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LETTER FROM U S EPA REGARDING REVIEW OF TRIAL BURN SPECIFICATIONS FOR DIOXIN DESTRUCTION NCBC GULFPORT MS
3/27/1987
IDAHO NATIONAL ENGINEERING LABORATORY

Advance copy
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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

345 COURTLAND STREET
ATLANTA, GEORGIA 30365

MAR 27 1987

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WD-RM

Captain C. M. Maskell
CEC, U.S. Navy
Commanding Officer
Naval Construction Battalion Center (NCBC)
Gulfport, MS 39501

Dear Captain Maskell:

We have reviewed the Trial Burn Plan Dioxin Surrogates for the ENSCO NWP 2000 at the Naval Construction Battalion Center, Gulfport, Mississippi dated 20 March 1987 and have determined that it is not approvable as written. Enclosed is a list of deficiencies and items that need clarification.

The major items which must addressed before the trial burn are:

- Detailed description of the waste feed system and how it will accurately measure the quantity and feed rate of the solid waste feed.
- Detailed description of the analytical and sample preparation techniques that will be used for each type of sample taken.
- Samples must be composited over each run rather than each test.
- Detailed description of the QA/QC procedures, and how the data will be used.

The plan submitted was too generic.

Some of the enclosed comments have been discussed by telephone with Dan Haley of EG & G and Darrell Derrington of Versar. If you need any further clarifications, please contact Betty C. Willis of my staff at (404) 347-3433. We will continue to work closely with your staff in the finalization of this trial burn plan. Your staff and contractors did an admirable job given the limited amount of time they had to work on

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this document. Even though the enclosed list looks long, we feel that the items that must be addressed before approval of the testing can be very quickly and easily resolved by your staff and contractors

Sincerely yours,

George L. Harlow

for Patrick M. Tobin, Director
Waste Management Division

Enclosure

cc: Dan Haley, EG & G, Idaho
Darrell Derrington, Versar
Barry Rieter, ENSCO
Sam Mabry, MS, DNR

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Clarifications Needed and
Deficiencies in the Trial Burn Plan
for ENSCO MWP2000 at NCBC
Gulfport, Mississippi

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*1. The trial burn plan (TBP) must be signed and certified as required by 40 CFR §270.11 and permit condition I-G.

2. The revised TBP should have the pages numbered for ease of reference. The page numbers referenced hereafter were arrived at by sequentially numbering each page in each section, i.e., page II-3 is page 3 in section II.

3. The last sentence on page I-2 should have "and RCRA" deleted since ENSCO did not demonstrate greater than 6-9s DRE in the Eldorado RCRA burns.

4. Page I-5, in paragraphs 1 and 2, says that an objective of this trial burn is to "obtain a RCRA non-liquid permit for operation." Does the Air Force intend to seek an operating permit rather than complete the NCBC work under the RD&D permit?

5. Your current RD&D permit does not allow the burning of contaminated water (see Condition III-D). On page I-8, paragraph f implies that you may burn contaminated water in the incinerator. This will require a permit modification, but we agree that if the water is fed only in the kiln and the kiln and SCC temperatures are maintained that the water should not significantly effect the combustion process, therefore we are not going to require a change in the TBP to include a water waste stream.

6. On page II-6 it appears that the "access lid" is what is more commonly referred to as a "dump stack" or "thermal relief valve (TRV)." A complete description needs to be provided of the specific conditions that cause this lid to open and what functions of the incineration system stay on and what shuts down. Is it opened automatically (if so what readings on what instruments trigger this) or manually by the operator (if so what criteria will he use to determine when to open it)? What backup systems does ENSCO have to reduce the frequency of this event? Please provide calculations showing that the dump stack height is sufficient to create a negative draft at the face plate of the kiln and/or data taken while the TRV is open that shows a negative pressure is maintained. The Contingency Plan should address what actions will be taken if the TRV does open while hazardous wastes are present in the incinerator.

*7. On several pages in Section II (II-10, 12, 17, 18, 19, etc.) the TBP just says "a device" is used to measure the vacuum or another parameter. Please specify what device is being used for these purposes.

8. On page II-17 it says the stack height is 35.5 feet high and yet when you add all the components up it would appear to be 46.5 feet high yet Drawing 8 shows the stack as 40 feet from ground level. Please revise the document to correctly describe the stack height in all places.

9. On page II-22 it says that the solid which settles out in the Effluent Unit "are handled identically to the kiln ash." How are these solids dewatered (all free liquids removed) before they are "landfilled?"

