

STATE OF NEW MEXICO
BEFORE THE ENVIRONMENTAL IMPROVEMENT BOARD



IN THE MATTER OF PROPOSED REPEAL AND
REPLACEMENT OF 20.2.7 NMAC – *EXCESS EMISSIONS
DURING MALFUNCTION, STARTUP, SHUTDOWN,
OR SCHEDULED MAINTENANCE*

No. EIB 07-16(R)

STATE OF NEW MEXICO
BEFORE THE ENVIRONMENTAL IMPROVEMENT BOARD

IN THE MATTER OF PROPOSED REVISIONS
TO 20.2.70 NMAC – *OPERATING PERMITS*

No. EIB 08-07(R)

NEW MEXICO ENVIRONMENT DEPARTMENT'S
NOTICE OF INTENT TO PRESENT TECHNICAL TESTIMONY

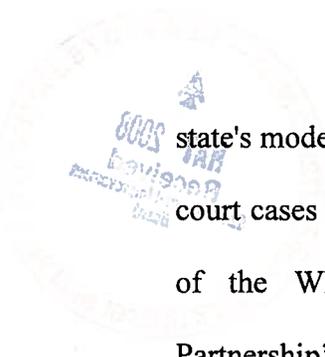
The New Mexico Environment Department, pursuant to 20.1.1 NMAC - *Rulemaking Procedures*, and the Notices of Public Hearing, file this Notice of Intent to Present Technical Testimony for the public hearing in the above-referenced matters which is scheduled to begin on June 2, 2008.

1. Persons filing the notice.

New Mexico Environment Department ("Department").

2. Identity and qualification of witnesses.

Mary Uhl. Mary Uhl is the Bureau Chief of the Department's Air Quality Bureau ("Bureau"). Since joining the Bureau in 1992, she has served as the manager of the modeling and planning/policy sections, and as an air dispersion modeling expert, during which she completed more than eight hundred (800) modeling analyses, developed the



state's modeling guidelines, managed the Corrales air toxics study, and testified in several court cases and numerous public hearings. Additionally, Ms. Uhl has served as co-chair of the WESTAR Technical Committee, co-chaired the Western Regional Air Partnership's Modeling Forum, and published several technical articles regarding air chemistry and dispersion modeling. Ms. Uhl holds a Bachelor of Science degree in Math and Chemistry and a Master of Science degree in Atmospheric Sciences from Purdue University.

Debra McElroy. Ms. McElroy is the manager of the Bureau's Enforcement and Compliance Section. She has worked for the Department since 1992, first as an inspector in the Hazardous and Radioactive Materials Bureau and then as an inspector in the Occupational Health and Safety Bureau. In 1997, Ms. McElroy became the program manager for the Consultation/Technical Services Section of the Occupational Health and Safety Bureau, a position she held until joining the Bureau in September 2001. Ms. McElroy holds a Bachelor of Science degree from the College of Technology at the University of Houston, and graduated as a Radiologic Technologist from the Health Science Center at the University of Texas-Houston.

Robert Samaniego. Mr. Samaniego is a Senior Environmental Compliance Specialist with the Bureau. He has been an Air Compliance Inspector since joining the Bureau in 1996, specializing in complex source inspections such as petroleum refineries and natural gas processing plants. Mr. Samaniego holds a Bachelor of Science degree in Chemical Engineering from Rensselaer Polytechnic Institute.

Richard Goodyear. Mr. Goodyear has been Engineering Manager for the Bureau's air quality permit programs for twelve years. Previously, he processed permits

in the Bureau's New Source Review Unit for 18 months and was the Program Manager for the Title V permit program for 2 years. He served for 21 years as an officer in the U.S. Army Corps of Engineers. He holds a Bachelor of Science degree from the U.S. Military Academy and an Master of Science degree in Mechanical Engineering from Iowa State University. He is a registered professional engineer in New Mexico.

Gail Cooke. Gail Cooke is a Supervisor in the Bureau's Control Strategies Section, where she has worked since June 1999. Ms. Cooke holds a Bachelor of Science degree in Environmental Design from Texas A&M University and a Master's degree in Urban and Regional Planning from Virginia Tech.

3. Direct testimony.

The direct testimony of Mary Uhl, Debra McElroy, Robert Samaniego, and Richard Goodyear is attached to this notice.

4. Duration of testimony.

The Department anticipates the duration of direct testimony as follows:

Mary Uhl	30 minutes
Debra McElroy	30 minutes
Robert Samaniego	60 minutes
Richard Goodyear	30 minutes
Gail Cooke	cross-examination only

5. Exhibits.

An exhibit list is attached to this notice. Paper copies of the exhibits have been filed in the record. Compact disks of the exhibits have been provided for the board members. Any board member requiring a paper copy of the exhibits should contact the board administrator.

On April 30, 2008, the U.S. Environmental Protection Agency sent a letter to the Department expressing its support for the proposed repeal and replacement of 20.2.7 NMAC. The letter is attached to this notice of intent. NMED Exhibit 25.

6. Text of recommended modifications.

The Department attaches to this notice of intent a revised version of 20.2.7 NMAC, reflecting changes in response to public comments since the version submitted on March 31, 2008 (NMED Exhibit 1).

The Department also attaches a revised version of 20.2.70 NMAC, reflecting a minor editorial correction regarding Section 302.G(2).

7. Reservation of rights.

The Department reserves the right to call any person and offer any exhibit in response to the testimony or exhibit offered by another person in the hearing.

Respectfully submitted,

NEW MEXICO ENVIRONMENT DEPARTMENT
OFFICE OF GENERAL COUNSEL



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TITLE 20 ENVIRONMENTAL PROTECTION
CHAPTER 2 AIR QUALITY (STATEWIDE)
PART 7 EXCESS EMISSIONS

20.2.7.1 ISSUING AGENCY. Environmental Improvement Board.
[11/30/95; 20.2.7.1 NMAC - Rn, 20 NMAC 2.7.100 10/31/02]

20.2.7.2 SCOPE. All geographic areas within the jurisdiction of the Environmental Improvement Board.
[11/30/95; 20.2.7.2 NMAC - Rn, 20 NMAC 2.7.101 10/31/02]

20.2.7.3 STATUTORY AUTHORITY. Environmental Improvement Act, NMSA 1978, section 74-1-8(A)(4) and (7), and Air Quality Control Act, NMSA 1978, sections 74-2-1 et seq., including specifically, section 74-2-5(A), (B) and (C).
[11/30/95; 20.2.7.3 NMAC - Rn, 20 NMAC 2.7.102 10/31/02]

20.2.7.4 DURATION. Permanent.
[11/30/95; 20.2.7.4 NMAC - Rn, 20 NMAC 2.7.103 10/31/02]

20.2.7.5 EFFECTIVE DATE. xx/xx/08.
[11/30/95; 20.2.7.5 NMAC - Rn, 20 NMAC 2.7.104 10/31/02]

20.2.7.6 OBJECTIVE.
A. Establish requirements for a source whose operation results in an excess emission.
B. Establish criteria for a source whose operation results in an excess emission to claim an affirmative defense in an administrative or judicial enforcement action from a civil penalty.
[11/30/95; 20.2.7.6 NMAC - Rn, 20 NMAC 2.7.105 10/31/02; Rp, xx/xx/xx]

20.2.7.7 DEFINITIONS. In addition to the terms defined in 20.2.2 NMAC (Definitions), as used in this part, the following definitions apply.

A. "Air pollution control equipment" means any apparatus, including acid plants, afterburners, baghouses, cyclones, electrostatic precipitators, flares, incinerators, and particulate or gaseous scrubbers, utilized to control the emission of a regulated air contaminant, including a fugitive emission.

B. "Air quality regulation or permit condition" means any regulation adopted by the Board, including a federal new source performance standard adopted by reference, or any condition of an air quality permit issued by the department. National emission standards for hazardous air pollutants and maximum achievable control technology standards are not included in this definition.

C. "Bypass" means the diversion of a regulated air contaminant around air pollution control equipment or process equipment.

D. "Excess emission" means the emission of an air contaminant, including a fugitive emission, in excess of the quantity, rate, opacity or concentration specified by an air quality regulation or permit condition.

E. "Malfunction" means any sudden and unavoidable failure of air pollution control equipment or process equipment beyond the control of the owner or operator, including malfunction during startup or shutdown. A failure that is caused entirely or in part by poor maintenance, careless operation, or any other preventable equipment breakdown shall not be considered a malfunction.

F. "Part" means an air quality regulation under Title 20, Chapter 2 of the New Mexico Administrative Code.

G. "Regular business day" means any day on which state government offices are open for normal business. Saturdays, Sundays, and official federal and state holidays are not regular business days.

H. "Shutdown" means the cessation of operation of any air pollution control equipment or process equipment.

I. "Startup" means the setting into operation of any air pollution control equipment or process equipment.

[11/30/95; 20.2.7.7 NMAC - Rn, 20 NMAC 2.7.107 10/31/02; Rp, xx/xx/xx]

20.2.7.8 AMENDMENT OR SUPERSESION OF PRIOR REGULATIONS. This part supersedes New Mexico Administrative Code ("NMAC") 20.2.7 -- Excess Emissions During Malfunction, Startup, Shutdown, or Scheduled Maintenance last filed October 30, 1995.

[11/30/95; 20.2.7.8 NMAC - Rn, 20 NMAC 2.7.106 10/31/02, Rp, xx/xx/xx]

20.2.7.9 DOCUMENTS. No documents are cited in this part.

[11/30/95; 20.2.7.9 NMAC - Rn, 20 NMAC 2.7.108 10/31/02]

20.2.7.10 SEVERABILITY. If any provision of this part, or the application of such provision to any person or circumstance, is held invalid, the remainder of this part, or the application of such provision to any person or circumstance other than those as to which it is held invalid, shall not be affected thereby.

[20.2.7.10 NMAC - N, xx/xx/xx]

20.2.7.11 CONSTRUCTION. This part shall be liberally construed to carry out its purpose.

[20.2.7.11 NMAC - N, xx/xx/xx]

20.2.7.12 SAVINGS CLAUSE. Repeal or supersession of a prior version of this part shall not affect any administrative or judicial action initiated under that prior version.

[20.2.7.12 NMAC - N, xx/xx/xx]

20.2.7.13 COMPLIANCE WITH OTHER REGULATIONS. Compliance with this part does not relieve a person from the responsibility to comply with any other applicable federal, state, or local statute or regulation.

[20.2.7.13 NMAC - N, xx/xx/xx]

20.2.7.14 DETERMINATION AND REQUIREMENTS REGARDING EMISSIONS DURING STARTUP, SHUTDOWN, AND MAINTENANCE

A. Determination regarding emissions during startup, shutdown, and scheduled maintenance.

No later than six (6) months after the promulgation of this part, the owner or operator of a source shall determine the following.

(1) Whether the source's emissions during startup, shutdown, and scheduled maintenance were authorized by the department in a notice of intent issued pursuant to 20.2.73 NMAC - Notices of Intent and Emissions Inventory Requirements, or a permit issued pursuant to 20.2.72 NMAC - Construction Permits, 20.2.70 NMAC - Operating Permits, 20.2.74 NMAC - C - Permits - Prevention of Significant Deterioration (PSD), or 20.2.79 NMAC - Permits - Nonattainment Areas. For the purpose of this section (20.2.7.14 NMAC), the owner or operator may conclude that the department authorized such emissions if:

(a) the administrative record for the permitting action reflects that the department specifically considered and approved such emissions for the source's operation during periods of startup, shutdown, and scheduled maintenance, and

(b) if the permit was issued pursuant to 20.2.74 NMAC, the permit imposed best available control technology or the source's emissions during startup, shutdown, and scheduled maintenance.

(2) If such emissions were not authorized, whether the inclusion of such emissions in the source's potential emission rate or potential to emit, as applicable, would exceed the applicability threshold for a notice of intent under 20.2.73 NMAC - Notices of Intent and Emissions Inventory Requirements, or a permit under 20.2.72 NMAC - Construction Permits, 20.2.70 NMAC - Operating Permits, 20.2.74 NMAC - Permits - Prevention of Significant Deterioration (PSD), or 20.2.79 NMAC - Permits - Nonattainment Areas.

B. Requirements.

(1) The owner or operator of any of the following sources shall establish and maintain a plan to minimize emissions during startup, shutdown, and scheduled maintenance through work practice standards and good air pollution control practices. The owner or operator shall implement this plan during startup, shutdown, and scheduled maintenance events at the source no later than 180 days after promulgation of this part. The owner or operator shall notify the department no later than 180 days after promulgation of this part that it is implementing the plan and identify the subsection below applicable to the source, retain the plan on-site for the duration of the permit, and provide the plan to the department upon request.

- (a) a source whose emissions during startup, shutdown, and scheduled maintenance were authorized by a notice of intent or permit;
- (b) a source for which the inclusion of such emissions in the source's potential emission rate or potential to emit, as applicable, would not exceed the emissions authorized by the notice of intent or permit; or
- (c) a source operating under a general construction permit issued pursuant to Section 20.2.72.220 NMAC.

(2) The owner or operator of a source that determines that its emissions during startup, shutdown, and scheduled maintenance are not authorized by a notice of intent or permit and the inclusion of such emissions in the source's potential emission rate or potential to emit, as applicable, would exceed the emissions authorized by the notice of intent or permit or the applicability threshold if the source does not have the appropriate notice of intent or permit, shall notify the department in writing no later than 180 days after the promulgation of this part. The notification shall include a preliminary estimate of emissions by pollutant to the extent practicable and the type of permitting action likely to be required.

(3) Upon request of the department, the owner or operator of a such source identified in Paragraph (2) of 20.2.7.14.B NMAC shall submit a notice of intent or permit application to authorize emissions during startup, shutdown, and scheduled maintenance. Additionally, each permit application shall include a plan to minimize such emissions through work practice standards and good air pollution control practices.

(a) Timely notification pursuant to Paragraph (2) of 20.2.7.14.B NMAC authorizes the owner or operator to continue operating such source until the department issues or denies a notice of intent or permit, provided that this authorization shall terminate if the owner or operator fails to submit the notice of intent or permit application or other information requested by the department by the specified deadlines.

(b) During the pendency of the authorization provided by Subparagraph (a) of 20.2.7.14.B.3 NMAC, the following shall apply.

i. For emissions during startup, shutdown, and scheduled maintenance for which the owner or operator of such source has submitted timely notification pursuant to Paragraph (2) of 20.2.7.14.B NMAC, the owner or operator shall comply only with Paragraph (2) of 20.2.7.110.A NMAC - Final Report, until the notice of intent or permit is issued.

ii. The owner or operator of such source shall establish and maintain a plan to minimize such emissions through work practice standards and good air pollution control practices. The owner or operator shall implement this plan during startup, shutdown, and scheduled maintenance events at the source no later than 180 days after promulgation of this part. This plan shall be retained by the owner or operator and provided to the department upon request.

iii. In any action brought by the Department, The the owner or operator of such source shall not be liable for not having originally filed the correct notice or obtained the correct permit under 20.2.73 NMAC - Notices of Intent and Emissions Inventory Requirements, 20.2.72 NMAC - Construction Permits, 20.2.70 NMAC - Operating Permits, 20.2.74 NMAC - Permits - Prevention of Significant Deterioration (PSD), or 20.2.79 NMAC - Permits - Nonattainment Areas, solely on the basis of excess emissions during startup, shutdown, and scheduled maintenance.

(4) At the request of the department, the owner or operator of a source that does not submit a notification under Paragraph (2) of 20.2.7.14.B NMAC shall submit its determination and supporting analysis under Subsection A of 20.2.7.14 NMAC.

[20.2.7.15 NMAC - N, xx/xx/xx]

20.2.7.15 to 20.2.7.107 [RESERVED]

20.2.7.108 APPLICABILITY.

A. Any source:

(1) Whose operation results in an emission of an air contaminant, including a fugitive emission, in excess of the quantity, rate, opacity or concentration specified by an air quality regulation or permit condition; or

(2) Subject to the requirements of 20.2.73 NMAC - Notices of Intent and Emissions Inventory Requirements, 20.2.72 NMAC - Construction Permits, 20.2.70 NMAC - Operating Permits, 20.2.74 - Permits - Prevention of Significant Deterioration (PSD), or 20.2.79 - Permits - Nonattainment Areas pursuant to Section 14 of 20.2.7 NMAC.

B. Deviations under 20.2.70 NMAC - Operating Permits that do not result in excess emissions are not subject to the provisions of 20.2.7 NMAC.

C. This part does not create a separate cause of action for failure to obtain a notice of intent under 20.2.73 NMAC – Notice of Intent and Emission Inventory Requirements or permit under 20.2.72 NMAC - Construction Permits, 20.2.70 NMAC - Operating Permits, 20.2.74 - Permits - Prevention of Significant Deterioration (PSD), or 20.2.79 - Permits - Nonattainment Areas.
[20.2.7.15 NMAC - N, xx/xx/xx]

20.2.7.109 OPERATION RESULTING IN AN EXCESS EMISSIONS. The emission of an air contaminant in excess of the quantity, rate, opacity, or concentration specified in an air quality regulation or permit condition that results in an excess emission is a violation of the air quality regulation or permit condition and may be subject to an enforcement action. The owner or operator of a source having an excess emission shall, to the extent practicable, operate the source, including associated air pollution control equipment, in a manner consistent with good air pollution control practices for minimizing emissions.
[11/30/95; 20.2.7.109 NMAC - Rn, 20 NMAC 2.7.109 10/31/02; Rp, xx/xx/xx]

20.2.7.110 NOTIFICATION.

A. The owner or operator of a source having an excess emission shall report the following information to the department on forms provided by the department. The department may authorize the submittal of such reports in electronic format.

(1) Initial Report: The owner or operator shall file an initial report, no later than the end of the next regular business day after the time of discovery of an excess emission that includes all available information for each item in Subsection B of 20.2.7.110 NMAC.

(2) Final Report: The owner or operator shall file a final report that contains specific and detailed information for each item in Subsection B of 20.2.7.110 NMAC, no later than ten (10) days after the end of the excess emission.

B. The report shall include the following information.

(1) The name of the source.
(2) The name of the owner and operator of the source.
(3) The name and title of the person preparing the report.
(4) Identifying information such as permit and database numbers.
(5) The specific date(s) and time(s) the excess emission occurred.
(6) Identification of the equipment involved and the emission point(s) (including bypass) from which the excess emission occurred.

(7) The air quality regulation or permit condition that was exceeded.
(8) Identification of the air contaminant(s) and the magnitude of the excess emission expressed in the units of the air quality regulation or permit condition.

(9) The method for determining the magnitude and duration of the excess emission.
(10) The cause and nature of the excess emission.
(11) The steps taken to limit the duration and magnitude of the excess emission.
(12) The corrective action(s) taken to eliminate the cause of the excess emission. If one or more corrective actions are required, the report shall include a schedule for implementation of those actions, with associated progress reports. If no corrective actions are required, the report shall include a detailed explanation for that conclusion.

(13) The corrective action(s) taken to prevent a recurrence of the excess emission.
(14) Whether the owner or operator attributes the excess emission to malfunction, startup or shutdown.

(15) Whether the owner or operator will claim an affirmative defense under Sections 111 or 112 of 20.2.7 NMAC. If claiming an affirmative defense, an analysis with and the supporting evidence for each criterion shall be submitted no later than thirty (30) days after submittal of the final report required by this subsection (20.2.7.110.B NMAC). Upon the Department's receipt of a written request by the owner or operator no later than thirty (30) days after submittal of the final report, the Department may grant an extension to complete the analysis not to exceed thirty (30) additional days.

(16) The contents of the final report shall contain a signed certification of truth, accuracy, and completeness. This certification shall be signed by the person who is reporting the excess emission.

C. The department may request that the owner or operator of a source provide additional information. This information shall be reported within a time period specified by the department.

D. If the period of an excess emission extends beyond the deadline specified in Paragraph (2) of 20.2.7.110.A NMAC, the owner or operator shall notify the department in writing within seventy-two (72) hours of the date and time when the excess emission ceased. This notification shall include all items required in Subsection B of 20.2.7.110 NMAC.

[11/30/95; 20.2.7.110 NMAC - Rn, 20 NMAC 2.7.110 10/31/02; Rp, xx/xx/xx]

20.2.7.111 AFFIRMATIVE DEFENSE FOR AN EXCESS EMISSION DURING MALFUNCTION.

A. The owner or operator of a source subject to this part may claim an affirmative defense for an excess emission during malfunction for a civil penalty in an administrative or judicial enforcement action, except for an action to enforce a federal new source performance standard. There shall be no affirmative defense for an excess emission during malfunction for the owner or operator's liability or the department's claim for injunctive relief for the excess emission. The owner or operator claiming an affirmative defense for an excess emission during malfunction shall bear the burden of proof to demonstrate the following criteria.

- (1) The excess emission was caused by a malfunction.
- (2) The excess emission:
 - (a) did not stem from any activity or event that could have been foreseen and avoided, or planned for; and
 - (b) could not have been avoided by better operation and maintenance practices.
- (3) To the maximum extent practicable the air pollution control equipment or processes were maintained and operated in a manner consistent with good practice for minimizing emissions.
- (4) Repairs were made in an expeditious fashion when the operator knew or should have known that applicable emission limitations were being exceeded. Off-shift labor and overtime must have been utilized, to the extent practicable, to ensure that such repairs were made as expeditiously as practicable.
- (5) The amount and duration of the excess emission (including any bypass) were minimized to the maximum extent practicable during periods of such emissions.
- (6) All possible steps were taken to minimize the impact of the excess emission on ambient air quality.
- (7) All emission monitoring systems were kept in operation if at all possible.
- (8) The excess emission was not part of a recurring pattern indicative of inadequate design, operation, or maintenance.
- (9) The owner or operator complied with the notification requirements in Section 110 of 20.2.7 NMAC.
- (10) The owner or operator's actions in response to the excess emission were documented by properly signed, contemporaneous operating logs, or other relevant evidence.

B. The department may request that the owner or operator of a source provide additional information beyond what is required in this section (20.2.7.111 NMAC). This additional information shall be reported within the time period specified by the department.

[20.2.7.15 NMAC - N, xx/xx/xx]

20.2.7.112 AFFIRMATIVE DEFENSE FOR AN EXCESS EMISSION DURING STARTUP OR SHUTDOWN.

A. The owner or operator of a source subject to this part may claim an affirmative defense for an excess emission during startup or shutdown for a civil penalty in an administrative or judicial enforcement action, except for an action to enforce a federal new source performance standard. There shall be no affirmative defense for an excess emission during startup or shutdown for the owner or operator's liability or the department's claim for injunctive relief for the excess emission. The owner or operator claiming an affirmative defense for an excess emission during startup or shutdown shall bear the burden of proof to demonstrate the following criteria.

- (1) The excess emission occurred during a startup or shutdown.
- (2) The duration of the excess emission that occurred during startup and shutdown was short and could not have been prevented through careful planning and design.
- (3) The excess emission was not part of a recurring pattern indicative of inadequate design, operation, or maintenance.
- (4) If the excess emission was caused by a bypass (an intentional diversion of control equipment), then the bypass was unavoidable to prevent loss of life, personal injury, or severe property damage.
- (5) At all times, the source was operated in a manner consistent with good practices for minimizing emissions.

(6) The frequency and duration of operation in startup or shutdown mode was minimized to the maximum extent possible.

(7) All possible steps were taken to minimize the impact of the excess emission on ambient air quality.

(8) All emissions monitoring systems were kept in operation if at all possible.

(9) The owner or operator complied with the notification requirements in Section 110 of 20.2.7 NMAC.

(10) The owner or operator's actions during the period of the excess emission were documented by properly signed, contemporaneous operating logs, or other relevant evidence.

B. The department may request that the owner or operator of a source provide additional information beyond what is required in this section (20.2.7.112 NMAC). This additional information shall be reported within the time period specified by the department.

C. An excess emission due to malfunction during a period of startup or shutdown which is authorized by permit shall be treated as a malfunction under Section 111 of 20.2.7 NMAC.
[20.2.7.15 NMAC - N, xx/xx/xx]

20.2.7.113 ROOT CAUSE AND CORRECTIVE ACTION ANALYSIS.

A. The owner or operator of a source having an excess emission shall prepare an analysis containing the following information:

(1) A detailed analysis describing the root cause and all contributing causes of the excess emission.

(2) An analysis of the corrective actions available to reduce the likelihood of a recurrence of the excess emission resulting from the causes identified under Paragraph (1) of 20.2.7.113 NMAC, including:

(a) Identification of available corrective action alternatives, such as changes in design, operation and maintenance;

(b) The estimated cost associated with each corrective action alternative;

(c) The probable effectiveness of each corrective action alternative;

(d) To the extent that the investigation of the root and contributing causes or corrective action alternatives are ongoing on the due date of the analysis, a statement of the anticipated date of completion and the date on which the additional information will be submitted;

(e) If no corrective action alternatives are available, a detailed explanation of the basis for that conclusion; and

(f) If one or more corrective actions are required, a schedule for implementation and progress reports.

B. The completed analysis shall be submitted to the department no later than sixty (60) days after the submittal of the final report if required by Subsection A of 20.2.7.113 NMAC, or sixty (60) days after the owner or operator receives notice from the department B of 20.2.7.110 NMAC. The department may grant an extension to submit the completed analysis, or part thereof as identified by the owner or operator pursuant to Subparagraph (d) of 20.2.7.113.A.2 NMAC,
[20.2.7.15 NMAC - N, xx/xx/xx]

20.2.7.114 REVIEW OF THE DEPARTMENT'S DETERMINATIONS UNDER SECTIONS 111 AND 112.

The department may issue a determination regarding an owner or operator's assertion of the affirmative defense under Section 111 or 112 of 20.2.7 NMAC on the basis of any relevant information, including but not limited to information submitted pursuant to this part or obtained through an inspection. Any such determination is not a final action and is not reviewable, shall not be a prerequisite to the commencement of an administrative or judicial enforcement action, does not constitute a waiver of liability pursuant to Section 115 of 20.2.7 NMAC, and shall not preclude an enforcement action by the federal government or a citizen pursuant to the federal Clean Air Act. A source may not assert an affirmative defense under Section 111 or 112 of 20.2.7 NMAC in an administrative or judicial enforcement action unless it asserted such defense pursuant to Subsection B of 20.2.7 110 NMAC.

[20.2.7.15 NMAC - N, xx/xx/xx]

20.2.7.115 FUTURE ENFORCEMENT ACTION.

The department may commence an administrative or judicial enforcement action against the owner or operator of a source for an excess emission for which it has made a determination pursuant to Section 114 of 20.2.7 NMAC if the department determines that the excess emission is related to a pattern of excess emission events, poor maintenance, careless or marginal operation, or other appropriate reason.

[20.2.7.15 NMAC - N, xx/xx/xx]

HISTORY OF 20.2.7 NMAC:

Pre- NMAC History: The material in this part was derived from that previously filed with the commission of public records – state records center and archives.

HSSD 70-1, Ambient Air Quality Standards And Air Quality Control Regulations, 01/27/70.

ACQR 801, Air Quality Control Regulation 801 - Excess Emissions During Malfunction, Startup, Shutdown, or Scheduled Maintenance, 04/29/81.

History of Repealed Material: [RESERVED]

Other History:

ACQR 801, Air Quality Control Regulation 801 - Excess Emissions During Malfunction, Startup, Shutdown, or Scheduled Maintenance, filed 04/29/81 was renumbered into first version of the New Mexico Administrative Code as 20 NMAC 2.7, Air Quality (Statewide) - Excess Emissions During Malfunction, Startup, Shutdown, or Scheduled Maintenance, filed 10/30/95.

20 NMAC 2.7, Air Quality (Statewide) - Excess Emissions During Malfunction, Startup, Shutdown, or Scheduled Maintenance, filed 10/30/95 was renumbered, reformatted and replaced by 20.2.7 NMAC, Excess Emissions During Malfunction, Startup, Shutdown, or Scheduled Maintenance, effective 10/31/02.

**TITLE 20 ENVIRONMENTAL PROTECTION
CHAPTER 2 AIR QUALITY (STATEWIDE)
PART 70 OPERATING PERMITS**

Revisions at time of March 31 petition in black lettering

Revisions subsequent to March 31 petition in red lettering

20.2.70.302 PERMIT CONTENT:

A. Permit conditions.

(1) The department shall specify conditions upon a permit, including emission limitations and sufficient operational requirements and limitations, to assure compliance with all applicable requirements at the time of permit issuance or as specified in the approved schedule of compliance. The permit shall:

(a) for major sources, include all applicable requirements for all relevant emissions units in the major source;

(b) for any non-major source subject to 20.2.70.200 NMAC - 20.2.70.299 NMAC, include all applicable requirements which apply to emissions units that cause the source to be subject to this part;

(c) specify and reference the origin of and authority for each term or condition, and identify any difference in form as compared to the applicable requirement upon which the term or condition is based;

(d) include a severability clause to ensure the continued validity of the various permit requirements in the event of a challenge to any portions of the permit;

(e) include a provision to ensure that the permittee pays fees to the department consistent with the fee schedule in 20.2.71 NMAC (Operating Permit Emission Fees); and

(f) for purposes of the permit shield, identify any requirement specifically identified in the permit application or significant permit modification that the department has determined is not applicable to the source, and state the basis for any such determination.

(2) Each permit issued shall, additionally, include provisions stating the following.

(a) The permittee shall comply with all terms and conditions of the permit. Any permit noncompliance is grounds for enforcement action. In addition, noncompliance with federally enforceable permit conditions constitutes a violation of the federal act.

(b) It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of the permit.

(c) The permit may be modified, reopened and revised, revoked and reissued, or terminated for cause in accordance with 20.2.70.405 NMAC.

