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Jane E. Norton, Executive Director

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Colorado Department
of Public Health
and Environment

January 12, 2001

Mr. Joseph A. Legare
Assistant Manager for Environment and Infrastructure
U.S. Department of Energy
Rocky Flats Field Office
10808 Highway 93, Unit A
Golden, Colorado 80403-8200

Dear Mr. Legare:

RE: State Comments on the Draft Industrial Area Sampling and Analysis Plan

This letter transmits the final version of our comments on the Draft Industrial Area Sampling and Analysis Plan (attached). The outstanding issue for this SAP is regulatory approval of the SAP addenda, which will contain the detailed analysis of known information and the sampling approach for the IHSS, PAC, and UBC groupings. There are also critical pieces of information that are not included and have not been provided during the review period. The specific items are noted in our comments.

The SAP provided for the IA Group 700-4 needs considerable additional detail along with the information not yet provided in the SAP.

We expect to continue working with the site to resolve our comments and reach a Sampling and Analysis Plan that adequately covers the process we are about to undertake. Should you have questions on our comments please contact Elizabeth Pottorff at 303-692-3429, or Carl Spreng 303-692-3358.

Sincerely,

Steven H. Gunderson
Rocky Flats Project Coordinator



ADMIN RECORD

IA-A-000711

2

Joseph A. Legare
January 11, 2001
Page 2 of 2

SHG/ETP/etp

Enclosure

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State Comments on the Draft Industrial Area Sampling and Analysis Plan

- 1) Page 2, Section 1.1 – This section and this document need to be more specific about how this SAP fits into the integration of functions (characterization, remediation, and closure) that occur in an accelerated action.
- 2) Page 3, Section 1.3 –
 - A) Any addenda to this SAP must be reviewed and approved by the regulatory agencies. We recognize due to the cyclical nature of the DQO's that multiple rounds of sampling may be conducted under a SAP Addendum. Once an addendum is approved it may be appropriate to work on a concurrence basis for the follow-up rounds of sampling. It is not clear how data will be reported to the agencies. The State and the site should discuss details of how real-time data used for decision making will be provided to the regulators.
 - B) RFETS submitted revised language on this section, our comments on that revision are:
 1. Add bullets for the Elements of the IASAP which are applied and the Rationale for the use of the sampling methodology.
 2. The methodologies (biased, Smartsampling, and statistical gridding) are not adequately included in this document.
 3. There is no language in RFCA to define what “non-concurrence” of the LRA means, however, “non-approval” is defined by a process in RFCA.
 4. We think 15 working days from the receipt of an addendum document is an attainable turnaround for approval.
- 3) Section 2.3.2 OU9 – Original Process Waste Lines - The text references Figure 4, which shows only the outside tanks. The process waste lines are shown in Figure 22 through Figure 25D, which should also be referenced.
- 5) Section 3.1.1 –
 - A) This section has been reviewed with the understanding that some of the previous assumptions regarding Tier I and Tier II levels may change based the choice of restricted or unrestricted use action levels. Currently there is little or no difference between the Tiers for surface soils and subsurface soils. Based on the RSALs process and the Project Coordinator's agreements the concentration values could be changed based on priorities set by those groups.
 - B) How well are the MDL's in Appendix D. known before the contract for each field method is completed?
 - C) Inputs to the Decisions (pages 21 and 26) The following replacement text is suggested for items 4.f) and 6.f) in these sections respectively:

For sites with soil data values exceeding Tier I and/or Tier II ALs, the spatial extent of the AOC will be established by delineating detectable contamination; i.e., PCOC values above the background mean plus two standard deviations for inorganics and radionuclides, and PCOC values above detection limits for organics. Additionally, PCOC values above Tier I ALs and PCOC values above Tier II ALs will be delineated.

