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K-65 RESIDUE SAMPLING - RESPONSE TO U.S. EPA COMMENTS ON SAMPLING PROCEDURES

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LETTER

Department of Energy
FMPC Site Office
P.O. Box 398705
Cincinnati, Ohio 45239-8705
(513) 738-6319

R-008-1001.10

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SEP 19 1990
DOE-1937-90

Ms. Catherine A. McCord, Remedial Project Director
U. S. Environmental Protection Agency
Region V - 5HR-12
230 South Dearborn Street
Chicago, IL 60604

Dear Ms. McCord:

K-65 RESIDUE SAMPLING - RESPONSE TO U.S. EPA COMMENTS ON SAMPLING PROCEDURES

Reference: Letter, C.A. McCord to B.J. Davis, "K-65 Sampling Operable Unit 4 - U.S. DOE-Fernald - oh6 890 008 976," dated August 15, 1990 R-008-201.6

The referenced letter transmitted U.S. EPA comments on the K-65 residue sampling procedures. Enclosed are DOE responses to the U.S. EPA comments.

As verbally agreed to between Jack Craig, of my staff, and yourself at a meeting on August 28, 1990 in Chicago, the revised sampling procedures are not enclosed. If U.S. EPA concurs with the DOE responses it was agreed that U.S. EPA approval would be given on the procedures based on the condition that the comment responses be incorporated into the sampling work plan.

Your expeditious review and response to the enclosed document is requested. If you have any questions, please contact Jack Craig, at FTS 774-6159.

Sincerely,

Andrew P. Avel

Andrew P. Avel
FMPC Remedial Action
Project Director

DP-84:Craig

Enclosure: As stated

cc w/encl.:

L. P. Duffy, EM-1, FORS
P. Q. Andrews, USEPA-V
D. A. Kee, USEPA-V
K. Pierard, USEPA-V
D. Ullrich, USEPA-V
E. Schuessler, PRC
D. Nixon, WMCO
J. Razor, IT

[redacted]

FMPC RI/FS PROJECT
OU4 - "K-65 SILOS SAMPLING AND ANALYSIS PLAN"

COMMENT: **1. The issue of the release of radioactive materials, other than radon 222, and other hazardous substances from use of the vibracore must be addressed. It is important to determine whether radium, thorium, and radon daughter products will be released in quantities sufficient to cause doses to members of the public approaching or exceeding the standard of 40 CFR 61, Subpart H of 10 mrem/year. Such a project would normally required NESHAP analysis if the potential exists for increased emissions (except radon 222).**

RESPONSE: Containment systems, air treatment systems, and proper radiological controls will be utilized throughout the sampling operations. Prior to sampling each manway the Radon Treatment System (RTS) attached to each silo will be operated to reduce radon and airborne particulate levels in the silo headspace. The RTS is an air treatment system for the silos consisting of piping, a fan unit, HEPA filters, dehumidifiers, and carbon adsorption units. A glove bag will be placed over each manway prior to removing the manway cover and will be used to isolate the silo atmosphere from the surrounding environs. The Vibra-Corer Sampling device will be placed inside a containment bag during sampling operations. At no time will the contents of the silo or the contaminated Vibra-Corer core barrel be exposed to atmosphere. The containment systems and operations procedures will prevent the release of radioactive particulates and radon.

An enclosed, 40-foot, HEPA-filtered examination trailer will be used to subsection and sample the LEXAN tube containing silo residues. This LEXAN tube will be withdrawn from the Vibra-Corer core barrel. Although the examination trailer air treatment system will prevent the release of radioactive particulates it will not prevent the release of radon. The quantity of radon released during the sampling operations is approximately 16 millicuries over a two month period. This estimate is based on the volume of residue material in the examination trailer during sampling operations, the maximum concentration of radium in the residues as reported in the 1989 silo sampling analytical data,

[redacted]

the assumption that the radon is in secular equilibrium with the radium, and the assumption that all of the radon escapes from the trailer.

Because the Operable Unit 4 Risk Assessment determined the direct threat to the public on a cancer risk factor basis it was not possible to determine the effect on a dose rate basis. As a result, the threat to the public due to the emission of radon daughters from the examination trailer is presented as a cancer risk factor than a dose. The "Assessment of Radiation Dose and Cancer Risk for Emissions from 1951-1984, Feed Materials Production Center, Fernald, Ohio", prepared by IT Corporation for the US DOE, Oak Ridge Operations, in August 1989, puts daily radon discharges from the K-65 Silos at 2 to 3 curies resulting in a lifetime cancer risk to the maximally exposed individual at 4×10^{-4}. This compares to the acceptable risk range promulgated by the National Contingency Plan (NCP) of 10^{-4} to 10^{-6}. The 16 millicures discharged during sampling operations results in a risk of approximately 2×10^{-6}, two orders of magnitude lower than that due to silo radon emissions.