(d) The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or of a notification of planned changes or anticipated noncompliance shall not stay any permit condition.

(e) The permit does not convey any property rights of any sort, or any exclusive privilege.

(f) Within the period specified by the department, the permittee shall furnish any information that the department may request in writing to determine whether cause exists for reopening and revising, revoking and reissuing, or termination of the permit or to determine compliance with the permit. Upon request, the permittee shall also furnish to the department copies of records required by the permit to be maintained.

(3) The terms and conditions for all alternative operating scenarios identified in the application and approved by the department:

(a) shall require that the permittee maintain a log at the permitted facility which documents, contemporaneously with any change from one operating scenario to another, the scenario under which the facility is operating; and

(b) shall, for each such alternative scenario, meet all applicable requirements and the requirements of this part.

(4) The department may impose conditions regulating emissions during startup and shutdown.

(5) All permit terms and conditions which are required under the federal act or under any of its applicable requirements, including any provisions designed to limit a source's potential to emit, are enforceable by the administrator and citizens under the federal act. The permit shall specifically designate as not being federally enforceable under the federal act any terms or conditions included in the permit that are not required under the federal act or under any of its applicable requirements.

(6) The issuance of a permit, or the filing or approval of a compliance plan, does not relieve any person from civil or criminal liability for failure to comply with the provisions of the Air Quality Control Act, the federal act, federal regulations thereunder, any applicable regulations of the Board, and any other applicable law or regulation.

(7) The department may include part or all of the contents of the application as terms and conditions of the permit or permit modification. The department shall not apply permit terms and conditions upon emissions of regulated pollutants for which there are no applicable requirements, unless the source is major for that pollutant.

(8) Fugitive emissions from a source shall be included in the operating permit in the same manner as stack emissions, regardless of whether the source category in question is included in the list of sources contained in the definition of major source.

(9) The acid rain portion of operating permits for acid rain sources shall additionally:

(a) state that, where an applicable requirement of the federal act is more stringent than an applicable requirement of regulations promulgated under Title IV of the federal act, both provisions shall be incorporated into the permit and shall be enforceable by the administrator; and

(b) contain a permit condition prohibiting emissions exceeding any allowances that the acid rain source lawfully holds under Title IV of the federal act or the regulations promulgated thereunder; no permit modification under this part shall be required for increases in emissions that are authorized by allowances acquired pursuant to the acid rain program, provided that such increases do not require a permit modification under any other applicable requirement; no limit shall be placed on the number of allowances held by the acid rain source; the permittee may not use allowances as a defense to noncompliance with any other applicable requirement; any such allowance shall be accounted for according to the procedures established in regulations promulgated under Title IV of the federal act.

B. Permit duration. The department shall issue operating permits for a fixed term of five (5) years.

C. Monitoring.

(1) Each permit shall contain all emissions monitoring requirements, and analysis procedures or test methods, required to assure and verify compliance with the terms and conditions of the permit and applicable requirements, including any procedures and methods promulgated by the administrator.

(2) Where the applicable requirement does not require periodic testing or instrumental or noninstrumental monitoring (which may consist of recordkeeping designed to serve as monitoring), the permit shall require periodic monitoring sufficient to yield reliable data from the relevant time period that are representative of the source's compliance with the permit, as reported pursuant to Subsection E of 20.2.70.302 NMAC. Such monitoring requirements shall assure use of terms, test methods, units, averaging periods, and other statistical conventions consistent with the applicable requirement.

(3) The permit shall also contain specific requirements concerning the use, maintenance, and, when appropriate, installation of monitoring equipment or methods.

D. Recordkeeping.

(1) The permit shall require recordkeeping sufficient to assure and verify compliance with the terms and conditions of the permit, including recordkeeping of:

(a) the date, place as defined in the permit, and time of sampling or measurements;

(b) the date(s) analyses were performed;

(c) the company or entity that performed the analyses;

(d) the analytical techniques or methods used;

(e) the results of such analyses; and

(f) the operating conditions existing at the time of sampling or measurement.

(2) Records of all monitoring data and support information shall be retained for a period of at least five (5) years from the date of the monitoring sample, measurement, report, or application. Supporting information includes all calibration and maintenance records and all original strip-chart recordings for continuous monitoring instrumentation, and copies of all reports required by the permit.

E. Reporting. The permit shall require reporting sufficient to assure and verify compliance with the terms and conditions of the permit and all applicable requirements, including all of the following.

(1) Submittal of reports of any required monitoring at least every six (6) months. The reports shall be due to the department within forty-five (45) days of the end of the permittee's reporting period. All instances of deviations from permit requirements, including emergencies, must be clearly identified in such reports. All required reports must be certified by a responsible official consistent with Subsection E of 20.2.70.300 NMAC.

(2) Prompt reporting of all deviations (~~including emergencies~~) from permit requirements, including those attributable to upset conditions as defined in the permit, the date, time, duration and probable cause of such deviations, the quantity and pollutant type of excess emissions resulting from the deviation, and any corrective actions or preventive measures taken. ~~Such reports shall include telephone, verbal or facsimile communication within twenty-four (24) hours of the start of the next business day and written notification within ten (10) days. The report shall be contained in the report submitted in accordance with the timeframe given in paragraph (1) of this section.~~

(3) Submittal of compliance certification reports at least every twelve (12) months (or more frequently if so specified by an applicable requirement) certifying the source's compliance status with terms and conditions contained in the permit, including emission limitations, standards, or work practices. The reports shall be due to the department within thirty (30) days of the end of the permittee's reporting period. Such compliance certifications shall be submitted to the administrator as well as to the department and shall include:

- (a) the identification of each term or condition of the permit that is the basis of the certification;
- (b) the compliance status of the source;
- (c) whether compliance was continuous or intermittent;
- (d) the method(s) used for determining the compliance status of the source, currently and during the reporting period identified in the permit; and
- (e) such other facts as the department may require to determine the compliance status of the source.

(4) Such additional provisions as may be specified by the administrator to determine the compliance status of the source.

F. Portable and Temporary Sources. The department may issue permits for portable and temporary sources which allow such sources to relocate without undergoing a permit modification. Such permits shall not apply to acid rain sources and shall include conditions to assure that:

- (1) the source is installed at all locations in a manner conforming with the permit;
- (2) the source shall comply with all applicable requirements and all other provisions of this part at all authorized locations;
- (3) the owner or operator shall notify the department in writing at least fifteen (15) calendar days in advance of each change in location;
- (4) notification shall include a legal description of where the source is to be relocated and how long it will be located there; and
- (5) emissions from the source shall not, at any location, result in or contribute to an exceedance of a national ambient air quality standard or increment or visibility requirement under Part C of Title I of the federal act; the department may require dispersion modeling to assure compliance at any location.

G. Compliance. To assure and verify compliance with the terms and conditions of the permit and with this part, permits shall also include all the following.

(1) Require that, upon presentation of credentials and other documents as may be required by law, the permittee shall allow authorized representatives of the department to perform the following:

- (a) enter upon the permittee's premises where a source is located or emission related activity is conducted, or where records must be kept under the conditions of the permit;
- (b) have access to and copy any records that must be kept under the conditions of the permit;
- (c) inspect any facilities, equipment (including monitoring and air pollution control equipment), practices, or operations regulated or required under the permit; and
- (d) sample or monitor any substances or parameters for the purpose of assuring compliance with the permit or applicable requirements or as otherwise authorized by the federal act.

(2) Require that sources required under Paragraph (42 11) of Subsection D of 20.2.70.300 NMAC to have a schedule of compliance submit progress reports to the department at least semiannually, or more frequently if specified in the applicable requirement or by the department. Such progress reports shall be consistent with the schedule of compliance and requirements of Paragraph (42 11) of Subsection D of 20.2.70.300 NMAC and shall contain:

(a) dates for achieving the activities, milestones, or compliance required in the schedule of compliance, and dates when such activities, milestones or compliance were achieved; and
(b) an explanation of why any dates in the schedule of compliance were not or will not be met, and any preventive or corrective measures adopted.

(3) Include such other provisions as the department may require.

H. Operational flexibility.

(1) Section 502(b)(10) changes.

(a) The permittee may make Section 502(b)(10) changes, as defined in 20.2.70.7 NMAC, without applying for a permit modification, if those changes are not title I modifications and the changes do not cause the facility to exceed the emissions allowable under the permit (whether expressed as a rate of emissions or in terms of total emissions).

(b) For each such change, the permittee shall provide written notification to the department and the administrator at least seven (7) days in advance of the proposed changes. Such notification shall include a brief description of the change within the permitted facility, the date on which the change will occur, any change in emissions, and any permit term or condition that is no longer applicable as a result of the change.

(c) The permittee and department shall attach each such notice to their copy of the relevant permit.

(d) If the written notification and the change qualify under this provision, the permittee is not required to comply with the permit terms and conditions it has identified that restrict the change. If the change does not qualify under this provision, the original terms of the permit remain fully enforceable.

(2) Emissions trading within a facility.

(a) The department shall, if an applicant requests it, issue permits that contain terms and conditions allowing for the trading of emissions increases and decreases in the permitted facility solely for the purpose of complying with a federally enforceable emissions cap that is established in the permit in addition to any applicable requirements. Such terms and conditions shall include all terms and conditions required under 20.2.70.302 NMAC to determine compliance. If applicable requirements apply to the requested emissions trading, permit conditions shall be issued only to the extent that the applicable requirements provide for trading such increases and decreases without a case-by-case approval.

(b) The applicant shall include in the application proposed replicable procedures and permit terms that ensure the emissions trades are quantifiable and enforceable. The department shall not include in the emissions trading provisions any emissions units for which emissions are not quantifiable or for which there are no replicable procedures to enforce the emissions trades. The permit shall require compliance with all applicable requirements.

(c) For each such change, the permittee shall provide written notification to the department and the administrator at least seven (7) days in advance of the proposed changes. Such notification shall state when the change will occur and shall describe the changes in emissions that will result and how these increases and decreases in emissions will comply with the terms and conditions of the permit.

(d) The permittee and department shall attach each such notice to their copy of the relevant permit.

I. Off-Permit Changes.

(1) Permittees are allowed to make, without a permit modification, changes that are not addressed or prohibited by the operating permit, if:

(a) each such change meets all applicable requirements and shall not violate any existing permit term or condition;

(b) such changes are not subject to any requirements under Title IV of the federal act and are not Title I modifications;

(c) such changes are not subject to permit modification procedures under 20.2.70.404 NMAC; and

(d) the permittee provides contemporaneous written notice to the department and US EPA of each such change, except for changes that qualify as insignificant activities. Such written notice shall describe each such change, including the date, any change in emissions, pollutants emitted and any applicable requirement that would apply as a result of the change.

(2) The permittee shall keep a record describing changes made at the source that result in emissions of a regulated air pollutant subject to an applicable requirement, but not otherwise regulated under the permit, and the emissions resulting from those changes.

J. Permit Shield.

(1) Except as provided in this part, the department shall expressly include in a Part 70 (20.2.70 NMAC) permit a provision stating that compliance with the conditions of the permit shall be deemed compliance with any applicable requirements as of the date of permit issuance, provided that:

(a) such applicable requirements are included and are specifically identified in the permit; or

(b) the department, in acting on the permit application or significant permit modification, determines in writing that other requirements specifically identified are not applicable to the source, and the permit includes the determination or a concise summary thereof.

(2) A Part 70 (20.2.70 NMAC) permit that does not expressly state that a permit shield exists for a specific provision shall be presumed not to provide such a shield for that provision.

(3) Nothing in this section or in any Part 70 (20.2.70 NMAC) permit shall alter or affect the following:

(a) the provisions of Section 303 of the federal act -- Emergency Powers, including the authority of the administrator under that section, or the provisions of the New Mexico Air Quality Control Act, Section 74-2-10 NMSA 1978;

(b) the liability of an owner or operator of a source for any violation of applicable requirements prior to or at the time of permit issuance;

(c) the applicable requirements of the acid rain program, consistent with Section 408(a) of the federal act; or

(d) the ability of US EPA to obtain information from a source pursuant to Section 114 of the federal act, or the department to obtain information subject to the New Mexico Air Quality Control Act, Section 74-2-13 NMSA 1978.

(4) The permit shield shall remain in effect if the permit terms and conditions are extended past the expiration date of the permit pursuant to Subsection D of 20.2.70.400 NMAC.

(5) The permit shield shall extend to terms and conditions that allow emission increases and decreases as part of emissions trading within a facility pursuant to Paragraph (2) of Subsection H of 20.2.70.302 NMAC, and to all terms and conditions under each operating scenario included pursuant to Paragraph (3) of Subsection A of 20.2.70.302 NMAC.

(6) The permit shield shall not extend to administrative amendments under Subsection A of 20.2.70.404 NMAC, to minor permit modifications under Subsection B of 20.2.70.404 NMAC, to Section 502(b)(10) changes under Paragraph (1) of Subsection H of 20.2.70.302 NMAC, or to permit terms or conditions for which notice has been given to reopen or revoke all or part under 20.2.70.405 NMAC. [11/30/95; A, 11/14/98; 20.2.70.302 NMAC - Rn, 20 NMAC 2.70.III.302, 06/14/02; A, xx/xx/08]

20.2.70.304 EMERGENCY PROVISION:

A. An "emergency" means any situation arising from sudden and reasonably unforeseeable events beyond the control of the permittee, including acts of God, which situation requires immediate corrective action to restore normal operation, and that causes the source to exceed a technology-based emission limitation under the permit due to unavoidable increases in emissions attributable to the emergency. An emergency shall not include noncompliance to the extent caused by improperly designed equipment, lack of preventive maintenance, or careless or improper operation.

B. An emergency constitutes an affirmative defense to an action brought for noncompliance with such technology-based emission limitations if the permittee has demonstrated through properly signed, contemporaneous operating logs, or other relevant evidence that:

(1) An emergency occurred and that the permittee can identify the cause(s) of the emergency;

- (2) The permitted facility was at the time being properly operated;
- (3) During the period of the emergency the permittee took all reasonable steps to minimize levels of emissions that exceeded the emission standards or other requirements in the permit; and
- (4) ~~The permittee fulfilled notification requirements under Paragraph (2) of Subsection E of 20.2.70.302 NMAC.~~ The permittee submitted notice of the emergency to the Department within 2 working days of the time when emission limitations were exceeded due to the emergency. This notice fulfills the requirement of 20.2.70.302.E(2) NMAC. This notice must contain a description of the emergency, any steps taken to mitigate emissions, and corrective actions taken.

C. In any enforcement proceeding, the permittee seeking to establish the occurrence of an emergency has the burden of proof.

D. This provision is in addition to any emergency or upset provision contained in any applicable requirement.

[11/30/95; 20.2.70.304 NMAC - Rn, 20 NMAC 2.70.III.304, 06/14/02; A, 9/6/06; A, xx/xx/08]

20.2.70.403 PETITIONS FOR REVIEW OF FINAL ACTION:

A. Hearing Before the Board:

(1) Any person who participated in a permitting action before the Department and who is adversely affected by such permitting action may file a petition for hearing before the Board. For the purposes of this section, permitting action shall include the failure of the Department to take final action on an application for a permit (including renewal) or permit modification within the time specified in this Part.

(2) The petition shall be made in writing to the Board within thirty (30) days from the date notice is given of the Department's action and shall specify the portions of the permitting action to which the petitioner objects, certify that a copy of the petition has been mailed or hand-delivered as required by this paragraph, and attach a copy of the permitting action for which review is sought. Unless a timely request for hearing is made, the decision of the Department shall be final. The petition shall be copied simultaneously to the Department upon receipt of the appeal notice. If the petitioner is not the applicant or permittee, the petitioner shall mail or hand-deliver a copy of the petition to the applicant or permittee. The Department shall certify the administrative record to the Board.

(3) If a timely request for hearing is made, the Board shall hold a hearing within ~~ninety (90)~~ sixty (60) days of receipt of the petition in accordance with New Mexico Air Quality Control Act section 74-2-7 NMSA 1978.

B. Judicial Review:

(1) Any person who is adversely affected by an administrative action taken by the Board pursuant to subsection A of 20.2.70.403 NMAC may appeal to the Court of Appeals in accordance with New Mexico Air Quality Control Act section 74-2-9 NMSA 1978. Petitions for judicial review must be filed no later than thirty (30) days after the administrative action.

(2) The judicial review provided for by 20.2.70.403 NMAC shall be the exclusive means for obtaining judicial review of the terms and conditions of the permit.

[11/30/95; 20.2.70.403 NMAC - Rn, 20 NMAC 2.70.403 06/14/02; A, xx/xx/08]

1 proposed rule would replace a regulation adopted in 1970, amended in 1981, and
2 unchanged since then.

3 There are several reasons for proposing a new regulation. First, the 1981 rule
4 does not conform to guidance issued by the U.S. Environmental Protection Agency
5 ("EPA") regarding the acceptable approaches for states to address excess emissions
6 during malfunction, startup, shutdown, and maintenance. EPA has noted on several
7 occasions (and more frequently in recent years) that the 1981 rule fails to conform to this
8 guidance. Indeed, EPA has informed the Department that this deficiency makes it
9 difficult to approve the Department's Title V and NSR permitting actions. Second, the
10 1981 rule is vague, allowing facilities to claim defenses to emissions during startup,
11 shutdown, and maintenance, making it difficult for the Department to enforce emission
12 limit violations, and leading to resource- and time-consuming litigation. Third, the 1981
13 rule creates uncertainty for the business community and may cause delays in the issuance
14 of Title V and PSD permits, particularly if EPA begins objecting to these permits because
15 of the rule. Finally, the 1981 rule has proved inadequate to stem the flow of excess
16 emission reports, which have exceeded 2,500 in recent years. The Department is not
17 adequately staffed to review and enforce such a large number of reports. Additionally,
18 the rule does not explicitly require sources to determine the root cause of their excess
19 emissions, so the same events occur again and again. In some cases, these events actually
20 constitute the normal operation of the facility, and the resulting emissions should be
21 modeled and incorporated into enforceable permit conditions.

22 As I previously mentioned, EPA has defined the manner in which states can
23 regulate excess emissions to comply with the federal Clean Air Act. EPA's 1999 policy

1 (which it affirmed in 2001), clearly states that "all excess emissions are violations of the
2 applicable emission limitation." EPA recognized, however, that sources may experience
3 unavoidable malfunctions, entirely beyond the control of the owner or operator, which
4 cause excess emissions. In these limited circumstances, the states can provide an
5 affirmative defense and exercise enforcement discretion to determine whether to
6 commence an enforcement action. In 2004, EPA informed the Department that the 1981
7 rule fell short of these requirements, and might exacerbate existing air quality conditions,
8 interfere with the attainment of federal ambient air quality standards, and adversely affect
9 the permitting program. Accordingly, the Department believes that it is time to fix the
10 problem.

11 The proposed rule complies with EPA's guidance. Further, it has been designed
12 to reduce the frequency of reports for emissions during startup, shutdown, and
13 maintenance, which by definition are violations without an affirmative defense, and
14 which should be included in permitted emission limits. The proposed rule also contains a
15 requirement to identify and correct the causes of an excess emission event. Both the
16 Department and EPA have required this type of analysis in settlements of enforcement
17 actions, and the Department believes that this analysis can reduce the likelihood of
18 recurring events, thereby preventing and abating air pollution throughout the state.

19 **III. STAKEHOLDER PROCESS**

20 The Department developed the proposed rule through a lengthy stakeholder
21 process. NMED Exhibit 24. The Department convened the first stakeholder meeting on
22 August 1, 2007 to announce its intent to revise the rule. Since then, the Department held
23 three more public meetings, as well as several sector-specific meetings, to discuss

1 particular aspects of the rule. To facilitate this discussion, the Department twice
2 postponed the rulemaking process at the request of stakeholders. The Department
3 carefully reviewed public comments and adopted many revisions proposed by
4 stakeholders. As you listen to the testimony today, please keep in mind that this
5 proposed rule replaces an inadequate regulation that does not conform with the Federal
6 Clean Air Act. Not surprisingly, the new rule will be more detailed, more stringent, more
7 action-forcing, and more enforceable than its outdated predecessor.

8 **IV. SMALL BUSINESS REGULATORY RELIEF ACT**

9 The Department complied with the Small Business Regulatory Relief Act. The
10 Act establishes a review process, not a standard or outcome. The Department must
11 analyze the effect of the proposed rule on small businesses; if the Department identifies
12 an adverse effect, it must consider the available methods to reduce the effect, but even if
13 there are no such methods, the Board may approve the proposed rule to accomplish the
14 objectives of the applicable law.

15 As required by the Act, the Department submitted to the Small Business Advisory
16 Commission a letter evaluating the effect of the proposed rule on small businesses. A
17 copy of the letter was filed in the record of this rulemaking. In the letter, the Department
18 determined that the proposed rule would not have an adverse effect on small businesses.
19 The proposed rule repeals and replaces an existing rule that already requires small
20 businesses to report excess emissions. In fact, the proposed rule reduces the impact of
21 the existing rule on small businesses by clarifying the circumstances in which they can
22 claim an affirmative defense for excess emissions which are, by definition, violations of
23 the applicable permit or regulation and subject to enforcement action. The requirement

1 for root cause analysis also benefits small businesses by identifying and implementing
2 practices that will avoid or reduce the amount of excess emissions in the future, resulting
3 in less reporting, better compliance, and reduced risk of enforcement and civil penalties.

4 Because the Department determined that the proposed rule would not have an
5 adverse effect on small businesses, it was not required to consider alternative regulatory
6 methods. Nonetheless, the Department considered such methods and determined that
7 none were available that would accomplish the objectives of the applicable law. The
8 proposed rule is required to comply with EPA policy, as well as to enforce applicable air
9 quality requirements and prevent or abate air pollution. The Department did not identify
10 any alternative method to the proposed rule for achieving these objectives. Moreover, no
11 stakeholder demonstrated - or attempted to demonstrate - that the proposed rule will
12 adversely affect small businesses, nor identified - or attempted to identify - any
13 alternative method capable of achieving these objectives. Finally, the Department
14 received no response from the Commission.

15 **V. ENVIRONMENTAL JUSTICE EXECUTIVE ORDER**

16 The Department complied with Governor Richardson's executive order on
17 environmental justice, EO 2006-056 (November 18, 2005). The order requires the
18 Department to "provide meaningful opportunities for involvement to all people regardless
19 of race, color, ethnicity, religion, income, or educational level." The Department
20 complied with this requirement by holding four public meetings and providing long
21 comment periods. The order also requires the Department to provide notice in English
22 and Spanish. The Department complied with this requirement by publishing the notice of
23 the public comment period and this hearing in both languages. Finally, the Department

1 determined that the proposed rule will benefit communities with environmental justice
2 concerns, as well as the broader public health and environment. Socioeconomically
3 disadvantaged people often live near industrial facilities. Under the proposed rule, these
4 facilities will be required to report emissions which are not accounted for by the
5 modeling conducted for permitted emissions. Additionally, these facilities will be
6 required to conduct root cause analysis and take corrective actions to reduce or eliminate
7 these emissions.

1 demonstrates that the excess emissions were unavoidable, minimized as much as
2 practicable, occurred infrequently, and did not endanger public health.

3 **II. PROPOSED REPEAL AND REPLACEMENT**

4 There are two primary reasons for the Department's proposal to repeal and replace
5 the 1981 rule. First, the rule does not comply with federal policy for excess emissions.
6 Second, the rule is not adequate to deal with the volume and significance of excess
7 emissions in New Mexico.

8 **A. FEDERAL POLICY**

9 In September 2004, the U.S. Environmental Protection Agency ("EPA") notified
10 the Department that the 1981 rule is not consistent with EPA's interpretation of the
11 federal Clean Air Act. Since the rule was adopted, EPA has issued several policy
12 statements regarding the type of enforcement discretion that states can exercise for excess
13 emissions without violating the Clean Air Act. EPA has been clear that the 1981 rule
14 does not comply with these policy statements, and that it may take adverse action unless
15 the Department revises the rule.

16 EPA's September 2004 letter stated:

17 [T]here is a problem with Section 20.2.7.109. Although the
18 State is not making changes to Section 20.2.7.109 directly,
19 that provision now becomes applicable to all [T]itle V
20 sources with this change. Section 20.2.7.109 is not
21 consistent with [EPA]'s interpretation of the Clean Air Act
22 as outlined in a 1999 memorandum, State Implementation
23 Plans (SIPs): Policy Regarding Excess Emissions During
24 Malfunctions, Startup, and Shutdown.

25 ...
26

27
28 Section 20.2.7.109 is inconsistent with EPA's interpretation
29 of the Clean Air Act because the provision can be
30 interpreted to exempt emissions from compliance with SIP

1 limits. Because excess emissions might aggravate air
2 quality so as to prevent attainment or interfere with
3 maintenance of the ambient air quality standards, EPA
4 views all excess emissions as violations of the applicable
5 emission limitation.
6

7 NMED Exhibit 15.

8 EPA voiced a related concern regarding the rule in November 2007. In an
9 electronic mail message, EPA informed the Department that it might reject Title V
10 permits that do not incorporate enforceable limits for emissions during startup, shutdown,
11 and scheduled maintenance. NMED Exhibit 17. Although the Department told EPA that
12 under its interpretation the rule does not exempt emissions during startup, shutdown, and
13 scheduled maintenance, EPA believes that the rule could be construed differently. EPA's
14 position creates a significant problem: if the rule can be read to excuse an excess
15 emission that is predictable enough to require an enforceable emission limit, EPA will
16 object to Title V permits, slowing down the permit process with adverse consequences
17 for both the Department and permittees.

18 I would like to step back and describe EPA's policy regarding excess emissions.
19 EPA established its policy in a memorandum issued in 1982, and subsequently affirmed
20 the policy with minor adjustments in memoranda issued in 1983, 1999, and 2001.
21 NMED Exhibits 11-14. These memoranda are reproduced in the Department's exhibits.
22 Rather than review each version of the policy, I will focus on the most recent and
23 currently applicable statement from 2001. NMED Exhibit 14.

24 EPA begins with the principle that all excess emissions, without exception, are
25 violations of the applicable emission limitation. EPA recognizes, however, that in
26 limited circumstances, such as malfunctions, it would be appropriate to exercise

1 enforcement discretion and not assess a civil penalty. Malfunctions are defined in EPA
2 guidance as the sudden and unavoidable failure of process or air pollution control
3 equipment which is entirely beyond the control of the owner or operator of the source.
4 The states may exercise this enforcement discretion by allowing sources to assert an
5 affirmative defense for civil penalties. The affirmative defense applies only to civil
6 penalties, not injunctive relief (more commonly known in this context as corrective
7 action). Additionally, the affirmative defense does not be apply to violations of federal
8 technology standards, such as the New Source Performance Standards ("NSPS"),
9 National Emission Standards for Hazardous Air Pollutants ("NESHAP"), and Maximum
10 Achievable Control Technology Standards ("MACT"). To claim the affirmative defense,
11 a source must make a demonstration regarding several criteria, which Robert Samaniego
12 will describe in more detail.

13 EPA also authorizes the states to extend this affirmative defense to emissions
14 during startup and shutdown of process and air pollution control equipment. However,
15 EPA makes clear that this defense is extremely limited because most emissions during
16 the startup and shutdown are reasonably foreseeable. In fact, most emissions during
17 startup and shutdown are considered to be part of the normal operation of the source, and
18 should be accounted for in the planning, design, and implementation of operating
19 procedures. For this reason, most emissions during startup and shutdown should be
20 addressed in a source's permit rather than excused by an affirmative defense. Similarly,
21 under EPA's policy, emissions during scheduled maintenance are never entitled to an
22 affirmative defense, because by definition they are foreseeable. As EPA has stated, "[a]n
23 affirmative defense is not appropriate for maintenance activities. Maintenance is a

1 predictable or anticipated event which can be scheduled to a large extent at the discretion
2 of the source." NMED Exhibit 16.

3 **B. REVISIONS TO 1981 RULE**

4 EPA informed the Department on several occasions that the 1981 rule is not
5 consistent with the Clean Air Act because the rule can be read to grant an automatic
6 exemption. NMED Exhibit 14 ("Any provision that allows for an automatic exemption
7 for excess emissions is prohibited."). EPA's interpretation is supported by the arguments
8 advanced by some sources that their emissions are automatically exempted from liability
9 if they demonstrate the criteria specified in section 109 of the rule, and further, that their
10 emissions during startup, shutdown, and scheduled maintenance are entitled to this
11 exemption.

12 In recent years, the Department has stated clearly that the rule should be construed
13 as providing an affirmative defense, not an automatic exemption. Nonetheless, because
14 the matter has not been resolved by order of the Secretary or a court, sources are not
15 precluded for advancing this argument. To eliminate this argument, as well as to
16 conform the rule with EPA policy, the rule must be revised.

17 The proposed rule clarifies that all excess emissions are violations of the
18 applicable emission limitation, provides an affirmative defense only for malfunctions,
19 startups, and shutdowns, and establishes clear and consistent reporting and data
20 requirements. The proposed rule, in contrast to the 1981 rule, incorporates nearly
21 verbatim the criteria from EPA's policy regarding affirmative defenses. Both EPA and
22 the regulated community recommend this approach. As Robert Samaniego will explain,

1 the Department has deviated from EPA's criteria only to the extent necessary to
2 accommodate the structure of the proposed rule.

3 Throughout the rule development process, the Department regularly consulted
4 with EPA to ensure consistency with EPA policy and SIP approvability. In August 2007,
5 the EPA reviewed a draft of the proposed rule. NMED Exhibit 16. EPA observed that its
6 policy "establishes our expectation on what is an approvable State regulation." EPA also
7 stated that it "fully supports your consideration for improving the New Mexico rule and
8 recognizes that the New Mexico Environment Department's current initiatives to reduce
9 excess emissions that may aggravate air quality and interfere with the goals of
10 maintaining attainment of the national ambient air quality standards (NAAQS)."