There is no lower limit on the size of an AOC; however, no single AOC will exceed (TBD; equal to the size of the smallest exposure unit used in the CRA) acres. Data will be aggregated over the AOC according to the decision rules. The 95% upper confidence limit (UCL) of the mean for each PCOC will be compared to the Tier I and Tier II ALs in order to make appropriate remedial decisions. When evaluation of a Tier I exceedance indicates an area of very limited extent (i.e., a hot spot), data aggregation may not be appropriate. The methodology for determining potential hot spots is described in Section 4.3.

- D) Page 20 - Analyzing for a complete PCOC list is compatible with the site's desire to accomplish as much sampling as possible in one phase and would eliminate data gaps in the analyte by analyte evaluation for the CRA.
- E) Page 23 - The Decision Rules for characterization sampling could be simplified by assuming that action levels account for background levels; i.e., if a background level for an organic or radionuclide is higher than its Tier II AL, the background level becomes the de facto soil AL. This procedure is similar to the protocol for groundwater ALs (RFCA Attachment 5, 3.3.C.3). Comparisons to background or detection levels would then be superfluous to comparisons to ALs.
- F) Page 23 - In Decision Rule #5, it is unclear which PCOC in a sum of ratios that exceeds 1 becomes a COC. These DQOs do not incorporate our comment that the text should say, "some action has to be taken". Data evaluation and aggregation are not the only possible actions that should come out of this step.
- G) It is unclear what kind of data will be acceptable for the CRA, and what will not. Some sections differ from conclusions reached during meetings with the regulators.
- H) Section 3.1.3 Final Characterization of the Industrial Area for the Comprehensive Risk Assessment - Inputs to the Decisions (page 31)
 - 1. It is not clear exactly what kind of data from pre-demolition survey reports, or pre-remediation data collected for AL comparisons will be used for the CRA. More detail needs to be provided here.

2. Section 4.1 In-Process Sampling (page 35) This section seems to indicate that field data could be used for the CRA. This would only be acceptable if the field data has been demonstrated to be of similar quality and to attain similar detection limits as more standard laboratory procedures. This needs to be stated here.
- 6) Page 32 Section 3.1.3 – Which modeling studies are/will be approvable?
 - 7) The IA Data Quality filter needs to be included in this document.
 - 8) Section 4.3 Hot Spot Methodology (page 39) Three sections, 4.3, 5.2.2, and 5.3 deal directly with hot spots. It seems more appropriate and efficient to have all this guidance and protocol together in one section, then reference that section as necessary.
 - A) This section states that separate hot spot methodologies will be discussed for each of the three area designations, but only one methodology is needed. Elevated Measurement Comparisons (EMCs) should only be necessary in Class 1 areas. Any direct measurement or sample that is $>DCGL_{EMC}$ (or the EMC for non-radionuclides) in Class 1 areas should be flagged for further investigation. If the elevated measurement is real, then any concentration greater than the $DCGL_{EMC}$ would be included in the calculation of the average hot spot concentration. "...[A]reas of elevated activity should not exist in Class 2 or Class 3 areas." (MARSSIM Rev. 1, p. 8-23) and "Measurements exceeding $DCGL_w$ in Class 2 or Class 3 areas may indicate survey unit misclassification." (MARSSIM Rev. 1, p. 8-22) Rather than applying a hot spot methodology to areas not expected to have action level exceedances, the IASAP should focus on clarifying and better defining the classifications and how areas can be re-classified. Action level exceedances in a Class 2 area should lead to further investigation. The result may be reclassifying the area of elevated measurements as Class 1 and increasing the sampling density.
 - B) The IASAP appears to rely only on statistically placed grids or SmartSampling to determine where hot spots occur. Additional scanning, as recommended in MARSSIM is not included. Therefore, the level of confidence that hot spots not caught by the gridded sampling will not be as great for this methodology as it is for the MARSSIM methodology.
 - C) DOE Order 5400.5 specifically puts a lower limit on the size of a hot spot, namely 25 square meters, so that there is an upper limit to the allowable concentration of a contaminant in a hot spot that can be left on-site. DOE Orders are "To-Be-Considered" during cleanups, apparently this criterion was not considered for the IASAP. What is the justification for not following this criterion? Incidentally, RAC recommended and Weldon Springs placed lower limits on the size (and therefore upper concentration limits) on hot spots.