10. On page II-23, and/or elsewhere in the document you need to more clearly describe how you will arrive at the solid waste feed rates. Describe the weigh hopper, its capacity by volume and weight, type of weighing device, accuracy of measurements, units of measure, is it connected to the computer, if so does the computer calculate feed rates or only record weights, and are the weights accurate enough to demonstrate 6-9's DRE?

*11. A more complete description needs to be provided on page II-24 of the feed hopper and screw auger so we can determine how far in advance of the trial burn you should begin taking solid waste samples.

12. Under Section II-G you must include an Automatic Waste Feed Shut Off (AWFSO) tied to an indicator of combustion gas velocity that indicates the gaseous residence time in the Secondary Combustion Chamber (SCC) is < 1 second as required by Condition III.E.9.d of your permit. Even though your RD&D permit does not require an AWFSO system for exceeding the maximum waste feed rate and minimum water flow rates to the packed tower and the scrubber during the trial burn or opening of the TRV, you should include these AWFSOs since these shut offs would normally be required on a RCRA incinerator and the purpose of the RD&D permit is to collect data on the reliabililty, maintainability, and cost-effectiveness of using a RCRA incinerator at military bases. For any changes made submit verbal descriptions and modified blue prints.

*13. On pages II-31, 32 and/or elsewhere in the TBP you need to provide complete descriptions of the O_2, CO, and CO_2 monitors; what is the range of each one, what concentration of calibration gases are used, are they NBS traceable, are the calibration gases fed through the complete sampling line and conditioning systems etc.?

14. EPA does not agree that having a technician present in the control room where numerous indicator devices are installed constitutes "continuous monitoring." Continuous monitoring can only be achieved by strip chart recorders (or other pen and ink type recorders) or computer storage of the data where each data point is no more than 1-2 seconds apart. Please revise your definition on page II-33 and all the tables and charts in the TBP where "Continuous" is used incorrectly. If the technician manually logs certain data on a set frequency to assure that he is monitoring the various indicator devices, then that time frequency should be entered in the charts.

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15. If any device that triggers (or should trigger) an AWFSO malfunctions then you must stop solid waste feed until it can be repaired, unless you have a backup device which you can use. We agree that for all other meters or measuring devices you can continue waste feed for 15 minutes while repairing it. Please revise the tables in Sections II and III accordingly.

*16. On page II-39 it indicates under "Location," NA for the secondary combustion gas residence time. The TBP needs to describe how the computer will calculate the residence time - what data from what device(s) will be used. The location of those devices should be used on page II-39 instead of NA.

17. On page II-40 you need to include what you are using to assure a negative pressure at the face of the kiln and the outlet gas temperature from the SCC.

18. From Drawing 6 it appears that the thermocouple that is connected to the AWFSO system is monitoring the refractory rather than the combustion gases, if this is not true, please explain the significance of some TEs going to the surface of the secondary combustion chamber (SCC) and other TEs extending inside the SCC. Are there actually two thermocouples connected to TE 222 or is TE 223 the redundant thermocouple mentioned on page II-30? If TE 223 is the redundant thermocouple it must also be connected to the ASFSO system.

*19. Even though your method of mixing the sand and POHC seems to be as good as can be done, we recognize that it is extremely difficult to mix three solids homogeneously and therefore there is a very distinct possibility that even though you take three grab samples every 15 minutes those samples may not, when analyzed, give POHC concentrations in the 1500 - 3000ppm range. We therefore request that you also very accurately weigh the amount of each POHC added to each batch used in each run and calculate the theoretical concentration of each POHC burned during each run and compare that to the analytically determined concentration in the composited waste feed samples. If good correlation is not achieved, then you must use the more conservative amount of POHC as the "POHC in mass" in calculating the DRE. Section III also needs to discuss when contaminated sand feed will begin in relation to the beginning of stack gas sampling. If the solids residence time is 30 minutes then the contaminated sand must be fed for 30 minutes before beginning stack sampling. Please change Section III appropriately.

*20. We recommend that you take a blank water sample from the neutralization tank before this trial burn begins rather than from the water tap. On page III-7 and elsewhere in the TBP you need to change your sampling matrix to include sampling of the water effluent prior to the carbon absorption unit to use in estimating the fate of the POHCs (§270.62(b)(6)(iii).

*21. All through Section III it refers to compositing samples of feedstock, solid residue and water after the <u>test</u> is completed. You must composite these samples for each <u>run</u> so you will have three separate samples for each test.

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*22. On page III-9 you may want to be more specific on what you mean by "clean aluminum foil" and with what you are going to cover the stainles steel bucket. If the foil and what ever you cover the bucket with is not cleaned with solvents prior to use, you may pick up contamination from them. Since any contamination picked up would tend to give higher numbers we are not requiring you to make any changes in this regard, but we want to make sure you are aware of the potential problem.