11 More recently, EPA informed the Department that the current version of the
12 proposed rule would be approvable as part of the New Mexico SIP. In fact, EPA
13 informed the Department that the proposed rule is the most comprehensive effort to
14 reduce excess emissions in Region 6, and sets the standard for other states. In particular,
15 EPA strongly supports the Department's proposed requirement for root cause and
16 corrective action analysis, which goes to the heart of the excess emission problem. This
17 requirement, which I will discuss later in my testimony, prevents and abates air pollution
18 by requiring sources to investigate and correct the cause of excess emissions, thereby
19 avoiding recurring episodes of emissions not authorized by permits or regulations.

20 **C. EXCESS EMISSION ENFORCEMENT**

21 **1. CURRENT ENFORCEMENT APPROACH**

22 The 1981 rule requires a source having an excess emission event due to startup,
23 shutdown, or malfunction to notify the Department verbally as soon as possible, and in

1 writing within twenty (24) hours and again within ten (10) days following the event. For
2 an excess emission event due to scheduled maintenance, the source must notify the
3 Department verbally within twenty (24) hours and in writing within ten (10) days.

4 The Department's enforcement staff reviews the written notifications, called
5 "excess emission reports", or "801 reports" after the original designation of the 1981 rule.
6 The Department typically reviews these reports in the course of routine facility
7 inspections or, if the facility has a Title V permit, during its review of the Annual
8 Compliance Certification. The Department less frequently reviews these reports as soon
9 as they are submitted, primarily due to the high volume of reports and the lack of
10 enforcement resources. However, when the reports indicate large quantities, long
11 durations, or frequent recurrences of a particular type of event, the Department reviews
12 the reports on a case-by-case basis. If the Department determines that an excess emission
13 report does not satisfy the criteria for an affirmative defense, the Department may issue a
14 notice of violation or compliance order.

15 2. FREQUENCY OF EXCESS EMISSION REPORTS

16 The volume of excess emission reports suggests that the 1981 rule is not working
17 to reduce unpermitted emissions. A summary table of excess emission reports for 2006
18 and 2007 indicates that the Department receives more than 2,500 reports each year.
19 NMED Exhibit 3. In 2006, the Department received 2,544 reports from 107 facilities. In
20 2007, the Department received 2,762 reports from 104 facilities. The majority of reports
21 are submitted by Title V facilities. The oil and gas sector submitted the most reports,
22 accounting for more than sixty (60) percent of reports in 2006, and more than seventy
23 (70) percent of reports in 2007. In this sector, gas processing plants submitted the most

1 reports, followed by compressor and booster stations. Indeed, in each industry category,
2 a handful of sources were responsible for a significant proportion of the reports each
3 year. The data suggest that some sources have significant problems that are not being
4 addressed, but there also is a question, based in part on the Department's compliance
5 inspections, that some sources may not be accurately reporting their excess emissions.

6 Although the Department has data on the number of reports filed annually, it does
7 not have good data on the quantity of excess emissions, in large part because of the
8 current system design. Nonetheless, the available information indicates that the quantity
9 of excess emissions is substantial. For instance, in a recent enforcement action involving
10 three gas processing plants owned by one company, the Department calculated the excess
11 emissions over a seven (7) year period exceeded 11,000 tons. Indeed, during the last
12 eight (8) months of this period, the gas plants emitted more than two hundred (200) tons
13 of sulfur dioxide, more than five (5) times the threshold for a major modification under
14 the PSD program. .

15 The current system is not designed to produce good data on the quantity of these
16 unpermitted emissions. The rule does not require sources to calculate their total excess
17 emissions on a rolling or annual basis. Source often submit more than one report for a
18 single event, making it difficult to calculate the emissions during even one event. None
19 of the reporting is electronic. The Department lacks the resources to track and correct the
20 data, and in all but a few cases, to reconstruct the record and tabulate emissions.

21 3. INADEQUACY OF 1981 RULE

22 Beyond the sheer volume of reports and emissions, the 1981 rule is difficult to
23 enforce. For years, sources have used a variant of the same form to report excess

1 emissions, and due to a lack of enforcement action by the Department, the regulated
2 community has developed the assumption that their current level of reporting is sufficient
3 to satisfy the rule. In recent years, the Department has worked to correct this assumption,
4 but sources continue to submit information that falls well short of the basic requirements
5 in the rule.

6 While the basic requirements may seem to be clear, the type and amount of
7 information often is inadequate to determine whether the source satisfies the criteria for
8 the affirmative defense. Sources rarely provide more than a sentence describing the
9 nature and cause of the event, and seldom address the criteria required to demonstrate an
10 affirmative defense. NMED Exhibit 6. As a result, it has been very difficult to determine
11 whether a particular event could have been avoided through better planning, operation,
12 and maintenance, is part of a recurring pattern of events attributable to the same causal
13 factor, or should be granted the affirmative defense.

14 The Department's recent effort to enforce the basic requirements has been met
15 with strong resistance. When the Department requests additional information to
16 supplement an inadequate report, particularly with respect to causal factors and corrective
17 actions, sources complain that the Department is becoming too involved in their
18 operation, does not understand the nature of their operation, makes unreasonable
19 requests, exceeds the scope of its authority under the 1981 rule, waived its right to bring
20 an enforcement action by failing to take earlier action, and is barred from taking an
21 enforcement action by the statute of limitations in the Air Quality Control Act. As a
22 result, it takes a significant investment of resources for the Department to pursue even a
23 fraction of the illegal emissions reported each year.

1 Even so, the Department has brought two significant enforcement actions
2 involving excess emissions in recent years. The first case involved a coal-fired power
3 plant, in which the Department and citizen groups alleged more than one thousand
4 (1,000) violations of permitted emission limits and nearly sixty thousand (60,000)
5 violations of the opacity standard in federal regulations. NMED Exhibit 5. This case
6 ultimately resulted in a \$200M settlement requiring the installation of state-of-the-art
7 pollution controls for nitrous oxides, sulfur dioxide, particular matter, and mercury, but
8 only after the plant owner had exhausted its effort to excuse the alleged violations.

9 The second case involved three (3) gas processing plants owned and operated by
10 the same company. The Department filed compliance orders alleging that the gas plants
11 had violated their permits on thousands of occasions by flaring natural gas and waste
12 products during reasonably foreseeable and avoidable equipment breakdowns. NMED
13 Exhibit 4. These flaring incidents resulted in thousands of tons of unauthorized pollution.
14 The Department recently settled these orders for more than \$60M in civil penalties and
15 environmental projects, but much of this pollution, as well as the the litigation and
16 penalties, could have been avoided if the company had properly investigated and
17 corrected the problems when they occurred. Moreover, the litigation diverted the
18 Department's limited resources from other enforcement priorities, including the
19 thousands of other excess emission reports submitted during this pendency of the action.

20 **III. BENEFITS OF PROPOSED RULE**

21 The proposed rule conveys many benefits, of which three are paramount:
22 enhanced reporting, enhanced criteria for affirmative defense claims, and root cause and
23 corrective cause analysis.

1 The first benefit is enhanced reporting. For years, the Department has used the
2 same form for all excess emission events. While the form has been updated from time to
3 time, it is tied to the 1981 rule, whose deficiencies have already been discussed. Under
4 the proposed rule, the reporting requirements are clarified, the criteria for affirmative
5 defenses are specified, and root cause analysis is required. To implement these
6 improvements, the Department developed separate forms for reporting an excess
7 emission, claiming an affirmative defense, and preparing a root cause analysis. The new
8 forms also provide a pathway to electronic reporting and data analysis. As Robert
9 Samaniego will describe in more detail, the Department is developing an electronic
10 reporting procedure to capture information from the reports. This procedure will
11 streamline the submittal and review processes, and allow the Department to extract
12 information to track and tabulate data, evaluate trends, and develop programs to identify
13 and reduce emissions in specific industry categories.

14 The second benefit is the clarification of the criteria for claiming an affirmative
15 defense for a civil penalty. As I mentioned earlier, the 1981 rule predated EPA's policy,
16 and therefore did not include the criteria recommended by EPA. As a result, the
17 Department and the regulated community disagreed whether the rule provided an
18 automatic exemption or an affirmative defense, as well as the meaning of the criteria for
19 either approach. The consequence has been more than 2,500 excess emission reports
20 each year, inadequate reports, recurring events, and minimal or nonexistent root cause
21 analysis and corrective actions. The volume of reports and the cost and demand of
22 enforcement is overwhelming, while the public health and environment are compromised
23 by large quantities of unpermitted pollution.

1 The proposed rule directly addresses this situation by clarifying that the owner or
2 operator of a source having an excess emission bears the burden to prove each criteria for
3 an affirmative defense claim. The affirmative defense is divided into malfunction and
4 startup/shutdown, reflecting the different criteria applicable to each category.
5 Maintenance is entirely eliminated as an excusable emission event and must be included
6 in permits. . Sources are required to provide sufficient data for the Department to make
7 an affirmative defense determination, including any additional information by specified
8 deadlines upon request by the Department.

9 The final benefit of the proposed rule is the root cause and corrective action
10 analysis. This requirement may be the single most important part of the proposed rule.
11 Root cause analysis ("RCA") is the process of investigating and categorizing the causes
12 of events. NMED Exhibit 18. RCA identifies what, how, and why an event happened by
13 collecting data, tracking potential causes, and implementing recommendations to prevent
14 those causes from recurring.

15 There are several recognized methods for conducting RCA. NMED Exhibit 19.
16 The level of effort required for RCA depends in large part on the significance and
17 complexity of the event. EPA has recognized the value of RCA for reducing excess
18 emission events.

19 In the final NESHAP rule amending the general provisions, EPA stated:

20 By removing the requirement that the SSM plan must be followed
21 during periods of SSM, the final amendments allow sources
22 flexibility to address emissions during periods of SSM. This in no
23 way alters the obligation and requirement set out in 40 CFR
24 63.6(e)(1)(i) that source owners or operators "minimize emissions"
25 at all times, including periods of SSM. Root cause analysis of
26 excess emissions events may generally be the most effective means
27 in many industry sectors to assist a source in meeting its regulatory

1 obligations to minimize emissions at all times including during
2 periods of SSM. Appropriately conducted root cause analysis
3 should determine the fundamental cause necessary to ensure that
4 the excess emission does not arise again. Through this process, we
5 have determined that fewer and fewer excess emission events
6 occur over time. Thus, performing a root cause or similar analysis
7 and implementing corrective action may often be relevant in
8 determining whether a source has met the good air pollution
9 control measures standards.

10
11 NMED Exhibit 20.

12
13 In the proposed NSPS rule for petroleum refineries, EPA stated:
14

15 Finally, we evaluated a requirement for performing root-cause
16 analyses as a means to minimize the frequency of process
17 malfunctions and thereby reduce malfunction emissions. Even
18 though process upset gas is exempt from SO₂ emission limits
19 associated with fuel gas combustion units, we believe it is good air
20 pollution practice to investigate the causes of significant
21 atmospheric releases caused by process upsets or malfunctions to
22 determine if similar upsets or malfunctions can be reasonably
23 prevented from recurring. Similarly, we believe it is good
24 pollution control practice to investigate significant emission
25 exceedances to determine the cause of the exceedance and to
26 implement procedures to prevent its recurrence.
27

28 NMED Exhibit 21.

29
30 These statements are consistent with EPA's practice of requiring RCA in consent decrees
31 under the national refinery initiative, including the decree for Navajo Refining
32 Company's Artesia Refinery and the stipulated final order for Western Refining
33 Company's Gallup and Bloomfield Refineries. NMED Exhibit 22.

34 The Department agrees with EPA that RCA constitutes a good air pollution
35 control practice for minimizing emissions, and included this requirement in the recent gas
36 plant settlement mentioned earlier. By investigating and correcting excess emission
37 events, sources can avoid recurring causes and prevent or abate air pollution, as well as
38 protect the federal ambient air quality standards.

1 implement the regulation and enforce against excess emissions that are denied the
2 affirmative defense.

3 **II. SECTION-BY-SECTION REVIEW OF PROPOSED RULE**

4 **A. SECTION 109 - EXCESS EMISSIONS ARE VIOLATIONS**

5
6 Section 109 establishes two fundamental requirements. The first requirement is
7 that the emission of an air contaminant in excess of a limitation imposed by an applicable
8 air quality regulation or permit condition is a violation and may be subject to an
9 enforcement action. This language is not expressly stated in the 1981 rule. For this
10 reason, EPA informed the Department that the 1981 rule does not comply with EPA
11 policy regarding excess emissions. In correspondence from EPA Region 6 to Richard
12 Goodyear of the Department dated September 10, 2004, EPA stated:

13 However, there is a problem with Section 20.2.7.109. Although
14 the State is not making changes to Section 20.2.7.109 directly, that
15 provision now becomes applicable to all title V sources with this
16 change. Section 20.2.7.109 is not consistent with the
17 Environmental Protection Agency's (EPA) interpretation of the
18 Clean Air Act as outlined in a 1999 Memorandum, State
19 Implementation Plans (SIPs): Policy Regarding Excess Emissions
20 During Malfunctions, Startup, and Shutdown." . . . Section
21 20.2.7.109 is inconsistent with EPA's interpretation of the Clean
22 Air Act because the provision can be interpreted to exempt
23 emissions from compliance with SIP limits. Because excess
24 emissions might aggravate air quality so as to prevent attainment
25 or interfere with maintenance of the ambient air quality standards,
26 EPA views all excess emissions as violations of the applicable
27 emission limitation.

28
29 The second requirement is that the owners or operators of sources having an
30 excess emission must operate the source and associated air pollution control equipment in
31 a manner consistent with good air pollution control practices for minimizing emissions.
32 This requirement is a basic obligation for every air pollution source, and sources must

1 demonstrate compliance in order to qualify for an affirmative defense under the proposed
2 rule.

3 **B. SECTION 110 - NOTIFICATION**

4 The Department proposes to amend Section 110 to ensure timely, accurate, and
5 complete reporting of excess emissions. The notification deadline for initial reports is the
6 end of the next regular business day after discovery of the excess emission. The
7 notification deadline for final reports is ten (10) days after the end of the excess emission.
8 Although EPA policy does not address notification deadlines, the initial report
9 requirement is consistent with the notification deadline for emergencies in 40 CFR §70.6.
10 These notification deadlines respond to comments from the regulated community, which
11 sought additional flexibility in reporting that matched the realities of industrial settings.
12 Additionally, the Department proposes to allow electronic reporting. As I will discuss
13 later in my testimony, the Department is developing a web-based electronic reporting tool
14 for use in this context.

15 The Department also proposes to expand and clarify the information required in
16 excess emission reports. This information will allow the Department to better categorize
17 and assess events. New and clarified information requirements include:

- 18 1. The name and title of the person preparing the report.
- 19 2. The permit and database numbers for the facility.
- 20 3. The air quality regulation or permit condition that was exceeded.
- 21 4. The method for determining the magnitude and duration of the excess emission.
- 22 5. The corrective action(s) taken to eliminate the cause of the excess emission, and a
23 schedule for implementation and progress reports.

- 1 6. The corrective action(s) taken to prevent a recurrence of the excess emission.
- 2 7. Whether the owner or operator attributes the excess emission to malfunction,
3 startup or shutdown.
- 4 8. Whether the owner or operator will claim an affirmative defense under Sections
5 111 or 112 of 20.2.7 NMAC. An affirmative defense claim triggers the
6 requirement to provide additional information regarding the event. Failure by the
7 owner or operator to assert the claim waives the affirmative defense.
- 8 9. A signed certification that the content of the report is true, accurate, and complete.
9 The certification must be signed by the person reporting the excess emission.
- 10 10. A requirement to provide additional information upon request of the Department.

11 The Department received comments from the regulated community requesting
12 that the Department establish a *de minimis* threshold for reporting excess emission
13 events. The 1981 rule does not contain such thresholds. As a result, any excess emission
14 must be reported. The Department believes that such a threshold in the proposed
15 regulation would be ill-advised. All excess emissions are violations subject to
16 enforcement, must be minimized by good air pollution control practices, and may
17 adversely affect air quality and compliance with air quality standards. In addition,
18 beginning this year, Title V sources will be required to pay a fee for their excess
19 emissions. To enforce the regulation and accurately assess Title V fees, the Department
20 requires information regarding every excess emission. Moreover, EPA Region 6
21 expressed opposition to the concept of *de minimis* reporting thresholds, indicating that the
22 owner or operator of a source should be required to report every excess emission
23 regardless of the amount.

1 **C. SECTIONS 111 and 112 - AFFIRMATIVE DEFENSE**

2 Sections 111 and 112 propose to establish the criteria for sources to claim an
3 affirmative defense for their excess emissions. The source bears the burden of proving
4 each criterion. If successful, the Department would not assess a civil penalty. However,
5 the source would remain liable for injunctive relief, e.g., corrective action. As Debra
6 McElroy explained, the 1981 rule does not clearly identify Section 109 as the criteria for
7 an affirmative defense, and these criteria differ greatly from EPA policy.

8 In Sections 111 and 112, the Department proposes to adopt the affirmative
9 defense criteria set forth in EPA policy. Earlier versions of the proposed rule deviated
10 from these criteria, but both EPA and the regulated community requested conformity, and
11 the Department's current proposal reflects the criteria almost verbatim.

12 The affirmative defenses in Sections 111 and 112 contain both common and
13 independent requirements. With respect to independent requirements, the affirmative
14 defense for malfunctions requires the source to demonstrate, first and foremost, that the
15 excess emission was caused by a malfunction. "Malfunction" is defined in Section 7 as
16 the sudden and unavoidable failure of process or air pollution control equipment beyond
17 the control of the owner or operator. Failures caused entirely or in part by poor
18 maintenance, careless operation, or other preventable problem are explicitly excluded.
19 Additionally, the source must show that the excess emission did not stem from any
20 activity or event that could have been foreseen and avoided, or planned for, or that could
21 not have been avoided by better operation and maintenance practices. Finally, the source
22 must show that the event is not part of a recurring pattern indicative of inadequate design,
23 operation, or maintenance. The affirmative defense for startups and shutdowns requires

1 the source to demonstrate that the excess emission occurred during a startup or shutdown.
2 It must also demonstrate that the duration of the excess emission was short, could not
3 have been prevented through careful planning and design, and was not part of a recurring
4 pattern indicative of inadequate design, operation, or maintenance.

5 The common requirements for both affirmative defenses concern the source's
6 conduct during and in response to the excess emission event. For both malfunctions and
7 startups/shutdowns, the source must demonstrate that during the event, it maintained and
8 operated process and air pollution control equipment in a manner consistent with good
9 practice for minimizing emissions, emissions were minimized to the extent practicable,
10 emission monitoring systems were kept in operation, and repairs were made
11 expeditiously. Finally, the source must document these actions by signed,
12 contemporaneous operating logs, or other relevant evidence.

13 The Department's original proposal required sources to submit the affirmative
14 defense demonstration with the final report. However, in response to comments from the
15 regulated community that this deadline was too short given the information requirements,
16 the Department extended the deadline to thirty (30) days after the submission of the final
17 report. More recently, the Department added language to allow sources to request an
18 additional extension of time.

19 **D. SECTION 113 - ROOT CAUSE AND CORRECTIVE ACTION**
20 **ANALYSIS**

21
22 The Department proposes a requirement for sources to conduct a Root Cause and
23 Corrective Action Analysis ("RCA") for each excess emissions event. As Debra
24 McElroy testified, RCA is a good engineering practice that is routinely used by many
25 facilities to improve their health, safety, and environmental performance. EPA has

1 required RCA in federal consent decrees for petroleum refineries, including Navajo
2 Refining Company's Artesia Refinery. NMED Exhibit 22-23. EPA has endorsed RCA in
3 rules for NSPS and NESHAP as one the best available methods to reduce the frequency
4 and severity of excess emission events. NMED Exhibits 20 and 21.

5 The Department agrees with EPA's position. In light of the volume of excess
6 emission reports historically received by the Department, as well as the frequency of
7 recurring causes, RCA could be an effective approach to preventing and abating air
8 pollution. The Department's review of excess emission reports suggests that some
9 facilities do not apply the effort and resources to identify and correct the root and
10 contributing causes of excess emission events, and thus experience recurrences that could
11 have been prevented.

12 Despite these benefits, some members of the regulated community object that the
13 Board lacks the statutory authority to require RCA. The Department does not agree with
14 this objection. By identifying and correcting the causes of excess emission events, RCA
15 prevents and abates air pollution. These members of the regulated community also argue
16 that RCA is too burdensome and vague. However, if the regulated community does not
17 conduct the analysis, the burden falls to the Department, and the situation will remain
18 essentially as it stands today. Because excess emissions are violations, the burden should
19 be on the source, not the Department.

20 Moreover, RCA ultimately benefits the source because it avoids future events -
21 arising from the same or similar causes. Under the proposed rule, the Department does
22 not review or approve a RCA. However, sources that conduct RCA can minimize their

1 liability by avoiding future events, while providing documentation for the Department to
2 determine that future events did not result from the same or similar causes.

3 The RCA elements are based on sound practice. They were developed by EPA in
4 the context of the refinery initiative, and applied in many consent decrees. The first set of
5 elements concerns the identification of the root cause and all contributing causes. The
6 second set of elements concern the analysis of corrective actions to reduce the likelihood
7 of a recurrence of the excess emission, including their estimated cost, probable
8 effectiveness, and implementation schedule.

9 The Department adjusted the RCA submittal deadline to accommodate industry
10 concerns. The Department's original proposal required sources to submit the RCA no
11 later than forty-five (45) days after the end of the excess emission. In response to
12 comments, the Department changed this date to no later than sixty (60) days after the
13 submission of the final report.

14 The Department received requests from the regulated community to establish *de*
15 *minimus* thresholds for conducting RCA. The Department originally agreed to this
16 concept, but was not prepared to include specific levels in the proposed rule.
17 Accordingly, the Department proposed to establish *de minimus* thresholds through
18 guidance after consultation with the regulated community. However, the New Mexico
19 Oil and Gas Association objected to this proposal, arguing that allowing the Department
20 to set these thresholds would constitute an unlawful delegation of authority.

21 Because the proposed rule neither contains thresholds nor allows the Department
22 to set thresholds, members of the regulated community have expressed concern that every
23 excess emission event is subject to RCA. Although such a requirement would be

1 appropriate because every excess emission is a violation which should be investigated
2 and corrected, the Department remains willing to develop *de minimus* thresholds on an
3 industry-by-industry basis after consultation with the regulated community.

4 The Department received requests from the regulated community for guidance
5 regarding the RCA process. To ensure consistent analysis, the Department recommends
6 that sources conduct RCA in accordance with the U.S. Department of Energy Guideline
7 Document, *Root Cause Analysis Guidance Document*, DOE-NE-STD-1004-92, February
8 1992. NMED Exhibit 19. This document will be available for downloading at the Air
9 Quality Bureau's website.

10 Finally, the Department proposes some changes to the version of the proposed
11 rule published on March 31, 2008. In subsection B, the Department proposes to correct
12 the erroneous citation and reference to RCA submittal no later than sixty (60) days after
13 request by the Department. This language, which was written in the context of an earlier
14 draft of the proposed rule, is no longer applicable.

15 **E. SECTION 114 - REVIEW OF DEPARTMENT'S**
16 **DETERMINATIONS**

17
18 Section 114 describes the Department's process for making determinations
19 regarding affirmative defenses. While the Department may issue a determination after
20 reviewing all relevant information regarding an excess emission event, the affected
21 source cannot challenge the decision until the Department commences an administrative
22 or judicial action. This limitation ensures that the Department's determination will not be
23 challenged until the Department decides to take concrete action to enforce the rule. It is
24 possible that, even though the Department has made an adverse determination, it may

1 decide for any number of reasons not to commence an enforcement action, and it should
2 not be forced to defend its determination prematurely.

3 **F. SECTION 115 - FUTURE ENFORCEMENT ACTION**

4 Section 115 is intended to preserve the Department's right to commence an
5 enforcement action for an excess emission on which it has already made a positive
6 determination regarding an affirmative defense, if the Department determines that the
7 emission should be enforced on the basis of information learned after the fact. The
8 Department is aware that the regulated community desires certainty and closure regarding
9 excess emission events, and therefore it will make an effort to issue determinations as
10 expeditiously as possible. However, the Department recognizes that patterns of events,
11 and their underlying causes, may not be apparent before the determination is issued.
12 Therefore, this section provides the regulated community with a determination in a
13 reasonable period of time, while preserving the Department's right to reevaluate that
14 determination if warranted by the circumstances.

15 **III. REPORTING FORMS**

16 The Department designed forms for reporting excess emissions, claiming
17 affirmative defenses, and conducting root cause and corrective action analyses. Each
18 form is accompanied by a set of instructions. On April 18, 2008, the Department sent the
19 forms and instructions to the regulated community and published them on the Air Quality
20 Bureau's website. After reviewing public comment, the Department will finalize the
21 forms and instructions no later than the effective date of the proposed rule. The forms
22 and instructions are attached to my testimony. In drafting these documents, the
23 Department used the best of the work product in neighboring states with updated excess

1 emission rules, including Colorado, Arizona, Oklahoma, and Texas. NMED Exhibits 7-
2 10.

3 **IV. WEB-BASED ELECTRONIC REPORTING TOOL**

4 As I previously mentioned, the Department is developing a software application
5 to allow sources to submit excess emission reports over the internet. Upon submission,
6 the data in these reports will be automatically inserted into a Department database.
7 Internal applications are being developed to extract and analyze these data, significantly
8 expanding the Department's ability to prioritize enforcement actions and manage
9 administrative resources.

10 The user interface will be designed to facilitate web reporting. The reporting
11 facility representative logs onto the Department Electronic Reporting Tool ("ERT")
12 website via the internet. The representative will preregister with the Department for
13 access to the facility's general information. From this position, the representative
14 proceeds through several screens to enter the required information on a form that mirrors
15 the paper format attached to my testimony. The system will be designed to allow the
16 attachment of supporting documentation required by the applicable form. At the end of
17 the process, the representative submits the report and receives a confirmation number and
18 receipt from the system, and can print a hard copy for the facility's records.

**NMED AIR QUALITY BUREAU - ENFORCEMENT SECTION
1301 SILER ROAD, BLDG. B - SANTA FE, NM 87507 – FAX NUMBER (505) 476-4375**

EXCESS EMISSIONS REPORTING FORM

This form must be submitted before the end of the next regular business day after discovery and no later than 10 days after the conclusion of the event.

VERSION 04.16.08

SECTION I - GENERAL INFORMATION: (Note 1)										
A. AI Number:		B. Activity Number:			C. Company Name:			D. Facility Name:		
E. Stationary Source <input type="checkbox"/>		F. Portable Source <input type="checkbox"/>		G. If portable source, location of source (UTM Coordinates to nearest 0.1 km or lat, long):						
H. TV Permit No.:	I. NSR Permit No.:	J. Initial Report: <input type="checkbox"/>	K. Update Report: <input type="checkbox"/>	L. Initial/Final Report: <input type="checkbox"/>	M. Final Report: <input type="checkbox"/>	N. Affirmative Defense Claim? <input type="checkbox"/> Yes <input type="checkbox"/> No				
O. Failure Pt. No.:	P. Failure Pt. Description:			Q. Release Pt. No.:	R. Release Pt. Description:					
S. Discovery Date:	T. Discovery Time:	U. Failure Date:	V. Failure Time:	W. Corrected Date:	X. Corrected Time:	Y. 1 st Bus. Day After Disc:				
Z. Person Reporting:			AA. Office Phone Number:		BB. Cell Phone Number:		CC. Email Address:			
SECTION II - REPORTING REQUIREMENT (check all that apply): (Note 2)										
A. <input type="checkbox"/> 20.2.7 NMAC		B. <input type="checkbox"/> 20.2.70.302.E NMAC (Title V Deviation)			C. <input type="checkbox"/> 20.2.70.304.B NMAC (Title V Emergency)			D. <input type="checkbox"/> NSPS		
SECTION III - EVENT TYPE (check all that apply): (Note 3)										
A. <input type="checkbox"/> Malfunction		B. <input type="checkbox"/> Startup	C. <input type="checkbox"/> Shutdown	D. <input type="checkbox"/> TV Emergency		E. <input type="checkbox"/> TV Deviation		F. <input type="checkbox"/> Scheduled Maintenance		
G. If the excess emission was due to Startup, Shutdown or Scheduled Maintenance, have you submitted a notification to the Department pursuant to 20.2.7.14 NMAC to permit these emissions?								<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA		
H. Explain answer to G above:										
SECTION IV - EMISSIONS ARE IN EXCESS OF THE FOLLOWING REQUIREMENT: (Note 4)										
A. Citation:										
B. Text:										
C. Emission Limit:		D. Units:		E. Averaging Period:		F. Avg. Emission Rate:		G. No. of Exceedences:		
SECTION V - CAUSE AND NATURE OF EVENT (Detailed Description): (Note 5)										
SECTION VI - STEPS TAKEN TO LIMIT DURATION AND MAGNITUDE OF EXCESS EMISSION: (Note 6)										
SECTION VII - CORRECTIVE MEASURES TAKEN (Detailed Description): (Note 7)										
SECTION VIII - DURATION OF EVENT, hh:mm: (Note 8)										
A. NOx:	B. SO2:	C. CO:	D. PM:	E. VOC:	F. H2S:	G. Opacity	H. Visible Emissions:	I. Other (specify)		
SECTION IX - EXCESS EMISSIONS FOR EVENT, pounds (except for opacity and visible emissions): (Note 9)										
A. NOx:	B. SO2:	C. CO:	D. PM:	E. VOC:	F. H2S:	G. Opacity (%):	H. Visible Emissions: <input type="checkbox"/> Yes <input type="checkbox"/> No	I. Other (specify)		
SECTION X - BASIS OF ESTIMATE (attach supporting data): (Note 10)										
A. <input type="checkbox"/> Compliance Testing		B. <input type="checkbox"/> Continuous Emission Monitor			C. <input type="checkbox"/> Calculation		D. <input type="checkbox"/> Operating Log(s)		E. <input type="checkbox"/> Other	
If other, explain:										
SECTION XI - CERTIFICATION: (Note 11)										
After reasonable inquiry, I certify this report as true, accurate and complete.										
SIGNATURE OF REPORTING OFFICIAL:					TITLE:					



New Mexico Environment Department
Air Quality Bureau
Compliance and Enforcement Section
1301 Siler Road Building B
Santa Fe, NM 87507
Phone (505) 476-4300
Fax (505) 476-4375



VERSION 04.16.08

20.2.7 NMAC – EXCESS EMISSIONS

INSTRUCTIONS FOR COMPLETING EXCESS EMISSIONS REPORTING (EER) FORM

PLEASE NOTE:

1. A reporting submittal form (used for routine submittals required by permits and/or regulations such as Title V Annual Compliance Certification reports and NSPS Subpart KKK semi-annual reports) is **NOT** required for submitting an EER form.
2. The EER form will expand automatically to accommodate text as needed.