6

9) Page 41 Section 4.3.2 – The SmartSampling variogram range should be determined for each area and contaminant. What is the basis for the statement that it provides good correlation with to 10,000 m² hot spot?

10) Page 42 Section 4.4.1 – It would be helpful to summarize the procedures in this SOP as not everyone reviewing this document has easy access to the SOP documents. Will SOP's be developed for the field instruments? Since it is possible that bedrock materials could be contaminated as well, sampling methods for consolidated materials should be included here.

11) Table 4 – This table does not appear to be complete. Why are no samples listed for the Solar Evaporation Ponds IHSS when the table indicates sampling is complete? We would like to see an aggregation of this data with SmartSampling that demonstrates no additional sampling is needed. Other areas for which we believe there is sampling data do not indicate that it exists.

12) Page 53 Section 4.5.1 – The MDL and associated lab error must be below the Tier II action levels for confirmation samples to be taken with field instrumentation. For example the MDL of the field method for beryllium would not allow sufficient confidence for confirmation samples.

13) Section 4.5.2, Sampling Locations - In the August 3, 2000 IASAP working group meeting, the State stated that a percentage of HPGe sampling needed to be supplemented with alpha spectrometry so that site-specific correlations could be determined. This comment was not incorporated into the IASAP document.

14) Page 59 Section 4.8.5 – We are concerned about the lack of detail in this section. We don't believe enough is known about the process waste lines to be able to characterize leaks with biased sampling. Not characterizing the interiors of the lines and leaving them in place may allow contaminants well above Tier I levels to remain in the subsurface environment. There is a high probability of failure for those structures before any radioactive contamination would decay to safe levels, therefore they should be characterized and treated as other subsurface contamination that has escaped containment.

15) Page 62 Sections 4.9.1 to 4.9.3 – The information referenced here is not yet included in Appendix G.

16) Page 64 Section 4.10.2 – Surface vegetation may be removed but subsurface organic matter should be included in the soil samples.

17) Page 64 Section 4.10.3 – What provision will be made to keep contamination from migrating down a borehole and causing lower samples to appear contaminated?

18) Page 66 Section 4.10.4 – We are interested in the results and evaluation of the HDD and EMWD projects.

19) Page 70 Section 5.1.2 – Level III and Level IV measurements are not defined for this calculation.

20) Page 71 Section 5.1.4 – How will the number of verification samples be determined when field or onsite analytical methods are not of adequate quality?

21) Page 71 Section 5.2 – Although decision errors were previously mentioned it would be appropriate to restate them in this section and discuss their implication. It would also be useful to illustrate the discussion with probability diagrams for contaminants of interest such as beryllium and vinyl chloride showing the overlap of the analytical gray area (plus or minus 20% or 30% according to acceptable data guidelines) with the alpha and beta errors around the action level. Other diagrams such as cadmium, uranium, or plutonium can also be presented to illustrate how safe it is to make decisions based on the field instruments.

22) Page 72 Section 5.2.1 – What level of geologic logging will be done for the many shallow boreholes that will be drilled?

23) Section 5.3 Elevated Measurement Comparison -

A) The elevated measurement concentration (EMC) is not equal to the equation listed on page 75. It appears that too many steps have been combined into one equation. The sum of the ratio of the average concentration in an AOC to the action level plus the ratio of the average hotspot concentration to the action level for that size hotspot does not equal the EMC. This sum should be less than 1 in order to make sure that the 25 mrem dose standard or any other action level will not be exceeded. However, it is incorrect to equate this sum to the EMC. The EMC, or $DCGL_{EMC}$ was defined by MARSSIM as the radionuclide-specific activity concentration within a survey unit corresponding to the release criterion. In other words, it is the concentration of a particular radionuclide in a particular sized hotspot that would result in a 25 mrem/y dose (or any other risk-based limit). MARSSIM calculates the $DCGL_{EMC}$ by multiplying $DCGL_w$ by the appropriate Area Factor for the hot spot size.

