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## ENVIRONMENTAL REGULATION

### DIVISION OF POLLUTION PREVENTION AND RELEASE PREVENTION

Toxic Catastrophe Prevention Act Program

Readoption with Amendments: N.J.A.C. 7:31

Adopted Repeal: N.J.A.C. 7:31-1.11

Proposed: February 18, 2003 at 35 N.J.R. 935(a)

Adopted: July 7, 2003 by Bradley M. Campbell, Commissioner,  
Department of Environmental Protection.

Filed: July 14, 2003 as R.2003 d. 335, **with substantive and technical changes** not requiring additional public notice and comment (see N.J.A.C. 1:30-6.3).

Authority: N.J.S.A. 13:1K-19 et seq., 13:1D-9, 13:1B-3 and 26:2C-1 et seq.

DEP Docket Number: 02-03-01/325

Effective Date: July 14, 2003, Readoption;

August 4, 2003, Amendments.

Expiration Date: July 14, 2008.

On February 18, 2003, the Department of Environmental Protection (Department) proposed to readopt, with amendments, N.J.A.C. 7:31, the Toxic Catastrophe Prevention Act (TCPA) program rules, which were scheduled to expire on June 16, 2003 in accordance with Executive

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Order No. 66 (1978). The proposed readoption contained amendments that (1) add reactive hazard substances and Liquefied Petroleum Gas (LPG) to the list of extraordinarily hazardous substances (EHSs) regulated under the TCPA rules; (2) replace the current penalty table with an expanded version that lists individual categories of offense; (3) reinstate some program requirements that were eliminated during the 1998 readoption; and (4) clarify existing rule requirements.

As a result of the comments received regarding the listing of LPG as flammable EHSs and the LPG regulations adopted by the Department of Community Affairs in April, 2003 and published in the May 19, 2003 New Jersey Register at 35 N.J.R. 2187(a), the Department has determined that additional regulation under the TCPA program is unnecessary. Therefore, the Department has not adopted the proposed changes at N.J.A.C. 7:31-6.3(a) Table I, Part C.

The goal of the TCPA program is to protect the public from catastrophic accidents that could cause death or permanent disability to citizens beyond the property boundary. The TCPA, N.J.S.A. 13:1K-19, requires owners and operators using, manufacturing, storing or handling EHSs in quantities that meet or exceed threshold quantities to anticipate the circumstances that could result in EHS accidents and to take precautionary or preemptive measures to prevent these accidents. The TCPA rules at N.J.A.C. 7:31 contain the requirements for developing and implementing risk management programs to reduce the risk of accidental releases to the environment.

**Summary** of Hearing Officer's Recommendations and Agency Responses:

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On March 17, 2003, a public hearing was held in the Department's hearing room at 401 E. State Street in Trenton, New Jersey to provide interested parties the opportunity to comment on the proposal. Notice of the public hearing was published with the proposal in the February 18, 2003 New Jersey Register at 35 N.J.R. 935. Additional notice was published in the Trenton Times on February 12, 2003 and the Newark Star-Ledger on February 14, 2003. Notice was also posted on the Department's web site and the web site of the New Jersey Press Association. Notice was also telefaxed or hand delivered to newspaper reporters from around the state who have offices at the Statehouse. Also, on February 10, 2003, notice of the proposal and the public hearing was electronically mailed to the participants of the workgroup convened by the Department to assist in developing the proposed rules. Notice of the proposal and public hearing was sent by regular mail to current TCPA registrants on February 13, 2003. The comment period for submittal of written comments closed on April 21, 2003.

Allan Edwards, Director of the Division of Pollution Prevention and Release Prevention, served as the hearing officer for the public hearing. Ten persons presented oral comments at the public hearing; seven of these persons also submitted written comments to the Department. Thirty-five additional persons submitted written comments on the proposal before the April 21, 2003 close of the comment period. After reviewing the oral and written testimony received, the hearing officer recommended that the proposal be adopted with the amendments described in the Summary of Public Comments and Agency Responses below. The hearing record is available for inspection in accordance with applicable law by contacting Office of Legal Affairs, Department of Environmental Protection, Attn: DEP Docket No. 02-03-01/325, P.O. Box 402, Trenton, New Jersey 08625-0402.

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On May 13, 2003, a meeting was held with industry representatives that was attended by the Commissioner of the Department , the Assistant Commissioner for Environmental Regulation, and the Director of the Division of Pollution Prevention and Release Prevention. Representatives of the Chemistry Council of New Jersey, Reckitt Banckiser, and Church & Dwight Company, Inc. further explained their written comments, submitted to the Department during the comment period, concerning the impacts of regulating liquefied petroleum gases (LPG) on companies manufacturing and distributing aerosol consumer products. This meeting was followed by a letter from the Chemistry Council of New Jersey, dated May 27, 2003, memorializing the meeting. This letter is included in the administrative record for this rulemaking.

#### Summary of Public Comments and Agency Responses:

The commenters were as follows:

1. John Anderson
2. Alan Bahl, Sensient Technologies Corporation
3. Rick Bay, Reckitt Banckiser
4. Mark Conish, Church and Dwight Co. Inc.
5. Marie Curtis, NJ Environmental Lobby
6. Albert Dealmagro, Utility Workers Union of America Local 534
7. Mark Dudzic, Paper, Allied- Industrial, Chemical and Energy Workers
8. Fitzroy A Dyer, Church and Dwight Co. Inc.
9. Rick Engler, NJ Work Environment Council
10. Douglas Fratz, Consumer Specialty Products Association