*23. Section 2.1 needs to specify whether or not the grab samples of feedstock will be capped until after the run when they are all composited.

*24. On page III-10 and elsewhere in the TBP you may want to change your procedures to include XAD traps in both Method 5 trains. The extra XAD traps in the particulate train could be archived in case you "loose" any XAD traps from the POHC train.

*25. On page III-10 and elsewhere you need to specify what concentration of what alkaline chemical will be used in the second impinger for chlorides determination.

*26. Page III-26 (first page after Table III.D-1) needs to be revised to agree with page III-12 and the EPA Method 5 procedures which requires all the front half of the train to be rinsed and the weight of the particulate in the rinsate to be added to the weight of the particulate on the filter.

*27. Table III.D.2 needs to be revised to include the samples from both MM5 trains and the blanks of methylene chloride and methanol discussed on the previous page. Do you intend to save any blanks on the POHCs? Tables III.D.2 and III.E.3.1 must be consistent with each other.

*28. On page III-30 you need to specify what preservatives will be used in which samples, how long each type of sample will be stored prior to analysis, and how the samples will be stored, or reference future page numbers where the TBP discusses storing the samples in ice chests etc.

*29. On pages III-33, 34, and several other places in the TBP it says you will use a "solvent of choice" or "sorbent of choice." All these references must be changed to specify exactly what will be used. If a different solvent(s) will be used on the two different MM5 trains then you need to specify that also. You also need to go through each of the EPA test methods included in Appendix I and where these generic methods say to select an appropriate chemical or extraction medium or clean-up technique, etc., you need to specify what chemicals technique etc., you will use for HCE and HCB. We recommend that you make sure IT or whatever analytical labs you use, have looked over this portion of the TBP and are prepared to do the methods exactly as they are specified in the revised document.

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*30. Pages III-33 to 36 need to be revised to specify that two MM5 trains will be used and how the particulate filters, probe rinses, etc., from each train will be handled. Both trains are necessary and technically possible.

31. On pages III-40 and 41 what does "" mean? You also need to include stack gas CO. The soil residence time and the gas residence time should be held constant during each test. The TBP must specify how you are calculating the residence time.

32. Section III.H also needs to be revised to include the AWFSOs discussed in our earlier comment.

33. Section III.I needs to include inspection frequency for cleaning the flame detector lens (missing in both places) and inspecting the oil level in the compressor. From this section it appears that you have CO and O_2 meters in the SCC as well as the stack, is this correct? The O_2 and CO monitors should be calibrated (four points on scale) weekly instead of monthly. This table should also include weekly testing of the AWFSO Systems.

34. Page 1 of the SPCC Plan says the incinerator is a 4 ton/hr kiln, this needs to be changed to be consistent with the rest of the TBP.

35. In Section 3.5 of the SPCC please fill in the blanks on the distance between the acids and caustics storage areas.

36. Appendix I seems to be missing a number of Sections, i.e., it jumps from 14.0A to 3.0B. Please clarify if there should be Sections 1B and 2B.

37. In Appendix I, Section 3.1A and elsewhere in the TBP (Section II) it appears that there is a misunderstanding of what EPA is requiring for compliance with the regulatory requirement to continuously monitor the "indicator of combustion gas velocity" in 40 CFR §264.346. An annubar is an acceptable method if it is located such that it is actually measuring the velocity of the gases exiting the combustion chamber, but from the blue prints it appears that the annubars are in the lines from the combustion air blowers. Since this incinerator is under negative pressure what is the correlation between flow rate of the combustion air and the velocity of the gases exiting each combustion chamber? Provide documentation to support the correlation.

*38. Table 3.1 should include the QA objectives for the waste feed rate.

*39. Section 6.1.2A states that the calibration criteria for the gas monitors, thermocouples and weigh hopper are specified in Section II. I could not find the criteria; it must be included in the TBP so either include it or discuss exactly where it is located.

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*40. Section 7.0A states that "no analyses are required for ...samples that will be collected." Please clarify this statement.

*41. The formula you have proposed in Section 8.1A for calculating HCl removal efficiency does not make sense, because you can't subtract volume rates from mass rates. Please explain what "HRE" stands for, what "HCl produced" is and what "Volume rate of gas" is or replace this formula with the standard formulas for calculating the HCl emmissions (see attachment). Rewrite this section to clearly explain how you plan to determine the HCl concentration in the gases prior to entering the pollution control equipment if you intend to demonstrate 99% removal rather than compliance with the 4 pounds per hour limit.

*42. Section 8.3A must specify the frequency at which the micro processor will record the operating parameters; "on a periodic basis" is not adequate.

*43. Section 3.0B, 3.1.3 references Table 2, where is it located?