COMMENT: **2. The number of samples proposed to be collected may not be sufficient to characterize the materials in the K-65 Silos. The analytical data from 1955 and 1958 has been used to determine the number of samples needed to be analyzed. There are three problems using these data. First, the samples were collected from the transfer lines and not the silos themselves. Second, the data they use from 1955 to 1958 is from an extraction test; extraction procedures tend to buffer or moderate the variability between samples. Third, an examination of the 1989 data appears to show significant variability between samples (barium and copper data, for example). Therefore, the discussion presented in Section 2.2 does not seem to be valid.**

RESPONSE: The statistical basis for sampling the K-65 Silos, as outlined in procedure SW-846, was reviewed in light of the 1989 sampling data to verify the sampling rationale. The method prescribed in procedure SW-846 requires that the estimated mean concentration of each parameter to be sampled for be compared to its regulatory threshold. An underlying assumption in the statistical analysis is that the expected mean concentration of each parameter is equal to 50 percent of the regulatory threshold (RT). Based on the assumption that the RT is twice the mean concentration, the recommended number of samples per SW-846 would increase as the mean concentration approaches

the RT and decrease as the mean concentration moves away from the RT. Probability dictates that any RT is more likely to fall outside of the narrow range between the observed mean and the RT. Consequently, the difference between the actual mean and the RT will be much greater than the value used in the current calculations, resulting in a lower number of samples to be collected than estimated here.

Tables 1, 2, and 3 of the attachment to this document summarize the results of the analyses of the number of samples to be collected using the 1989 data and SW-846 methodology. In all cases except three the recommended number of samples is less than four. The exceptions involve arsenic, calcium, and copper in Silo 2. The large number for arsenic is primarily due to the one high reading (1960) in sample S2NE1. Calcium concentrations span three orders of magnitude; however, because this parameter is not likely to drive the remedial effort, there seems little reason to use the recommended number of samples calculated for this parameter as the minimum number that should be collected for all parameters. The higher than average number of samples for copper is attributed to two factors: a high reading in S2NE1 (1790) and the substitution of the value zero for the ND reading in sample S2NE2. A more appropriate value to use would have been one-half the detection limit. Use of this value would have resulted in a lower number of recommended samples.

ASI/IT has proposed to collect a total of 11 samples from each silo. The manner and locations from which these samples will be collected is described in the sampling plan. The number of samples proposed is greater than any of the numbers calculated using SW-846 methodology.

The Sampling and Analysis Plan has been revised to incorporate the results of the statistical data based on the 1989 silo samples.

COMMENT: **3. As mentioned above, it does not appear that the determination of the number of samples needed to characterize the materials in the silos is supported by the data. The sampling frequency should be doubled (half the sample length) of the sections to be analyzed. However, the number of composite samples can remain the same. In addition, it would be appropriate that, at a minimum, the composite TCLP extracts, and possibly all TCLP extracts, also be analyzed for all TCLP organic compounds and pesticides. The proposed increase in the number of samples is justified when considering the**

relatively low cost of analyses compared to the overall cost of the K-65 sampling investigation.

RESPONSE: Please see the response to comment #2. In reference to the additional TCLP extract organic analyses it is agreed that additional samples should be analyzed for organic compounds but that these samples under go HSL organic analyses rather than TCLP organic analyses. This is recommended because whereas the HSL organic analyses will determine the actual levels of organic compounds in the wastes, the TCLP organic analyses will only determine the leachability of the organic compounds from the wastes. It is proposed, and this agrees with conventional sampling rationale, that all samples be analyzed for HSL organic compounds and that those samples found to contain organic compounds have their leachate analyzed for TCLP organic compounds. The 1989 analytical results do not indicate that there are many organic compounds in the silo residues but because of the long holding times, the questionable representatives of the samples, and the unexpected presence of PCB's it is wise to analyze all samples for organic compounds. The approach described above is prudent, cost effective and technically sound.

COMMENT: **4. Due to the radioactivity of the samples, holding times for volatile organic compounds will almost certainly be exceeded. Volatile organic compound could, if present, be a problem during solidification and vitrification processing. Therefore, every effort must be made to analyze the samples within the required time frames (samples from the 1989 sampling were analyzed for volatile organic compound more than three months after collection).**

RESPONSE: Due to laboratory operational difficulties associated with radiation levels of the K-65 Silo samples, the CLP holding times for volatile organic compounds cannot be met. In contrast to the analytical delays experienced in the 1989 sampling effort, however, all samples will be sent in one shipment to the laboratory immediately following the completion of sampling operations.

COMMENT: **5. There are no specific quality control procedures listed in the Sampling and Analysis Plan (SAP). Quality control is only mentioned in passing. The sampling plan needs to address the type, number, frequency and methodologies associated with quality control samples. Potential sample types include trip blanks, transport blanks, field/reinstate blanks, collocated samples, split samples and spikes. A table should be developed**

to cover these samples.

RESPONSE: The text of Section 6.0, Quality Assurance, has been expanded to include a list of Quality Control options that will be integrated into the sampling procedures. DWP-002, Section 3.4, and Table 2-2 have been revised to show in a detailed manner how the options will be implemented into the procedures.

COMMENT: **6. The exact methodology for compositing samples from the core sections needs to be included in the detailed work procedures. The procedures, as they exist now, only address the steps for transferring a sample from the core section to the sample bottles.**

RESPONSE: Each sample core will be subdivided into zones based on observed physical characteristics. These zones will then be further subdivided into 18-inch sections. Composite samples will consist of material taken from the sections within each zone. DWP-002, section 7.4, of Appendix A of the SAP, has been expanded to detail the methodology for obtaining composites of each zone.