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11. William A. Frauenheim, Diversified CPC International, Inc.
12. Eric Frumin, Union of Needle Trades, Industrial and Textile Employees
13. Amy Goldsmith, NJ Environmental Federation
14. Curt Greder, International Brotherhood of Teamsters Local 877
15. Peter Guzzo, Consumers For Civil Justice
16. Helen L. Gregory, GEO Specialty Chemicals
17. Peter Paul Howell, Mark V, Inc.
18. Peter R. Jordan, MBD Risk Management Services
19. Carla Katz, CWA Local 1034
20. David LeGrande, Communication Workers of America
21. Peter Montague, Environmental Research Foundation
22. Dena Mottola, NJ Public Interest Research Group
23. Jane Nogaki, NJ Environmental Federation
24. John Pajak, Teamsters Local #877
25. Becky Plattus, PACE Northeast Area Resource Center
26. Gerald V. Poje, U.S. Chemical Safety Board
27. David Pringle, Vote Environment Campaign
28. J. Lawrence Robinson, Color Pigments Manufacturers Assoc. Inc.
29. Richard S. Rosera, Dock Resins Corporation
30. Anthony Russo, Chemistry Council of NJ
31. B. Sachau
32. Harold A. Schaitberger, International Association of Firefighters
33. Jim Sinclair, NJ Business and Industry Association

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34. Michael Sprinker, International Chemical Workers Union Council
35. Nancy Tanner, DuPont Chemicals
36. Jeff Tittel, NJ Sierra Club
37. Robert E. Turkos, Daicolor-Pope, Inc.
38. D. F. Van Derveer, Green Tree Chemical Technologies, Inc.
39. Morgan Walker, Conoco-Phillips/Bayway Refinery
40. Joel S. Weissglass, Magruder Color Company
41. Charles Wowkanech, NJ State AFL-CIO
42. Michael J. Wright, United Steelworkers of America

The number(s) in parenthesis after each comment below corresponds to the commenter number above to indicate the person(s) who submitted the comment.

#### General Comments

1. COMMENT: One commenter stated that the Department failed to make a case in the proposal for exceeding the standards of the Federal Accidental Release Prevention Program.(33)

RESPONSE: The rule proposal and adoption contain a Federal Standards Analysis (see 35 N.J.R. 945-948; and below), which is an extensive comparison of the State and Federal accidental release prevention (ARP) programs. As required by the New Jersey Administrative Procedure Act, the Department has explained its rationale for every State TCPA requirement that is more stringent or broader in scope than the corresponding Federal requirement in 40 CFR 68. As discussed in the Federal Standards Analysis, many of the requirements that exceed Federal standards are mandated by the Toxic Catastrophe Prevention Act, which predates the Federal ARP program. Others, as discussed in the

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Federal Standards Analysis, are needed to effectively implement the TCPA program. Since the Federal rules were incorporated by reference with changes in 1998, the Department's experience has been that these requirements continue to be necessary to implement the TCPA program in New Jersey.

In addition to what the Federal Standards Analysis explains, the Department notes that the United States Chemical Safety and Hazard Investigation Board recommended in 2002 that the USEPA and OSHA should revise their regulations to address reactive hazards. The federal government had actually planned to do so; on May 14, 2001, OSHA published a "Unified Agenda" stating that it intended to publish an advance notice of proposed rulemaking to address the need to add reactive chemicals to the scope of its process safety management rules. On September 24, 2001, OSHA withdrew that item from its Unified Agenda due to resource constraints. In other words, the most recent guidance available from the federal government indicates that reactive chemicals should be addressed, but that the resources are not currently available to accomplish this.

2.COMMENT: One commenter expressed support of the current TCPA rule for safeguarding the public.(35)

RESPONSE: The Department acknowledges this comment in support of the rules.

3. COMMENT: Several commenters asked the Department to consider a rule allowing and encouraging an "employee representative" to accompany TCPA staff on field audits since employee involvement would enhance community protection.(5-7, 9, 12-15, 19-25, 27, 32, 34, 36, 41, 42) One of these commenters further stated that an employee representative can often explain issues in a manner that enhances the value and speed of an inspection.(34)

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RESPONSE: The Department acknowledges the commenter's suggestion and is currently considering various strategies for employee representation during TCPA audits. The Department does not believe a rule is necessary to allow or encourage employee representative participation in a TCPA audit.

#### Definitions

4. COMMENT: Several commenters suggested that the Department replace the definition of "functional group" at N.J.A.C. 7:31-1.5, and replace the term "functional group" at N.J.A.C. 7:31-6.2(g) and N.J.A.C. 7:31-6.3 Table I, Part D, Group II, with the more proper term "molecular structure". (5-7, 9, 12-15, 17, 19-25, 27, 32, 36, 41, 42)

RESPONSE: The term "functional group" is used throughout L. Brethrick's Handbook of Reactive Chemical Hazards (Sixth Edition, 1999), recognized as an authoritative source on reactive chemicals. In addition, the definition of functional group used at N.J.A.C. 7:31-1.5 is a standard organic chemistry textbook definition. The Department is satisfied that the term "functional group" conveys the appropriate meaning to those who will be using the rules and complying with the requirements.

5. COMMENT: Several commenters suggested that the Department clarify the definition of "heat of reaction" at N.J.A.C. 7:31-1.5 to state that the heat of reaction is equal to the heat energy of the reaction products minus the heat energy of the reactants. These commenters asked the Department to revise the symbol used for this term from  $\Delta H$  to  $\Delta H_R$  at N.J.A.C. 7:31-6.2(g). (5-7, 9, 12-15, 17, 19-25, 27, 32, 36, 41, 42)

RESPONSE: The Department concurs with the commenters. The  $\Delta H_R$  symbol and the revised definition of heat of reaction are common in technical literature and chemistry and engineering textbooks. The proposed definition of heat of reaction was written in language that will be understood



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by the general public. The adopted definition continues to include the original language but provides an alternative definition written in scientific terms. The adopted definition does not change the meaning or use of the term in the rule. Therefore, the Department has modified the definition of “heat of reaction” at N.J.A.C. 7:31-1.5 accordingly and has modified the heat of reaction symbol where it appears in the rules.