SECTION I - GENERAL INFORMATION: (Note 1)

- A. *AI Number* – Identification number for the facility assigned by the Department database. If you do not know the AI number for your facility, contact the AQB.
- B. *Activity Number* – Identification number for the excess emission event assigned by the Department database. Not required for Initial Report or Initial/Final Report. If you do not know the activity number for an Update or a Final Report, contact the AQB.
- C. *Company Name* - Identify the owner or operator of the facility.
- D. *Facility Name* – Self explanatory.
- E. *Stationary Source* - any building, structure, equipment, facility, installation (including temporary installations), or operation which emits or may emit any air contaminant.
- F. *Portable Source* – a source which can be relocated to another operating site with limited dismantling and reassembly, including for example but not limited to moveable sand and gravel processing operations and asphalt plants.
- G. *If portable source, location of source* – Indicate location in UTM coordinates (to nearest 0.1 km), or lat, long (degrees, min, sec).
- H. *TV Permit No.* – Permit number of current title V permit (i.e.; P456-R2-M1). If you do not have a Title V permit, you may leave this field blank.
- I. *NSR Permit No.* - Permit number of current state construction permit (i.e.; 9456-M1, GCP-XXX, PSD-NM- 4343).
- J. *Initial Report* – Check if you are submitting the first report for this excess emission for an ongoing event. A final report will be required after conclusion of the event. The initial report is due no later than the end of the next regular business day after the time of discovery. The end of the business day means 23:59:59.
- K. *Update Report* - Check if you are submitting (1) a report for which you have already submitted an initial report, the event is continuing, and you intend to submit additional update reports or a final report, or (2) a correction to the initial report. A final report will be required after conclusion of the event.
- L. *Initial/Final Report* – Check if you are submitting a combined initial/final report for this excess emission (i.e.; the event has already concluded, all information is available, and this is the only

report that will be submitted for the event). This report is due before the end of the next regular business day after discovery of the excess emission.

- M. *Final Report* - Check if you are submitting the final report for this excess emission (i.e.; the event has already concluded, an initial report has been submitted, all information is available, and this is the final report that will be submitted for the event). The final report is due no later than ten (10) days after the conclusion of the excess emission.
- N. *Affirmative Defense Claim* – Check if you intend to claim an affirmative defense for the excess emission. You must submit an Affirmative Defense Demonstration Form with all supporting documentation no later than thirty (30) days after the conclusion of the event. Failure to check the box or submit the form by the specified deadline shall waive the defense. PLEASE NOTE – There is no affirmative defense under state law for an excess emission due to scheduled maintenance or for a violation of a NSPS standard, however, you may be entitled to an affirmative defense under federal law for a violation of a NSPS standard.
- O. *Failure Point No.* – Permit-based emission unit designation for the specific piece of equipment that failed and caused the excess emission (i.e; EU-25, ES-01, Unit No. 007). If the equipment that failed and caused the excess emission is not permitted, (i.e.; third party electrical supply, DCS system, etc.) you may leave this field blank.
- P. *Failure Point Description* – Description of the specific piece of equipment that failed and caused the excess emission (i.e.; Inlet Turbine, Baghouse, Catalytic Converter, Third Party Electrical Supply, DCS System).
- Q. *Release Point No.* - Permit-based emission unit designation for the specific piece of equipment from which the excess emission was released (i.e; FL-25, ES-01, Unit No. 007).
- R. *Release Point Description* – Description of the specific piece of equipment from which the excess emission was released (i.e.; Emergency Flare, Turbine Stack, Baghouse Stack).
- S. *Discovery Date*, T. *Discovery Time* – Date (mm/dd/yyyy) and time (hh:mm, military format) the excess emission was discovered.
- U. *Failure Date*, V. *Failure Time* – Date (mm/dd/yyyy) and time (hh:mm, military format) the excess emission event commenced.
- W. *Corrected Date*, X. *Corrected Time* – Date (mm/dd/yyyy) and time (hh:mm, military format) the excess emission event concluded.
- Y. *1st Bus. Day After Disc.* – First business day after the excess emission was discovered. Business day means any day on which state government offices are open for normal business. Saturdays, Sundays, and official federal or state holidays are not business days (i.e.; if an excess emission is discovered on a Friday, Saturday or Sunday, Monday would be the first business day after discovery unless it is a holiday. If that Monday is a federal or state holiday, Tuesday would be the first business day after discovery).
- Z. *Person Reporting* - Self explanatory.
- AA. *Office Phone*, BB. *Cell Phone* – Office and cell phone numbers of person reporting.
- CC. *Email Address* – Email address of person reporting.

SECTION II. - REPORTING REQUIREMENT: (Note 2)

- A. 20.2.7 NMAC – This box must be checked for all reports.
- B. 20.2.70.302.E NMAC (*Title V Deviation*) – If your facility has a Title V permit, you must check this box.

- C. *20.2.70.304.B NMAC (Title V Emergency)* – Check this box if your facility has a Title V permit and the excess emission was due to any situation arising from sudden and reasonably unforeseeable events beyond the control of the permittee, including an act of God that caused the facility to exceed a technology-based emission limitation in the permit.
- D. *NSPS* – Check this box if you exceeded an applicable NSPS standard for an emission unit not equipped with a continuous monitoring system (i.e., during a periodic emission test on a turbine subject to NSPS Subpart GG, the results indicate that the turbine exceeded the NO_x emission limit in ppm specified by 40 CFR §60.332(a)).

SECTION III - EVENT TYPE: (Note 3)

- A. *Malfunction* – Check if the excess emission was due to malfunction (i.e., a sudden and unavoidable failure of air pollution control equipment or process equipment beyond the control of the owner or operator, including malfunction during startup or shutdown. [20.2.7.7.E NMAC]). PLEASE NOTE - A failure that is caused entirely or in part by poor maintenance, careless operation, or any other preventable equipment breakdown shall not be considered a malfunction.
- B. *Startup* – Check if the excess emission was due to startup (i.e., the setting into operation of any air pollution control equipment or process equipment [20.2.7.7.I NMAC]).
- C. *Shutdown* – Check if the excess emission was due to shutdown (i.e., the cessation of operation of any air pollution control equipment or process equipment [20.2.7.7.H NMAC]).
- D. *Emergency* - Check if your facility has a Title V permit and the excess emission was due to any situation arising from sudden and reasonably unforeseeable events beyond the control of the permittee, including an act of God that caused the source to exceed a technology-based emission limitation in the permit.
- E. *Deviation* – If you are a Title V source, you must check this box.
- F. *Scheduled Maintenance* – Check if the excess emission was due to a scheduled maintenance event. PLEASE NOTE – There is no affirmative defense for an excess emission due to scheduled maintenance.
- G. *If the excess emission was due to Startup, Shutdown or Scheduled Maintenance, have you submitted a notification to the Department pursuant to 20.2.7.14 NMAC to permit these emissions?* - Check yes, no or NA.
- H. *Explain answer to G above* – Identify the date on which you submitted the notification or explain why you have not submitted such notification.

SECTION IV - EMISSIONS ARE IN EXCESS OF THE FOLLOWING REQUIREMENT: (Note 4)

- A. *Citation* - List the permit number and condition or regulatory citation and section of the emission limit (or standard) that was exceeded (i.e.; Permit number P5678-R2-M1, Condition 2.1, NSPS Subpart GG, Section 60.332(a), 20.2.14.202.A NMAC).
- B. *Text* - Reproduce the text from the permit condition or the regulatory citation in its entirety (i.e.; “Table 3.2 lists the emission units and their allowable limits”).
- C. *Emission Limit* – List the value from the permit or regulatory citation (i.e.; 14.6, 0.2, 160).
- D. *Units* – List the units from the permit or regulatory citation (i.e.; lb/hr, lb/MMBtu, ppm, tons/yr).
- E. *Averaging Period* – Averaging time that is the basis of the emission limit (i.e.; for lb/hr, 1 hour, if the permit indicates three hour average, 3 hours, if the regulation indicates 30 day rolling average, 30 days). If there is no apparent averaging period, leave blank.

F. *Avg. Emission Rate* – The average emission rate over the duration of the excess emission.

G. *No. of Exceedences* – The number of exceedences of the emission limit over the duration of the excess emission. This is calculated by dividing the duration of the excess emission in hours by the averaging period (i.e.; If a permit limit based on a 3 hour average is exceeded for 24 hours, the number of exceedences would be $24/3 = 8$).

SECTION V – CAUSE AND NATURE OF EVENT (Detailed Description): (Note 5)

Describe in detail the cause and the nature of the excess emission.

SECTION VI – STEPS TAKEN TO LIMIT DURATION AND MAGNITUDE OF EXCESS EMISSION (Detailed Description): (Note 6)

Describe in detail the measures taken to minimize the duration and magnitude of the excess emissions.

SECTION VII - CORRECTIVE MEASURES (Detailed Description): (Note 7)

Describe in detail the corrective measures implemented to eliminate the excess emissions and to prevent a recurrence.

SECTION VIII - DURATION OF EVENT (if applicable), hh:mm: (Note 8)

For each pollutant, provide the duration of the excess emission event in hours and minutes (hh:mm format). Aggregate the duration for noncontiguous periods constituting a single event.

If you are reporting an excess emission of a pollutant not listed in fields A to H, enter the pollutant name in field I (i.e.; PM10, PM2.5, individual HAPs such as formaldehyde, hexane, etc.) and provide the duration in hours and minutes (hh:mm format) in the text field below.

The example below is for formaldehyde, 25 hours 33 minutes:

I. Formaldehyde 25:33

SECTION IX - EXCESS EMISSIONS FOR EVENT, pounds (except for opacity and visible emissions): (Note 9)

A. *NOx*, B. *SO2*, C. *CO*, D. *PM* (total particulate), E. *VOC*, F. *H2S* – Provide the quantity of the excess emission for each pollutant in pounds, regardless whether the quantity would be more conveniently expressed in tons. For exceedences of emission limits (or standards) expressed in units of lbs/MMBtu or ppm, report the quantity in pounds. Attach detailed calculations to the report. Sample calculations are provided below.

- i. The permitted emission limit for a unit is 10 lbs/hr NO_x, and the emissions are 15 lbs/hr for 10 hours. Enter 50 lbs (10 hours * 5 lbs/hr in excess of emission limit).
- ii. The emission standard is 0.2 lbs/MMBtu NO_x, and the emissions are 0.3 lbs/MMBtu for 30 hours. Enter 15 lbs (30 hours * 0.1 lbs/MMBtu in excess of standard * 1000 Btu/scf fuel heating value * 5000 scf/hr fuel flow rate * 1/1E6).
- iii. The emission standard is 150 ppm NO_x and the emissions are 300 ppm NO_x for 50 hours. Enter 78 lbs (50 hours * 150 ppm in excess of standard * 1000 Btu/scf fuel heating value * 5000 scf/hr fuel flow rate * 1E-6 * 8710 dscf/MMBtu * 46.01 lb/lbmol NO_x * 2.594E-9).

G. *Opacity* – Report the average opacity (%) for the duration of the excess emission. Attach a copy of the EPA Method 9 opacity form to the EER.

H. *Visible Emissions* - Indicate Yes or No.

I. *Other (specify)* – If you are reporting an excess emission of a pollutant not listed in fields A to H, enter the pollutant name in field I (i.e.; PM10, PM2.5, individual HAPs such as formaldehyde, hexane, etc.) and provide the quantity in pounds in the text field below.

The example below is for formaldehyde, 257 pounds:

I. Formaldehyde 257

SECTION X - BASIS OF ESTIMATE (attach supporting data): (Note 10)

Provide all supporting data for each basis of estimate.

- A. *Compliance Test* - Check if the excess emission amount was calculated using data from a compliance test.
- B. *Continuous Monitor* - Check if the excess emission was calculated using continuous monitor (CEM, COM, or other) data.
- C. *Calculation* - Check if the excess emission was calculated using data from a permit application, mass balance, AP-42, or other theoretical basis.
- D. *Operating Log(s)* - Check if the excess emission was calculated using data from a plant operating log.
- E. *Other* - Check if the excess emission was calculated using data from a source other than items A – D.
- F. *If other, explain* - If you checked item E, identify the method used to calculate the excess emission.

SECTION XI - CERTIFICATION: (Note 11)

The final report must be signed by the company representative submitting the report. This signature constitutes a certification of the truth, accuracy and completeness of the contents of the report and all supporting documentation.

D. For the duration of the event, explain how the air pollution control equipment or process equipment was maintained and operated in a manner consistent with good air pollution control practices for minimizing emissions.

E. Explain how the quantity and duration of the excess emission (including any bypass) were minimized during this event. Why was this quantity and duration the minimum possible for this event?

F. Explain all steps taken to minimize the impact of the excess emission on ambient air quality. Please provide documentation.

G. Were emission monitoring systems (if applicable) kept in operation during this event? If not, please explain why.

H. Was the owner or operator's actions during this event documented by properly signed, contemporaneous operating logs, or other relevant evidence? Attach the documentation.

SECTION III – DETAILED INFORMATION REQUIRED FOR MALFUNCTION: (Note 3)

PLEASE NOTE – Complete all fields in Section III if you are claiming an affirmative defense for malfunction. Do not complete if you are claiming an affirmative defense for startup or shutdown.

A. Provide a chronology including when the event was discovered and when the repairs were commenced and completed. Explain how this chronology indicates that repairs were made as expeditiously as possible.

B. Was off-shift labor and overtime required during this event? Why or why not?

C. Identify each excess emission event in the preceding 12 months (including date and activity number) that involved the same emissions unit(s) identified in this excess emission event.

D. For each excess emission event described in item C, state whether it involved the same or similar direct or contributing cause for this excess emission event, and explain why the cause was not resolved.

SECTION IV – DETAILED INFORMATION REQUIRED FOR STARTUP OR SHUTDOWN: (Note 4)

PLEASE NOTE – Complete all fields in Section IV if you are claiming an affirmative defense for startup or shutdown. Do not complete if you are claiming an affirmative defense for malfunction.

A. Was this excess emission caused by an intentional bypass of air pollution control equipment? If so, please explain why an intentional bypass was required.

B. Identify each excess emission event due to non-permitted startup or shutdown in the preceding 12 months (including date and activity number) that involved the same emissions unit(s) identified in this excess emission event.

C. For each excess emission event described in item B, state whether it involved the same or similar direct or contributing cause for this excess emission event, and explain why the cause was not resolved or the excess emission was not permitted.

D. Have you submitted or do you intend to submit an application to include this excess emission in your permit? Indicate the date of actual or intended application. If you have not submitted and do not intend to submit an application, explain why.

SECTION V – CERTIFICATION (Note 5)

I certify, based on information and belief formed after reasonable inquiry, the statements and information in this document and all attachments are true, accurate and complete.

SIGNATURE OF REPORTING PERSON:

TITLE:



New Mexico Environment Department
Air Quality Bureau
Compliance and Enforcement Section
1301 Siler Road Building B
Santa Fe, NM 87507
Phone (505) 476-4300
Fax (505) 476-4375



VERSION 04.16.08

20.2.7 NMAC – EXCESS EMISSIONS

INSTRUCTIONS FOR AFFIRMATIVE DEFENSE DEMONSTRATION FORM

PLEASE NOTE:

1. A reporting submittal form used for routine submittals required by permits and/or regulations (such as Title V Annual Compliance Certification reports and NSPS Subpart KKK semi-annual reports) is **NOT** required for submitting an affirmative defense demonstration form.
2. The affirmative defense demonstration form will expand automatically to accommodate text as needed.

SECTION I - GENERAL INFORMATION (Note 1)

- A. *AI Number* – Identification number for the facility assigned by the Department database. If you do not know the AI number for your facility, contact the AQB.
- B. *Activity Number* – Identification number for the excess emission event assigned by the Department database. If you do not know the activity number for the excess emission event you are claiming an affirmative defense for, contact the AQB.
- C. *Company Name* – Identify the owner or operator of the facility.
- D. *Facility Name* – Self explanatory.
- E. *TV Permit No.* – Permit number of current title V permit (i.e.; P456-R2-M1).
- F. *NSR Permit No.* - Permit number of current state construction permit (i.e.; 9456-M1, GCP-XXX, PSD-NM- 4343).
- G. *Startup* – Check if you are claiming an affirmative defense for startup (i.e.; the setting into operation of any air pollution control equipment or process equipment [20.2.7.7.I NMAC]).
- H. *Shutdown* - Check if you are claiming an affirmative defense for shutdown (i.e.; the cessation of operation of any air pollution control equipment or process equipment [20.2.7.7.H NMAC]).
- I. *Malfunction* – Check if you are claiming an affirmative defense for malfunction (i.e., a sudden and unavoidable failure of air pollution control equipment or process equipment beyond the control of the owner or operator, including malfunction during startup or shutdown [20.2.7.7.E NMAC]).
PLEASE NOTE - A failure that is caused entirely or in part by poor maintenance, careless operation, or any other preventable equipment breakdown shall not be considered a malfunction.
- J. *Failure Point No.* – Permit-based emission unit designation from permit for the specific piece of equipment that failed and caused the excess emission (i.e.; EU-25, ES-01, Unit No. 007).
- K. *Failure Point Description* – Description of the specific piece of equipment that failed and caused the excess emission (i.e.; Inlet Turbine, Baghouse, Catalytic Converter).
- L. *Release Point No.* - Permit-based emission unit designation from the permit for the specific piece of equipment from which the excess emission was released (i.e.; FL-25, ES-01, Unit No. 007).
- M. *Release Point Description* – Description of the specific piece of equipment from which the excess emission was released (i.e.; Emergency Flare, Turbine Stack, Baghouse Stack).

- N. *Discovery Date*, O. *Discovery Time* - Date (mm/dd/yyyy) and time (hh:mm, military format) the excess emission was discovered. This information is available on your EER form you submitted for this event.
- P. *1st Bus. Day After Discovery* – First business day after the excess emission was discovered. This information is available on the EER form you submitted for this event.
- Q. *Initial Report Submittal Date* – Date (mm/dd/yyyy) you submitted the initial EER for this event.
- R. *Final Report Submittal Date* – Date (mm/dd/yyyy) you submitted the final EER for this event.
- S. *Submittal Date* – Date (mm/dd/yyyy) you are submitting Affirmative Defense Demonstration Form.
- T. *Person Reporting* - Self explanatory
- U. *Office Phone*, V. *Cell Phone* - Office and cell phone numbers of person reporting.
- W. *Email Address* – Email address of person reporting.

SECTION II. – DETAILED INFORMATION REQUIRED FOR AFFIRMATIVE DEFENSE (Note 2)

- A. *Describe in detail the direct cause and all contributing causes of the excess emission.* – You must determine the direct cause of the event (i.e.; keep asking why until the cause of the excess emission is determined). The statement, “compressor down on high discharge pressure” is not a determination of the direct cause. The following definitions are provided for clarification.
- Direct Cause* - The cause that directly resulted in the occurrence. For example, in the case of a leak, the direct cause could have been the problem in the component or equipment that leaked. In the case of a system misalignment, the direct cause could have been operator error in the alignment.
- Contributing Cause* - A cause that contributed to an occurrence but, by itself, would not have caused the occurrence. For example, in the case of a leak, a contributing cause could be lack of adequate operator training in leak detection and response, resulting in a more severe event than would have otherwise occurred. In the case of a system misalignment, a contributing cause could be excessive distractions to the operators during shift change, resulting in less-than-adequate attention to important details during system alignment.
- B. *Could this event have been foreseen and avoided or planned for? Why or why not?* – Please explain why you could not have foreseen, avoided, or planned to prevent the excess emission.
- C. *Why were your operation and maintenance practices unable to prevent this event? Include documentation of the facility maintenance program and the manufacturer’s recommended maintenance for each emission unit involved in this event (if applicable).* - If the excess emission is due to the failure of equipment, you must demonstrate that the equipment had been maintained in accordance with the manufacturer’s specifications.
- D. *For the duration of the event, explain how the air pollution control equipment or process equipment were maintained and operated in a manner consistent with good air pollution control practices for minimizing emissions.* - In accordance with EPA guidance, good air pollution control practices for minimizing emissions require that a facility must be brought back into compliance with permit and/or regulatory requirements as soon as possible.
- E. *Explain how the quantity and duration of the excess emissions (including any bypass) were minimized during this event? Why was this quantity and duration the minimum possible for this event?* - Explain why the quantity and duration of the excess emission were the minimum possible for this event.

- F. *Explain all steps taken to minimize the impact of the excess emissions on ambient air quality. Please provide documentation.* - Indicate why you believe this event does not result in an exceedance of the ambient air quality standards.
- G. *Were emission monitoring systems (if applicable) kept in operation during this event? If not, please explain why.* - If monitoring systems were kept in operation, yes is sufficient. If not, please explain (not applicable would also be sufficient).
- H. *Was the owner or operator's actions during this event documented by properly signed, contemporaneous operating logs, or other relevant evidence? Attach the documentation.* - The certification required by Section V will satisfy the requirement for properly signed documents. Each document does not need to be individually signed.

SECTION III. – DETAILED INFORMATION REQUIRED FOR MALFUNCTION ONLY (Note 3)

- A. *Provide a chronology including when the event was discovered and when the repairs were commenced and completed. Explain how this chronology indicates that repairs were made as expeditiously as possible* - Summarize the chronology (mm/dd/yyyy and hh:mm) of the discovery of the event, and the commencement and conclusion of each repair. Explain why the repair was commenced and completed as expeditiously as possible.
- B. *Was off-shift labor and overtime required during this event? Why or why not?* - Explain why off shift labor and overtime were or were not used to commence and complete the repairs as expeditiously as possible.
- C. *Identify each excess emission event in the preceding 12 months (including date and activity number) that involved the same emissions unit(s) identified in this excess emission event.* – List the date and activity number for each related event.
- D. *For each excess emission event described in item C, state whether it involved the same or similar direct or contributing cause for this excess emission event, and explain why the cause was not resolved.* – If the same cause occurred in a preceding event, identify the date and activity number for the event, and explain why the cause was not resolved.

SECTION IV. – DETAILED INFORMATION REQUIRED FOR STARTUP OR SHUTDOWN ONLY (Note 4)

- A. *Was this excess emission caused by an intentional bypass of air pollution control equipment? If so, please explain why an intentional bypass was required.* - If the excess emission was caused by an intentional bypass of air pollution control equipment during a startup or shutdown, please explain why an intentional bypass was necessary.
- B. *Identify each excess emission event due to non-permitted startup or shutdown in the preceding 12 months (including date and activity number) that involved the same emission unit(s) identified in this excess emission event.* – List the date and activity number for each related event.
- C. *For each excess emission event described in item B, state whether it involved the same or similar direct or contributing cause for this excess emission event, and explain why the cause was not resolved or the excess emission was not permitted.* - If the cause occurred in a preceding event, identify the date and activity number for the event, and explain why the cause was not resolved or why this event is not permitted.
- D. *Have you submitted or do you intend to submit an application to include this excess emission in your permit? Indicate the date of actual or intended application. If you have not submitted or do not intend to submit an application, explain why.* – Events that involve an emission during a

recurring startup or shutdown should be permitted. You must submit an application upon discovering an emission during a recurring startup or shutdown.

SECTION V - CERTIFICATION: (Note 5)

The form must be signed by the company representative submitting the affirmative defense claim. This signature constitutes a certification of the truth, accuracy and completeness of the contents of the form and supporting documentation regardless of submittal date.

**NMED AIR QUALITY BUREAU – ENFORCEMENT SECTION
P.O. BOX 26110 - SANTA FE, NM – 87502-0110
FAX NUMBER (505) 476-4375**

ROOT CAUSE AND CORRECTIVE ACTION ANALYSIS SUMMARY FORM

TO BE USED FOR ROOT CAUSE AND CORRECTIVE ACTION ANALYSIS PURSUANT TO 20.2.7.113 NMAC

The following information must be submitted no later than 60 days after submittal of the final report for the excess emission event.

VERSION 04.16.08

SECTION I - GENERAL INFORMATION: (Note 1)						
A. AI Number:	B. Activity Number:	C. Company Name:			D. Facility Name:	
E. TV Permit No.:	F. NSR Permit No.:	G. Startup: <input type="checkbox"/>	H. Shutdown: <input type="checkbox"/>	I. Malfunction: <input type="checkbox"/>	J. Submittal Date:	K. Final Report Submittal Date:
L. Failure Pt. No.:	M. Failure Pt. Description:		N. Release Pt. No.:	O. Release Pt. Description:		
P. Person Reporting:			Q. Office Phone	R. Cell Phone	S. Email Address:	

*****The owner or operator must conduct a root cause analysis of the excess emission event in accordance with DOE Guideline Document entitled "ROOT CAUSE ANALYSIS GUIDANCE DOCUMENT", DOE-NE-STD-1004-92, February 1992 (http://www.nmenv.state.nm.us/aqb/enforce_compliance/compliance.html).*****

*****Attach all supporting documentation (i.e. contemporaneous logs, charts, maintenance records, calculations, etc)*****

SECTION II – SUMMARY OF ROOT CAUSE AND CORRECTIVE ACTION ANALYSIS: (Note 2)

A. Has the root cause and corrective action analysis been completed? If no, explain the reason and state the date on which the analysis will be completed and submitted.

B. Describe in detail the root cause and all contributing causes of the excess emission.

C. Identify the root cause analysis method(s) used:

- Events and Causal Factor Analysis**
- Change Analysis**
- Barrier Analysis**
- Management Oversight and Risk Tree (MORT) Analysis**
- Human Performance Evaluation**
- Kepner-Tregoe Problem Solving and Decision Making.**

D. Explain why you chose the method(s) identified in item C.

E. Identify the corrective action alternatives, such as changes in design, operation, and maintenance, evaluated to reduce the likelihood of a recurrence of an excess emission from the cause(s) identified in item B.

F. Identify the estimated cost of each corrective action alternative identified in item E.

G. Describe the probable effectiveness of each corrective action alternative identified in item E.

H. Identify and justify the corrective action alternative(s) chosen. If you determine that no corrective action alternative(s) are available, explain why.

I. Provide the implementation schedule for the corrective action alternative(s) identified in item H, and the dates on which progress reports will be submitted.

SECTION III – ATTACHMENTS: (Note 3)

- A. Root Cause Analysis Worksheet
- B. Causal Factor Worksheets
- C. Other (Indicate) _____
- D. Other (Indicate) _____
- E. Other (Indicate) _____
- F. Other (Indicate) _____
- G. Other (Indicate) _____
- H. Other (Indicate) _____

SECTION IV – CERTIFICATION (Note 4)

I certify, based on information and belief formed after reasonable inquiry, the statements and information in this document and all attachments are true, accurate and complete.

SIGNATURE OF REPORTING PERSON:

TITLE:



New Mexico Environment Department
Air Quality Bureau
Compliance and Enforcement Section
1301 Siler Road Building B
Santa Fe, NM 87507
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VERSION 04.16.08

20.2.7 NMAC – EXCESS EMISSIONS

INSTRUCTIONS FOR ROOT CAUSE AND CORRECTIVE ACTION ANALYSIS SUMMARY FORM

PLEASE NOTE:

1. A reporting submittal form used for routine submittals required by permits and/or regulations (such as Title V Annual Compliance Certification reports and NSPS Subpart KKK semi-annual reports) is **NOT** required for submitting a Root Cause and Corrective Action Analysis (RCA).
2. The RCA Summary Form and the RCA Worksheet will expand automatically to accommodate text as needed.
3. The owner or operator must conduct a root cause analysis of the excess emission event in accordance with DOE Guideline Document, "ROOT CAUSE ANALYSIS GUIDANCE DOCUMENT", DOE-NE-STD-1004-92, February 1992 (http://www.nmenv.state.nm.us/aqb/enforce_compliance/compliance.html).

