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GUIDANCE ON TRIAL BURN FAILURES

United States Environmental Protection Agency
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Office of Solid Waste and Emergency Response

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MEMORANDUM

Subject: Guidance on Trial Burn Failures

From: Michael Shapiro, Director
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To: Hazardous Waste Management Division Directors
Regions I-X

The purpose of this memorandum is to clarify EPA's policy on trial burns for incinerators and boilers and industrial furnaces (BIFs) under the Resource Conservation and Recovery Act (RCRA), and to address issues that have recently been raised regarding trial burn failures. These issues include: 1) what constitutes a successful trial burn; 2) how to handle invalid data; 3) what constitutes an unsuccessful trial burn; 4) how to handle a request for a trial burn retest; and 5) how to restrict operations after an unsuccessful trial burn.

The policies set out in this memorandum are not final agency action, but are intended solely as guidance. They are not intended, nor can they be relied upon, to create any rights enforceable by any party in litigation with the United States. EPA officials may decide to follow the guidance provided in this memorandum, or to act at variance with the guidance, based on an analysis of specific site circumstances. The Agency also reserves the right to change this guidance at any time without public notice.

Purpose of a Trial Burn

A trial burn serves several purposes. It is used to determine whether a facility can meet the required performance standards for

either hazardous waste incinerators (40 CFR 264.343) or BIFs (40 CFR Part 266 Subpart H), and to determine the operating conditions that should be set in the permit. A trial burn is also used by the permit writer to determine the need for and establish other limits or requirements on a site specific basis under the "omnibus" authority of RCRA Section 3005(c)(3). This guidance will consider the term "performance standards" to include both regulatory performance standards and such site-specific standards imposed through the omnibus authority. Until continuous emission monitors (CEMs) are available, setting permit operating conditions based on the results of trial burns is the best method of assuring compliance with the regulations.

A trial burn typically consists of a series of "tests". A trial burn test (or combination of tests) should be done for each set of operating conditions for which the facility desires to be permitted. Three "runs" should be performed for each test. Each run of a test should be conducted at the same nominal operating conditions. In general, each run of a test should be passed for the test to be considered successful and for the facility to be permitted to operate at that set of conditions.

Facilities will often perform multiple tests during the trial burn in order to develop all applicable permit operating conditions. For example, facilities will usually perform a minimum and a maximum temperature test, since decreasing temperatures tend to decrease organics destruction, and increasing temperatures tend to increase metals emissions due to an increase in volatility. These tests, if successful, will determine the temperature boundaries between which the facility can operate in compliance with the destruction and removal efficiency (DRE) and metal emissions standards.

During a trial burn, a facility's general strategy is typically to operate at conditions that will give it a broad range of permit operating conditions. The permit writer should take great care in reviewing the trial burn plan to assure that the test conditions meet the regulatory requirements. According to 40 CFR 270.62(b)(5) for incinerators and 40 CFR 270.66(d)(2) for BIFs, the trial burn plan can only be approved if 1) it is likely to determine if the performance standards can be met, 2) it does not present an imminent hazard to human health or the environment, and 3) it will help to determine the necessary operating requirements. In determining if the performance standards can be met in the trial

burn, permit writers should use their experience and best engineering judgement to make sure that the trial burn represents "good operating practices". EPA believes that a trial burn plan that allows or incorporates sub standard operating practices is less likely to demonstrate compliance with required performance standards than a plan based on a well-operated unit. The Combustion Emissions Technical Resource Document (CETRED), which helps to define best operating practices for various categories of hazardous waste combustors, can assist in determining good operating practices. Engineering judgement and generally accepted industry practices for achieving good mixing, adequate temperatures and residence times, adequate oxygen, steady-state operation, and minimization of fugitive emissions can also be used in this evaluation. Additionally, in reviewing and approving a trial burn plan, the permit writer may find it useful to examine the facility's compliance history and past operating history when applicable.

What Constitutes a Successful Trial Burn

A trial burn is successful only if enough tests are passed so that the permit writer can establish a complete set of operating conditions in the permit to assure compliance with applicable performance standards. A successful trial burn test generally consists of passing three separate runs at the same nominal operating conditions. If a test is successful, the facility would be allowed to operate under the tested conditions. In general, failing any performance standard in any one of the three runs constitutes a failure of that test. If a test fails, the facility should not be permitted to operate under the failed conditions.

A facility may fail an individual test (or several tests) at particular operating conditions during the trial burn; however, if sufficient tests are passed such that applicable permit operating conditions can be established from the successful tests, then the trial burn is still considered successful. For example, for a facility where maximum and minimum temperature limits are necessary, the facility would typically have to pass both a minimum temperature test and a maximum temperature test, along with any other necessary tests, for the trial burn to be successful.