6. COMMENT: Several commenters asked the Department to add a definition of “heat of explosion” at N.J.A.C. 7:31-1.5 and suggested the language for this definition. (5-7, 9, 12-15, 17, 19-25, 27, 32, 36, 41, 42) One commenter explained the definition is needed to define the term as used in the Act.(17)

RESPONSE: The term “heat of explosion” does not appear in the Toxic Catastrophe Prevention Act; however, as it was used in the proposed rules at N.J.A.C. 7:31-6.3(b)2i, it appeared to be one of the analogous terms for heat of reaction. This provision has been revised on adoption to remove the specific types of heats of reaction (including heat of decomposition, heat of combustion, and heat of explosion) since only the amount of heat generated from the reactions is needed , rather than the reaction mechanism that caused the heat generation. Since the term “heat of explosion” is used only in the definition of “heat of reaction” at N.J.A.C. 7:31-1.5 as an example of a type of chemical reaction, a definition for it is not necessary.

7. COMMENT: Several commenters asked the Department to modify the proposed definition of “industrial complex” at N.J.A.C. 7:31-1.5 by adding “access” after “provide” in item 1 of the listed criteria. These commenters stated that an owner or operator of a stationary source within an industrial complex should be required to provide the owners and operators of the other stationary sources in the industrial complex with access to process hazard analysis with risk assessment reports and accident

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investigation reports, rather than requiring owners or operators to provide copies of the actual records.(8, 30, 35, 38, 39)

RESPONSE: The Department agrees that owners and operators of stationary sources within the industrial complex can be provided with “access to” required reports and records rather than be provided with copies of the actual records. However, since the purpose of the requirement is to ensure that the qualified person from each of the sources is aware of the risks associated with each of the other sources co-occupying the site, the Department is also modifying the definition of “industrial complex” on adoption to require an annual certification by each company co-occupying the industrial complex that the records and reports have been reviewed. This statement must be available for review by the Department at each source. These changes will ensure that the records and reports are reviewed, but lessens the paperwork burden of physically transferring the reports and records to the other owners and operators.

8. COMMENT: Several commenters requested that the Department delete the reference to two contiguous TCPA sources in the proposed definition of “industrial complex.” They contend that the Department indicated at the workgroup meetings that any two business units physically connected by location, regardless of whether they were TCPA covered sources, would be covered under this definition. (8, 16, 18, 30, 38, 39)

RESPONSE: The Department regrets any misunderstanding among workgroup members regarding the intent and scope of this provision. The intent, as stated in the summary of the proposal, was to allow two or more TCPA regulated sources and site co-occupants that were once part of a single company that formerly occupied the site, to use the original site boundary for fulfilling the State’s risk reduction and accident notification requirements. These companies are independent of the predecessor company and

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each other but they typically still continue to share common piping, equipment, utilities, security and emergency response personnel, site access, and history. Thus, the scope of this definition is intended to be very limited, as described in the proposal summary. The Department did not intend that every stationary source could use the property boundary of contiguous businesses rather than its own property boundary for purposes of these rules.

9. COMMENT: Several commenters asked the Department to clarify that employees of each of the individual TCPA sources in the industrial complex will have access to all TCPA information required to be developed for all stationary sources within the industrial complex including process hazard analysis with risk assessment reports and accident investigation records.(5-7, 9, 12-15, 19-25, 27, 32, 34, 36, 41, 42) One commenter stated that this information, which is crucial for avoiding injury and harm, is difficult for workers to obtain without a rule requiring it.(34)

RESPONSE: Item 2 of the definition of “industrial complex” at N.J.A.C. 7:31-1.5 requires that employees of each of the individual sources have access to the reports and information required to be developed under these rules. The owners and operators in industrial complexes are therefore obligated to share this information with employees of all TCPA sources co-occupying the industrial complex site.

10. COMMENT: Several commenters asked the Department to replace the wording of the proposed definition of “inherently safer technology” with the following suggested definition:

Inherently safer technology means “ a process which is designed to minimize or eliminate the potential for an EHS incident by utilizing techniques that include but are not limited to:

- 1) Minimizing the amount of EHS stored on site and used in a process;
- 2) Substituting a non-hazardous or less hazardous material for the EHS used in the process;

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3) Operating the process under less hazardous conditions (low temperature instead of high temperature, low pressure instead of high pressure);

4) Designing the process equipment so that it can contain the EHS under the worst case scenario (i.e. using a pressure vessel that has a Maximum Allowable Working Pressure (MAWP) that is greater than the highest pressure that can possibly be produced under the worst case condition). Designs of this type are much less susceptible to incidents caused by human errors.”

(5-7, 9, 12-15, 17, 19-25, 27, 32, 34, 36, 41, 42) One commenter said the suggested definition is more accurate. (17)

RESPONSE: The Department reviewed the proposed and suggested definitions and determined that “inherently safer technology” should be defined in terms of the principles or techniques that make a process safer, rather than the design of the process, as proposed, or the process itself, as suggested. The Department also reviewed the proposed and suggested lists of inherently safer technology techniques and found the four suggested techniques to be analogous to those in the proposed definition. The proposed definition was developed from several sources contained in process safety literature. Although the techniques listed in the suggested definition are more detailed, the Department does not agree that this definition is more accurate than the one proposed. The Department is, however, modifying the proposed definition on adoption to describe inherently safer technology in terms of the principles incorporated in a newly designed and constructed process.

11. COMMENT: Several commenters requested that the Department replace the term “new covered process” in the definition of “inherently safer technology” with “newly constructed process,” to clarify that an inherently safer technology evaluation would not be required for an existing process that becomes newly covered under TCPA because of the expansion of the EHS list.(8, 30, 38, 39) One

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commenter suggested that the term “new covered process” be replaced with “newly designed and constructed process”.(35)

RESPONSE: The Department agrees that a change to the “inherently safer technology” definition to “newly designed and constructed process” should be made to conform with the Department’s intent regarding “inherently safer technology” and has modified the definition at N.J.A.C. 7:31-1.5, accordingly. The proposed definition of “inherently safer technology” stated that this technology applied to “new covered processes.” The rule requirements for “new covered processes” are specified at N.J.A.C. 7:31-4.11 and apply to both newly constructed processes and to existing processes that will be placed into service using a new EHS. However, since the most reasonable and effective time for an owner or operator to evaluate inherently safer technology is during the design phase of a process before it has been built, the Department intended to apply this requirement only to newly constructed processes. Moreover, in technical literature the term “inherently safer technology” is often used interchangeably with the term “inherently safer design.” This supports the Department’s decision to limit the performance of the inherently safer technology evaluation to processes that are being newly designed. The Department has also modified on adoption N.J.A.C. 7:31-4.2(g) and the corresponding penalty in Table III at N.J.A.C. 7:31-11.4(c), item 259, to be consistent with the modified definition.