SECTION I - GENERAL INFORMATION (Note 1)

- A. *AI Number* – Identification number for the facility assigned by the Department database. If you do not know the AI number for your facility, contact the AQB.
- B. *Activity Number* – Identification number for the excess emission event assigned by the Department database. Not required for Initial Report or Initial/Final Report. If you do not know the activity number for an Update or a Final Report, contact the AQB.
- C. *Company Name* - Identify the owner or operator of the facility.
- D. *Facility Name* – Self explanatory.
- E. *TV Permit No.* – Permit number of current title V permit (i.e.; P456-R2-M1).
- F. *NSR Permit No.* - Permit number of current state construction permit (i.e.; 9456-M1, GCP-XXX, PSD-NM- 4343).
- G. *Startup* – Check if you are claiming an affirmative defense for startup (i.e., the setting into operation of any air pollution control equipment or process equipment [20.2.7.7.I NMAC]).
- H. *Shutdown* - Check if you are claiming an affirmative defense for shutdown (i.e.; the cessation of operation of any air pollution control equipment or process equipment [20.2.7.7.H NMAC]).
- I. *Malfunction* – Check if you are claiming an affirmative defense for malfunction (i.e., a sudden and unavoidable failure of air pollution control equipment or process equipment beyond the control of the owner or operator, including malfunction during startup or shutdown [20.2.7.7.E NMAC]).
PLEASE NOTE - A failure that is caused entirely or in part by poor maintenance, careless operation, or any other preventable equipment breakdown shall not be considered a malfunction.
- J. *Submittal Date* – Date you are submitting RCA (mm/dd/yyyy).
- K. *Final Report Submittal Date* – Date you submitted final excess emission report for event (mm/dd/yyyy).

- L. *Failure Point No.* – Permit-based emission unit designation from permit for the specific piece of equipment that failed and caused the excess emission (i.e.; EU-25, ES-01, Unit No. 007).
- M. *Failure Point Description* – Description of the specific piece of equipment that failed and was the cause of the excess emission (i.e.; Inlet Turbine, Baghouse, Catalytic Converter).
- N. *Release Point No.* - Permit-based emission unit designation from the permit for the specific piece of equipment from which the excess emission was released (i.e.; FL-25, ES-01, Unit No. 007).
- O. *Release Point Description* – Description of the specific piece of equipment from which the excess emissions were released (i.e.; Emergency Flare, Turbine Stack, Baghouse Stack).
- P. *Person Reporting* - Self explanatory
- Q. *Office Phone*, R. *Cell Phone* - Office and cell phone numbers of person reporting.
- S. *Email Address* – Email address of person reporting.

SECTION II. – ROOT CAUSE AND CORRECTIVE ACTION ANALYSIS SUMMARY (Note 3)

- A. *Has the root cause and corrective action analysis been completed? If no, explain the reason and state the date on which the analysis will be completed and submitted.* – If the analysis is ongoing on the submittal deadline, indicate when you expect to complete and submit the analysis.

- B. *Identify in detail the root cause and all contributing causes of the excess emission* – The definitions below are provided for clarification. A more detailed discussion can be found in the DOE guidance document referenced above.

Root Cause - The cause that, if corrected, would prevent recurrence of this and similar occurrences. The root cause does not apply to this occurrence only, but has generic implications to a broad group of possible occurrences, and it is the most fundamental aspect of the cause that can logically be identified and corrected. There may be a series of causes that can be identified, one leading to another. This series should be pursued until each fundamental, correctable cause has been identified.

Contributing Cause - A cause that contributed to an occurrence but, by itself, would not have caused the occurrence. For example, in the case of a leak, a contributing cause could be lack of adequate operator training in leak detection and response, resulting in a more severe event than would have otherwise occurred. In the case of a system misalignment, a contributing cause could be excessive distractions to the operators during shift change, resulting in less-than-adequate attention to important details during system alignment.

- C. *Identify the root cause analysis method(s) indicated in item C:* - The DOE guidance document describes the root cause analysis methods listed in the summary form.
- D. *Explain why you chose the method indicated in item C.* – The DOE guidance document identifies criteria for selecting a root cause analysis method. Indicate the criteria used in making your choice.
- E. *Identify the corrective action alternatives, such as changes in design, operation, and maintenance, evaluated to reduce the likelihood of a recurrence of an excess emission from the cause(s) identified in item B.* – List each corrective action alternative evaluated pursuant to 20.2.7.113.A.2.a NMAC.
- F. *Identify the estimated cost of each corrective action alternative identified in item E.* - Indicate the estimated cost associated with each corrective action alternative evaluated pursuant to 20.2.7.113.A.2.b NMAC, including capital, labor, and other costs.
- G. *Describe the probable effectiveness of each corrective action alternative identified in item E* – Discuss the advantages and disadvantages of each corrective action alternative evaluated.

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- H. *Identify and justify the corrective action alternative(s) chosen. If you determine that no corrective action alternative(s) are available, explain why.* – Based on the criteria discussed in items F and G, indicate which corrective action was chosen. If no corrective action alternatives were chosen, explain why.
- I. *Provide the implementation schedule for the corrective action alternative(s) identified in item H, and the dates on which progress reports will be submitted.* – If the corrective action alternatives have already been implemented, progress reports are not required.

SECTION III. – ATTACHMENTS (Note 3)

The Root Cause Analysis and Causal Factor Worksheets are mandatory. The “Other” fields are reserved for supporting documentation such as facility records, operating logs, economic analysis worksheets, etc.

SECTION IV - CERTIFICATION: (Note 4)

The form must be signed by the company representative submitting the affirmative defense claim. This signature constitutes a certification of the truth, accuracy and completeness of the contents of the form as well as all supporting documentation regardless of submittal date.

DOE GUIDELINE

ROOT CAUSE ANALYSIS GUIDANCE DOCUMENT

February 1992



**U.S. Department of Energy
Office of Nuclear Energy
Office of Nuclear Safety Policy and Standards
Washington, D.C. 20585**

ABSTRACT

DOE Order 5000.3A, "Occurrence Reporting and Processing of Operations Information," requires the investigation and reporting of occurrences (including the performance of root cause analysis) and the selection, implementation, and follow-up of corrective actions. The level of effort expended should be based on the significance attached to the occurrence. Most off-normal occurrences need only a scaled-down effort while most emergency occurrences should be investigated using one or more of the formal analytical models. A discussion of methodologies, instructions, and worksheets in this document guides the analysis of occurrences as specified by DOE Order 5000.3A.

ROOT CAUSE ANALYSIS GUIDANCE DOCUMENT

1. SUMMARY

This document is a guide for root cause analysis specified by DOE Order 5000.3A, "Occurrence Reporting and Processing of Operations Information." Causal factors identify program control deficiencies and guide early corrective actions. As such, root cause analysis is central to DOE Order 5000.3A.

The basic reason for investigating and reporting the causes of occurrences is to enable the identification of corrective actions adequate to prevent recurrence and thereby protect the health and safety of the public, the workers, and the environment.

Every root cause investigation and reporting process should include five phases. While there may be some overlap between phases, every effort should be made to keep them separate and distinct.

Phase I. Data Collection. It is important to begin the data collection phase of root cause analysis immediately following the occurrence identification to ensure that data are not lost. (Without compromising safety or recovery, data should be collected even during an occurrence.) The information that should be collected consists of conditions before, during, and after the occurrence; personnel involvement (including actions taken); environmental factors; and other information having relevance to the occurrence.

Phase II. Assessment. Any root cause analysis method may be used that includes the following steps:

1. Identify the problem
2. Determine the significance of the problem
3. Identify the causes (conditions or actions) immediately preceding and surrounding the problem
4. Identify the reasons why the causes in the preceding step existed, working back to the root cause (the fundamental reason which, if corrected, will prevent recurrence of these and similar occurrences throughout the facility). This root cause is the stopping point in the assessment phase.

The most common root cause analysis methods are:

- Events and Causal Factor Analysis. Events and Causal Factor Analysis identifies the time sequence of a series of tasks and/or actions and the surrounding conditions leading to an occurrence. The results are displayed in an Events and Causal Factor chart that gives a picture of the relationships of the events and causal factors.
- Change Analysis. Change Analysis is used when the problem is obscure. It is a systematic process that is generally used for a single occurrence and focuses on elements that have changed.

- **Barrier Analysis.** Barrier Analysis is a systematic process that can be used to identify physical, administrative, and procedural barriers or controls that should have prevented the occurrence.
- **Management oversight and Risk Tree (MORT) Analysis.** MORT and Mini-MORT are used to identify inadequacies in barriers/controls, specific barrier and support functions, and management functions. It identifies specific factors relating to an occurrence and identifies the management factors that permitted these factors to exist.
- **Human Performance Evaluation.** Human Performance Evaluation identifies those factors that influence task performance. The focus of this analysis method is on operability, work environment, and management factors. Man-machine interface studies to improve performance take precedence over disciplinary measures.
- **Kepner-Tregoe Problem Solving and Decision Making.** Kepner-Tregoe provides a systematic framework for gathering, organizing, and evaluating information and applies to all phases of the occurrence investigation process. Its focus on each phase helps keep them separate and distinct. The root cause phase is similar to change analysis.

Phase III. Corrective Actions. Implementing effective corrective actions for each cause reduces the probability that a problem will recur and improves reliability and safety.

Phase IV. Inform. Entering the report on the Occurrence Reporting and Processing System (ORPS) is part of the inform process. Also included is discussing and explaining the results of the analysis, including corrective actions, with management and personnel involved in the occurrence. In addition, consideration should be given to providing information of interest to other facilities.

Phase V. Follow-up. Follow-up includes determining if corrective action has been effective in resolving problems. An effectiveness review is essential to ensure that corrective actions have been implemented and are preventing recurrence.

Management involvement and adequate allocation of resources are essential to successful execution of the five root cause investigation and reporting phases.

2. DEFINITIONS

See DOE Order 5000.3A, Section 5.

Facility. Any equipment, structure, system, process, or activity that fulfills a specific purpose. Examples include accelerators, storage areas, fusion research devices, nuclear reactors, production or processing plants, coal conversion plants, magnetohydrodynamics experiments, windmills, radioactive waste disposal systems and burial grounds, testing laboratories, research laboratories, transportation activities, and accommodations for analytical examinations of irradiated and unirradiated components.

Reportable Occurrence. An event or condition, to be reported according to the criteria defined in DOE Order 5000.3A.

Occurrence Report. An occurrence report is a written evaluation of an event or condition that is prepared in sufficient detail to enable the reader to assess its significance, consequences, or implications and evaluate actions being employed to correct the condition or to avoid recurrence.

Event. A real-time occurrence (e.g., pipe break, valve failure, loss of power). Note that an event is also anything that could seriously impact the intended mission of DOE facilities.

Condition. Any as-found state, whether or not resulting from an event, that may have adverse safety, health, quality assurance, security, operational, or environmental implications. A rendition is usually programmatic in nature; for example, an (existing) error in analysis or calculation, an anomaly associated with (resulting from) design or performance, or an item indicating a weakness in the management process are all conditions.

Cause (Causal Factor). A condition or an event that results in an effect (anything that shapes or influences the outcome). This may be anything from noise in an instrument channel, a pipe break, an operator error, or a weakness or deficiency in management or administration. In the context of DOE Order 5000.3A there are seven major cause (causal factor) categories. These major categories are subdivided into a total of 32 subcategories (see Appendix A).

Causal Factor Chain (Sequence of Events and Causal Factors). A cause and effect sequence in which a specific action creates a condition that contributes to or results in an event. This creates new conditions that, in turn, result in another event. Earlier events or conditions in a sequence are called upstream factors.

Direct Cause. The cause that directly resulted in the occurrence. For example, in the case of a leak, the direct cause could have been the problem in the component or equipment that leaked. In the case of a system misalignment, the direct cause could have been operator error in the alignment.

Contributing Cause. A cause that contributed to an occurrence but, by itself, would not have caused the occurrence. For example, in the case of a leak, a contributing cause could be lack of adequate operator training in leak detection and response, resulting in a more severe event than would have otherwise occurred. In the case of a system misalignment, a contributing cause could be excessive distractions to the operators during shift change, resulting in less-than-adequate attention to important details during system alignment.

Root Cause. The cause that, if corrected, would prevent recurrence of this and similar occurrences. The root cause does not apply to this occurrence only, but has generic implications to a broad group of possible occurrences, and it is the most fundamental aspect of the cause that can logically be identified and corrected. There may be a series of causes that can be identified, one leading to another. This series should be pursued until the fundamental, correctable cause has been identified.

For example, in the case of a leak, the root cause could be management not ensuring that maintenance is effectively managed and controlled. This cause could have led to the use of improper seal material or missed preventive maintenance on a component, which ultimately led to the leak. In the case of a system misalignment, the root cause could be a problem in the training program, leading to a situation in which operators are not fully familiar with control room procedures and are willing to accept excessive distractions.

3. OVERVIEW OF OCCURRENCE INVESTIGATION

The objective of investigating and reporting the cause of occurrences is to enable the identification of corrective actions adequate to prevent recurrence and thereby protect the health and safety of the public, the workers, and the environment. Programs can then be improved and managed more efficiently and safely.

The investigation process is used to gain an understanding of the occurrence, its causes, and what corrective actions are necessary to prevent recurrence. The line of reasoning in the investigation process is: Outline what happened step by step. Begin with the occurrence and identify the problem (condition, situation, or action that was not wanted and not planned). Determine what program element was

supposed to have prevented this occurrence? (Was it lacking or did it fail?) Investigate the reasons why this situation was permitted to exist.

This line of reasoning will explain why the occurrence was not prevented and what corrective actions will be most effective. This reasoning should be kept in mind during the entire root cause process. Effective corrective action programs include the following:

- Management emphasis on the identification and correction of problems that can affect human and equipment performance, including assigning qualified personnel to effectively evaluate equipment/human performance problems, implementing corrective actions, and following up to verify corrective actions are effective
- Development of administrative procedures that describe the process, identify resources, and assign responsibility
- Development of a working environment that requires accountability for correction of impediments to error-free task performance and reliable equipment performance
- Development of a working environment that encourages voluntary reporting of deficiencies, errors, or omissions
- Training programs for individuals in root-cause analysis
- Training of personnel and managers to recognize and report occurrences, including early identification of significant and generic problems
- Development of programs to ensure prompt investigation following an occurrence or identification of declining trends in performance to determine root causes and corrective actions
- Adoption of a classification and trending mechanism that identifies those factors that continue to cause problems with generic implications.

4. PHASE I - DATA COLLECTION

It is important to begin the data collection phase of the root cause process immediately following occurrence identification to ensure that data are not lost. (Without compromising safety or recovery, data should be collected even during an occurrence.) The information that should be collected consists of conditions before, during, and after the occurrence; personnel involvement (including actions taken); environmental factors; and other information having relevance to the condition or problem. For serious cases, photographing the area of the occurrence from several views may be useful in analyzing information developed during the investigation. Every effort should be made to preserve physical evidence such as failed components, ruptured gaskets, burned leads, blown fuses, spilled fluids, partially completed work orders and procedures. This should be done despite operational pressures to restore equipment to service. Occurrence participants and other knowledgeable individuals should be identified.

Once all the data associated with this occurrence have been collected, the data should be verified to ensure accuracy. The investigation may be enhanced if some physical evidence is retained. Establishing a quarantine area, or the tagging and segregation of pieces and material, should be performed for failed equipment or components.

The basic need is to determine the direct, contributing and root causes so that effective corrective actions can be taken that will prevent recurrence. Some areas to be considered when determining what information is needed include:

- Activities related to the occurrence
- Initial or recurring problems
- Hardware (equipment) or software (programmatic-type issues) associated with the occurrence
- Recent administrative program or equipment changes
- Physical environment or circumstances.

Some methods of gathering information include:

- Conducting interviews/collecting statements - Interviews must be fact finding and not fault finding. Preparing questions before the interview is essential to ensure that all necessary information is obtained. The causal factor work sheets in Appendix B can be used as a tool to help gather information.

Interviews should be conducted, preferably in person, with those people who are most familiar with the problem. Individual statements could be obtained if time or the number of personnel involved make interviewing impractical. Interviews can be documented using any format desired by the interviewer. Consider conducting a "walk-through" as part of this interview if time permits.

Although preparing for the interview is important, it should not delay prompt contact with participants and witnesses. The first interview may consist solely of hearing their narrative. A second, more-detailed interview can be arranged, if needed. The interviewer should always consider the interviewee's objectivity and frame of reference.

- Interviewing others - Consider interviewing other personnel who have performed the job in the past. Consider using a "walk-through" as part of the interview.
- Reviewing records - Review relevant documents or portions of documents as necessary and reference their use in support of the root cause analysis. Record appropriate dates and times associated with the occurrence on the documents reviewed. Examples of documents include the following:

- Operating logs
- Correspondence
- Inspection/surveillance records
- Maintenance records
- Meeting minutes
- Computer process data
- Procedures and instructions
- Vendor Manuals
- Drawings and specifications
- Functional retest specification and results
- Equipment history records
- Design basis information
- Safety Analysis Report (SAR)/Technical Specifications
- Related quality control evaluation reports

Operational Safety Requirements
Safety Performance Measurement System/Occurrence Reporting
and Processing System (SPMS/ORPS) Reports
Radiological surveys
Trend charts and graphs
Facility parameter readings
Sample analysis and results (chemistry, radiological, air, etc.)
Work orders.

- Acquiring related information - Some additional information that an evaluator should consider when analyzing the causes includes the following:
 - Evaluating the need for laboratory tests, such as destructive/nondestructive failure analysis
 - Viewing physical layout of system, component, or work area; developing layout sketches of the area; and taking photographs to better understand the condition
 - Determining if operating experience information exists for similar events at other facilities
 - Reviewing equipment supplier and manufacturer records to determine if correspondence has been received addressing this problem.

5. PHASE II - ASSESSMENT

The assessment phase includes analyzing the data to identify the causal factors, summarizing the findings, and categorizing the findings by the cause categories specified in DOE Order 5000.3A (see Appendix A). The major cause categories are:

- Equipment/Material Problem
- Procedure Problem
- Personnel Error
- Design Problem
- Training Deficiency
- Management Problem
- External Phenomena.

These categories have been carefully selected with the intent to address all problems that could arise in conducting DOE operations. Those elements necessary to perform any task are equipment/material, procedures (instructions), and personnel. Design and training determine the quality and effectiveness of equipment and personnel. These five elements must be managed; therefore, management is also a necessary element. Whenever there is an occurrence, one of these six program elements was inadequate to prevent the occurrence. (External phenomena beyond operational control serves as a seventh cause category.) These causal factors specified in DOE Order 5000.3A can be associated in a logical causal factor chain as shown in Figure 1. (Note that a direct, contributing, or root cause can occur any place in the causal factor chain; that is, a root cause can be an operator error while a management problem can be a direct cause, depending on the nature of the occurrence.) These seven cause categories are subdivided into a total of 32 subcategories. The direct cause, contributing causes, and root cause are all selected from these subcategories (see Appendix A).

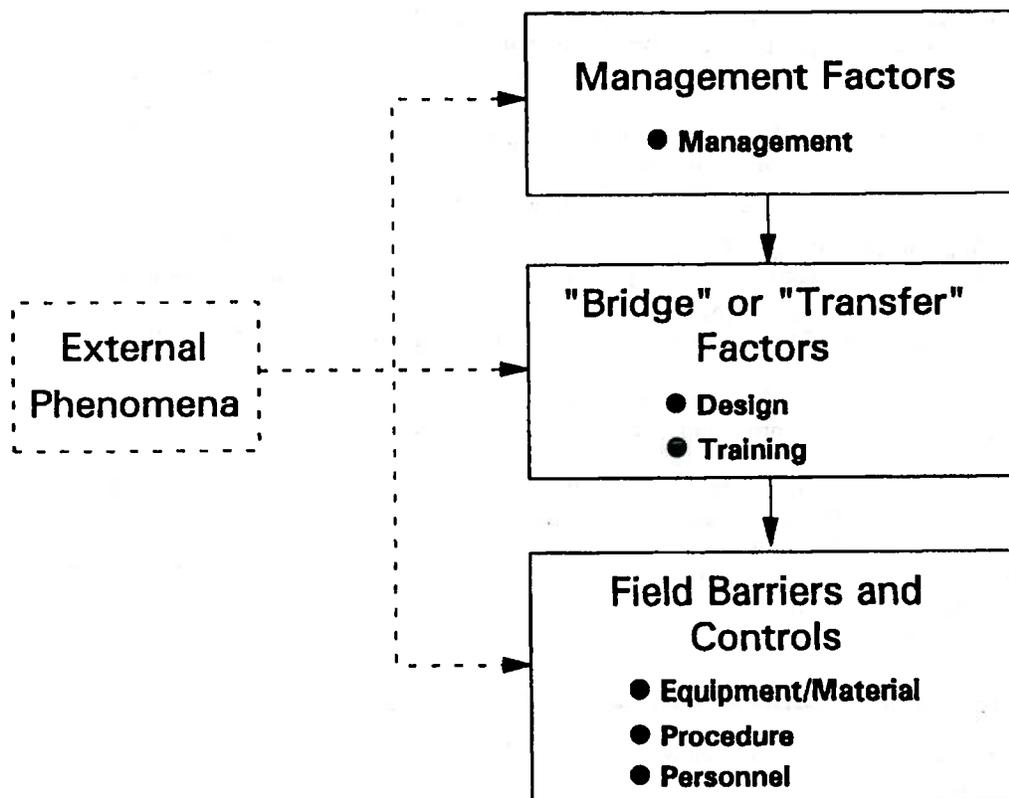


Figure 1. Causal Factor Categories Associated in a Logical Chain

5.1. Assessment and Reporting Guidance

To perform the assessment and report the causal factors and corrective actions:

1. Analyze and determine the events and causal factor chain.

Any root cause analysis method that includes the following basic steps maybe used.

- (a) Identify the problem. Remember that actuation of a protective system constitutes the occurrence but is not the real problem; the unwanted, unplanned condition or action that resulted in actuation is the problem to be solved. For an example, dust in the air actuates a false fire alarm. In this case, the occurrence is the actuation of an engineered safety feature. The smoke detector and alarm functioned as intended; the problem to be solved is the dust in the air, not the false fire alarm. Another example is when an operator follows a defective procedure and causes an occurrence. The real problem is the defective procedure; the operator has not committed an error. However, if the operator had been correctly trained to perform the task and, therefore, could reasonably have been expected to detect the defect in the procedure, then a personnel problem may also exist.
- (b) Determine the significance of the problem. Were the consequences severe? Could they be next time? How likely is recurrence? Is the occurrence symptomatic of poor attitude, a safety culture problem, or other widespread program deficiency? **Base the level of effort of subsequent steps of your assessment upon the estimation of the level of significance.**
- (c) Identify the causes (conditions or actions) immediately preceding and surrounding the problem (the reason the problem occurred).
- (d) Identify the reasons why the causes in the preceding identification step existed, working your way back to the root cause (the fundamental reason that, if corrected, will prevent recurrence of this and similar occurrences throughout the facility and other facilities under your control). This root cause is the stopping point in the assessment of causal factors. It is the place where, with appropriate corrective action, the problem will be eliminated and will not recur.

2. Summarize findings, list the causal factors, and list corrective actions.

Summarize your findings using the worksheets in Appendix B, and classify each finding or cause by the cause categories in Appendix A.

Select the one (most) direct cause and the root cause (the one for which corrective action will prevent recurrence and have the greatest, most widespread effect). In cause selection, focus on programmatic and system deficiencies and avoid simple excuses such as blaming the employee. Note that the root cause must be an explanation (the why) of the direct cause, not a repeat of the direct cause. In addition, a cause description is not just a repeat of the category code description; it is a description specific to the occurrence. Also, up to three (contributing) causes may be selected. Describe the corrective actions selected to prevent recurrence, including the reason why they were selected, and how they will prevent recurrence. Collect additional information as necessary. Appendix B includes instructions and worksheets that may be used to collect and summarize data. Appendix C contains examples of root cause analyses.

3. Enter the occurrence report using ORPS.

Enter the occurrence report into ORPS, using the ORPS User's Manual as necessary. When entering the cause code data using ORPS PC Software, match your direct cause, root cause, and each of

the contributing causes with one of the cause categories given in Appendix A (also available through a HELP screen).

5.2. Root Cause Methods

A number of methods for performing root cause analysis are given in the references 3 through 17. Many of these methods are specialized and apply to specific situations or objectives. Most have their own cause categorizations, but all are very effective when used within the scope for which they were designed. The most common methods are:

- Events and Causal Factor Analysis
- Change Analysis
- Barrier Analysis
- Management Oversight and Risk Tree (MORT) Analysis
- Human Performance Evaluation
- Kepner-Tregoe Problem Solving and Decision Making.

A summary of the most common root cause methods, when it is appropriate to use each method, and the advantages/disadvantages of each are given in Figure 2 and Table 1. The extent to which these methods are used and the level of analytical effort spent on root cause analysis should be commensurate with the significance of the occurrence. A high-level effort should be spent on most emergencies, an intermediate level should be spent on most unusual occurrences, and a relatively low-level effort should be adequate for most off-normal occurrences. In any case, the depth of analysis should be adequate to explain why the occurrence happened, determine how to prevent recurrence, and assign responsibility for corrective actions. An inordinate amount of effort to pursue the causal path is not expected if the significance of the occurrence is minor.

A high-level effort includes use and documentation of formal root cause analysis to identify the upstream factors and the program deficiencies. Both Events and Causal Factor Analysis and MORT could be used together in an extensive investigation of the causal factor chain. An intermediate level might be a simple Barrier, Change, or Mini-MORT Analysis. A low-level effort may include only gathering information and drawing conclusions without documenting use of any formal analytical method. However, in most cases, a thorough knowledge and understanding of the root cause analytical methods is essential to conducting an adequate investigation and drawing correct conclusions, regardless of the selected level of effort.

5.2.1. Events and Causal Factor Analysis

Events and Causal Factor Analysis is used for multi-faceted problems or long, complex causal factor chains. The resulting chart is a cause and effects diagram that describes the time sequence of a series of tasks and/or actions and the surrounding conditions leading to an event. The event line is a time sequence of actions or happenings while the conditions are anything that shapes the outcome and ranges from physical conditions (such as an open valve or noise) to attitude or safety culture. The events and conditions as given on the chart describe a causal factor chain. The direct, root, and contributing cause relationships in the causal factor chain are shown in Figure 3.

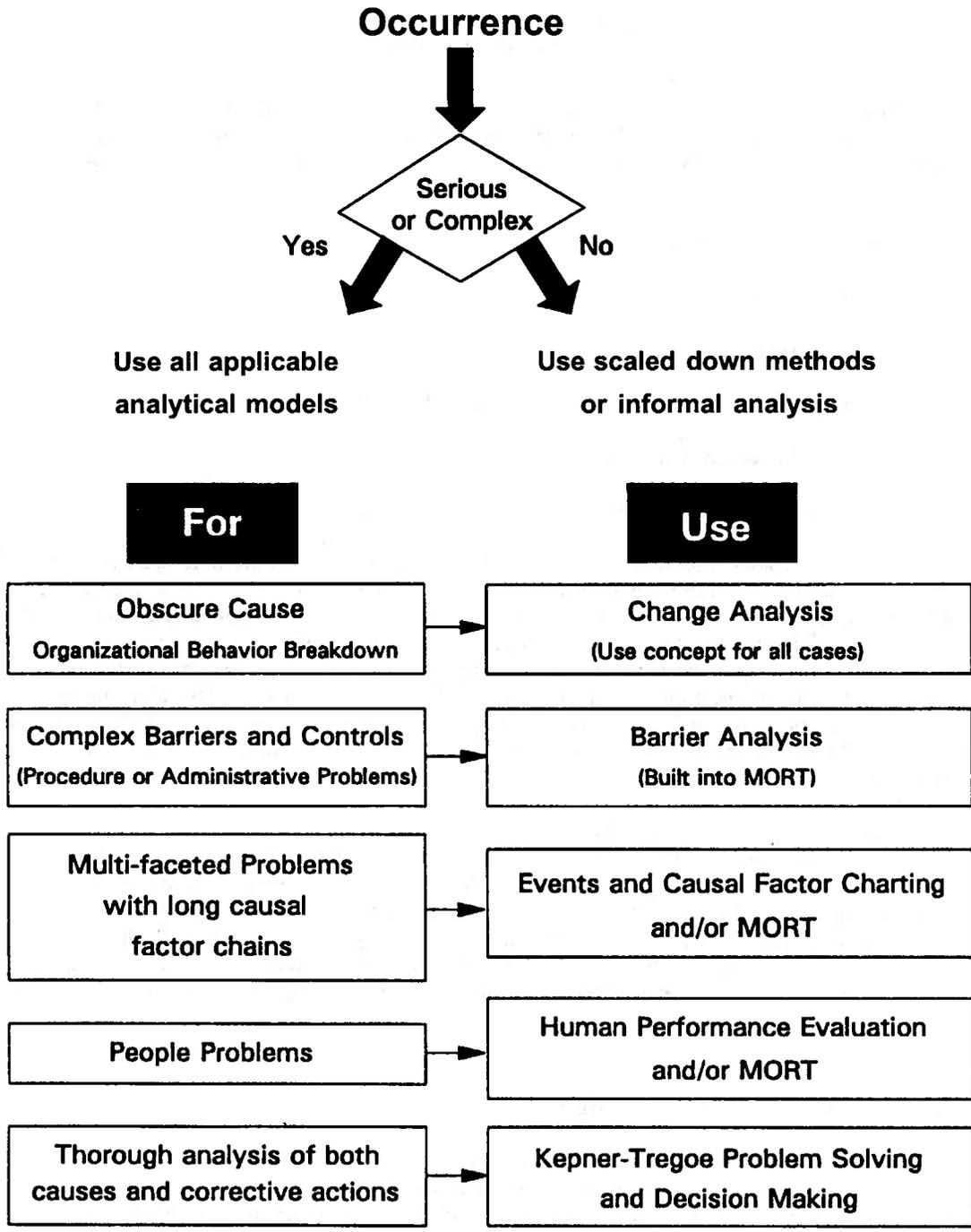


Figure 2. Summary of Root Cause Methods (Flow Chart)

TABLE 1. SUMMARY OF ROOT CAUSE METHODS

METHOD	WHEN TO USE	ADVANTAGES	DISADVANTAGES	REMARKS
Events and Causal Factor Analysis	Use for multi-faceted problems with long or complex causal factor chain.	Provides visual display of analysis process. Identifies probable contributors to the condition.	Time-consuming and requires familiarity with process to be effective.	Requires a broad perspective of the event to identify unrelated problems. Helps to identify where deviations occurred from acceptable methods.
Change Analysis	Use when cause is obscure. Especially useful in evaluating equipment failures.	Simple 6-step process.	Limited value because of the danger of accepting wrong, "obvious" answer.	A singular problem technique that can be used in support of a larger investigation. All root causes may not be identified.
Barrier Analysis	Use to identify barrier and equipment failures and procedural or administrative problems.	Provides systematic approach.	Requires familiarity with process to be effective.	This process is based on the MORT Hazard/Target Concept.
MORT/Mini-MORT	Use when there is a shortage of experts to ask the right questions and whenever the problem is a recurring one. Helpful in solving programmatic problems.	Can be used with limited prior training. Provides a list of questions for specific control and management factors.	May only identify area of cause, not specific causes.	If this process fails to identify problem areas, seek additional help or use cause-and-effect analysis.
Human Performance Evaluations (HPE)	Use whenever people have been identified as being involved in the problem cause.	Thorough analysis.	None if process is closely followed.	Requires HPE training.
Kepner-Tregoe	Use for major concerns where all aspects need thorough analysis.	Highly structured approach focuses on all aspects of the occurrence and problem resolution.	More comprehensive than may be needed.	Requires Kepner-Tregoe training.