COMMENT: **7. The SAP primarily addresses samples that are expected to be dry in nature. It is not inconceivable that some samples could be semi-solid or semi-liquid. Samples falling in this category would require modification of several procedures including sample transfer from core section to sample bottles, decontamination procedures, collection of representative samples and requested sample analyses.**

RESPONSE: Previous K-65 Silo sampling efforts indicate a possibility of recovering semi-solid and/or semi-liquid samples from Silo #1. DWP-002 sections 7.1, 7.3, 7.4, and 7.5 have been revised to accommodate this possibility.

Responsive actions if liquids are present in the sample material would include, collecting a free liquid sample for analysis, homogeneous mixture involving liquids and sample material for composite samples, and caution while handling sample core material to prevent the spread of contamination.

COMMENT: **8. Page 1, First Paragraph: An accurate description of the previous studies needs to be presented. Previous sampling attempts were not successful in going to the required depths or collecting complete samples.**

RESPONSE: The introduction of the sampling plan has been revised to describe the 1989 sampling attempt and now provides additional background data on the silos in addition to analytical results from previous sampling efforts.

COMMENT: **9. Section 2.1: There is no indication of which statistical approach was selected; procedure SW-846 or the tolerance limit approach. Drawbacks associated with each were presented. Regardless of the statistical approach that was taken, statistical analysis justifying the number and type of samples should be included in this section in its entirety.**

RESPONSE: Please see the response to comment #2. The discussion on the tolerance limit approach in the referenced section has been deleted because it is not applicable to the selected sampling rationale.

COMMENT: **10. Section 2.1, Page 4, Paragraph 3: There are two potential interpretations of this statement, both having different implications. The first is that the current U.S. EPA-approved extraction procedures were not in place at that time and therefore were not used, resulting in no leachate generated and no data. The second is that leachate was generated, but not using U.S. EPA protocols, therefore no "usable" data was generated. The statement should be clarified to define the intent. Furthermore, the 1989 data provided leachate data of known quality.**

RESPONSE: Please see the response to comment #2. The statement referenced in this comment has been deleted because the 1989 analytical data used in the statistical discussion in the response to comment #2 did provide leachate data of known quality.

COMMENT: **11. Page 5, Second Paragraph: The statement "there is high probability that the waste will be relatively homogenous in the horizontal direction" needs to be justified and more specific.**

RESPONSE: Agree. The K-65 residues were introduced from the top of the silos as a slurry and tended to settle. For this reason there is a high probability that the waste will be relatively homogenous in the horizontal direction. The text has been revised to reflect this.

COMMENT: **12. Page 6, Table 2-1: Units for radium (mg/ton) are highly unconventional. Using standard conversions, 1.1 nanocuries/gram equals 277 mg/ton and radium**

concentrations are more than 100 times this value.

RESPONSE: Agree. Table 2-1 has been replaced and lists units of pCi/gm for radionuclides and mg/kg for inorganics.

COMMENT: **13. Section 2.2, Page 7, First Paragraph: The text indicates that the selection of the number of samples was based on four samples of K-65 residues collected between 1955 and 1958. The mean and standard deviation were calculated using data generated from these four samples. The small standard deviation was used to justify the conclusion that only two samples were needed to characterize the wastes in these silos. This may or may not be appropriate as the instrument detection limits and method detection limits achievable in the 1950's were not nearly as sensitive as present day technology. Aside from this issue, four samples may not yield statistically sound results.**

RESPONSE: Please see the response for comment #2.

COMMENT: **14. Page 7. First Paragraph: In referencing "two samples from each core", it should be specified whether these are two samples from each strata or composites.**

RESPONSE: The statistical results of the SW-846 analysis shown in Tables 2-1, 2-2, and 2-3 indicate that at least four samples will be required from each silo, with the exception of the arsenic, copper, and calcium anomalies discussed in the response to comment #2. The SAP calls for eleven samples from each silo and they will come from either strata, zone composites, or full core composites.

COMMENT: **15. Section 2.2, Page 9: Describe the method used for selecting the exact location of the representative sample from each section. The selection of zones relies on physical variability and radioactivity. However, the rationale for delineating the sections within each zone, including the representative section, is not presented.**

RESPONSE: Please see the response for Comment #17.

COMMENT: **16. Section 2.2, Page 9: The term "representative" should be defined in this context.**

RESPONSE: The term "representative" is used to indicate that the sample will represent the physical variability and radioactivity of the sample core for the required analysis. In reference to composite samples, the term

"representative" is used to indicate that the sample shall represent each section within a zone.