12. COMMENT: Several commenters questioned the Department’s use of the definition of “inherently safer technology” and asked how compliance with the definition and its requirements will be measured. These commenters stated that the burden should be on the facility to certify and verify safety to the satisfaction of the Department’s inspector and the Department should not mandate inherently safer technologies without consideration of cost and reduction of risks.(8, 16, 30, 38, 39)

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RESPONSE: The Department is requiring that the owner or operator designing and constructing a new process evaluate the process to determine the feasibility of incorporating inherently safer technologies into it. The Department intended owners or operators of newly designed and constructed processes to evaluate the risk reduction benefits of using such technologies in light of the costs of incorporating these technologies. In many cases any additional cost of incorporating inherently safer technologies during the design and construction phase will be offset by other factors such as enabling the owner or operator to purchase smaller amounts of hazardous materials and the need to comply with fewer regulations. The Department is not mandating that inherently safer technologies be incorporated into every newly designed process.

13. COMMENT: Several commenters asked the Department to delete item 2 in the proposed “inherently safer technology” definition at N.J.A.C. 7:31-1.5 regarding materials substitution with less hazardous substances. They stated that there are instances where substitution of materials is not feasible for maintaining product quality standards and could lead to enforcement action. (8, 30, 38, 39)

RESPONSE: The definition of “inherently safer technology” includes generally recognized principles for minimizing the potential for a catastrophic EHS release. Item 2, materials substitution of more hazardous substances with substances that present fewer hazards, is one such technique that would contribute to an inherently safer process. Therefore, item 2 cannot be deleted from the “inherently safer technology” definition. The Department recognizes that every technique will not be suitable for every process and will rely on the owner or operator’s evaluation of which techniques, if any, will be appropriate for a particular newly designed and constructed process.

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14. COMMENT: Several commenters questioned how the Department would measure during an audit whether an owner or operator met the requirements for a “state-of-the-art” evaluation of risk reduction opportunities and questioned how the Department would determine the cost effectiveness of implementing “state-of-the-art” risk reduction measures. (8, 16, 30, 38, 39)

RESPONSE: The Department will review the risk reduction plan in the process hazard analysis with risk assessment to determine the risk reduction options selected to reduce the risks associated with the process. Under N.J.A.C. 7:31-4.2(c), the owner or operator is required to perform a state-of-the-art evaluation and identify a list of available risk reduction measures. The owner or operator must document how the state-of-the-art evaluation was performed. The Department will rely on the owner or operator to determine the cost effectiveness of each item identified. The owner or operator must document, upon the Department’s request, whether the reduction in risk is commensurate with the costs of its implementation.

15. COMMENT: One commenter stated that the “state- of -the -art” definition is too broad and subject to varied interpretations and requested that the Department delete the definition from the rule. This commenter questioned who will determine what is considered “state-of-the-art” since engineering standards and published documentation are not available for every scenario with potential off-site impacts.(35)

RESPONSE: The Department is re-establishing a requirement that was part of the TCPA rules prior to 1998. The required “state-of-the-art” evaluation of risk reduction options is conducted every five years as part of the process hazard analysis and must include the owner or operator’s review of any available new or existing technologies or equipment that will reduce the risk of a catastrophic accident. Owners and operators are expected to be aware of new risk reduction technologies that become available for

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their operations. Information on “state-of-the-art” technologies is available through trade associations, literature searches, and other sources. The evaluation of the applicability of available “state-of-the-art” technologies to an individual process will be reflected in the owner or operator’s risk reduction plan.

16. COMMENT: Several commenters agreed with the concepts in the definitions of “inherently safer technologies” and “state-of-the-art” but advised the Department of the potential for disputes and enforcement actions caused by the subjectivity of these requirements. The commenters asked the Department to delete these definitions at N.J.A.C.7:31-1.5 or clarify how a DEP auditor will evaluate “state-of-the-art” and “inherently safer technology” determinations and how the Department will gauge whether the costs of implementation are commensurate with the reduction of risk. (8, 16, 30, 38, 39)

RESPONSE: Under N.J.A.C. 7:31-4.2(c), (d) and (g) “state-of-the-art” and “inherently safer technologies” are evaluated in light of the owner or operator’s individual process to determine whether the costs and benefits of implementing the technology warrants its incorporation into the process. For the state-of-the-art evaluation performed every five years as part of the process hazard analysis with risk assessment, the owner or operator must identify risk reduction measures in the public domain, recognized to be reliable, and that have been applied at similar facilities. The inherently safer technology evaluation is performed only when a process is being designed and constructed to determine whether technologies are available to reduce the potential for a catastrophic release and if the cost of incorporating this technology is commensurate with the risk reduction to be achieved. The results of the state-of-the-art and inherently safer technology evaluations, including the risk reduction items identified, and the owner or operator’s analysis of the costs and benefits of implementing these measures, must be documented in the risk reduction plan and be made available to the Department for review. The



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Department will use the standards in these definitions to determine whether a comprehensive evaluation was performed.

17. COMMENT: Several commenters supported the Department’s proposal to restore the “state-of-the-art” standard to the TCPA rules. (5-7, 9, 12-15, 19-25, 27, 32, 34, 36, 41, 42)

RESPONSE: The Department acknowledges this comment in support of the rules.

18. COMMENT: One commenter stated that the Department failed in its economic impact analysis to consider additional costs of installation and operation of state-of-the-art technologies. (2)

RESPONSE: The Department did not include the costs of the actual implementation of the state-of-the-art technologies because these costs will vary depending on the individual process, the state-of-the-art technologies available, and the risk reduction plan developed by the individual owner and operator.