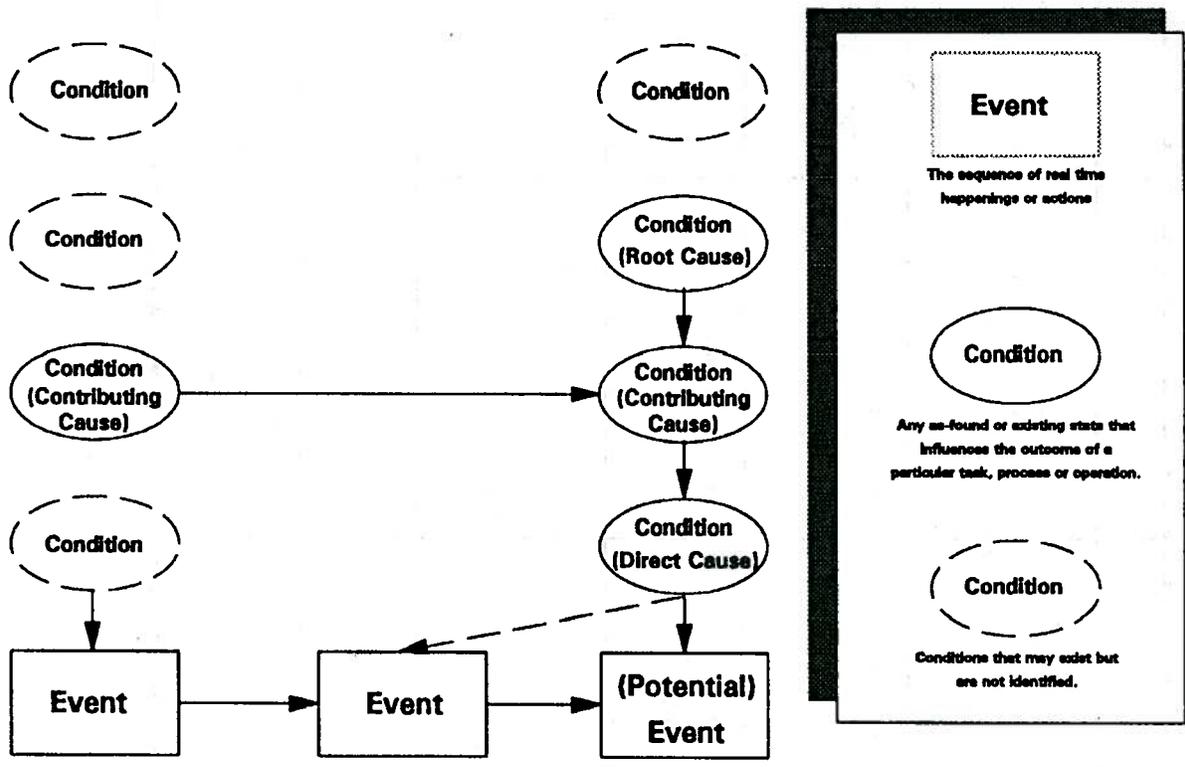


Figure 3. Causal Factor Relationships

This diagram is a graphical display of what is known. Since all conditions are a result of prior actions, the diagram identifies what questions to ask to follow the path to the source or root cause. In real life, the causal factor chain will usually be complex with many branches. In such cases, a diagram will be necessary to understand what happened and why. The cause and effect block diagram offers these advantages:

- It provides a means for organizing the occurrence data
- It provides the investigator with a concise summary of what is known and what is unknown; thus, it serves as a guide to direct the course of the investigation
- It results in a detailed display of the sequence of facts, conditions, and activities
- It assists in organization of the report data and provides a picture format for briefing management.

Appendix D describes this technique.

5.2.2. Change Analysis

Change Analysis is used when the problem is obscure. It is a systematic process that is generally used for a single occurrence and focuses on elements that have changed. It compares the previous trouble-free activity with the occurrence to identify differences. These differences are subsequently evaluated to determine how they contributed to the occurrence. Appendix E describes this technique.

5.2.3. Barrier Analysis

Barrier Analysis is a systematic process that can be used to identify physical, administrative, and procedural barriers or controls that should have prevented the occurrence. This technique should be used to determine why these barriers or controls failed and what is needed to prevent recurrence. Appendix F describes this technique.

5.2.4. Management Oversight and Risk Tree (MORT)

MORT/Mini-MORT is used to prevent oversight in the identification of causal factors. It lists on the left side of the tree specific factors relating to the occurrence and on the right side of the tree, it lists the management deficiencies that permit specific factors to exist. The management factors all support each of the specific barrier/control factors. Included is a set of questions to be asked for each of the factors on the tree. As such, it is useful in preventing oversight and ensuring that all potential causal factors are considered. It is especially useful when there is a shortage of experts to ask the right questions.

However, because each of the management factors may apply to the specific barrier/control factors, the direct linkage or relationship is not shown but is left up to the analyst. For this reason, Events and Causal Factor Analysis and MORT should be used together for serious occurrences: one to show the relationship, the other to prevent oversight. A number of condensed versions of MORT, called Mini-MORT, have been produced. For a major occurrence justifying a comprehensive investigation, a full MORT analysis could be performed while Mini-MORT would be used for most other occurrences. Appendix G describes the Mini-MORT technique.

5.2.5. Human Performance Evaluation

Human Performance Evaluation is used to identify factors that influence task performance. It is most frequently used for man-machine interface studies. Its focus is on operability and work environment, rather than training operators to compensate for bad conditions. Also, human performance evaluation may be used for most occurrences since many conditions and situations leading to an occurrence ultimately result from some task performance problem such as planning, scheduling, task assignment analysis, maintenance, and inspections. Training in ergonomics and human factors is needed to perform adequate human performance evaluations, especially in man-machine interface situations. Appendix H discusses this technique.

5.2.6. Kepner-Tregoe Problem Solving and Decision Making

Kepner-Tregoe is used when a comprehensive analysis is needed for all phases of the occurrence investigation process. Its strength lies in providing an efficient, systematic framework for gathering, organizing and evaluating information and consists of four basic steps:

- a. Situation appraisal to identify concerns, set priorities, and plan the next steps.
- b. Problem analysis to precisely describe the problem, identify and evaluate the causes and confirm the true cause. (This step is similar to change analysis).
- c. Decision analysis to clarify purpose, evaluate alternatives, assess the risks of each option and to make a final decision.
- d. Potential problem analysis to identify safety degradation that might be introduced by the corrective action, identify the likely causes of those problems, take preventive action and plan contingent action. This final step provides assurance that the safety of no other system is degraded by changes introduced by proposed corrective actions.

These four steps cover all phases of the occurrence investigation process and thus, Kepner-Tregoe can be used for more than causal factor analysis. Separate worksheets (provided by Kepner-Tregoe) provide a specific focus on each of the four basic steps and consist of step by step procedures to aid in the analyses. This systems approach prevents overlooking any aspect of the concern. As formal Kepner-Tregoe training is needed for those using this method, a further description is not included in this document.

6. PHASE III - CORRECTIVE ACTIONS

The root cause analysis enables the improvement of reliability and safety by selecting and implementing effective corrective actions. To begin, identify the corrective action for each cause; then apply the following criteria to the corrective actions to ensure they are viable. If the corrective actions are not viable, re-evaluate the solutions.

1. Will the corrective action prevent recurrence?
2. Is the corrective action feasible?
3. Does the corrective action allow meeting primary objectives or mission?

4. Does the corrective action introduce new risks? Are the assumed risks clearly stated? (The safety of other systems must not be degraded by the proposed corrective action.)
5. Were the immediate actions taken appropriate and effective?

A systems approach, such as Kepner-Tregoe, should be used in determining appropriate corrective actions. It should consider not only the impact they will have on preventing recurrence, but also the potential that the corrective actions may actually degrade some other aspect of nuclear safety. Also, the impact the corrective actions will have on other facilities and their operations should be considered. The proposed corrective actions must be compatible with facility commitments and other obligations. In addition, those affected by or responsible for any part of the corrective actions, including management, should be involved in the process. Proposed corrective actions should be reviewed to ensure the above criteria have been met, and should be prioritized based on importance, scheduled (a change in priority or schedule should be approved by management), entered into a commitment tracking system, and implemented in a timely manner. A complete corrective action program should be based, not only on specific causes of occurrences, but also on items such as lessons learned from other facilities, appraisals, and employee suggestions.

A successful corrective action program requires management that is involved at the appropriate level and is willing to take responsibility and allocate adequate resources for corrective actions.

Additional specific questions and considerations in developing and implementing corrective actions include:

- Do the corrective actions address all the causes?
- Will the corrective actions cause detrimental effects?
- What are the consequences of implementing the corrective actions?
- What are the consequences of not implementing the corrective actions?
- What is the cost of implementing the corrective actions (capital costs, operations, and maintenance costs)?
- Will training be required as part of the implementation?
- In what time frame can the corrective actions reasonably be implemented?
- What resources are required for successful development of the corrective actions?
- What resources are required for successful implementation and continued effectiveness of the corrective actions?
- What impact will the development and implementation of the corrective actions have on other work groups?
- Is the implementation of the corrective actions measurable? (For example, "Revise step 6.2 of the procedure to reflect the correct equipment location," is measurable; "Ensure the actions of procedure step 6.2 are performed correctly in the future," is not measurable.)

7. PHASE IV - INFORM

Electronic reporting to ORPS is part of the inform process for all occurrences. (For those occurrences containing classified information, an unclassified version shall be entered into ORPS.) Effectively preventing recurrences requires the distribution of these reports (especially the lessons learned) to all personnel who might benefit. Methods and procedures for identifying personnel who have an interest is essential to effective communications.

In addition, an internal self-appraisal report identifying management and control system defects should be presented to management for the more serious occurrences. The defective elements can be identified using MORT or Mini-MORT as described in Appendix G.

Consideration should be given to directly sharing the details of root cause information with similar facilities where significant or long-standing problems may also exist.

8. PHASE V - FOLLOW-UP

Follow-up includes determining if corrective actions have been effective in resolving problems. First, the corrective actions should be tracked to ensure that they have been properly implemented and are functioning as intended. Second, a periodic structured review of the corrective action tracking system, normal process and change control system, and occurrence tracking system should be conducted to ensure that past corrective actions have been effectively handled. The recurrence of the same or similar events must be identified and analyzed. If an occurrence recurs, the original occurrence should be re-evaluated to determine why corrective actions were not effective. Also, the new occurrence should be investigated using change analysis. The process change control system should be evaluated to determine what improvements are needed to keep up with changing conditions. Early indications of deteriorating conditions can be obtained from tracking and trend analyses of occurrence information. In addition, the ORPS database should be reviewed to identify good practices and lessons learned from other facilities. Prompt corrective actions should be taken to reverse deteriorating conditions or to apply lessons learned.

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APPENDIX A - CAUSE CODES

1. Equipment/Material Problem

- 1A = Defective or failed part
- 1B = Defective or failed material
- 1C = Defective weld, braze, or soldered joint
- 1D = Error by manufacturer in shipping or marking
- 1E = Electrical or instrument noise
- 1F = Contamination

2. Procedure Problem

- 2A = Defective or inadequate procedure
- 2B = Lack of procedure

3. Personnel Error

- 3A = Inadequate work environment
- 3B = Inattention to detail
- 3C = Violation of requirement or procedure
- 3D = Verbal communication problem
- 3E = Other human error

4. Design Problem

- 4A = Inadequate man-machine interface
- 4B = Inadequate or defective design
- 4C = Error in equipment or material selection
- 4D = Drawing, specification, or data errors

5. Training Deficiency

- 5A = No training provided
- 5B = Insufficient practice or hands-on experience
- 5C = Inadequate content
- 5D = Insufficient refresher training
- 5E = Inadequate presentation or materials

6. Management Problem

- 6A = Inadequate administrative control
- 6B = Work organization/planning deficiency
- 6C = Inadequate supervision
- 6D = Improper resource allocation
- 6E = Policy not adequately defined, disseminated, or enforced
- 6F = Other management problem

7. External Phenomenon

- 7A = Weather or ambient condition
- 7B = Power failure or transient
- 7C = External fire or explosion
- 7D = Theft, tampering, sabotage, or vandalism

APPENDIX B - CAUSAL FACTOR WORKSHEETS

After an appropriate root cause model has been used to identify the direct cause, the root cause, and any applicable contributing cause, these findings can be related to the ORPS cause categories by using one or more of the worksheets in this appendix. Each of the seven major cause worksheets has a matrix to list the applicable subcategory cause for each finding. (The same subcategory cause may be listed for up to four similar findings under columns I through IV). The Worksheet Summary can be used to list, from the individual worksheets, the one direct cause, the one root cause, and up to three contributing causes, their descriptions, and the corrective actions for electronic entry.

Worksheet Instructions:

1. Check each worksheet as applicable or nonapplicable.
2. List subcategory cause information on each applicable worksheet.
 - a. List the applicable subcategory cause for the root cause, the contributing causes, and the direct cause by placing an R, C, or D in the appropriate box. (The same cause may be listed for up to four similar findings; for example, four different failed parts).
 - b. Under cause description, reference each cause with the code and Roman numeral from the matrix and describe each cause (explain how it was related to the occurrence).
 - c. Under recommended corrective actions, list the action intended to correct each cause to prevent recurrence.
3. Transfer the direct, the root, and up to three contributing causes and the corrective actions to the Worksheet Summary. When there are more than three contributing causes, select those that result in the greatest and most widespread improvement when corrected. (Note that even though only three contributing causes may be reported, corrective actions should be made for all identified causes). Use the ORPS PC software to transmit the results to the ORPS database.

Refer to Appendix C for an example of how to use the worksheets.

1. Equipment/Material Worksheet

Applicable

Not Applicable

Why was "Equipment/Material" a Cause?

Rate each subcategory cause:

D = Direct Cause

C = Contributing Cause

R = Root Cause

Equipment/Material Problem Subcategories	I	II	III	IV
1A = Defective or Failed Part				
1B = Defective or Failed Material				
1C = Defective Weld, Braze, or Soldered Joint				
1D = Error by Manufacturer in Shipping or Marking				
1E = Electrical or Instrument Noise				
1F = Contamination				

Cause Descriptions:

Recommended Corrective Actions:

2. Procedure Worksheet

Applicable

Not Applicable

Why was "Procedures" a Cause?

Rate each subcategory cause:

- D = Direct Cause
- C = Contributing Cause
- R = Root Cause

Procedure Problem Subcategory	I	II	III	IV
2A = Defective or Inadequate Procedure				
2B = Lack of Procedure				

Cause Descriptions:

Recommended Corrective Actions:

3. Personnel Error Worksheet

Applicable

Not Applicable

Why was "Personnel Error" a Cause?

Rate each subcategory cause:

D = Direct Cause
 C = Contributing Cause
 R = Root Cause

Personnel Error Subcategory	I	II	III	IV
3A = Inadequate Work Environment				
3B = Inattention to Detail				
3C = Violation of Requirement or Procedure				
3D = Verbal Communication Problem				
3E = Other Human Error				

Cause Description:

Recommended Corrective Actions:

4. Design Problem Worksheet

Applicable

Not Applicable

Why was "Design" a Cause?

Rate each subcategory cause:

D = Direct Cause

C = Contributing Cause

R = Root Cause

Design Problem Subcategories	I	II	III	IV
4A = Inadequate Man-Machine Interface				
4B = Inadequate or Defective Design				
4C = Error in Equipment or Material Selection				
4D = Drawing, Specification, or Date Errors				

Cause Descriptions:

Recommended Corrective Actions:

5. Training Deficiency Worksheet

Applicable

Not Applicable

Why was "Training Deficiency" a Cause?

Rate each subcategory cause:

D = Direct Cause

C = Contributing Cause

R = Root Cause

Training Deficiency Subcategories	I	II	III	IV
5A = No Training Provided				
5B = Insufficient Practice or Hands-On Experience				
5C = Inadequate Content				
5D = Insufficient Refresher Training				
5E = Inadequate Presentation or Materials				

Cause Descriptions:

Recommended Corrective Actions:

6. Management Problem Worksheet

Applicable

Not Applicable

Why was "Management Problem" a Cause?

Rate each subcategory cause:

D = Direct Cause

C = Contributing Cause

R = Root Cause

Management Problem Subcategories	I	II	III	IV
6A = Inadequate Administrative Control				
6B = Work Organization/Planning Deficiency				
6C = Inadequate Supervision				
6D = Improper Resource Allocation				
6E = Policy Not Adequately Defined, Disseminated, or Enforced				
6D = Other				

Cause Descriptions:

Recommended Corrective Actions:

7. External Phenomena Worksheet

Applicable

Not Applicable

Why was "External Phenomena" a Cause?

Rate each subcategory cause:

D = Direct Cause

C = Contributing Cause

R = Root Cause

External Phenomena Subcategories	I	II	III	IV
7A = Weather or Ambient Condition				
7B = Power Failure or Transient				
7C = External Fire or Explosion				
7D = Theft, Tampering, Sabotage, Vandalism				

Cause Descriptions:

Recommended Corrective Actions:

Worksheet Summary

Problem/Deficiency Category		Direct Cause	Root Cause	Contributing Cause
Operational Readiness Problem	Equipment/ Material Problem			
	Procedure Problem			
	Personnel Error			
Management/Field Bridge Problem	Design Problem			
	Training Deficiency			
Management Problem				
External Phenomenon				

Cause Description:

Corrective Actions:

APPENDIX C - CAUSAL FACTOR ANALYSIS EXAMPLES

EXAMPLE 1

Contaminated water leaked from a pump (wrapped in plastic) after the pump was removed from a hot cell. Investigation using Mini-MORT revealed:

- A safe-work permit was obtained and properly signed off but did not contain adequate precautions against possible water involvement in the task
- The safe-work permit included a list of hazards but omitted liquid potential
- A Safety Analysis Report (SAR) identified this particular hazard, but this information was not used in preparing the safe-work permit checklist.

This occurrence was an off-normal release of radionuclides. Using Mini-MORT as a guide, “controls less than adequate” was identified. The problem was leakage of contaminated water. The direct cause was not draining the pump before removing it from the hot cell. Following down the Mini-MORT chart, Performance Error, Job Assignment Less Than Adequate (LTA) was found. The operator had not been instructed or trained on this hazard, and the safe work permit did not include this precaution (Cause Code 2A, Defective or Inadequate Procedure - lacks something essential to successfully perform activity). Continuing on the Mini-MORT chart, Technical Information, Communication, and Knowledge were found. Asking questions about these factors revealed that the root cause was the safe-work permit form. The checklist on the form was developed without reviewing the hazard identified on the SAR (Cause Code 6B, Management, Work Organization/Planning Deficiency). Also on the Mini-MORT chart under performance error, training is listed. Investigation of this factor revealed that a contributing cause was that neither the health physics technician nor the operator recognized the hazard (Cause Code 5A, Training Deficiency, No Training Provided).

Note that water in the pump was a condition. Some may feel that this condition was the direct cause of this occurrence, but water in a pump given as a cause of water leaking from a pump is too simplistic; there is a need to know why a pump containing water was removed from a hot cell. In addition, operator error should be listed as a cause only if the operator had been trained and reasonably could have been expected to recognize the hazard. Also note that full MORT analysis was not used for this off-normal occurrence; the Mini-MORT chart led to asking the few, right questions with a low level of effort required to perform the root cause analysis.

EXAMPLE 2

With the reactor at full power, the outer shim cylinder would not move when attempting to adjust power. While there was no immediate safety concern, the reactor was shut down. Since this was a physical barrier that did not perform its function, we use barrier analysis to ask why. Investigation revealed a broken connection in the wire that activates a solenoid to release the cylinder brake. The Barrier Analysis Checklist asks: Were there unwanted energies present? Vibration was determined to be the cause of the broken solder connection. Using other questions in the Barrier Analysis Checklist or by merely asking the next logical questions, we discover that vibration had not been considered in the design. Inspections had been conducted during the last shutdown. The installation had been according to design specifications and verified by quality assurance.

This was classified as an unusual occurrence involving performance degradation of Class A equipment. The direct cause was Cause Code 1A, Equipment/Material Problem - defective or failed part; lacking something to perform its intended function. The joint was soldered adequately but lacked support. The root cause was Cause Code 4B, Design Problem - something essential was not included.

Corrective actions included repair of the broken connection, inspection of the other connections, and installation of shrink tubing for structural support. In addition, a checklist, including vibration, was developed to avoid oversight in design considerations.

EXAMPLE 3

An experiment high-temperature alarm occurred during reactor startup. (Change analysis, Mini-MORT, or Cause and Effects are all adequate for this investigation.) It was revealed that:

- The cooling gas lead was hooked to the wrong cylinder
- The operator had followed the startup procedure to verify correct hook up
- The procedure was not sufficiently detailed to ensure adequate verification (the procedure did not state that the operator was to verify the correct hookup, only to verify the correct gas mixture in the cylinder)
- The cylinders had been moved by maintenance personnel to facilitate other noncylinder work in the area and had been returned to the wrong position in the rack (management did not want the cylinders moved by maintenance, but had not implemented any controls)
- The cylinders were not color coded.

This was classified as an off-normal occurrence related to nuclear safety. The problem was inadequate cooling and the resulting high temperature in the experiment loop. The direct cause was not verifying correct hookup because of inadequate startup procedures (Cause Code 2A, Procedure Problem, Defective or Inadequate Procedure). Contributing causes were maintenance personnel returning the cylinder to the wrong position (Cause Code 3B, Personnel, Inadequate Attention to Detail), and identical leads and colors of cylinders with different contents (Cause Code 4A, Design, Inadequate Man-Machine Interface). The root cause was determined to be the prevailing attitudes and culture that contributed to the maintenance errors and poor design (Cause Code 6E, Management, Policy Not Adequately Defined, Disseminated, or Enforced). In this case, personnel error is not a valid cause because the operator had not been trained to this requirement and could not reasonably have been expected to take the extra precautions.

Note that in this case, as a minimum, corrective action should include review (and revision as appropriate) of other procedures and training operators to the new procedures. Further corrective action would include installation of fittings that make it impossible to hook up the wrong cylinder, a review of other hookups within the facility to correct similar problems, and the use of human factors (ergonomics) in configuration design and control.

EXAMPLE 4

A large 2400-volt fan system blew a fuse. The electrician obtained a fuse from the store room, tagged out the switch and replaced the fuse. The system would not work, so the electrician bypassed a safety interlock and used a meter to check the fuse. A large fireball erupted causing burns that required hospitalization and 50 lost workdays.

This was classified as an off-normal, personnel safety occurrence (in-patient hospitalization). However, because this was a near fatality and because there existed a potential for significant programmatic impact, the investigation used formal Cause and Effects Analysis with charting to identify all of the contributing conditions and any weaknesses in programmatic or operational control. A condensed version of the working chart is given in Figure C-1. The significant findings are given below. The worksheets following the chart illustrate transferring the findings to the ORPS cause subcategories on the worksheets.

Findings included:

- The regular electrician was sick so a substitute who was not trained on high voltage was used (Cause Code 5A, No Training Provided).
- The substitute did not follow procedures. The substitute tied out the interlocks and used the wrong meter (Cause Code 3C, Violation of Requirement or Procedure).
- The fuse obtained from the storeroom was outdated and was no good (Cause Code 1A, Defective or Failed Part).
- The large fan was not designed for cycling (frequent startups) and had been regularly blowing fuses (Cause Code 4B, Inadequate or Defective Design).
- The supervisor knew the substitute was inexperienced but did not observe the substitute or give any special assistance (Cause Code 6C, Inadequate Supervision).
- Known defects had not been corrected (Cause Code 6A, Inadequate Administrative Control).

To correct these conditions, the following recommendations were made:

- Investigate and repair the system so that it does not blow fuses.
- Train supervisors to ensure that the worker is qualified for that task.
- Provide high-voltage training as needed.
- Evaluate management response to safety problems and operation of malfunctioning equipment.

As a result of the potential significance of this occurrence, a formal, detailed root cause analysis was performed. A high level of effort was expended but the effort was justified due to the consequences of a repeat occurrence.

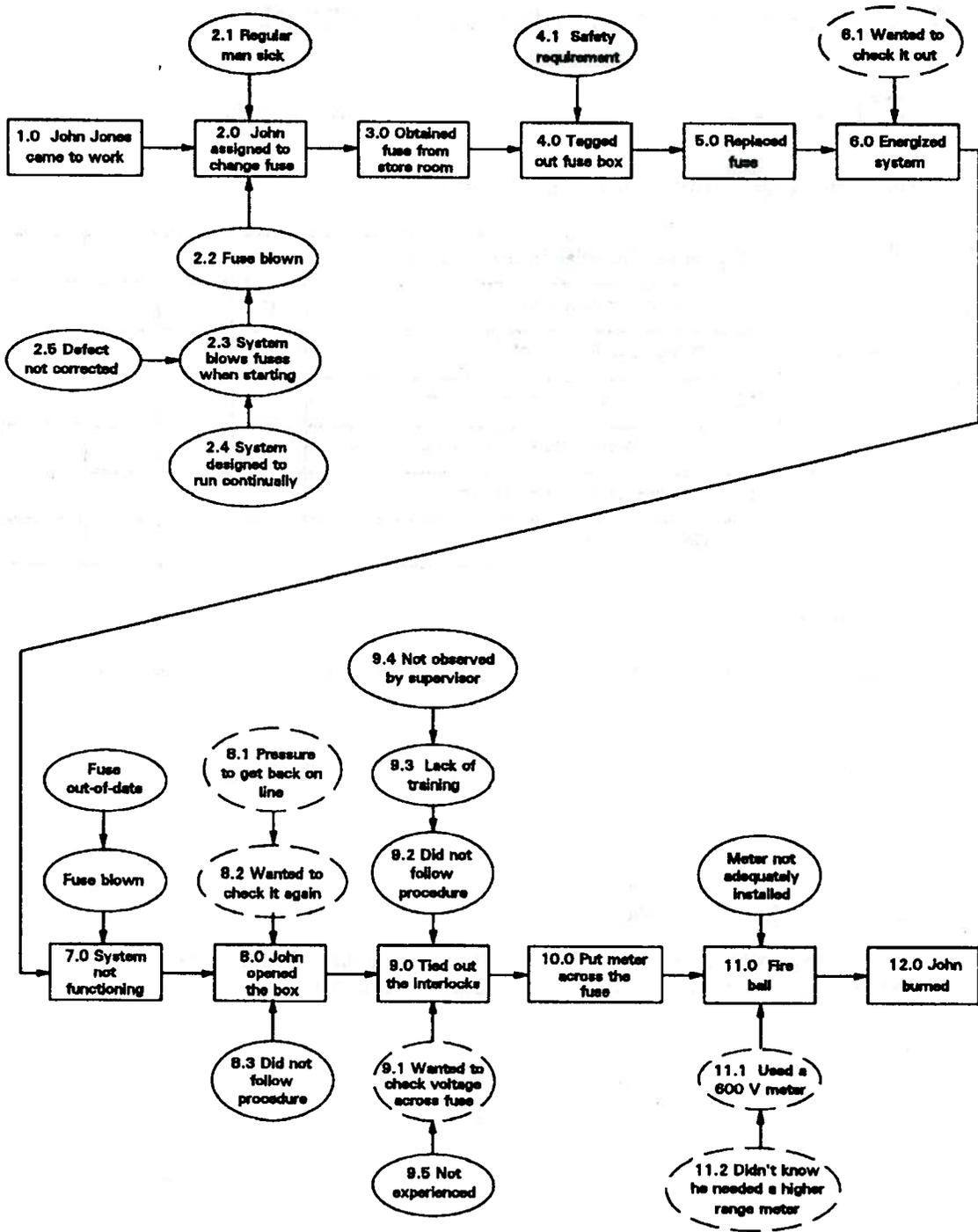


Figure C-1. Events and Causal Factors Chart

1. Equipment/Material Worksheet

Applicable

Not Applicable

Why was "Equipment/Material" a Cause?

Rate each subcategory cause:

D = Direct Cause

C = Contributing Cause

R = Root Cause

Equipment/Material Problem Subcategories	I	II	III	IV
1A = Defective or Failed Part	C			
1B = Defective or Failed Material				
1C = Defective Weld, Braze, or Soldered Joint				
1D = Error by Manufacturer in Shipping or Marking				
1E = Electrical or Instrument Noise				
1F = Contamination				

Cause Descriptions:

1A - Defective or Failed Part. The replacement fuse was out-of-date and was no good.