Facilities can receive final permit conditions for only those conditions that they passed in the trial burn or that are set independent of the trial burn (e.g., Tier I metal limits, which are

discussed later in this document). Thus, in a case where a facility passed some tests and failed others, it is important to be able to distinguish the difference between the successful and unsuccessful conditions. Final permit conditions should be written to allow the facility to operate at the successful conditions while excluding the unsuccessful ones. Additionally, the permit writer should be sure to set-monitoring and recording requirements in the permit to assure that operating conditions are being met.

Final permit conditions will directly reflect the successful operating conditions from the trial burn. Due to unforeseen circumstances that may arise during trial burns, the trial burn conditions may deviate somewhat from the conditions specified in the trial burn plan. If this situation occurs, and the trial burn was successful, the operating conditions in the permit should be the conditions demonstrated during the trial burn, not the conditions from the trial burn plan. In other words, for conditions that are set based on the trial burn, a facility will be permitted to operate only at those conditions that have been demonstrated successfully during the trial burn.

Facilities may perform several tests during a trial burn in an attempt to have different sets of operating conditions for different sets of wastes (i.e., "campaign burning"). If a facility fails a particular test, it may still be permitted to operate on those waste streams and at those conditions that were successfully demonstrated, provided that sufficient data are available from the passed tests to set all necessary permit operating conditions. If trial burn results do not provide sufficient data to enable the Agency to set permit conditions which assure compliance with the performance standards, then the trial burn would not be considered successful.

How to Handle Invalid Data

In limited situations, the Agency believes it may be appropriate to use data from two successful runs as the basis to determine that a trial burn test was successful when circumstances beyond the owner/operator's control caused the invalidation of a third run. An invalid run is different from a failed run. A failed run occurs when the data show nonconformance with the performance standards under a particular set of operating conditions. An invalid (or inconclusive) run occurs when data problems (for example, resulting from breakage of a sample tube in

a laboratory) make comparison with the performance standards impossible; neither conformance nor nonconformance with the standards has been shown in these cases. Such situations would include sampling and analysis problems, but not operational problems, which are presumed to be within the control of the owner/operator.

The criteria permit writers should use in accepting two runs as a successful trial burn test are listed below.

- a) Only one run contains invalid data. If two or more runs contain invalid data, then the test should be considered inconclusive and should not be used to set operating conditions (i.e., the test should not be considered successful).
- b) No data from any run shows failure. For example, if during a trial burn test/ one run passes for DRE, one run fails for DRE, and one run has invalid data for DRE, then that test should be considered a failure.
- c) The data from the two successful runs should show a reasonable degree of precision and margin of compliance.
- d) There should be no reason to believe (based on operating data, observation of stack emissions, etc.) that the invalid run was less likely to be in compliance than the other two-runs. Immediate reporting by the facility of an incident which might invalidate a run (e.g., QA/QC outside of control limits) lends more credence to the claim of invalidity than if the facility waits until all analytical results are in and emission calculations have been made.
- e) A detailed written description of the circumstances resulting in the invalidation of data related to any test should be submitted to, and reviewed by, the Agency.

Generally, two valid runs should not be accepted as a successful trial burn test when the owner/operator had direct control over the situation that caused the third run to be invalidated. The trial burn test should be considered unsuccessful

if neglect and/or carelessness of either the owner/operator or those conducting the testing/analysis caused the invalidation of a run.

What Constitutes an Unsuccessful Trial Burn

A trial burn is unsuccessful either because it showed a failure to meet the performance standards, or it was inconclusive. A trial burn is considered a failure when enough tests have failed (i.e., show a failure to meet performance standards) such that a full set of operating conditions representing compliance cannot be set in the permit.

A trial burn failure is different from failure of a trial burn test. A test failure shows nonconformance with the standards at one set of operating conditions; however, a facility may still be permitted to operate if it passes one or more trial burn tests at other operating conditions. A trial burn failure occurs when enough tests have failed such that a full set of operating conditions representing compliance cannot be set in the permit. The results of a failed trial burn should not be used to establish final permit operating conditions. Following a failed trial burn, the permitting authority should take one or more of the following actions, as appropriate: 1) take steps to restrict operations (as discussed later in this document); 2) begin processing a denial of the facility's permit application (for an interim status facility); 3) initiate proceedings to terminate the facility's permit (for a new facility); 4) authorize a trial burn retest (also discussed later in this document).