In order to be consistent with MARSSIM's definition, for radionuclides,
$$EMC = DCGL_{EA} = AL \times (DCGL_{hotspot} / DCGL_w) = AL \times \text{Area Factor}$$

For non-radionuclides,
$$EMC = AL \times (\text{Area}_{AOC} / \text{Area}_{hotspot}) = AL \times \text{Area Factor}.$$

The elevated measurement comparison should be done by directly comparing each measurement to the above appropriate EMCs. Equations 5-3 and 5-4 are used to indicate whether a remedy occurs or not; however they should not be equated to the EMC.

B) This section needs to clearly delineate the sequence of events that should happen during the elevated measurement comparison. This may be done best in a flow chart, should include the following steps:

1. Calculate an EMC ($DCGL_{EMC}$) based on the size of the grid area.
2. Do a point by point comparison to the appropriate EMC.
3. If a point is greater than the EMC, it should be investigated further, i.e.,
4. Is the hot spot real, or merely an anomalous analytical result?
5. If the hot spot is real, how big is it? (nature and extent of the hot spot)
6. If the hot spot is confirmed, recalculate the EMC for the specific area of the hot spot, A' .
7. Is the average concentration in the hot spot greater than the hot spot-specific EMC? (Using the area factor $F_{A'}$ for the area A' , the average concentration in the area, A' (95% UCL on the mean) should not exceed the product ($F_{A'} \times DCGL_W$) in order for the survey unit to meet the release criterion.

C) Equations 5-3 and 5-4 use the terms $95\%UCL_{ipu}$ and $Area_{ipu}$. As stated in the second paragraph of this section, the applicable area is the AOC, not the generally drawn IHSS, PAC or UBC areas. The terms, therefore, should be the $95\%UCL_{AOC}$ and $Area_{AOC}$.

D) Please provide a more complete rationale, such as written up in MARSSIM (Aug.2000) page D-22 & 23 for internal radionuclides that justifies the validity of simply comparing areas of the AOC and of the hot spot as a surrogate for the Area Factor for non-radionuclides.

E) In the August 3, 2000 IASAP working group meeting, the State had asked that the potential for acute toxicity be factored in to the evaluation of whether a hot spot should remain or not. This document uses a value of three times the AL as an upper limit for re-evaluation, and states that this is consistent with RESRAD's release criteria. What is the basis for considering "three times" a chronic action level as safe from an acute standpoint across the board? It appears more toxicologically justifiable to evaluate the potential for individual PCOCs to produce acute effects.

F) What are the standard units for the parameters in this equation?

24) Page 77 Section 6.0 – The geologic data management system is not mentioned here or in Table 9.

25) Page 80 Section 6.1.7 – It is not clear here and elsewhere in this document what data or reports will be submitted for regulatory approval. Please include discussion of how and when evaluations of field data that lead to a decision to stop or continue sampling and remediation will be provided to the regulators.