19. COMMENT: Several commenters suggested that the definition of “reactive hazard substance mixture” at N.J.A.C. 7:31-1.5 and N.J.A.C. 7:31-6.3(b)2 be revised to be consistent with the convention used by the engineering and scientific community. The suggested definition clarifies that an RHS mixture is capable of undergoing an exothermic, or heat-releasing, reaction and that the amount of heat released is expressed as a negative value.(5-7, 9, 12-15, 17, 19-25, 27, 32, 36, 41, 42)

RESPONSE: The Department agrees and has revised the definition of “reactive hazard substance mixture” at N.J.A.C. 7:31-1.5 and the requirement at N.J.A.C. 7:31-6.3(b)2 to clarify that an RHS mixture is capable of undergoing an exothermic reaction and that the heat released is expressed as a negative value.

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20. COMMENT: One commenter stated that the proposed definition of “reactive hazard substance mixture”, where use of the word “capable” is the operative condition, is too broad. (37)

RESPONSE: A reactive hazard substance mixture is an intentional combination of substances that has the potential to undergo a chemical reaction with catastrophic consequences. This potential reaction could take place under the normal operating conditions or if any of various abnormal conditions occur. These abnormal conditions include, but are not limited to, situations such as overcharging a reactant, loss of cooling, too much heating, contamination, loss of agitation, and incorrect charging sequence of contents. Therefore, the use of the word “capable” in the definition is appropriate.

#### Fees

21. COMMENT: Several commenters asked why the annual TCPA fees have increased when the number of facilities covered by the program has decreased from 600 to 104 since 1988. These commenters disagreed with the Department’s assertion that TCPA fees for currently regulated facilities will remain the same after the rules for reactive hazard substances become effective.(8, 30, 39)

RESPONSE: TCPA fees are based on the costs of administering the program. Each year, the costs associated with the program (salaries and operating costs) are divided among the active registrants to determine the annual fees. The number of staff positions assigned to the program has decreased from 36 in 1988 to 11 in 2003, including the elimination of two chemical safety engineer positions, reflecting the decrease in the number of regulated TCPA facilities. Although the program costs have risen slightly over the years as salaries and expenses increased, the fees paid by each covered stationary source have increased because the program costs are shared among fewer active registrants. The expanded EHS list is expected to bring additional facilities into the program, thus decreasing the individual fees assessed to each currently regulated facility.

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### Hazard Assessment

22. COMMENT: One commenter asked the Department to explain the meaning of the requirement at N.J.A.C. 7:31-2.2(a)2, RHS hazard assessment, and asked the Department to rewrite it in clearer language but offered no suggestions.(37)

RESPONSE: N.J.A.C. 7:31-2.2(a)2 is patterned after 40 CFR 68.25(a)(2)(iii), and requires that additional toxic and flammable substance worst case scenarios be completed if the worst case scenarios from separate covered processes potentially affect different public receptors. The purpose of this provision is to require owners or operators having reactive hazard substances on large sites with covered processes at different locations within the overall site to report all the public receptors that could be affected by the different worst case scenarios. As the commenter did not provide suggested language for the rule, and because the Department believes the rule as proposed is clear, the Department is adopting N.J.A.C. 7:31-2.2(a)2 as proposed.

23. COMMENT: Many commenters questioned the Department's rationale for prohibiting the use of administrative controls to limit the maximum quantity in the process vessel at proposed N.J.A.C. 7:31-2.2(b)2 for worst case release scenarios. (8, 16, 28, 29, 30, 35, 38, 39, 40) Since the Department has allowed such controls for toxic and flammable substances in the past, several of these commenters asked the Department to allow the regulated community to consider administrative controls for reactive hazards, if those controls could never be breached.(8, 16, 30, 35, 38, 39)

RESPONSE: Administrative controls are procedures designed to limit certain activities as opposed to engineering controls which include installed equipment and hardware limitations. Administrative controls are designed to work under normal conditions to reduce the risk of an accidental release.

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Reactions that involve unstable chemicals are more complex and subject to many factors that can contribute to catastrophic accidents. Accidental releases that result from chemical reactions occur because existing controls on the process, including operator intervention, have failed. The Department has determined through review of accident investigation reports that administrative controls can be breached and often fail under unusual circumstances contributing to a catastrophic release. Therefore, the Department is adopting the hazard assessment rule for reactive hazard substances as proposed at N.J.A.C. 7:31-2.2(b)2 in relation to prohibiting the use of administrative controls for determining maximum quantity for worst case scenarios.

24. COMMENT: Several commenters suggested that the Department change the language of the worst case release quantity parameter at N.J.A.C. 7:31-2.2(b)2 from “the greatest amount contained in a single vessel” to “the greatest amount contained in a single vessel, or group of interconnected vessels where there are no isolation valves between the vessels, or if isolation valves are present, they are normally in the open position.” These commenters requested the change because the entire amount present in interconnected vessels is subject to release or explosion. (5-7, 9, 12-15, 17, 19-25, 27, 32, 36, 41, 42)

RESPONSE: The Department believes that the method in the rule for determining the worst case release quantity for RHSs and RHS mixtures is correct, because it is the amount in the vessel containing the mixture that presents the initial reactive hazard for explosion or over-pressurization. Although the contents of the associated equipment may subsequently be released or explode it is the explosion occurring in the original vessel that presents the worst case scenario. Other explosions are likely to be smaller and will not add to the effects of the worst case scenario.

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25. COMMENT: Several commenters suggested the Department change N.J.A.C. 7:31-2.2(b)3i from “The heat of combustion of the RHS or RHS mixture” to “The heat of reaction of the RHS or RHS mixture” since heat of combustion is a special type of heat of reaction and the Department should not limit this to only that type of reaction.(5-7, 9, 12-15, 17, 19-25, 27, 32, 36, 41, 42)

RESPONSE: The Department agrees with the commenters that the RHS worst case scenario analysis should not be limited to a combustion reaction. Since the worst case scenario may involve types of reactions other than combustion reactions, “heat of reaction” is the appropriate term. The change of the term “heat of combustion” to “heat of reaction” is consistent with the term used elsewhere in the rule. Therefore, the Department has revised N.J.A.C. 7:31-2.2(b)3i by replacing “heat of combustion” with “heat of reaction.”