An entire trial burn (like a trial burn test) may be considered inconclusive. An inconclusive trial burn occurs when data problems have arisen such that neither conformance nor nonconformance with the performance standards can be shown. The results of an inconclusive trial burn may not be used to establish final permit operating conditions. Following an inconclusive trial burn, the permitting authority should take one or more of the following actions, as appropriate: 1) take steps to restrict operations as discussed later in this document); 2) begin processing a denial of the facility's permit application (for an interim status facility); 3) initiate proceedings to terminate the facility's permit (for a new facility); 4) authorize a trial burn retest (also discussed later in this document).

Facilities may choose not to test for certain parameters and be permitted at the Tier I or Adjusted Tier I feed rate screening limits established in the BIF rule (56 FR 7134, February 21, 1991), if appropriate. These parameters include metal emissions (40 CFR 266.106), and hydrogen chloride (HCl) and chlorine gas (Cl₂) emissions (40 CFR 266.107). The Tier I and Adjusted Tier I feed rate screening limits are based on the assumption that all metals, HCl, or Cl₂ (depending on the parameter) fed into the system are emitted (i.e., no partitioning into the bottom ash, and no removal by any air pollution control device). This case is the most conservative scenario possible and produces the most stringent feed limits in the permit. The Adjusted Tier I feed rate screening limits also allow for site-specific dispersion modeling. Although directly applicable only to BIFs, these provisions are generally applied to incinerators as well through the Agency's omnibus permitting authority, where necessary to protect human health and the environment.

Facilities that test for these parameters and fail, or show inconclusive results, should not be permitted to operate under the tested conditions. Instead, a permit for the facility (if one is issued) should limit the facility to the Tier I or Adjusted Tier I feed rate screening limits. For example, a permit for a facility that does not meet the HCl or Cl₂ standard when tested under higher chlorine feed rates should limit the chlorine and chloride input to the equivalent of 4 lbs HCl/hr, the Tier I limit, or the Adjusted Tier I limit, as applicable.

Similarly, a permit for a facility that does not meet the metals emissions standards during high temperature testing should limit the metals input into the system to the Tier I or Adjusted Tier I feed rate screening limits (see 56 FR 7171, February 21, 1991).

It should also be noted that, where the trial burn did not demonstrate compliance with the HCl, Cl₂, or metal emissions standards, the permit may specify allowable chlorine or metals feed rates that are more restrictive than the Tier I or Adjusted Tier-I limits, based on a site-specific risk assessment which considers both direct and indirect exposure pathways to a wide range of pollutants. In this case, the same assumption concerning stack emissions should be applied (that is, the assumption of no partitioning or removal).

How to Handle a Request For a Trial Burn Retest

Facilities that fail or conduct an inconclusive trial burn test or tests may request a retest and submit a revised trial burn plan. The permitting authority would review and approve or deny such a request. For a permitted incinerator or BIF (new or renewal), this request would be processed through the permit modification procedures in accordance with 40 CFR 270.42. The revised trial burn plan can only be approved if 1) it is likely to determine if the performance standards can be met, 2) it does not present an imminent hazard to human health or the environment, and 3) it will help to determine the necessary operating requirements (see 40 CFR 270.62(b)(5) for incinerators and 40 CFR,270.66(d)(2) for BIFs). In the case of a request for a trial burn retest following a trial burn test failure, the applicant should conduct an investigation into the reason for the failure, and make substantive changes in its proposed trial burn plan which would be expected to prevent failure from reoccurring. A facility should not be allowed to retest unless it has made changes to its process (i.e., design and/or operating conditions), that are likely to correct the problems encountered in the failed trial burn test. A facility should not be allowed just to "take its chances" on passing a retest under the same conditions. The first failed test indicates that, at best, the unit would not be in compliance some of the time when operated at those conditions, and that those conditions should therefore not be incorporated into a permit.

As opposed to a trial burn test failure, an inconclusive test would not necessarily require changes to be made to the process prior to allowing a retest. The test could be repeated under the same conditions as the previous test, but with special attention paid to the situation that caused the original test to be inconclusive. During the retest, all attempts should be made to prevent that situation from reoccurring.

There is no set limit on the number of retests allowed under EPA regulations, so long as after each unsuccessful test the above criteria are met and the trial burn plan is revised and approved (through a permit modification for a new incinerator or BIF) prior to any retesting. The same criteria recommended for the design and conduct of initial trial burns are also recommended for all retests (i.e., three runs for each trial burn test, etc.).

Facilities that wish to conduct a trial burn retest after an

unsuccessful test should expeditiously submit a comprehensive request consistent with the guidance discussed above. If a complete request is not promptly submitted, it is appropriate for the Agency to start permit denial proceedings. The Agency's decision to discontinue or delay permit denial proceedings will be highly dependent on the adequacy of any retest request and the Agency's ability assure compliance with the applicable regulations during the interim period.