COMMENT: **17. Section 2.2, Page 9: The description of the sampling scheme is confusing. The determination of zones based on physical appearance, radioactivity, or arbitrary top-middle-bottom classification will introduce variability into the locations of sections. The entire length of the core should be divided at set intervals, like 1.0 or 1.5 foot intervals, and numbered accordingly. Appearance and radiation considerations can be added as a secondary identifier. This is the most accurate way to characterize average radionuclide concentrations.**

RESPONSE: The zoning of the sample core will be performed at the direction of a geotechnical specialist.The sampling plan calls for zoning the sample core based on differences in observed physical characteristics. The reason being that those areas or zones of material exhibiting distinctly different observable characteristics may represent areas with correspondingly different chemical and radiological characteristics. Plant process records indicate that the K-65 Silos received material from different sources with varying physical characteristics. These zones will then be sampled and analyzed to determine the constituents. In order to obtain representative samples from these zones they will be subdivided into 18-inch sections. Material will then be removed in equal masses from these sections and be composited to form a single sample from that particular zone. The zones will be designated by letter (A,B,C, etc) and the sections within those zones will be designated numerically (1,2,3, etc.) In the event that the sample core exhibits uniform characteristics the core will be zoned into top, middle and bottom zones (A, B, C) and each zone will be sectioned as previously described. In addition to these samples, the section yielding the highest radiation reading during the radiation survey of the core will be sampled to establish a worst case condition from a radiological standpoint. Material from all sections of the core will also be composited to yield the final sample from the core.

COMMENT: **18. Page 12, First paragraph: The term "unbiased" is not correct, since the method described (30 inches) introduces systematic bias.**

RESPONSE: Agree. The term "unbiased" does not accurately describe the methodology outlined in the referenced text and in Figure 2-3 for collecting a composite sample from the third core from each silo. The term has been removed form the text and now reads "A composite sample will be collected from the third core from each silo".

COMMENT: **19. Page 12, First Paragraph: Equal masses, not volumes, should be composited since the activity/concentration per unit mass is what is derived.**

RESPONSE: Equal masses will be used for composite samples. The volume of material may be different in weight when compared to the same volume of material from another section within the sample core. The term volume has been removed from the text, and replaced with masses. This sentence now reads "This sample will be formed by equal masses of material from each core section."

COMMENT: **20. Table 2-2: The following omissions have been made:**

Composite 20 omits 2S2-NW-D1
5 omits 2S1-SE-D3
10 omits 2S1-NW-D3
15 omits 2S2-SE-D1

RESPONSE: All samples shown with a D suffix, such as 2S2-SE-D3 on Table 2-2, are quality control samples. D1 indicates a blind duplicate sample, D3 indicates a triplicate sample. The FMPC Quality Assurance Project Plan, Volume 5 of the FMPC RI/FS Task 2 Report Work Plan Requirements, states that the quality control sampling frequency rate is 1 in 10 borings for the blind duplicate sample, and 1 in 20 samples the triplicate sampling. On that basis these QC samples will not be taken from each manway. A change has been made on Table 2-2 to include a blind duplicate sample in one of the zone composite samples from the northeast sample core from silo #2.

COMMENT: **21. Section 2.3, Page 12, Paragraph 4: The number, type, location and frequency of quality control samples have not been specified. Specify whether <u>all</u> composite samples will be analyzed for radiological parameters, HSL inorganics, and TCLP.**

RESPONSE: The sentence in this paragraph of the SAP text has been changed to include the number and type of quality control samples from the eight cores retrieved from the two K-65 silos. The sentence now reads "along with 8 quality control samples which includes one blind

duplicate sample, two sets of triplicate samples, two equipment rinsate samples, and one rinsate blank sample."

The location of the quality control samples is indicated on the revised Table 2-2. Section 6 has been expanded to include among other items, quality control frequency rate.

All composite and strata samples as indicated in Figures 2-2 and 2-3, and also listed on revised Table 2-2, will be analyzed for TCLP metals, radiological parameters, and HSL inorganics in addition to HSL organics as proposed in the response to Comment #3.

COMMENT: **22. Section 2.3, Page 12, Paragraph 5: It is stated that four samples from each core (eight total) will be analyzed for HSL organics, PCBs and pesticides. However, table 2-2 shows ten analyses will be done.**

RESPONSE: Section 2.3 of the SAP, page 12, 5th Paragraph is correct. Table 2-2 has been revised.

COMMENT: **23. Section 2.3, Page 13: Table 2-2 does not include analyses for samples 2S1-NE-A and 2S2-NE-A. These core samples are described and diagramed on page 10 in Figure 2-3.**

RESPONSE: Samples 2S1-NE-A and 2S2-NE-A have been added to Table 2-2.

COMMENT: **24. Section 2.3, Page 13: Table 2-2 does not agree with the text. Section 2.3 appears to say all samples will be analyzed by TCLP where as the table indicates that only samples from the NW core will be analyzed after TCLP extraction.**

RESPONSE: Section 2.3, Page 13 is unclear as to the precise analytical requirements. As the SAP presently reads all samples will be analyzed for TCLP metals (extraction procedure) and those samples from the northwest core of each silo will be analyzed for HSL organics (CLP), not TCLP organics (extraction procedure). Per the response to comment #3 the SAP has been revised to require all samples be analyzed for HSL organic compounds and those samples with positive results be analyzed for TCLP organic compounds.

COMMENT: **25. Section 2.3, Page 14, First Paragraph 1: Specify**

which composite samples will be used for physical testing. This would be difficult to do on those samples that are slated for chemical analyses. If they are sub-samples from existing cores, as is implied in Figure 2-4, that should be spelled out in the text.

RESPONSE: The three samples from each silo composited for physical testing will come from the same locations as that slated for chemical analysis. For physical analyses that require an undisturbed sample, a five inch section of LEXAN tube containing the horizontal layer desired will be removed from the section. The text has been revised for clarification.