Recommended Corrective Actions:

Evaluate the parts inventory and procurement system and, where needed, implement program to discard and replace outdated parts.

2. Procedure Worksheet

Applicable

Not Applicable

Why was "Procedures" a Cause?

Rate each subcategory
cause:

D = Direct Cause

C = Contributing Cause

R = Root Cause

Procedure Problem Subcategory	I	II	III	IV
2A = Defective or Inadequate Procedure				
2B = Lack of Procedure				

Cause Descriptions:

Recommended Corrective Actions:

3. Personnel Error Worksheet

Applicable

Not Applicable

Why was "Personnel Error" a Cause?

Rate each subcategory cause:

D = Direct Cause

C = Contributing Cause

R = Root Cause

Personnel Error Subcategory	I	II	III	IV
3A = Inadequate Work Environment				
3B = Inattention to Detail				
3C = Violation of Requirement or Procedure	D			
3D = Verbal Communication Problem				
3E = Other Human Error				

Cause Description:

3C - Violation of Requirement or Procedure. Untrained employee tied out interlocks in violation of procedure and used wrong meter.

NOTE : Although an employee error was the direct cause, we do not blame the employee. See corrective action.

Recommended Corrective Actions:

1. Train supervisors to verify qualifications when assigning personnel to a hazardous task.
2. Reemphasize the need to obtain authorization prior to bypassing any interlock.

4. Design Problem Worksheet

Applicable

Not Applicable

Why was "Design" a Cause?

Rate each subcategory cause:

D = Direct Cause

C = Contributing Cause

R = Root Cause

Design Problem Subcategories	I	II	III	IV
4A = Inadequate Man-Machine Interface				
4B = Inadequate or Defective Design	C			
4C = Error in Equipment or Material Selection				
4D = Drawing, Specification, or Date Errors				

Cause Descriptions:

4B - Inadequate or Defective Design. The system was not designed for frequent cycling and blew fuse during start.

Recommended Corrective Actions:

Evaluate and implement design or operational changes to eliminate fuse blowing.

5. Training Deficiency Worksheet

Applicable

Not Applicable

Why was "Training Deficiency" a Cause?

Rate each subcategory cause:

D = Direct Cause

C = Contributing Cause

R = Root Cause

Training Deficiency Subcategories	I	II	III	IV
5A = No Training Provided	C			
5B = Insufficient Practice or Hands-On Experience				
5C = Inadequate Content				
5D = Insufficient Refresher Training				
5E = Inadequate Presentation or Materials				

Cause Descriptions:

5A - No Training Provided. The employee was not trained on high voltage.

NOTE: The training program was adequate.

Recommended Corrective Actions:

Train employee on high voltage.

6. Management Problem Worksheet

Applicable

Not Applicable

Why was "Management Problem" a Cause?

Rate each subcategory cause:

D = Direct Cause

C = Contributing Cause

R = Root Cause

Management Problem Subcategories	I	II	III	IV
6A = Inadequate Administrative Control	C			
6B = Work Organization/Planning Deficiency				
6C = Inadequate Supervision	R			
6D = Improper Resource Allocation				
6E = Policy Not Adequately Defined, Disseminated, or Enforced				
6D = Other				

Cause Descriptions:

6A - Inadequate Administrative Control. Reporting and correcting system malfunction (fuse blowing) was inadequate.

6C - Inadequate Supervision - The root cause was the supervisor assigned an unqualified person to work on high voltage.

Recommended Corrective Actions:

1. Train supervisors to verify qualifications when assigning personnel to hazardous tasks.
2. Implement procedures and controls to report and correct malfunctioning systems.

7. External Phenomena Worksheet

Applicable

Not Applicable

Why was "External Phenomena" a Cause?

Rate each subcategory cause:

D = Direct Cause

C = Contributing Cause

R = Root Cause

External Phenomena Subcategories	I	II	III	IV
7A = Weather or Ambient Condition				
7B = Power Failure or Transient				
7C = External Fire or Explosion				
7D = Theft, Tampering, Sabotage, Vandalism				

Cause Descriptions:

Recommended Corrective Actions:

Worksheet Summary

Problem/Deficiency Category		Direct Cause	Root Cause	Contributing Cause
Operational Readiness Problem	Equipment/ Material Problem			C
	Procedure Problem			
	Personnel Error	D		
Management/Field Bridge Problem	Design Problem			C
	Training Deficiency			
Management Problem			R	
External Phenomenon				

Cause Description:

The direct cause was an untrained employee violated safety procedures by tying out an interlock and using the wrong meter to test a high voltage fuse. The root cause was the supervisor assigned an unqualified substitute to work on high voltage. Contributing causes were failure to maintain up-to-date parts (fuse) and tolerance of an unsatisfactory operational system (frequent fuse blowing).

Corrective Actions:

1. Train supervision to verify qualifications when assigning personnel to hazardous tasks.
2. Evaluate parts inventory and procurement system and, where needed, discard and replace outdated parts.
3. Implement procedures and controls to report and correct malfunctioning systems.
4. Train employees, as needed, on high voltage systems.

APPENDIX D - EVENTS AND CAUSAL FACTOR ANALYSIS

(Cause and Effects [Walk-through] Task Analysis)

Cause and Effects (Walk-through) Task Analysis is a method in which personnel conduct a step-by-step reenactment of their actions for the observer without carrying out the actual function. If appropriate, it may be possible to use a simulator for performing the walk-through rather than the actual work location.

Objectives include:

- Determining how a task was really performed
- Identifying problems in human-factors design, discrepancies in procedural steps, training, etc.

Preconditions are that participants must be the people who actually do the task.

Steps in Cause and Effects Task Analysis are as follows:

1. Obtain preliminary information so you know what the person was doing when the problem or inappropriate action occurred.
2. Decide on a task of interest.
3. Obtain necessary background information:
 - Obtain relevant procedures
 - Obtain system drawings, block diagrams, piping and instrumentation diagrams, etc.
 - Interview personnel who have performed the task (but not those who will be observed) to obtain understanding of how the task should be performed.
4. Produce a guide outlining how the task will be carried out. A procedure with key items underlined is the easiest way of doing this. The guide should indicate steps in performing task and key controls and displays so that:
 - You will know what to look for
 - You will be able to record actions more easily.
5. Thoroughly familiarize yourself with the guide and decide exactly what information you are going to record and how you will record it.

You may want to check off each step and controls or displays used as they occur. Discrepancies and problems may be noted in the margin or in a space provided for comments, adjacent to the step.

6. Select personnel who normally perform the task. If the task is performed by a crew, crew members should play the same role they fulfill when carrying out the task.
7. Observe personnel walking through the task and record their actions and use of displays and controls. Note discrepancies and problem areas.

You should observe the task as it is normally carried out; however, if necessary, you may stop the task to gain full understanding of all steps. Conducting the task as closely to the conditions that existed when the event occurred will provide the best understanding of the event causal factors.

8. Summarize and consolidate any problem areas noted. Identify probable contributors to the event.

CAUSE AND EFFECT CHART

Figure D-1 shows the conceptual process of cause and effect charting. Figure D-2 shows a sample cause and effect chart. The primary effect given on the chart is the problem you are trying to prevent from recurring. To complete the cause and effect chart:

1. Identify the cause and effect starting with the primary effect. For each effect, there is a cause that then becomes the next effect for which you need to identify the cause. Each block is an effect and a cause, except for the first block (which is the primary effect) and the last block in each series, (which is the root cause).
2. For each cause, list in a block just below the cause two ways you know it to be true. If only one way is known or not firm, all possible causes should be evaluated as potential causes, and the bases for rejected and accepted causes should be stated.
3. When this process gets to the point where a cause can be corrected to prevent recurrence in a way that allows meeting your objectives and is within your control, you have found the root cause or causes.

Cause and Effect Chart

Conceptual Process of Cause and Effect Charting

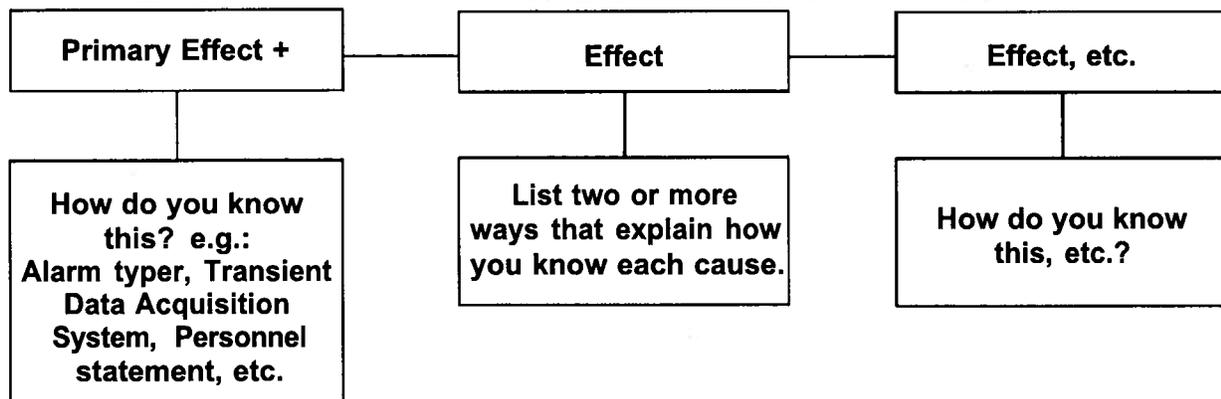


Figure D-1. Conceptual Process of Cause and Effect Charting

Cause and Effect Chart

Example of Cause and Effect Charting

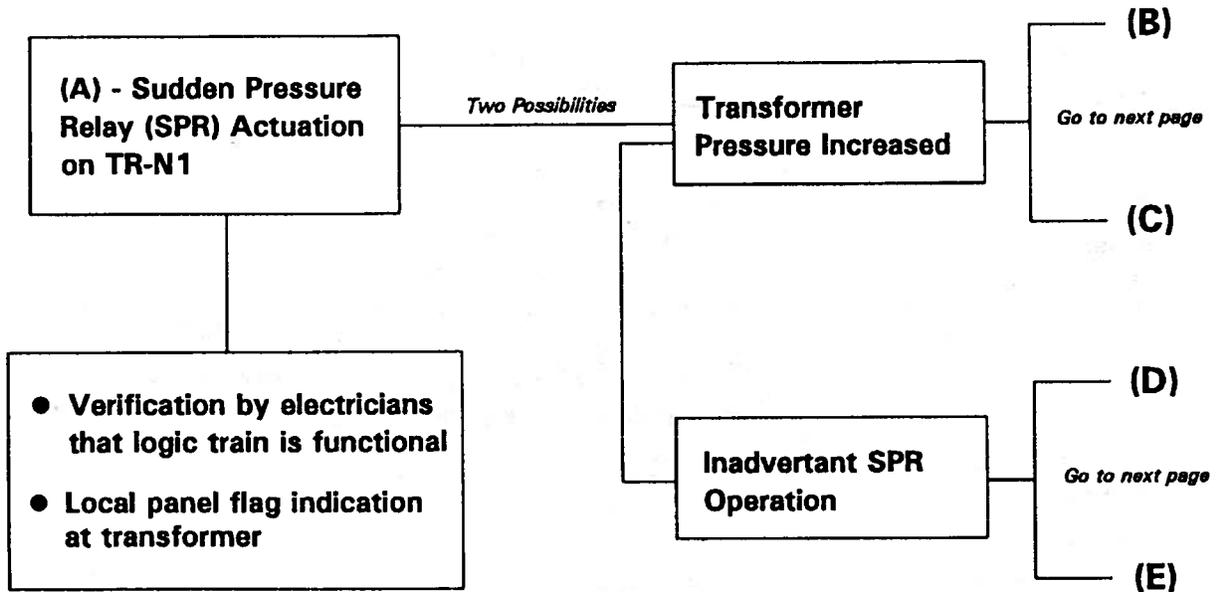
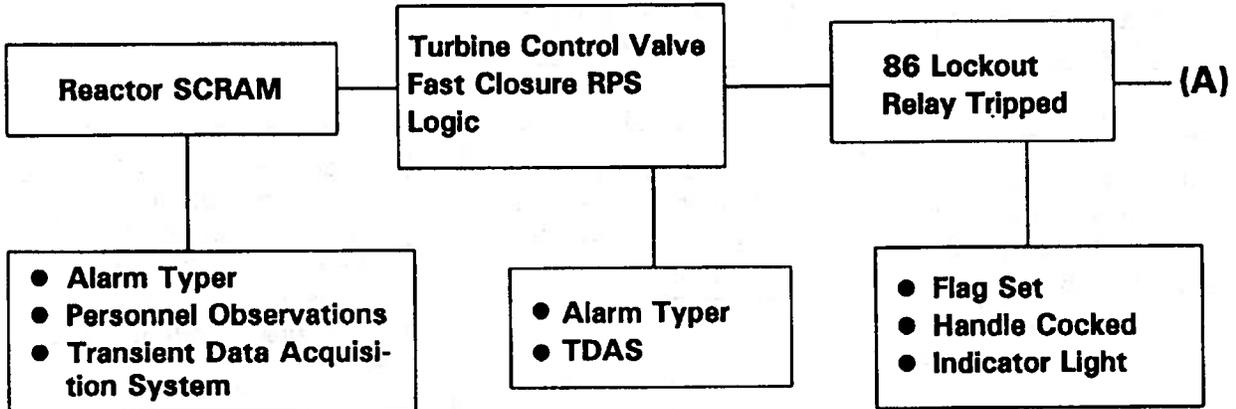


Figure D-2. Example of Cause and Effect Charting

Cause and Effect Chart

Example (Continued)

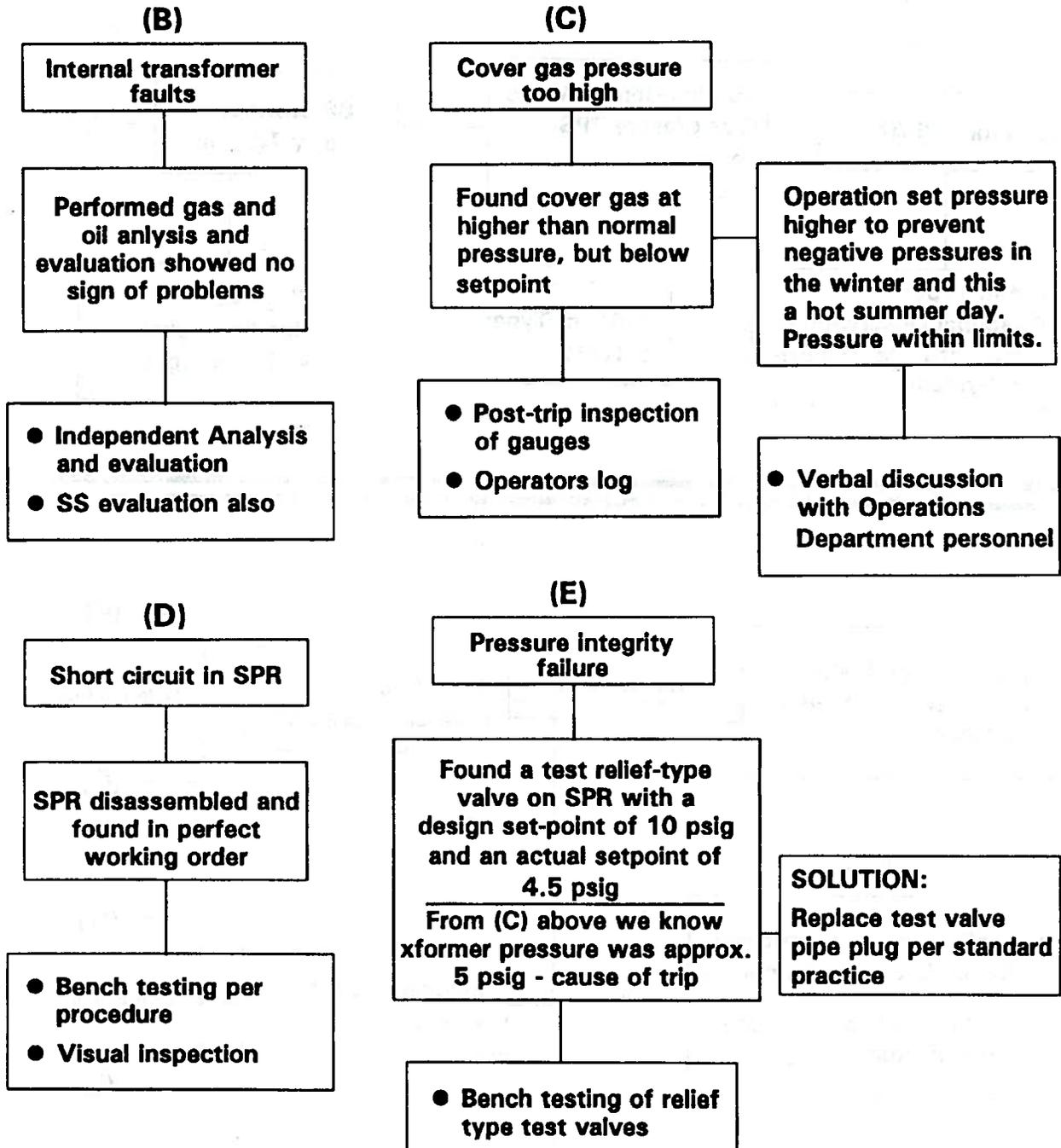


Figure D-2. Continued

APPENDIX E - CHANGE ANALYSIS

Change Analysis looks at a problem by analyzing the deviation between what is expected and what actually happened. The evaluator essentially asks what differences occurred to make the outcome of this task or activity different from all the other times this task or activity was successfully completed.

This technique consists of asking the questions: What? When? Where? Who? How? Answering these questions should provide direction toward answering the root cause determination question: Why?

Primary and secondary questions included within each category will provide the prompting necessary to thoroughly answer the overall question. Some of the questions will not be applicable to any given condition. Some amount of redundancy exists in the questions to ensure that all items are addressed.

Several key elements include the following:

- Consider the event containing the undesirable consequences.
- Consider a comparable activity that did not have the undesirable consequences.
- Compare the condition containing the undesirable consequences with the reference activity.
- Set down all known differences whether they appear to be relevant or not.
- Analyze the differences for their effects in producing the undesirable consequences. This must be done with careful attention to detail, ensuring that obscure and indirect relationships are identified (e.g., a change in color or finish may change the heat transfer parameters and consequently affect system temperature).
- Integrate information into the investigative process relevant to the causes of, or the contributors to, the undesirable consequences.

Change Analysis is a good technique to use whenever the causes of the condition are obscure, you do not know where to start, or you suspect a change may have contributed to the condition.

Not recognizing the compounding of change (e.g., a change made five years previously combined with a change made recently) is a potential shortcoming of Change Analysis. Not recognizing the introduction of gradual change as compared with immediate change also is possible.

This technique may be adequate to determine the root cause of a relatively simple condition. In general, though, it is not thorough enough to determine all the causes of more complex conditions.

Figure E-1 shows the six steps involved in Change Analysis. Figure E-2 is the Change Analysis worksheet. The following questions help identify information required on the worksheet.

WHAT?

- What is the condition?
- What occurred to create the condition?
- What occurred prior to the condition?
- What occurred following the condition?

- What activity was in progress when the condition occurred?
- What activity was in progress when the condition was identified?
 - Operational evolution in the work space?
 - Surveillance test?
 - Power increase/decrease?
 - Starting/stopping equipment?
 - Operational evolution outside the work space?
 - Valve line-up?
 - Fuel handling?
 - Removing equipment from service?
 - Returning equipment to service?
 - Maintenance activity?
 - Surveillance?
 - Corrective maintenance?
 - Modification installation?
 - Troubleshooting?
 - Training activity?
- What equipment was involved in the condition?
 - What equipment initiated the condition?
 - What equipment was affected by the condition?
 - What equipment mitigated the condition?
 - What is the equipment's function?
 - How does it work?
 - How is it operated?
 - What failed first?
 - Did anything else fail due to the first problem?
 - What form of energy caused the equipment problem?
 - What are recurring activities associated with the equipment?
 - What corrective maintenance has been performed on the equipment?
 - What modifications have been made to the equipment?
- What system or controls (barriers) should have prevented the condition?
- What barrier(s) mitigated the consequences of the condition?

WHEN?

- When did the condition occur?
- What was the facility's status at the time of occurrence?
- When was the condition identified?
- What was the facility's status at the time of identification?

- What effects did the time of day have on the condition? Did it affect:
 - Information availability?
 - Personnel availability?
 - Ambient lighting?
 - Ambient temperature?
- Did the condition involve shift-work personnel? If so:
 - What type of shift rotation was in use?
 - Where in the rotation were the personnel?
- For how many continuous hours had any involved personnel been working?

WHERE?

- Where did the condition occur?
- What were the physical conditions in the area?
- Where was the condition identified?
- Was location a factor in causing the condition?
 - Human factor?
 - Lighting?
 - Noise?
 - Temperature?
 - Equipment labeling?
 - Radiation levels?
 - Personal protective equipment required in the area?
 - Radiological protective equipment required in the area?
 - Accessibility?
 - Indication availability?
 - Other activities in the area?
 - What position is required to perform tasks in the area?
 - Equipment factor?
 - Humidity?
 - Temperature?
 - Cleanliness?

HOW?

- Was the condition an inappropriate action or was it caused by an inappropriate action?
 - An omitted action?
 - An extraneous action?
 - An action performed out of sequence?
 - An action performed to a too small of a degree? To a too large of a degree?
- Was procedure use a factor in the condition?

- Was there an applicable procedure?
- Was the correct procedure used?
- Was the procedure followed?
 - Followed in sequence?
 - Followed "blindly"--without thought?
- Was the procedure:
 - Legible?
 - Misleading?
 - Confusing?
 - An approved, current revision?
 - Adequate to do the task?
 - In compliance with other applicable codes and regulations?
- Did the procedure:
 - Have sufficient detail?
 - Have sufficient warnings and precautions?
 - Adequately identify techniques and components?
 - Have steps in the proper sequence?
 - Cover all involved systems?
 - Require adequate work review?

WHO?

- Which personnel:
 - Were involved with the condition?
 - Observed the condition?
 - Identified the condition?
 - Reported the condition?
 - Corrected the condition?
 - Mitigated the condition?
 - Missed the condition?
- What were:
 - The qualifications of these personnel?
 - The experience levels of these personnel?
 - The work groups of these personnel?
 - The attitudes of these personnel?
 - Their activities at the time of involvement with the condition?
- Did the personnel involved:
 - Have adequate instruction?
 - Have adequate supervision?
 - Have adequate training?
 - Have adequate knowledge?
 - Communicate effectively?
 - Perform correct actions?
 - Worsen the condition?
 - Mitigate the condition?

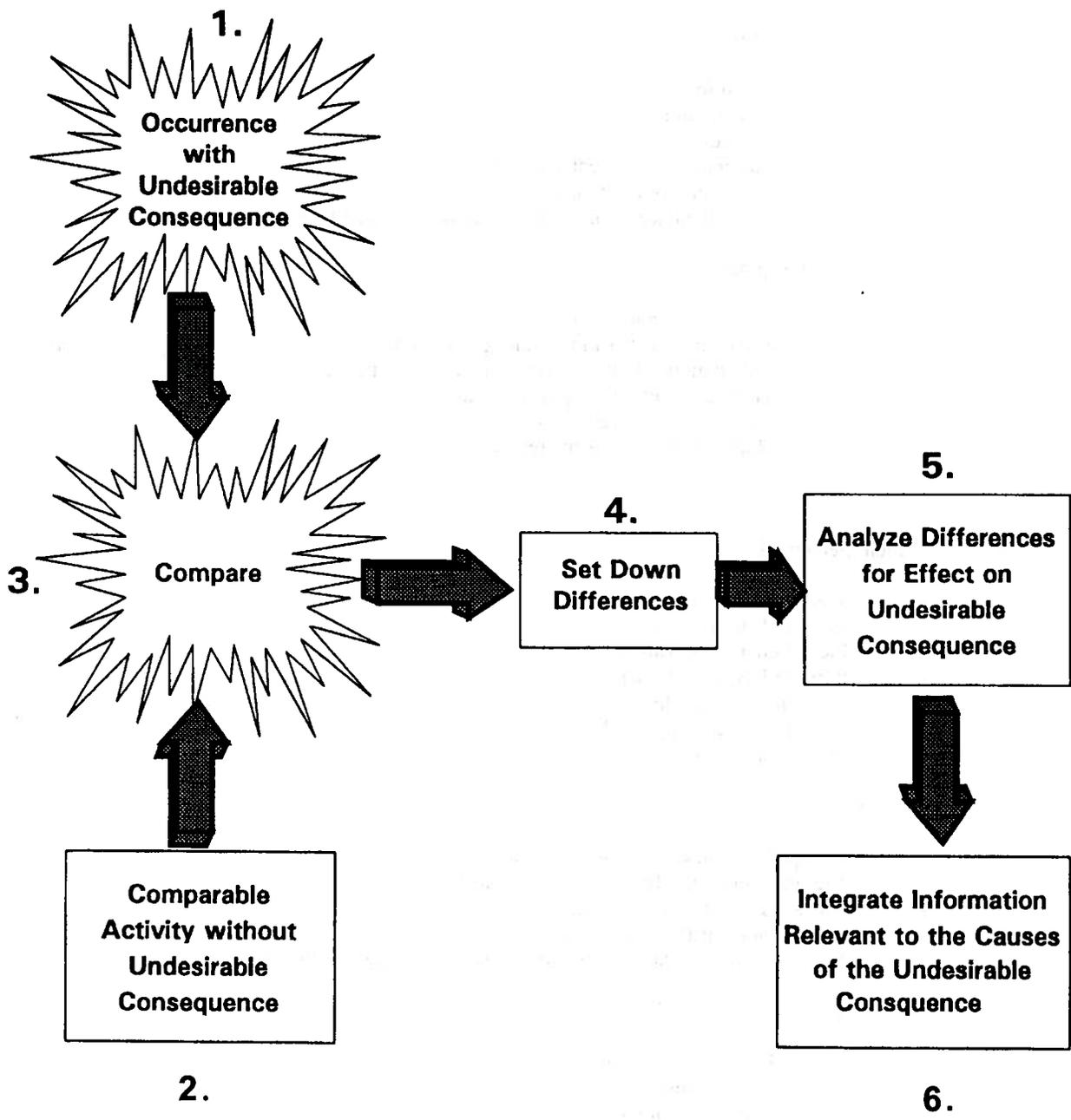


Figure E-1. Six Steps Involved in Change Analysis

Change Analysis Work Sheet

Change Factor	Difference/Change	Effect	Questions to Answer
What (Conditions, occurrence, activity, equipment)			
When (Occurred, identified, plant status, schedule)			
Where (Physical location, environmental conditions)			
How (Work practice, omission, extraneous action, out of sequence procedure)			
Who (Personnel involved, training, qualification, supervision)			

Figure E-2. Change Analysis Worksheet

APPENDIX F - BARRIER ANALYSIS

There are many things that should be addressed during the performance of a Barrier Analysis. NOTE: In this usage, a barrier is from Management Oversight and Risk Tree (MORT) terminology and is something that separates an affected component from an undesirable condition/situation. Figure F-1 provides an example of Barrier Analysis. The questions listed below are designed to aid in determining what barrier failed, thus resulting in the occurrence.

What barriers existed between the second, third, etc. condition/situation and the second, third, etc. problems?

If there were barriers, did they perform their functions? Why?

Did the presence of any barriers mitigate or increase the occurrence severity? Why?

Were any barriers not functioning as designed? Why?

Was the barrier design adequate? Why?

Were there any barriers in the condition/situation source(s)? Did they fail? Why?

Were there any barriers on the affected component(s)? Did they fail? Why?

Were the barriers adequately maintained?

Were the barriers inspected prior to expected use?

Why were any unwanted energies present?

Is the affected system/component designed to withstand the condition/situation without the barriers? Why?

What design changes could have prevented the unwanted flow of energy? Why?

What operating changes could have prevented the unwanted flow of energy? Why?

What maintenance changes could have prevented the unwanted flow of energy? Why?

Could the unwanted energy have been deflected or evaded? Why?

What other controls are the barriers subject to? Why?

Was this event foreseen by the designers, operators, maintainers, anyone?

Is it possible to have foreseen the occurrence? Why?

Is it practical to have taken further steps to have reduced the risk of the occurrence?

Can this reasoning be extended to other similar systems/components?

Were adequate human factors considered in the design of the equipment?

What additional human factors could be added? Should be added?

Is the system/component user friendly?

Is the system/component adequately labeled for ease of operation?

Is there sufficient technical information for operating the component properly? How do you know?

Is there sufficient technical information for maintaining the component properly? How do you know?

Did the environment mitigate or increase the severity of the occurrence? Why?

What changes were made to the system/component immediately after the occurrence?

What changes are planned to be made? What might be made?

Have these changes been properly, adequately analyzed for effect?

What related changes to operations and maintenance have to be made now?

Are expected changes cost effective? Why? How do you know?

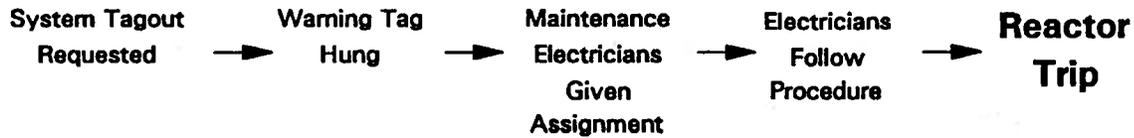
What would you have done differently to have prevented the occurrence, disregarding all economic considerations (as regards operation, maintenance, and design)?