For the facilities that fail a trial burn test for only the HC1, C12, particulate, or metal emissions standards, EPA believes it may be appropriate in some cases to authorize a retest for these failed performance standards without simultaneous DRE testing. This decision would depend on the nature of the design or operating modifications made for the retest. If the modifications would not adversely impact DRE (e.g., addition of pollution control equipment), then HC1, particulate, and/or metal tests are sufficient. In this case, operating conditions should be identical to those of the original trial burn test for all parameters other than those related to the modifications which were made. In contrast, if the design or operating modifications made by the facility in order to retest for the HC1, C12, particulate, or metals emissions standards have the potential to affect DRE, then DRE should be retested along with the standards that were not demonstrated.

The permit writer should ensure that operating conditions during a trial burn retest are consistent with the overall scheme of the trial burn plan so that all successful tests can be used in conjunction to establish final operating conditions.

How to Restrict Operations After an Unsuccessful Trial Burn

Permitting authorities should move expeditiously, in appropriate cases, to restrict operations (to the extent that regulatory and statutory authorities allow) after receiving information that a facility conducted an unsuccessful trial burn (i.e., a trial burn failure or an inconclusive trial burn).

Permits for new incinerators and BIFs should be written with a provision that would restrict post-trial burn operations if a facility conducts an unsuccessful trial burn. The Agency recommends that such permits contain the following conditions: 1) the permittee must notify the Regional Administrator within 24 hours of

making a determination that the incinerator of BIF failed to achieve any of the performance standards in any run of any test, and 2) upon the request of the Regional Administrator, the permittee shall feed waste and operate the incinerator of BIF only under restricted conditions as specified by the Regional Administrator. (A similar condition is recommended in the incinerator module of the model permit, except the second portion of the condition provides that, upon the request of the Regional Administrator, the permittee shall cease feeding hazardous waste to the incinerator. The new recommended language covers the case where a complete shutdown is required, while providing clearer authority in cases where some, but not all, tests were successful.) The permittee then has the option of applying for a permit modification pursuant to 40 CFR 270.42 to conduct a new trial burn pursuant to 40 CFR 270.62(b) for incinerators or 40 CFR 270.66 for BIFs. If an already issued permit does not have such a provision in it, and the trial burn is unsuccessful, then EPA may still be able to modify the permit to restrict operations based on 40 CFR 270.41(a)(2) or 40 CFR 270.41(b)(1), or terminate the permit based on 40 CFR 270.43(a)(3). The appropriate authorities should be invoked to assure that operations during the post-trial burn period will achieve compliance with the performance standards.

With respect to interim status BIFs, EPA regulations establish certain performance standards that must be met at all times when there is hazardous waste in the unit (40 CFR 266.103(c)(1)). Standards for carbon monoxide, total hydrocarbons, particulate matter, metals emissions, and hydrogen chloride and chlorine gas emissions are included in the regulations. If trial burn data from an interim status BIF indicate failure to comply with any of these standards, then under appropriate circumstances the permitting agency may be able to restrict operations under RCRA Section 3008 or Section 7003.

With respect to interim status incinerators that fail their trial burns, regulatory agencies should either move as quickly as possible to cause the incinerators to cease operations by denying their permits (or, if appropriate, through RCRA Section 7003 actions), or, if appropriate, authorize trial burn retests. This guidance also applies to interim status BIFs that fail their DRE standard during the trial burn, since the DRE standard generally does not apply to BIFs during interim status.

EPA has recently proposed a rule which would provide explicit

authority to restrict operations at interim status facilities after a failed or inconclusive trial burn (59 FR 28680, June 2, 1994). During the post-trial burn period, interim status facilities would only be able to operate under conditions that passed and were demonstrated to meet the applicable performance standards, and only if the successful trial burn data are sufficient to set all applicable operating conditions. If finalized as proposed, this regulation would provide additional authority to restrict operations at interim status facilities following a failed or inconclusive trial burn.

For more background on issues such as permit conditions, trial burn measurements, and validity of data, permit writers may consult the following guidance documents.

- Guidance on Setting Permit Conditions and Reporting Trial Burn Results; January 1989.
- Hazardous Waste Incineration Measurement Guidance Manual; June 1989.
- Quality Assurance/Quality Control (QA/QC) Procedures for Hazardous Waste Incineration, January 1990.

If your staff have any questions on this trial burn failure guidance or how to obtain other guidance materials, they may call Andy O'Palko at (703) 308-8646, or Sonya Sasseville at (703) 308-8648.

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