{EQUATION 2})$$

where:

DP_u = Percentage of usable data points

DP_n = Nonusable data points

DP_t = Total number of data points

Example:

DP_u = usable VOC soil samples

DP_n = 8 nonusable VOC soil samples

DP_t = 46 total number of VOC soil samples collected

$$\text{Completeness: } DP_u = \frac{46 - 8}{46} \times 100$$

$$DP_u = 83\%$$

Without 90% as a goal, $DP_u < 90\%$. Therefore, the soil sampling program is considered to be incomplete and additional VOC samples may be required to fulfill the Field Sampling Plan.

5.1.4 Determining Completeness (continued)

PM, SME, or Designee (continued)

- [3] IF actual sample types and quantities do NOT follow associated sample- controlling documents (such as the Work Plan),
THEN:
- [A] Indicate how completeness does not comply with DQO specifications.
 - [B] Explain and justify the deficiencies.
 - [C] Determine if additional sampling is required based on direction from DOE.

5.1.5 Determining Comparability for Analytical Chemistry and Radionuclide Data

PM, SME, or Designee

- [4] Demonstrate comparability of data sets with respect to one or more of the following commonalities:
- Protocols (such as procedures) used to collect or synthesize the samples
 - Matrix types (such as soil vs. water)
 - Temporal considerations (periodical, seasonal, event-related)
 - Spatial considerations (3-dimensional)

NOTE *Comparability is required to include at a minimum the comparison of real samples with:*

- *Other real samples, as appropriate.*
- *Background data.*

- [5] IF actual sample types and quantities do NOT follow associated sample-controlling documents (such as the Work Plan),
THEN:
- [A] Indicate how comparability does not comply with DQO specifications.
 - [B] Explain and justify the deficiencies.
 - [C] Determine if additional sampling is required based on direction from DOE.

5.2 Comparison of Environmental Samples with Blanks (Quality Control Samples)

PM, SME, or Designee

- [1] WHEN completing this section,
THEN consider all quality control (QC) samples collected during the field project, except duplicates and replicates, including the following:
 - Trip blanks
 - Rinsates
 - Preservation blanks
 - Any other field blanks

- [2] IF a detected analyte is a common laboratory contaminant,
AND the real sample concentration is less than 10 times the blank concentration,
THEN conclude that the potential contaminant of concern is a laboratory contaminant in the real sample.

- [3] IF a detected analyte is a common laboratory contaminant,
AND the real sample concentration is greater than or equal to 10 times the blank concentration,
THEN conclude that the analyte in the real sample is a true detect (US EPA, 1989).

- [4] IF a detected analyte is NOT a common laboratory contaminant,
AND the real sample concentration is less than 5 times the blank concentration,
THEN conclude that the potential contaminant of concern is a laboratory contaminant in the real sample.

- [5] IF a detected analyte is NOT a common laboratory contaminant,
AND the real sample concentration is greater than or equal to 5 times the blank concentration,
THEN conclude that the analyte in the real sample is a true detect (US EPA, 1989).

- [6] IF the source of detected contamination from real or QC samples is inconclusive,
THEN compare lot numbers of sampling containers used for real samples with analytical results for the same lots of sample containers produced by the laboratory.

This process should determine if the sample containers are the source of contamination.

- [7] Summarize the QC sample data by listing in tabular format the parameters listed in Table 7, QC Sample Summary, with respect to matrix type and analytical suite.

This table is an example of format only.

5.2 Comparison of Environmental Samples with Blanks (Quality Control Samples)
(continued)

TABLE 7
QC SAMPLE SUMMARY

94-Dmr-001986

	QC Sample Type	Date of QC Sample Collection	Assoc. Real Sample ID	Date of Real Sample Collection	QC Sample Result	Real Sample Result	Measured Units	Detect in Blank (yes/no)	Detection Limit	Threshold Value
QC Sample ID										
QC Sample ID										
QC Sample ID										

5.3 The Seven-Step DQO Process (EPA, 1993)

PM, SME, or Designee

- [1] IF the Seven-Step DQO process was initiated at the project's beginning, THEN compare report conclusions with the decisions and decision-error tolerances stipulated by the project DQOs.
- [2] Explain and justify any discrepancies between the DQOs and inadequacies of information and conclusions stated in the report.

6. RECORDS

There are no quality or non-quality records generated by this procedure.