COMMENT: **26. Section 2.3, Page 14, First Paragraph: The fourth "visual" horizontal zone composite mentioned here needs to be included in Table 2-2. Table 2-2 includes only six of these composites, instead of eight.**

RESPONSE: The text on page 14, 1st paragraph is incorrect. Composited samples will be made up from the same horizontal layers found in the three specified cores (6 total). The text has been revised to state "six composite samples representing three horizontal layers."

COMMENT: **27. Page 15, Figure 3.1: The examination trailer is proposed to be located in a relatively high "background" area (perhaps 1 millirem per hour), which would flaw the sensitivity of the examination of samples.**

RESPONSE: Actual radiation levels (measured 8/15/90) are 0.3 mr/hr gamma and are constant along the length of the trailer. This level is negligible when compared to the samples to be screened with a projected radiation level of 10 to 50 mr/hr gamma (Background level is 1 to 3% of source level).

COMMENT: **28. Page 17, 3.1.1.: The term "comparatively low background" must be quantified and its effects on the sensitivity of radiological examination described.**

RESPONSE: As stated in Response #27, background levels are 0.3 mr/hr at all locations at the examination trailer. The effects of this level of background radiation are negligible regarding radiological screening. Background is constant throughout the trailer and will account for only 1 to 3% of the total readings on the samples.

COMMENT: **29. Page 19, Last paragraph: A description of how it will be determined that the vibracore is one-foot from the bottom must be explained.**

RESPONSE: The distance from the manway opening (33'-7 3/4") to the bottom of the silo is a known value. The Vibracorer barrel is marked off in one foot increments. The vibracore will be stopped at the 33-foot mark, 7 3/4 inches above the silo bottom.

COMMENT: **30. Page 21, 3.2.2: The rational for adjusting the vibracore to penetrate <u>soil</u> north of silo #4 to simulate conditions in the silos is not clear. An alternative should be proposed.**

RESPONSE: The purpose of testing the Vibra-Corer in the soil north of Silo 4 was primarily to familiarize the sampling crew with the device and to evaluate the performance of the device in a readily available material. It is agreed that although soil is not representative of the silo material, sampling of the soil will provide Vibra-Corer performance data at the extreme end of a range of materials likely to be encountered during sampling. The lime sludge ponds were selected to provide material more representative of the silo material. Section 3.2.2 has been revised for clarification.

COMMENT: **31. Page 23, 3.4, Page 24, Table 3-1: The contamination levels presented in Table 3-1 should be specified as fixed, removable, or fixed and removable. The method for measurement should be specified, including instruments that are to be used, fixed scan or wipe-test count).**

RESPONSE: The numbers shown in Table 3-1 will be corrected to read as follows:

<u>Alpha</u> - 20 dpm/100 cm^2 (loose surface contamination as determined by a swipe) or "nondetectable" by audible response on a direct frisk.

<u>Beta/Gamma</u> - 100 dpm/100 cm^2 (fixed contamination by direct frisk).

COMMENT: **32. Section 3.4, Page 25, First Paragraph: Elaborate on storage and ultimate disposal of excess decontamination solutions and waste/water here. A brief discussion of disposal of decontamination solutions and wastewater should be incorporated into the description of each activity rather than referencing a later**

section.

RESPONSE: As stated in Section 7.0 of the SAP, WMCO has the responsibility of storage and ultimate disposal of excess decontamination solutions and solid waste for the K-65 resampling projects. This is in accordance with WMCO procedure SOP-65-C-106. In accordance with this procedure ASI/IT will prepare the waste products for shipping and package the wastes. WMCO will provide upon request all proper collection containers to ASI/IT Corporation. ASI/IT Corporation will use these containers for the K-65 resampling project in accordance with WMCO provisions and guidelines.

COMMENT: **33. Section 3.7, Page 28, Paragraph 3: The analysis of the TCLP extract should include all TCLP organic compounds. Submission of revised QAPP TCLP analytical procedures and QA requirements should be provided.**

RESPONSE: Please see the response to comment #3. The RI/FS QAPP is presently being revised to incorporate TCLP analytical procedures and QA requirements.

APPENDIX A:

COMMENT: **34. DWP-001, Page 4, Section 6.6: The leather gloves, if used, should be disposed after use.**

RESPONSE: A step will be inserted in Section 6 of DWP-001 directing the proper disposal of all contaminated items in accordance with WMCO procedure SOP 65-C-106, "Silo Waste Handling".

COMMENT: **35. DWP-001, Page 7, Section 7.2: The 75 mr/hr specified here conflicts with paragraph 6.11, which states an action level of 100 mr/hr.**

RESPONSE: Both numbers are operating limits. When radiation levels on the dome reach 100 mr/hr, sampling must stop and the Radon Treatment System (RTS) must be put in operation. The RTS must be operated until radiation levels on the dome decrease to 75 mr/hr or less.

COMMENT: **36. DWP-001, Page 7, Section 7.2.3: Explain how the bag is to be inflated.**

RESPONSE: The manway glove bag will be pressure tested with compressed air to check for leaks around glove ports, transfer sleeves, and seams prior to use on the silo

dome.