26. COMMENT: Several commenters asked the Department to clarify, at N.J.A.C. 7:31-2.2(b)3, that a TNT equivalent explosion method or a commercially or publicly available explosion modeling technique is acceptable to meet off-site consequence analysis requirements, since no one model is appropriate for every situation.(8, 30, 38)

RESPONSE: The commenters are correct in their understanding of N.J.A.C. 7:31-2.2(b)3 that a TNT-equivalent explosion method or a commercially or publicly available explosion modeling technique is acceptable to meet RHS hazard assessment requirements, including off-site consequence analysis requirements.

27. COMMENT: Several commenters asked the Department to clarify the language concerning “100% yield factor”, proposed at N.J.A.C. 7:31-2.2(b)3ii, by replacing it with “all of the RHS mixture reactants in the process vessel are assumed to react”.(5-7, 9, 12-15, 17, 19-25, 27, 32, 36, 41, 42)

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RESPONSE: The commenters are correct that the term “yield factor” should be clarified because there is no consistent definition in technical sources. Therefore, the Department has replaced “100 percent yield factor” with “100 percent of the total potential heat release (heat of reaction) assumed to contribute to the explosion.” The potential heat release (heat of reaction) is the data value that is necessary to perform the hazard assessment’s explosion modeling, which is supported by technical sources such as the American Institute of Chemical Engineers Center for Chemical Process Safety’s Guidelines for Evaluating the Characteristics of Vapor Cloud Explosions, Flash Fires, and Bleves, 1998. The Department believes this modified definition provides clarification to the commenters’ suggested language to ensure consistent interpretation by the Department and the regulated community.

28. COMMENT: Several commenters asked the Department to clarify the language at N.J.A.C. 7:31-2.2(b)3iii by replacing “28 percent yield factor” with the phrase “assume that 28 percent of the reactants react”.(5-7, 9, 12-15, 17, 19-25, 27, 32, 36, 41, 42)

RESPONSE: As discussed in the previous response, the commenters are correct that the term “yield factor” should be clarified. Therefore, the Department has replaced “28 percent yield factor” with “28 percent of the total potential heat release (heat of reaction) assumed to contribute to the explosion”.

#### Minimum Requirements for a TCPA Program 2 Risk Management Program

29. COMMENT: Several commenters asked the Department to add “accurate and complete” to the piping and instrument diagram (P&ID) requirement at N.J.A.C. 7:31-3.1(c)1i.(5-7, 9, 12-15, 17, 19-25, 27, 32, 34, 36, 41, 42)

RESPONSE: “Piping and instrument diagram” (P&ID) is defined at N.J.A.C. 7:31-1.5. Also, owners and operators are required by 40 CFR 68.58(a), which is incorporated with changes at N.J.A.C. 7:31-

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3.1(c)5 (Program 2), and by 40 CFR 68.79(a), which is incorporated with changes at N.J.A.C. 7:31-4.1(c)13 (Program 3), to verify that the process equipment and technology, as built and operated are in accordance with the process safety information, which includes the P&IDs. This means that the owner or operator must verify that all the process safety information, including the P&IDs, accurately reflect the current process equipment. Also, the owner or operator must verify that the process equipment is being operated within the design conditions specified in the process safety information. The owner or operator must certify that this has been verified as part of the compliance audit. Therefore, no changes to the provision are necessary.

30. COMMENT: Several commenters requested that the reactivity data specified at N.J.A.C. 7:31-3.1(c)1ii and N.J.A.C. 7:31-4.1(c)24ii be required only for those chemicals listed in Table I, Part D since the data are necessary to evaluate the hazards associated with reactive hazard substances.(8, 16, 30, 38, 39)

RESPONSE: The Department intended these provisions to apply to all EHSs including all toxic and flammable substances listed in Table I. N.J.A.C. 7:31-3.1(c)1ii and N.J.A.C. 7:31-4.1(c) 24 are proposed changes to the 1998 incorporation by reference of the Federal requirements at 40 CFR 68.48(a), safety information, and 40 CFR 68.65(b)4, process safety information, respectively. The proposed rule at N.J.A.C. 7:31-3.1(c)1ii and N.J.A.C. 7:31-4.1(c) 24 requires reactivity data for all EHSs. The rule summary at 35 NJR 939 for N.J.A.C. 7:31-3.1(c)1ii, which applies to Program 2, should have stated, “Reactivity data ... are necessary to evaluate hazards associated with EHSs” instead of limiting the requirement to reactive hazard substances. Since they went into effect, the Federal rules for Program 3 have required reactivity data for all EHSs including toxic and flammable substances at 40 CFR 68.65(b)4. Owners and operators should be aware of the reactivity potential for all EHSs in their

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processes in order to evaluate possible release scenarios in the Program 2 hazard review or the Program 3 process hazard analysis with risk assessment. Therefore, N.J.A.C. 7:31-3.1(c)1ii and N.J.A.C. 7:31-4.1(c)24ii are adopted as proposed.

31. COMMENT: Several commenters asked the Department to change the language at N.J.A.C. 7:31-3.1(c)1ii(3) from "...and rate of energy release;" to "...and rate of energy release as a function of reaction temperature" because the rate of energy release is a function of temperature. (5-7, 9, 12-15, 17, 19-25, 27, 32, 36, 41, 42)

RESPONSE: The Department agrees that the rate of energy release in a chemical reaction is a function of temperature. However, the Department only requires the temperature at which the instability occurs. Adding the phrase..."as a function of reaction temperature" would require owners and operators to do significantly more testing than what is needed, since testing would then need to be performed over a wider range of temperatures that go beyond the temperature at which instability initiates. N.J.A.C. 7:31-3.1(c)1ii(3) and an analogous requirement at N.J.A.C. 7:31-4.1(c)24ii have been revised to specify that the rate of energy release data is required only at the temperature at which instability initiates. This will clarify that this information is limited to that temperature and is not required over a wider temperature range.