7. REFERENCES

DOE, 1993, Data Management Requirements, Section 5, Management Procedures and Requirements, U.S. Department of Energy Rocky Flats Plant Environmental Restoration

EPA, 1993a, Guidance for Planning for Data Collection in Support of Environmental Decision Making Using the Data Quality Objectives Process, Interim Final, Office of Research and Development, Washington D.C., EPA QA/G-4

7. REFERENCES (continued)

EPA, 1993b, Data Quality Objectives Process for SUPERFUND: Interim Final Guidance; Office of Solid Waste and Emergency Response, Washington D.C., EPA 540-R-93-071

EPA, 1989, Risk Assessment Guidance for Superfund, Volume 1, Human Health Evaluation Manual (Part A), Office of Emergency and Remedial Response, Washington D.C.; EPA/540/1-89/002

EPA, 1987, Data Quality Objectives for Remedial Response Activities, Development Process, Office of Emergency and Remedial Response, Washington D.C., EPA/540/G-87/003

EPA, 1980, Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans, QAMS-005/80, Washington, DC

EG&G, 1991, General Radiochemistry and Routine Analytical Service Protocol, Parts A and B, EG&G Rocky Flats, Golden, CO

EG&G, 1989, Rocky Flats Plant Site-Wide Quality Assurance Project Plan for CERCLA Remedial Investigations/Feasibility Studies and RCRA Facility Investigations/Corrective Measures Studies Activities, EG&G Rocky Flats, Golden, CO

5-21000-OPS-GW.01, Water Level Measurements in Wells and Piezometers

09/15/94

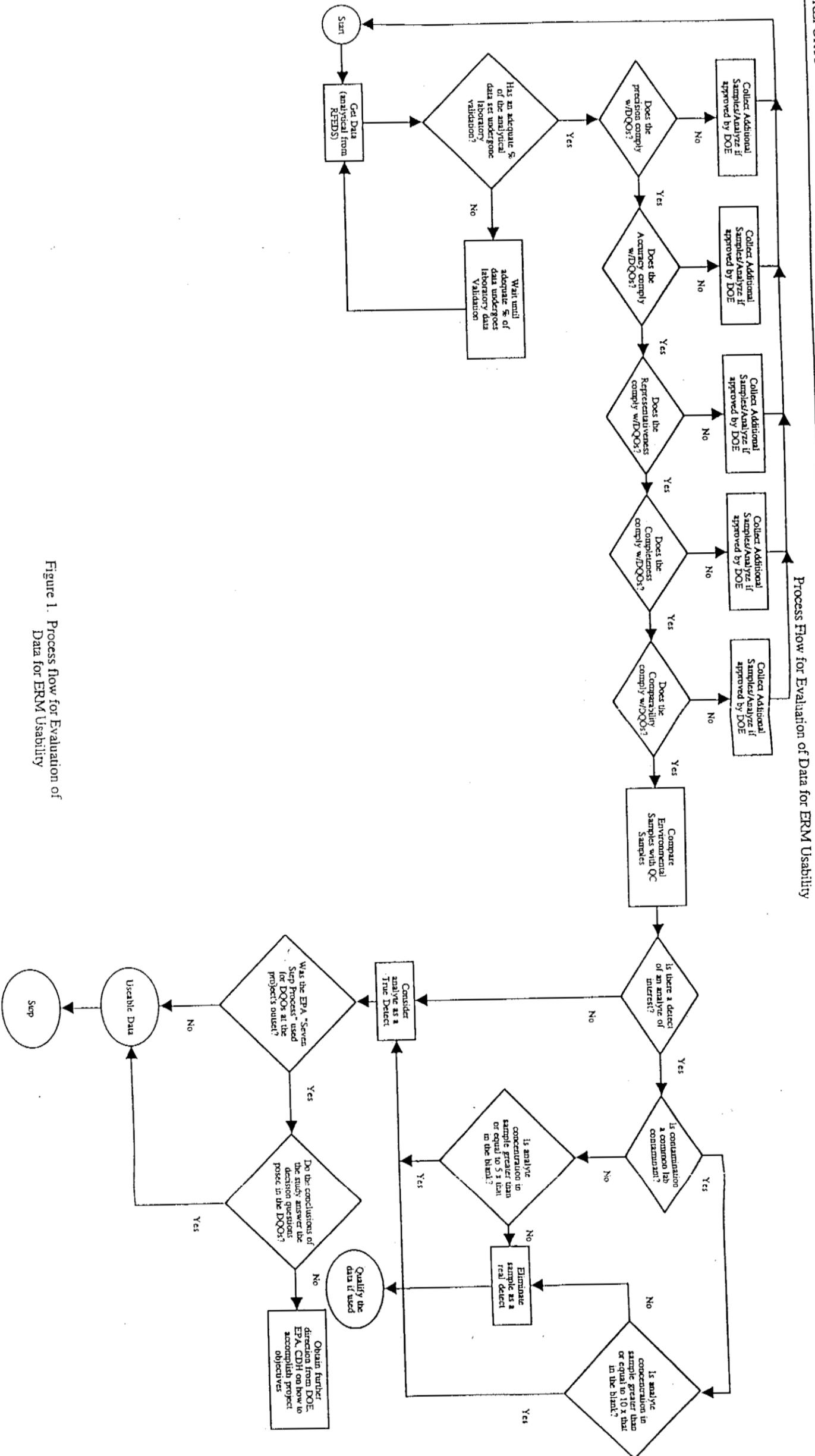


Figure 1. Process flow for Evaluation of Data for ERM Usability