COMMENT: **37. DWP-001, Page 10, Section 7.3.13: The second sentence is unclear. The term "cognizant operations technician" should be defined in the definitions section.**

RESPONSE: The second sentence has been revised to read as follows: "The third operations technician on the dome will be responsible to operate the Remote Throttle Control". The term "Cognizant Operations Technician" will be deleted and replaced with "throttle operator".

COMMENT: **38. DWP-001, Page 11, Section 7.3.18: Because this procedure involves the manual wiping of the sampling barrel, a safety procedure should be included here that specifies an action level beyond which manual wiping should not be attempted. If the removed waste is highly radioactive, finger ring dosimeters will not give a real-time reading of dangerous radiation levels .**

RESPONSE: A step will be added to the procedure to perform radiation surveys on the core barrel as it is withdrawn from the manway. If a radiation level greater than 200 mrem/hr is encountered the sampling supervisor will be notified and the ALARA aspects of the task will be reviewed.

COMMENT: **39. DWP-002, Page 3, Section 6.1: The statement "A defined safety system is not involved" should be clarified.**

RESPONSE: A "Safety system" is a Department of Energy term defined in DOE order 5484.1A as "equipment and/or hardware that actively provide a safety function by preventing or mitigating accidents . .". The statement "A defined safety system is not involved" simply implies that no safety systems involved in the sample core handling meet DOE's definition of a safety system.

COMMENT: **40. DWP-002, Page 5, Section 7.2: A rationale for periodic monitoring rather than continuous monitoring should be given here. If continuous monitoring is not practical during this operation, the frequency of periodic monitoring should be specified in the text.**

RESPONSE: The term "periodic" will be changed to "continuous".

COMMENT: **41. DWP-002, Page 6, Section 7.3.5: The text should read ". . .on the form . . " rather than" . . on the core . . .".**

RESPONSE: In the text, the part referred to as a "core" is the LEXAN tube containing the sample core. The purpose of this statement is to make sure that the same sample number appears on both the Sectioning Plan Log and LEXAN tube containing the core sample. The term core has been replaced with LEXAN tube in the text.

COMMENT: **42. DWP-002, Page 8, Section 7.4.7.1: The instructions need clarification. Specifically, describe how the inner sides of the lexan tubes are to be removed when the only opening thus far is at the end of the tube. A drawing of the procedure would be helpful. Also, explain how this will prevent cross contamination.**

RESPONSE: 1 to 2 inches of core material will be removed from each open end of the LEXAN tube. It is possible that material from one core section could be transmitted to an adjacent core section during the cutting process. By removing 1 to 2 inches of material from the open end of each LEXAN tube any potentially cross-contaminated material is removed.

COMMENT: **43. DWP-002, Page 9, Section 7.4.7.2: Define what is to be discarded.**

RESPONSE: The unwanted portion described in Section 7.4.7.2 is the 1 to 2 inches of material removed from the open ends of the LEXAN tube described in Section 7.4.7.1. Section 7.4.7.2 has been revised for clarity.

COMMENT: **44. DWP-002, Page 9, Section 7.4.9: Specify what is meant by ". . .proper sample aliquot. . .". The instructions need to be more explicit.**

RESPONSE: Chemical, radiological, engineering and treatability analyses are required for each silo core sample. Each have different requirements concerning the amount of material needed to perform the required analysis. DWP-002 has been revised to define, where possible, the aliquot of sample needed for each test required, and from where in the sample core this aliquot should originate.

COMMENT: **45. DWP-002, Page 9, Section 7.4.9: Indicate which**

equipment.

RESPONSE: The instrument used to retrieve the sample from the core section is a stainless steel pipe sampler. This sampler is a one-inch hollow stainless steel tube, twelve inches in length with a T handle at one end. It will be inserted into the center of the core section from each end of the eighteen inch core section. A stainless steel rod will be used if needed to remove material from the sampler.

Each sampler will be used only once. If it is determined that the equipment will need to be reused the equipment will be decontaminated as directed by revised SAP Section 3.4, Decontamination Requirements.

COMMENT: **46. DWP-002, Page 9, Section 7.4.9: Explain the rationale for selecting the exact location of the portion of the section to be sampled.**

RESPONSE: Each section shall have the center core of the core section removed for analysis. This center core shall be the entire length of the core section. This method will represent the core section for the analysis required.

COMMENT: **47. DWP-002, Page 9, Section 7.4.13: Indicate whether the sample bottle remains open during this procedure. Also, describe which instrumentation is to be used.**

RESPONSE: The sample bottle is closed in step 7.4.9 and remains closed during step 7.4.14. An Eberline Model RO3C pressurized ion chamber or equivalent instrumentation will be used for this survey.

COMMENT: **48. DWP-002, Page 9, Section 7.4.13: It should be mentioned that the radiation meters may need to be removed to a lesser contaminated area to reach background levels after use. Specify what is meant by a ". . .low background area. . .".**

RESPONSE: A "low background area", as referred to in this section, is defined as an area which has a lower background radiation level relative to the sample core (LEXAN tube) on the trailer floor. This lower background area will be determined by radiation surveys performed in the sample trailer by the Radiation Safety Technician.

COMMENT: **49. DWP-002, Page 9, Section 7.4.14: If liquid is generated during decontamination, the collection and disposal of this waste must be addressed.**

RESPONSE: Please see the response to Comment #32.