32. COMMENT: Two commenters objected to the requirements at N.J.A.C. 7:31-3.1(c)3 and N.J.A.C. 7:31-4.1(c)8 for owners and operators to provide operating procedures written in the language the operator can understand if that language is not English. They stated that the ability to communicate with supervisors and other workers in a common language is essential for: 1) the interaction involved in operating chemical processes; 2) responding to emergency situations; and 3) protecting the safety of the



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public. These commenters also cited the resource impacts on the regulated community of having to translate procedures into various languages and suggested English fluency be a job requirement. (1, 17)

RESPONSE: Mandating hiring practices concerning EHS operator qualifications is beyond the scope of these rules and rests with the owner or operator, who is responsible for assuring the employees can perform under any conditions that may arise at the stationary source. The requirement for owners and operators to provide operating procedures in the language EHS operators can understand provides reasonable assurance that all EHS operators will be able to understand how to perform under all conditions including routine operations as well as emergency situations. This requirement offers additional protection to public safety with minimum additional effort for the owner or operator.

33. COMMENT: One commenter stated that, as written, N.J.A.C. 7:31-3.1(c)3 and N.J.A.C. 7:31-4.1(c)8 could be interpreted to allow owners and operators to avoid writing procedures in the language the operators understand best. This commenter stated that people whose first language is not English, or the language in which instructions are written, may find it difficult to comprehend those instructions in high stress situations. The commenter suggested that the Department require instructions to be written in the language (or languages) with which operators are most familiar and that all procedures also be written in English as well. (34)

RESPONSE: The Department believes this commenter may have misinterpreted this requirement since its purpose is to ensure that EHS operators understand the company's routine and emergency procedures by providing this information in the language understood by the EHS operators. If that language is English, the procedures must be written, in English, in a manner that is understandable to the EHS operators. If that language is not English, the procedures must be written in the language the EHS

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operator can understand. The rule provisions, as written, are intended to assure that procedures are available in the language the EHS operator understands.

34. COMMENT: Several commenters asked the Department to consider replacing the term “accident” with “incident” at N.J.A.C. 7:31-3.3(b)4 and at all occurrences of “accident” since accident has several implied meanings and connotations.(5-7, 9, 12-15, 17, 19-25, 27, 32, 34, 36, 41, 42)

RESPONSE: The term “accident “ is used in the Toxic Catastrophe Prevention Act and has been used in the TCPA rules since their initial adoption in 1988. The current regulatory definition of “EHS accident” refers to unplanned, unforeseen and unanticipated incidents, which could result in an EHS release. The Department believes the regulated community is familiar with the meaning of “accident” and that the term “accident” is therefore appropriate.

35. COMMENT: Several commenters suggested the Department change the phrase “basic and contributory causes” to “root causes and contributing causes”, at N.J.A.C. 7:31-3.3(b)4 and N.J.A.C. 7:31-4.9(b)4iii, to be consistent with current safety professional terminology.(5-7, 9, 12-15, 17, 19-25, 27, 32, 36, 41, 42)

RESPONSE: The phrases “basic and contributory causes” and “root causes and contributing causes” are accepted by the scientific community and are used interchangeably. The term “basic and contributory causes” has been used in the TCPA rules since their initial adoption in 1988, and is understood and used by the regulated community. The Department’s main concern is that the phrase be understood by anyone using the rules or complying with the requirements. Since the Department believes that the rule language remains current, the suggested change is not necessary.

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36. COMMENT: Several commenters asked the Department to modify the requirements for the hazard review report at N.J.A.C. 7:31-3.5(a) 4 to include the positions of the hazard review participants as well as their names and affiliations. The commenters stated that the position of the participant helps to clarify the skills and knowledge the individual brings to the analysis and is useful for determining whether appropriate people participate. (5-7, 9, 12-15, 17, 19-25, 27, 32, 36, 41, 42)

RESPONSE: The Department agrees that the inclusion of the position of the hazard review participants in the hazard review report may be useful for the purpose which the commenters stated. Since the burden of its addition will be negligible, the Department has modified N.J.A.C. 7:31-3.5(a)4 on adoption to require this information.

37. COMMENT: Several commenters suggested that the Department include an additional hazard review report requirement at N.J.A.C. 7:31-3.5(a) for documentation that the safeguards provided or proposed achieve the level of risk required by the owners and operators. These commenters suggested that the owners and operators perform a risk assessment to compare the level of risk before and after the implementation of safeguards. (5-7, 9, 12-15, 17, 19-25, 27, 32, 36, 41, 42)

RESPONSE: The hazard review report requirements parallel the requirements for the hazard review at 40 CFR 68.50(a), which is incorporated by reference at N.J.A.C. 7:31-3.1(a). The Department intended that this Program 2 provision incorporate by reference the Federal rule without additional requirements. Program 2 requirements, including the hazard review requirements, as written by the USEPA and incorporated into the rule, are intended to be less complex than the corresponding Program 3 requirements. The Program 3 requirements which correspond to a Program 2 hazard review are the process hazard analysis with risk assessment. The commenters' suggestion would, in effect, increase the detail of the Program 2 hazard review to that of a Program 3 process hazard analysis with risk

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assessment, which requires sophisticated consequence modeling and likelihood analyses. This suggested change exceeds the requirements of the hazard review as well as the corresponding hazard review report. Therefore, the addition of this information in the hazard review report is not appropriate.