- 26) Page 82 Section 6.1.9 - What classification system will be used for soil horizons?
- 27) Page 83 Table 10 – Is the GPS system able to provide accurate locations for closely spaced sampling grids?
- 28) Page 84 Section 6.1.11 - What is the current and/or anticipated future laboratory capability for radiological samples above the DOT criteria?
- 29) Page 87 Section 9.0 - The State is especially concerned with H&S requirements for beryllium.
- 30) Figure 13 – The decision to disqualify a PCOC from further consideration should not be made before the nature and extent question is answered.
- 31) Figures 14 - It is also unclear how the last decision box in this flow diagram leads to “Remedial Decision” if the decision is “No.”
- 32) Figure 15 - It isn't clear why the initial input (blue box) is limited to "characterization sample analytical results". Won't confirmation sampling, plus any characterization sampling for areas where no remediation was necessary be the inputs here? Most of the characterization sampling will no longer represent the area where remediation has occurred since the locations will no longer exist.
- 33) Figure 17- What are the inputs to this decision? In evaluating the remedial locations the cost to remediate to an ALARA level should be included in the decision.
- A) The NFA circles at the top of this flow diagram should be revised so they are consistent with the first two corresponding steps of Figure 18.
 - B) The criteria for how the decision is made that "the data indicate a hot spot" needs to be specifically listed, e.g., spatial distribution, concentration > $DCGL_{EMC}$.
 - C) References to the text would make all of the flow diagrams most useful.
- 34) Figure 18 - uses PCOC and COC inconsistently.

10

Comments on Appendix A, Draft Industrial Area Sampling and Analysis Plan Addendum Industrial Area Group 700-4

- 1) Page 1 Section 2.0 - The locations within Buildings 771 and 774 should be located on the reference map.
- 2) Page 11 Section 2.0 – The nitric acid dumpster is not identified on any maps, there is one biased sample just to the north of a gray rectangle in the area described in the text, does the rectangle represent this dumpster?
- 3) Map 2k-0404 is difficult to read and interpret. It is not labeled with a figure number although the text seems to reference it as Figure 2. The IHSS layer covers the building boundaries so interior and exterior IHSS's are hard to distinguish. Sometimes the IHSS is labeled with an IHSS number and sometimes with a tank number, this inconsistency makes it difficult to match the description to the location. Neither IHSS 124.1, 124.2, 124.3 or the associated tank numbers could be located on this map. It would be helpful to include the PCOC list for a tank or IHSS. The surface soil data posted seems to show several common soil parameters above the background plus two standard deviations and very few PCOC's. Perhaps there is another way to screen the data for this posting that eliminates the clutter caused by highly variable background parameters.
- 4) Page 18 Table 1- IHSS 124.1, 124.2, 124.3, and 125 - Why is only surface soil being sampled for these IHSS? Uranium and nitrate in solution are able to infiltrate to subsurface depths. All descriptions indicate there were liquid spills.
- 5) Figures 3 & 4 – It appears that some gridded sample locations are the same as some biased sample locations, what is the difference between the two types of samples? What do the irregular blue crosshatched areas represent? If these are lakes and ponds as indicated on the larger map have the sediments been sampled? If not, these areas should be included in the second round of gridded sampling.
- 6) IHSS 150.1 – A biased sampling location is listed in the table but there is no sample location posted on the map. The existing data posted on the map does not include radionuclides. Why is this IHSS not included in the second round of grid sampling when the numerous contamination events are not specifically located within the area?
- 7) Section 3.0 - In general the sampling rationale has not been well developed in this document. Sampling methods should be specified in the addendum. The posted existing data does not provide any information on the PCOCs. The sample locations are generally located with no information as to where a biased sample will be collected. Information on why biased samples were located or how they will be chosen should be included. It would be helpful to number the samples and include a table with the rationale for each biased sample. Does biased sampling mean a single sample, a composite sample, or multiple locations based on professional judgment in

11/11

the field? Will samples be removed from the borehole for analysis? How will they be collected? What sample size is needed? What analysis method will be used? What other analytes are included in the field sampling analysis besides the PCOC's?

- 8) Section 6.0 - The initial characterization phase should include general screening sampling and not focus on a narrow PCOC list developed from process information, at this stage of sampling there are too many unknowns. Is a six-inch sample depth from below a building really adequate to characterize what will be exposed when the building is removed?
- 9) Appendix G Page 9 Section 3.1 – It is not appropriate to assume uranium contamination will have an equilibrium activity ratio. Depleted uranium is a common COC at the site and U234 could be found at concentrations greater than a 1:1 ratio with U238 would indicate.