COMMENT: 50. DWP-002, Page 10, Section 7.4.21: Disposal of the tape from the end caps should be presented.

RESPONSE: Tape from the end caps will be disposed of upon removal. Section 7.4.2.1 states that the work area will be cleaned up upon completion of sampling and all items used for the sampling effort to be disposed of will be placed in a radiation waste bag per WMCO Procedure SOP-65-C-106. This section has been revised for clarity.

COMMENT: 51. DWP-002, Page 11, Section 7.7: Decontamination procedures for equipment should be spelled out rather than referenced.

RESPONSE: Agree. Section 7.7 has been revised to include decontamination procedures. These procedures correspond with the revised Section 3.4.

COMMENT: 52. DWP-002, Page 11, Section 7.7: Procedures for field blanks/rinsate blanks need to be included.

RESPONSE: Sample equipment rinsates and rinsate blanks are referenced in the revised DWP-002 and detailed in the revised Section 3.4.

COMMENT: 53. DWP-002, Page 14, Figure 3 needs to include a title (Sample Collection Log).

RESPONSE: Figure 3 of the SAP has been replaced with a titled form.

COMMENT: 54. DWP-004, Page 3, Section 6.1: This sentence should read "A life-line or other safety devise providing an equivalent level of protection. . .shall be worn. . ."

RESPONSE: Step 6.1 of DWP-004 shall be revised as follows: "A life-line or other safety device providing an equivalent level of protection specified by WMCO IRS & T shall be worn on top of Silo 4."

COMMENT: 55. DWP-004, Page 3, Section 6.2: The precise definition or diagram of the ". . .center area of the silo. . ." should be included.

RESPONSE: Step 6.2 of DWP-004 shall be revised as follows: "At no time shall personnel walk on or place equipment on the 20 foot diameter center section of the silo dome."

no time shall personnel walk on or place equipment on the 20 foot diameter center section of the silo dome."

COMMENT: **56. DWP-004, Page 6, Section 7.2.2: Because the sampling plan specifies that a drop light be lowered into the silo before testing for explosive gases, the specification in this section should include only explosion-proof lighting. Rather than using explosion-proof lighting on a contingency basis, as suggested in the procedures, such lighting should be exclusively specified at the outset of sampling activities.**

RESPONSE: The silo atmosphere will be tested for explosive gases prior to lowering the lighting system into the silo. Explosion-proof lighting will be utilized when required.

COMMENT: **57. DWP-004, Page 7, Section 7.2.9: This sentence should be modified to read: "If explosive gases are not detected, lower drop light into the silo . . ."**

RESPONSE: Agree. The text has been revised as recommended.

COMMENT: **58. DWP-005, Page 2, Section 2.1.4: The safety equipment list should include an explosimeter for the detection of dangerous conditions within the silos.**

RESPONSE: Agree. An explosimeter has been added to the list.

COMMENT: **59. DWP-005, Page 7, Section 4.2.1: The text specifies continuous radon monitoring will be conducted at the fence line. If possible, such monitoring should be conducted at the top of the silos, near the sampling personnel.**

RESPONSE: Please refer to DWP-005, Page 18 of 24, which shows that Radon Working Level Monitors (WLM) will be utilized immediately adjacent to the silos. Also, please note in DWP-005, Section 4.1, that additional sampling for radon daughters (working level grab samples) will be performed in the vicinity of the manways and downwind areas.

COMMENT: **60. DWP-005, Page 9, Section 1.3: The silo sampling safety equipment checklist should include explosimeter instruments.**

RESPONSE: Agree. An explosimeter has been added to the list.

COMMENT: **61. DWP-006, Page 4, Section 6.6: Sections 6.6 and 6.8 are redundant.**

RESPONSE: Step 6.8 of DWP-006 shall be deleted.

ATTACHMENT

TABLE 1
DETERMINATION OF NUMBER OF SAMPLES
METHOD SW-846

SILO 1

Nuclide (pCi/g)	S1NE1A	S1NE1B	S1NE1C	S1SE1	S1SE2	S1SW1	S1NW1	MEAN	STD	EST NMBR OF SAMPLES
Th-230	21412	39693	30751	10569	20848	40818	43771	29694.6	12487.4	0.4
Ra-226	108100	192600	166400	116800	89280	181200	163300	145382.9	40061.6	0.2
Pb-210	181100	83110	77460	71920	48980	69480	54350	83771.4	44598.0	0.6
U-234	815	326	622	663	814	594	897	675.9	191.3	0.2
U-238	920	398	610	545	758	532	687	635.7	170.6	0.1
U-Total*	2753	1189	1831	1633	2280	1602	2066	1907.7	511.5	0.1

SILO 2

Nuclide (pCi/g)	S2SW1	S2NW1	S2NE2	S2SW2	S2NE1	S2NW2	MEAN	STD	EST NMBR OF SAMPLES
Th-230	31825	32874	8365	29716	40124	25391	28049.2	10776.3	0.3
Ra-226	145300	61780	657	104900	65520	68310	74411.2	48312.1	0.9
Pb-210	141900	145200	87930	77940	150700	399200	167145.0	117874.0	1.1
U-234	859	1107	974	121	848	1404	885.5	427.2	0.5
U-238	661	1069	874	46	814	1240	784.0	414.2	0.6
U-Total*	1972	3210	2620	137	2437	3717	2348.8	1243.3	0.6