*44. Please explain what is meant by "Corrected Concentration data" in Section 3.5. The information developed under the QA/QC Plan cannot be used to correct raw data. You must report all data from all analyses. You can use QA/QC data to explain whether or not you think a particular number is correct, but you cannot use it to "correct" that number.

*45. Table III. B.1 needs to be totally redone. What is matrix code 6, what specific methods in SW-846 will be used, what does 24.9 standard deviation mean and what does an accuracy of D-152 mean? Please explain why you expect an accuracy range of 4-113% on HCE, i.e., +13% and - 96% is pretty unsual.

46. For completeness it would be a good idea to include Method 325.3.

*47. Section 9.0B and elsewhere in the TBP must be revised to include what chemicals will be used for calibration standards, and spiked surrogate compounds.

48. Section 10.0B says there will be two analytical labs involved with this project. The TBP previously had only mentioned IT in Knoxville, please clarify.

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Calculation of DRE -

$$DRE = \frac{W_{in} - W_{out}}{W_{in}} \times 100$$

The DRE values for the three POHCs are therefore:

hexachlorobutadiene	99.997
hexachlorobenzene	99.996
hexachloroethane	>99.993

Note that compliance with a "four-9's" performance standard could not have been demonstrated in this particular example for a component present at less than 1% in the waste itself (or less than 1000 mg/kg in the 1:10 waste: fuel blend fed to the incinerator) unless the detection limit for that component in the stack gas were less than 4 $\mu g/m^3$.

In this hypothetical example compliance with the 99.99% DRE performance standard has been demonstrated, in one test, for each of the three POHCs. If these results were supported by data from the other two replicate trial burn tests, the "four-9's" DRE could be considered to have been established.

Calculation of HCl Emissions - An incinerator burning highly chlorinated hazardous waste capable of producing significant stack gas emissions of hydrogen chloride (HCl) must monitor and/or control HCl emissions.

The hypothetical waste in this example contains approximately 75% chlorine by weight (Table 1). At the proposed 60-lb/hr feed rate of waste (blended 1:10 with auxiliary fuel for a total feed of 600 lb/hr or 9.8 x 10^6 Btu/hr), the maximum HCl emission rate would be 45 lb/hr of chlorine basis or 46 lb/hr as HCl. This is sufficiently high to warrant concern for potential HCl emissions and to indicate the necessity for stack measurement of HCl.

The stack emission rate of HCl can be calculated from:

$$HCl_{out} = C_{in} \times ER_s \times 1.32 \times 10^{-4}$$

where:

C_{in} = Concentration of HCl (as Cl^-) in the stack gas effluent and collected in the impingers.

ER_s = Volumetric flow rate of the stack gas in m^3/min.

1.32×10^{-4} = Conversion factor from mg/min to lb/hr.

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Assume that quantitative analysis of the impinger/condensate solution from the time-integrated comprehensive sampling train from test no. 1 gave 34 mg/m^3 HCl in the stack effluent.

The stack emission rate of HCl is calculated by:

$$HCl_{out} = 34\ mg/m^3\ (90\ m^3/min)\ (1.32 \times 10^{-4})$$

$$= 0.40\ lb/hr\ HCl$$

This emission level is less than 1% of the 46 lb/hr of HCl potentially generated from the waste, indicating that the removal efficiency of the wet scrubber was greater than 99%.

Calculation of Particulate Loading (mg/m^3) - An incinerator burning hazardous waste must not emit particulate matter in excess of 180 milligrams per dry standard cubic meter when corrected to a standard excess air level in the stack gas.

Assume that prior to chemical analysis, particulate samples from the stack effluent of the hypothetical waste (from probe washes and filter catches of the time-integrated comprehensive sample train) were dried and weighed.

The hypothetical particulate loading from these measurements was calculated to be 80 mg/m^3 at the actual excess air level of the stack. The excess air level was determined to be 150% based on hypothetical measured values of oxygen (12.8%) and carbon dioxide (6.7%). Correction to standard excess air level as specified in the Part 264 regulations leads to a particulate loading of 140 mg/m^3 (0.06 gr/SCF). This total particulate emission is in compliance with the Part 264 performance standard that specifies less than or equal to 180 mg/m^3 (less than or equal to 0.08 gr/SCF).

Summary

It is apparent that this sample from the hypothetical waste when burned under these conditions complies with the Part 264 Subpart O Incinerator Standards as they relate to:

1. Destruction and Removal Efficiency. All three POHCs showed compliance with the 99.99% DRE performance standard.

2. Limitation on HCl Emissions. The HCl emission rate of 0.40 lb/hr shows compliance with a 99% removal standard for HCl.

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