What would you have done differently to have prevented the occurrence, considering all economic concerns (as regards operation, maintenance and design)?

Work Task: Clean Relay Contact

Occurrence: Reactor Trip

Sequence of Events:



Barriers Analysis:



<p>MWR requests de-energizing two panels so relays can be cleaned. Operations will only allow one panel at a time to be tagged out. Electrical foreman told and agrees.</p>	<p>Tag hung on P689 - only P690 is still energized.</p>	<p>Electricians given MWR to work, which references a Maint. Procedure, but not told of change in scope by foreman.</p>	<p>Electricians go to P690 and begin procedure. Procedure has no step to verify dead power supply before starting. They open first relay and plant trips.</p>	<p>Electricians never trained to always check power supply prior to working on electrical equipment.</p>
<p>Barrier Holds</p>	<p>Barrier Holds</p>	<p>Barrier Fails</p>	<p>Barrier Fails</p>	<p>Barrier Fails</p>

Figure F-1. Examples of Barrier Analysis

APPENDIX G - MANAGEMENT OVERSIGHT AND RISK TREE (MORT) ANALYSIS

A Mini-MORT analysis chart is shown in Figure G-1. This chart is a checklist of what happened (less-than-adequate specific barriers and controls) and why it happened (less-than-adequate management). To perform the MORT analysis:

1. Identify the problem associated with the occurrence and list it as the top event.
2. Identify the elements on the "what" side of the tree that describe what happened in the occurrence (what barrier or control problems existed).
3. For each barrier or control problem, identify the management elements on the "why" side of the tree that permitted the barrier control problem.
4. Describe each of the identified inadequate elements (problems) and summarize your findings.

These findings can then be related to the ORPS cause codes using the worksheets in Appendix B. For critical self-assessment (not an ORPS requirement), the findings can also be related to MORT elements given in Figure G-2, MORT Based Root Cause Analysis Form. To do this, enter the findings in the left-hand column. Next, select the MORT elements from the top of the root cause form that most closely relate to the finding by placing a check in the column below the MORT elements and on the same line where the finding is listed (more than one element can be related to a single finding.) Then, sum the number of checks under each MORT element (the sum can be entered at the bottom of the page even though there is no place designated on the form). The relative number of checks under each MORT element (the sum of all the findings) is a measure of how widespread the element inadequacy is. The results guide the specific and generic corrective actions.

A brief explanation of the "what" and "why" may assist in using mini-MORT for causal analyses.

When a target inadvertently comes in contact with a hazard and sustains damage, the event is an accident. A hazard is any condition, situation, or activity representing a potential for adversely affecting economic values or the health or quality of people's lives. A target can be any process, hardware, people, the environment, product quality, or schedule--anything that has economic or personal value.

What prevents accidents or adverse programmatic impact events?

- Barriers that surround the hazard and/or the target and prevent contact or controls and procedures that ensure separation of the hazard from the target
- Plans and procedures that avoid conflicting conditions and prevent programmatic impacts.

In a facility, what functions implement and maintain these barriers, controls, plans, and procedures?

- Identifying the hazards, targets, and potential contacts or interactions and specifying the barriers/controls that minimize the likelihood and consequences of these contacts
- Identifying potential conflicts/problems in areas such as operations, scheduling, or quality and specifying management policy, plans, and programs that minimize the likelihood and consequences of these adverse occurrences
- Providing the physical barriers: designing, installation, signs/warnings, training or procedures

- Providing planning/scheduling, administrative controls, resources, or constraints
- Verifying that the barriers/controls have been implemented and are being maintained by operational readiness, inspections, audits, maintenance, and configuration/change control
- Verifying that planning, scheduling, and administrative controls have been implemented and are adequate
- Policy and policy implementation (identification of requirements, assignment of responsibility, allocation of responsibility, accountability, vigor and example in leadership and planning).

Cause definitions used with this method are similar to those in DOE Order 5000.3A:

A cause (causal factor) is any weakness or deficiency in the barrier/control functions or in the administration/management functions that implement and maintain the barriers/controls and the plans/procedures.

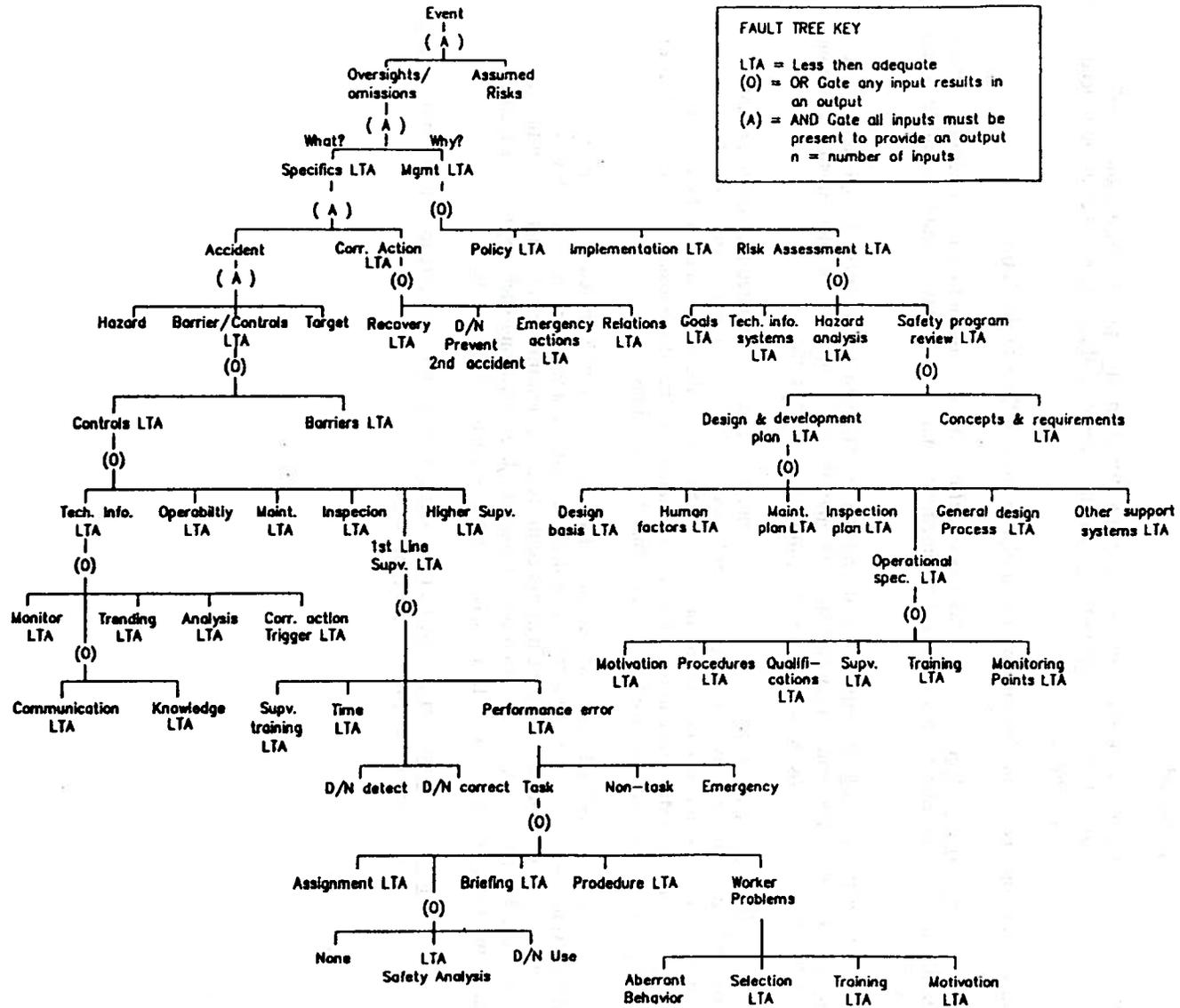
A causal factor chain (sequence or series) is a logical hierarchal chain of causal factors that extends from policy and policy implementation through the verification and implementation functions to the actual problem with the barrier/control or administrative functions.

A direct cause is a barrier/control problem that immediately preceded the occurrence and permitted the condition to exist or adverse event to occur. Since any element on the chart can be an occurrence, the next upstream condition or event on the chart is the direct cause and can be a management factor. (Management is seldom a direct cause for a real-time loss event such as injury or property damage but may very well be a direct cause for conditions.)

A root cause is the fundamental cause which, if corrected, will prevent recurrence of this and similar events. This is usually not a barrier/control problem but a weakness or deficiency in the identification, provision, or maintenance of the barriers/controls or the administrative functions. In the context of DOE Order 5000.3A, a root cause is ordinarily control-related involving such upstream elements as management and administration. In any case, it is the original or source cause.

A contributing cause is any cause that had some bearing on the occurrence, on the direct cause, or on the root cause but is not the direct or the root cause.

Figure G-1. Mini-MORT Analysis Chart



FAULT TREE KEY
 LTA = Less then adequate
 (O) = OR Gate any input results in an output
 (A) = AND Gate all inputs must be present to provide an output
 n = number of inputs

APPENDIX H - HUMAN PERFORMANCE EVALUATION

- a. Input detection
- b. Input understanding
- c. Action selection
- d. Action execution.

Facility and equipment operability, procedures and documentation, and management attitudes are all part of the work environment that needs to be evaluated for each of these steps. Common problems that need to be considered are:

- Cognitive overload
- Cognitive underload/boredom
- Habit intrusion
- Lapse of memory/recall
- Spatial misorientation
- Mindset/preconceived idea
- Tunnel vision or lack of big picture
- Unawareness
- Wrong assumptions made
- Reflect/instinctive action
- Thinking and actions not coordinated
- Insufficient degree of attention applied
- Shortcuts evoked to complete job
- Complacency/lack of perceived need for concern
- Confusion
- Misdiagnosis
- Fear of failure/consequences
- Tired/fatigued.

Where high risk is very sensitive to noncompliance with requirements, each of the human performance factors should be considered in order to achieve a high degree of reliability. These factors also should be considered in system design/control and operator training, as well as causal factor determination and corrective action decisions.

CONCLUDING MATERIAL

Review Activity:

DOE
DP
EH
EM
NE
ER
EM
NE
ER

Field Offices

AL
CH
ID
NV
OAK
OH
OR
RF
RL
SR

Preparing Activity:

DOE-EH-52

Project Number:

6910-0060

G. Identify the corrective action for each cause.

H. Evaluate each corrective action and corrective action alternative using the following questions:

- 1. Will the corrective action prevent recurrence?**
- 2. Is the corrective action feasible?**
- 3. Does the corrective action allow meeting primary objectives or mission?**
- 4. Does the corrective action introduce new risks? Are the assumed risks clearly stated?**
- 5. Were the immediate actions taken appropriate and effective?**
- 6. Will the corrective actions address all the causes?**
- 7. What are the consequences of implementing the corrective actions?**
- 8. What are the consequences of not implementing the corrective actions?**
- 9. What is the cost of implementing the corrective actions (capital costs, operations, and maintenance costs)?**
- 10. Will training be required as part of the implementation?**
- 11. In what time frame can the corrective actions reasonably be implemented?**
- 12. What resources are required for successful development of the corrective actions?**
- 13. What resources are required for successful implementation and continued effectiveness of the corrective actions?**
- 14. What impact will the development and implementation of the corrective actions have on other work groups?**
- 15. Is the implementation of the corrective actions measurable?**

I. Choose corrective action(s).

J. Identify the consequence of implementing the corrective action(s).

1. Equipment/Material Worksheet

Applicable

Not Applicable

Why was "Equipment/Material" a Cause?

Rate each subcategory cause:

D = Direct Cause

C = Contributing Cause

R = Root Cause

Equipment/Material Problem Subcategories	I	II	III	IV
1A = Defective or Failed Part				
1B = Defective or Failed Material				
1C = Defective Weld, Braze, or Soldered Joint				
1D = Error by Manufacturer in Shipping or Marking				
1E = Electrical or Instrument Noise				
1F = Contamination				

Cause Descriptions:

Recommended Corrective Actions:

2. Procedure Worksheet

Applicable

Not Applicable

Why was "Procedures" a Cause?

Rate each subcategory cause:

D = Direct Cause

C = Contributing Cause

R = Root Cause

Procedure Problem Subcategory	I	II	III	IV
2A = Defective or inadequate Procedure				
2B = Lack of Procedure				

Cause Descriptions:

Recommended Corrective Actions:

3. Personnel Error Worksheet

Applicable

Not Applicable

Why was "Personnel Error" a Cause?

Rate each subcategory cause:

- D = Direct Cause
- C = Contributing Cause
- R = Root Cause

Personnel Error Subcategory	I	II	III	IV
3A = Inadequate Work Environment				
3B = Inattention to Detail				
3C = Violation of Requirement or Procedure				
3D = Verbal Communication Problem				
3E = Other Human Error				

Cause Description:

Recommended Corrective Actions:

4. Design Problem Worksheet

Applicable

Not Applicable

Why was "Design" a Cause?

Rate each subcategory cause:

D = Direct Cause

C = Contributing Cause

R = Root Cause

Design Problem Subcategories	I	II	III	IV
4A = Inadequate Man-Machine Interface				
4B = Inadequate or Defective Design				
4C = Error in Equipment or Material Selection				
4D = Drawing, Specification, or Date Errors				

Cause Descriptions:

Recommended Corrective Actions:

5. Training Deficiency Worksheet

Applicable

Not Applicable

Why was "Training Deficiency" a Cause?

Rate each subcategory cause:

D = Direct Cause

C = Contributing Cause

R = Root Cause

Training Deficiency Subcategories	I	II	III	IV
5A = No Training Provided				
5B = Insufficient Practice or Hands-On Experience				
5C = Inadequate Content				
5D = Insufficient Refresher Training				
5E = Inadequate Presentation or Materials				

Cause Descriptions:

Recommended Corrective Actions:

6. Management Problem Worksheet

Applicable

Not Applicable

Why was "Management Problem" a Cause?

Rate each subcategory cause:

- D = Direct Cause
- C = Contributing Cause
- R = Root Cause

Management Problem Subcategories	I	II	III	IV
6A = Inadequate Administrative Control				
6B = Work Organization/Planning Deficiency				
6C = Inadequate Supervision				
6D = Improper Resource Allocation				
6E = Policy Not Adequately Defined, Disseminated, or Enforced				
6D = Other				

Cause Descriptions:

Recommended Corrective Actions:

7. External Phenomena Worksheet

Applicable

Not Applicable

Why was "External Phenomena" a Cause?

Rate each subcategory cause:

D = Direct Cause

C = Contributing Cause

R = Root Cause

External Phenomena Subcategories	I	II	III	IV
7A = Weather or Ambient Condition				
7B = Power Failure or Transient				
7C = External Fire or Explosion				
7D = Theft, Tampering, Sabotage, Vandalism				

Cause Descriptions:

Recommended Corrective Actions:

Worksheet Summary

Problem/Deficiency Category		Direct Cause	Root Cause	Contributing Cause
Operational Readiness Problem	Equipment/ Material Problem			
	Procedure Problem			
	Personnel Error			
Management/Field Bridge Problem	Design Problem			
	Training Deficiency			
Management Problem				
External Phenomenon				

Cause Description:

Corrective Actions:

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**STATE OF NEW MEXICO
BEFORE THE ENVIRONMENTAL IMPROVEMENT BOARD**

**IN THE MATTER OF PROPOSED REPEAL AND
REPLACEMENT OF 20.2.7 NMAC – *EXCESS EMISSIONS
DURING MALFUNCTION, STARTUP, SHUTDOWN,
OR SCHEDULED MAINTENANCE***

No. EIB 08-16(R)

**STATE OF NEW MEXICO
BEFORE THE ENVIRONMENTAL IMPROVEMENT BOARD**

**IN THE MATTER OF PROPOSED REVISIONS
TO 20.2.70 NMAC – *OPERATING PERMITS***

No. EIB 08-07(R)

DIRECT TESTIMONY OF RICHARD GOODYEAR

I. INTRODUCTION

The purpose of my testimony is to give the Board an explanation for the permitting provisions of 20.2.7 NMAC and the related changes in 20.2.70 NMAC. In 20.2.7 NMAC, the Department proposes a new section that requires sources to include in permits their emissions during startup, shutdown, and scheduled maintenance, or to obtain permits if counting those emissions would require a new or different permit. In 20.2.70 NMAC, the Department proposes changes that eliminate duplicative reporting requirements and conform with federal regulations.

1 **II. 20.2.7 NMAC**

2 **A. EPA POLICY REGARDING EMISSIONS DURING STARTUP,**
3 **SHUTDOWN, AND MAINTENANCE**
4

5 Previous witnesses have testified about EPA's policy regarding emissions during
6 startup, shutdown, and scheduled maintenance.

7 In general, startup and shutdown of process equipment are part of
8 the normal operation of a source and should be accounted for in the
9 planning, design, and implementation of operating procedures for
10 the process and control equipment.

11
12 NMED Exhibit 14. In September 2004, EPA advised the Department that it could not
13 automatically exempt these emissions. NMED Exhibit 15. More recently, EPA stated its
14 expectation that these emissions must be expressly addressed in Title V operating
15 permits, or those permits may be rejected.

16 We will also consider objecting to any Title V permit tht can be
17 interpreted to exempt SSM emissions from regulation in the
18 NSR/PSD permit (startup, shutdown, and maintenance emissions
19 are not "unplanned and [un]avoidable...the facility should be able
20 to analyze it's history of startup, shutdown, and maintenance
21 events and be able to project these activities and estimate the
22 emissions and what can be done to control them." Every effort
23 should be made by the permittee to minimize SSM emissions
24 during such activities, and these SSM terms/conditions should be
25 appropriately accounted for in the permit.

26
27 NMED Exhibit 17.

28
29 EPA's policy and these statements regarding Title V permits are applicable to
30 startup, shutdown, and maintenance emissions in all permitting contexts. Emissions
31 during startup, shutdown, and maintenance are foreseeable and predictable, and should be
32 included in state construction permits as well. Moreover, to the extent that sources have
33 not obtained a notice of intent or permit by excluding these emissions, they must
34 reevaluate their emission profile to determine the appropriate regulatory mechanism.

1 **B. SECTION 14 - DETERMINATION AND REQUIREMENTS**
2 **REGARDING STARTUP, SHUTDOWN, AND MAINTENANCE**

3
4 The Department's proposal to incorporate emissions during startup, shutdown, and
5 maintenance into the appropriate permits is described in Section 14, entitled
6 "Determination and Requirements Regarding Emissions During Startup, Shutdown, and
7 Maintenance." NMED Exhibit 1. As I stated earlier, this section is necessary because
8 the rule is being clarified to reflect that these emissions are *per se* violations of the
9 applicable permits and regulations, and sources cannot expect to receive an automatic
10 exemption or be granted an affirmative defense. Consequently, these sources need a
11 mechanism to add these emissions to their existing permits.

12 In developing the section 14 mechanism, the Department was mindful of the need
13 to balance the historical treatment of these emissions in the permitting context with the
14 expected administrative burden. As a result, section 14 encourages sources to report
15 these emissions by granting a limited amnesty from liability. The Department will use
16 the reports to prioritize the permitting process for sources requiring permit modifications
17 or new permits, including PSD permits which require time-intensive BACT reviews.
18 Because the Department has not historically included these emissions in permits, it is
19 possible that dozens or even hundreds of sources will require permitting actions, and the
20 Department needs time to organize and implement the administrative process.

21 I will now explain the mechanics of Section 14. Paragraph A establishes a two-
22 step process for sources to evaluate their compliance status regarding startup, shutdown,
23 and maintenance emissions. In the first step, sources must determine whether their
24 emissions were authorized in a previous permitting action. Sources may presume such
25 consideration and authorization if reflected by the record or the imposition of BACT

1 requirements in PSD permits. Sources that cannot invoke the presumption may make
2 their determination by another reliable method. In the second step, sources that have
3 determined that their startup, shutdown, and maintenance emissions were not authorized
4 by the Department must determine whether the inclusion of those emissions with their
5 permitted emissions would require a different permit than the current one. Sources must
6 complete both steps of this process no later than six (6) months after the effective date of
7 the proposed rule.

8 Paragraph B establishes a two-track process depending on the determination made
9 by sources under paragraph A. Paragraph B(1) describes the first track, which applies to
10 sources who determined that their startup, shutdown, and maintenance emissions were
11 authorized or, if not authorized, would not require a different permit, or which were
12 permitted under the general construction permit rules. For these sources, the Department
13 will require a plan to identify and implement operational practices that minimize
14 emissions. As previously noted by Debra McElroy, minimizing emissions during startup,
15 shutdown, and maintenance is a good air pollution control practice, and we want sources
16 to be proactive in their efforts to prevent and abate air pollution.

17 Paragraph B(2) describes the second track, which applies to sources who
18 determined that their startup, shutdown, and maintenance emissions were not authorized,
19 and whose inclusion with permitted emissions would trigger the requirement for a
20 different permit. Because the Department cannot be sure how many sources must follow
21 this track, the Department proposes a simple notification process. The notification must
22 include an estimate of emissions by pollutant and the type of permitting actions.

1 With respect to paragraph B(2), in response to public comments, the Department
2 proposes to clarify that the notification requirement also applies to sources that do not
3 currently have a notice of intent or permit. The previous wording could have been read
4 to exclude these sources, which would not be consistent with the intent of the section.

5 To facilitate the second track process, paragraph B(3) provides a limited amnesty
6 to sources for alleged violations of the permitting requirement. It is possible that,
7 depending on the number and complexity of facilities requiring permits, the Department
8 may need a year or more to establish a filing schedule, arrange for the appropriate
9 resources to complete the work, and process the permit applications. During this time,
10 the Department believes that it would be reasonable and appropriate for sources to
11 continue their operations without facing liability for permitting violations related to
12 startup, shutdown, and maintenance emissions. The amnesty applies only if the source
13 timely submits the permit application, complies with information requests, and
14 establishes work practice standards to minimize startup, shutdown, and maintenance
15 emissions. It is important to note that this amnesty does not apply to startup, shutdown,
16 and maintenance emissions, only the permitting requirement. Moreover, only the
17 Department is bound by the amnesty. At EPA's request, the language of paragraph
18 B(3)(b)(iii) has been qualified to exclude EPA and other parties. EPA made this request
19 after the Department submitted the revised rule on March 31, 2008, so this change is
20 reflected in the version attached to the Department's notice of intent. The Department
21 also clarifies the reference to "such source" by citing the applicable paragraph.

22 Finally, the Department provides one additional benefit for sources having to
23 permit their startup, shutdown, and maintenance emissions. Because the Department's

1 proposed rule clarifies the obligation to report these emissions, a significant increase in
2 reporting is possible. However, because the Department has limited resources, and
3 because by definition these emissions would not qualify for an affirmative defense,
4 sources must submit only the final report required by section 110. This benefit applies
5 only until the source obtains a new permit, at which time the Department anticipates that
6 these emissions either would be authorized or subject to the full reporting requirements of
7 the proposed rule.

8 **III. 20.2.70 NMAC**

9 The Department proposes to amend three (3) sections of Part 70, the operating
10 permit regulation. NMED Exhibit 2. First, the Department proposes to amend section
11 302.E(2) to conform with the federal requirement in 40 CFR §70.6(a)(3)(iii)(B). After
12 fourteen (14) years of experience with the Title V program, the Department believes that
13 not all deviations from Title V permit conditions warrant the expeditious reporting
14 required by 20.2.7 NMAC. The amendment would require Title V sources to report
15 deviations every six (6) months as part of the monitoring reports required by Title V
16 permits. Because most, if not all, Title V sources also have state construction permits
17 under Part 72, the violation of a permitted emission limit still must be reported under
18 20.2.7 NMAC, so the elimination of this language does not create a material distinction
19 in the obligations of Title V and non-Title V sources.

20 The Department also proposes to amend section 304.B(4) to conform with the
21 federal requirement in 40 CFR §70.6(g)(2)(iv). The federal regulation requires Title V
22 sources to notify the Department regarding an emergency no later than two (2) days after

1 the violation an emission limitation. The existing language in section 304.B(4) conflicts
2 with this requirement, and has been reworded to repeat verbatim the federal regulation.

3 Finally, the Department proposes two amendments that are not directly related to
4 excess emissions, but the Department wants to take advantage of this hearing to make
5 minor corrections. First, the Department proposes to amend section 403 to conform with
6 the express language of the Air Quality Control Act. Second, the Department proposes to
7 change the citation in Section 302.G(2) from Section 300.D(12) to 300.D(11), because
8 there is no subsection 12 in 300.D and subsection 11 is the correct reference.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 6

**1445 ROSS AVENUE, SUITE 1200
DALLAS, TX 75202-2733**

APR 30 2008

Ms. Mary Uhl
Bureau Chief
Air Quality Bureau
New Mexico Environment Department (NMED)
1301 Siler Road, Building B
Santa Fe, NM 87507

Dear Ms. Uhl:

We are writing this letter in support of the proposed revisions to the New Mexico Administrative Code, Title 20, Chapter 2, Part 7 regulation, dated March 25, 2008, concerning Excess Emissions. After review of the proposed rule, Region 6 would like to offer the following comments on the proposed revisions.

EPA Region 6 fully supports the proposed addition of 20.2.7.113 NMAC titled "Root Cause and Corrective Action Analysis." A root cause analysis, by definition, causes a company to identify the underlying reason(s) for an excess emission event providing the basis for preventing a similar event from occurring in the future. Since excess emissions are violations, a root cause analysis and corrective action plan should provide additional assurance to NMED and the public that a source is taking the necessary steps to improve performance. We have found that the root cause analysis provisions contained in the consent decrees of EPA's National Petroleum Refinery Initiative have been effective in reducing the amount of excess sulfur dioxide emissions at petroleum refineries.

In addition, we believe the addition of a root cause analysis section to the Excess Emissions rule will have the following added benefits: a) the root cause analysis will serve as a framework for the decision-making process associated with the review of excess emissions reports; b) NMED field personnel will know what information to ask or look for, and the owner or operator will know what information he/she is expected to make available when asserting an affirmative defense to a specific excess emissions scenario; c) the NMED can more efficiently tailor its resources to larger or more frequent excess emissions releases for better protection of air quality; d) having sector or location-specific action plans in place for certain pollutants (e.g., plans devised to minimize releases of ozone precursors often associated with the oil and gas operations in the Four Corners area) could assist the area from slipping into nonattainment for ozone, particularly with the recent Federal adoption of a more stringent ozone standard; and e) implementing such measures should bring in consistency and transparency to the review process associated with excess emissions reports.

With respect to the proposed addition of 20.2.7.14 NMAC titled "Determination and Requirements Regarding Emissions During Startup, Shutdown, and Maintenance," we applaud NMED's efforts to ensure that all emissions from a source are properly permitted, including routine emissions occurring during periods of startup, shutdown, and maintenance activities. The requirement for all sources to establish, maintain, and implement a plan to minimize emissions during startup, shutdown, and scheduled maintenance should be especially useful for reducing unnecessary emissions during these periods. The rule should require the plans to include emission limitations or other enforceable limitations on operations. We understand that the goal of NMED is to incorporate such plans into source permits in a manner that ensures that the plan requirements are enforceable both as a legal and practical matter. To that end, we would like to discuss with NMED how it intends to accomplish these goals as it implements the new rule.

From our discussions with your staff, we understand that a number of sources may need to apply for and obtain a different type of air permit due to emissions associated with startup, shutdown and maintenance; however, we are concerned that the proposed language of 20.2.7.14.B.1.b.iii, NMAC could be interpreted as providing an exemption from compliance for situations that would otherwise constitute a violation. EPA does not believe it can approve such a limitation on NMED's enforcement authority. We see two options for addressing this problem: (1) removal of this provision from the rule; or (2) rewording the provision to provide for an affirmative defense for the limited purpose and period of time contemplated by the original proposal. Alternative language, which may be considered acceptable, would include changing 20.2.7.14.B.3.b.iii to read:

"In any action brought by the department for excess emissions occurring during the pendency of the authorization, the owner or operator of such source may assert an affirmative defense to a claim for civil penalties only, due to not having originally filed the correct notice or obtained the correct permit under 20.2.73 NMAC – Notices of Intent and Emissions Inventory Requirements, or 20.2.72 NMAC – Construction Permits, 20.2.70 NMAC – Operating Permits, 20.2.74 NMAC – Permits – Prevention of Significant Deterioration (PSD), or 20.2.79 NMAC -- Permits – Nonattainment Areas, solely on the basis of excess emissions during startup, shutdown, and schedule maintenance. Nothing in this subsection shall be construed to affect the liability of a source for penalties or injunctive relief associated with excess emissions covered by 20.2.7.109 NMAC."

Should NMED decide to remove 20.2.7.14.B.3.b.iii, NMAC from the proposed rule, we offer our assistance to NMED as it creates policy or guidance related to the appropriate use of enforcement discretion.

Finally, we suggest the addition of the words "implemented or" into 20.2.7.113.A.2, NMAC of the proposed rule, so that the rule would read: "Analysis of the

the substitution of the word "identified" for "required" in 20.2.7.113.A.2.f. NMAC of the proposed rule, so that the rule would read: "If one or more corrective actions are *identified*, a schedule" We feel these changes support the intent of the rule and strengthen it.

Thank you for the opportunity to provide comments on this proposed rule and we look for to working with you to ensure its implementation is consistent with both state and federal law. Should you have any questions regarding this letter, please feel free to contact me at (214) 665-7242, or Mr. Alan Shar at (214) 665-6691.

Sincerely,

A handwritten signature in black ink, appearing to read "Guy Donaldson", written in a cursive style.

Guy Donaldson
Chief
Air Planning Section