* ppm

NOTES:

S1SW1 - The first penetration of the southwest manway of Silo 1

S2NW2 - The second penetration of the northwest manway of Silo 2

[redacted]

TABLE 2
DETERMINATION OF NUMBER OF SAMPLES
METHOD SW-846

SILO 1

Inorganic (mg/kg)	S1NE1A	SINE1B	SINE1C	S1NW1	S1SE1	S1SE2	S1SW1	MEAN	STD	EST NMBR OF SAMPLES
Aluminum	1260	60.4	1380	450	364	1430	733	811.1	549.0	0.9
Arsenic	57	47.9	45.8	54.5	14.7	68.4	61	49.9	17.3	0.2
Barium	4340	1970	4140	5000	2720	2190	7860	4031.4	2043.8	0.5
Beryllium	2.8	1.3	1.4	1.1	0.88	2.4	1.3	1.6	0.7	0.4
Cadmium	4.4	2.3	2.9	2.1	3	8	2.7	3.6	2.1	0.7
Calcium	5580	2320	2150	4130	3500	5700	5410	4112.9	1516.4	0.3
Chromium	43.3	25.8	22.8	21	165	111	42.6	61.6	55.2	1.7
Cobalt	1260	404	1210	681	349	814	657	767.9	357.7	0.4
Copper	473	122	410	217	126	307	209	266.3	136.2	0.5
Iron	24100	9090	7170	4340	22600	75100	8370	21538.6	24856.7	2.8
Lead	35800	61400	85100	81300	38900	38800	76900	59742.9	21798.7	0.3
Magnesium	2770	3270	3620	1900	1500	6020	2830	3130.0	1472.0	0.5
Manganese	178	36.5	83.1	33.5	94.2	257	54	105.2	83.1	1.3
Mercury	2.8	0.47	0.72	0.43	0.23	0.6	0.56	0.8	0.9	2.3
Nickel	1970	815	2580	1180	629	1350	1140	1380.6	679.4	0.5
Potassium	158	347	424	350	173	293	492	319.6	122.9	0.3
Selenium	172	139	170	162	106	180	168	156.7	25.8	0.1
Silver	9.8	5	23.3	9.5	6.3	13.1	9.8	11.0	6.0	0.6
Sodium	360	5730	13100	7080	1640	2610	7010	5361.4	4322.9	1.3
Thallium	0.09	0.38	0	0.49	0.24	0	0.52	0.2	0.2	1.7
Vanadium	240	111	110	105	72.2	140	106	126.3	53.9	0.4
Zinc	212	14.4	26.3	24.7	23.9	57.3	17.8	53.8	71.2	3.6
Cyanide	0.52	1.4	1.4	2.9	0.99	1.6	4.4	1.9	1.3	1.0

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TABLE 3
DETERMINATION OF NUMBER OF SAMPLES
METHOD SW-846

SILO 2

Inorganic (mg/kg)	S2NE1	S2NE2	S2NW1	S2NW2	S2SW1	S2SW2	MEAN	STD	EST NMBR OF SAMPLES
Aluminum	2570	1360	1250	1180	464	551	1229.2	756.7	0.8
Arsenic	1960	330	71.3	57.5	81.4	64.5	427.5	758.1	6.9
Barium	2460	89.2	1190	3090	8370	8000	3866.5	3503.7	1.8
Beryllium	2	0.66	6	2.7	1.6	2.1	2.5	1.8	1.2
Cadmium	19.1	4.1	5.6	5	3.6	3.4	6.8	6.1	1.7
Calcium	41900	301000	10300	2430	3610	8570	61301.7	118328.1	8.1
Chromium	42.2	12.9	68.8	47.2	24.3	34.1	38.3	19.4	0.6
Cobalt	2430	6.2	648	543	692	602	820.2	827.6	2.2
Copper	1790	0	220	221	263	249	457.2	660.1	4.5
Iron	13500	4010	37800	26900	8330	11400	16990.0	12791.9	1.2
Lead	21600	153	15100	17600	28500	29800	18792.2	10823.8	0.7
Magnesium	7390	8740	4200	4220	1520	2060	4688.3	2867.7	0.8
Manganese	403	335	170	160	74.2	83.2	204.2	135.1	1.0
Mercury	1	2.3	1.7	0.37	0	0.34	1.0	0.9	1.9
Nickel	2200	14.6	878	787	1070	897	974.4	704.7	1.1
Potassium	207	37.8	271	192	118	289	185.8	94.8	0.6
Selenium	91.1	0	117	95.9	118	105	87.8	44.4	0.6
Silver	22.8	0	9.1	12	7.4	10.1	10.2	7.4	1.1
Sodium	4070	588	912	226	3100	857	1625.5	1567.4	2.0
Thallium	0.61	0	0.33	0.39	1.4	0.82	0.6	0.5	1.5
Vanadium	142	21.9	214	211	151	193	155.5	72.1	0.5
Zinc	154	11.2	31.6	70.8	25.8	25.7	53.2	53.3	2.2
Cyanide	1.1	0	4.5	0.9	2.5	1.6	1.8	1.6	1.7

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