#### Minimum Requirements for a TCPA Program 3 Risk Management Program

38. COMMENT: One commenter suggested that in order to use established engineering practices, N.J.A.C. 7:31-4.1(c)24ii be changed to read, “Thermodynamic and reaction kinetic data including: heat of reaction; onset temperature at which the rate of temperature change due to uncontrolled reaction, decomposition, change in molecular structure, or polymerization exceeds 0.01 °C/min.; the rate of pressure rise(dP/dt); and the rate of temperature rise (dT/dt); all of which are to be corrected to a thermal inertia of 1.0 ( $\psi=1.0$ ).” (17)

RESPONSE: The Department believes that N.J.A.C.7:31-4.1(c) 24ii is sufficiently comprehensive for describing the reactivity data needed and that modifying the proposed provision to include more technical language may be unnecessarily confusing to the regulated community. This language was in the draft rule proposal reviewed and accepted by the workgroup, which included several members of the engineering community. Therefore, N.J.A.C. 7:31-4.1(c)24ii is adopted as proposed.

39. COMMENT: Several commenters stated that N.J.A.C. 7:31-4.2(c)1 and N.J.A.C. 7:31-4.2(c)2i should be amended to delete the phrase “including alternative processes, procedures, or equipment which would reduce the likelihood or consequences of an EHS release” if the “state-of-the-art” definition is incorporated into the TCPA rules. The commenters stated that this phrase reiterates the result of a state-of-the-art evaluation and is not needed. (8, 16, 30, 38, 39)

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RESPONSE: The Department believes that this phrase enhances understanding of this requirement in specific sections of the rule since it specifies the type of information to be included in a “state-of-the-art” evaluation. Therefore, the Department is adopting the provision as proposed to ensure owners and operators understand what must be included in a “state-of- the-art” evaluation of risk reduction alternatives.

40. COMMENT: Several commenters asked the Department to delete the last sentence of N.J.A.C. 7:31-4.2(c)3 that states, “The owner or operator shall utilize state-of-the-art risk reduction measures that will reduce the likelihood or consequence of a release”. N.J.A.C. 7:31-4.2(c)3 would then read, “The owner or operator shall develop a risk reduction plan for the release scenarios requiring state-of-the-art evaluation determined pursuant to (c)1 and 2i above.”(8, 30, 38, 39)

RESPONSE: The Department agrees with these commenters that the last sentence of N.J.A.C. 7:31-4.2(c)3 should be deleted. Since this sentence is redundant, it has been deleted on adoption.

41. COMMENT: Four commenters suggested that the Department delete the requirement at N.J.A.C. 7:31-4.2(d)5 for a statement of completion or an explanation of changes for each risk reduction measure in the risk reduction plan since that requirement provides no benefit and would create an undue burden. These commenters offered an alternative suggestion that this requirement be relocated to the implementation schedule requirements. (8, 30, 38, 39)

RESPONSE: The provision requires the owner or operator to document the outcome of each measure that had been listed in the risk reduction plan that was developed as part of the process hazard analysis with risk assessment. For the measures that have been implemented, a statement that the measure has been completed is all that is needed. For listed measures that were changed or were not implemented, an

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explanation of the reasons must be given. This documentation will enable the owner or operator and the Department to follow up on the resolution of the measures in the risk reduction plan to ensure that each risk reduction measure has been addressed. Since this is a risk assessment requirement, the Department believes this requirement is properly set forth at N.J.A.C. 7:31-4.2(d)5 as proposed.

42. COMMENT: Several commenters stated that the words “and to evaluate equipment reliability” at N.J.A.C. 7:31-4.5(b) had no purpose or benefit and asked the Department to delete them.(8, 30, 38, 39)

RESPONSE: The proposed amendment of N.J.A.C. 7:31-4.5(b) requires an owner or operator to implement a system for maintaining accurate maintenance records with the means of data retrieval and analysis to determine the frequency of inspections and tests and to evaluate equipment reliability. Prior to the rule proposal, this requirement did not include the provision “to evaluate equipment reliability.” The Department’s experience has shown that equipment maintenance data can be reviewed for purposes other than determining inspection frequencies such as the need to perform an alternate type of inspection or the need to replace equipment with a different typed of equipment. The term “equipment reliability” is an acknowledged industry term that encompasses all of these purposes. This provision does not require the performance of routine equipment reliability evaluations; however, the owner and operator must have a record-keeping system which provides the ability to evaluate the reliability of the equipment if necessary. Therefore, N.J.A.C. 7:31-4.5(b) is adopted as proposed.

43. COMMENT: Several commenters recommended that the Department change N.J.A.C. 7:31-4.5(b) from “...to determine the frequency of inspections and tests and to evaluate equipment reliability” to “...to determine the required frequency for inspections and tests and to evaluate equipment reliability.” These commenters stated that the Department should be interested in not only how often the facility

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does testing and inspections but how often it should be done based on the analysis testing and inspection results.(5-7, 9, 12-15, 17, 19-25, 27, 32, 36, 41, 42)

RESPONSE: Since the owner or operator sets the preventive maintenance schedule, the addition of the word “required” would not change the effect of the rule. The schedule is based on the owner or operator’s analysis of previous equipment maintenance records.

#### Emergency Response Program

44. COMMENT: One commenter requested that the Department delete the word “EHS” at N.J.A.C. 7:31-5.2(b)2, which requires the performance of at least one EHS emergency response exercise per calendar year. The commenter stated that a well planned and executed non-EHS emergency drill is frequently more effective as a training tool because it introduces variety and challenge to emergency responders and planners.(38)

RESPONSE: While the Department agrees that some well planned and executed non-EHS exercises may be an effective training tool, an EHS exercise ensures that the scenario selected addresses substantial risk to the community. If an exercise was performed for a non-EHS, it is probable that the scenario would not pose the same level of risk or that the exercise conducted would be less complex than one for an EHS. Also, the EHS exercise allows the owner or operator to evaluate the effectiveness of the emergency response plan, the response procedures, and the mitigation techniques for the specific EHS. The owner or operator may conduct additional emergency drills, including drills for non-EHS emergencies.

45. COMMENT: Several commenters did not support the Department’s proposed change at N.J.A.C. 7:31-5.2(b)4iii(1) to exempt from accidental release notification EHS releases that have no potential

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impact beyond the industrial complex boundary. These commenters stated that this would weaken reporting requirements and reduce the amount of information about EHS releases available to employees of adjacent facilities within the industrial complex boundary.(5-7, 9, 12-15, 19-25, 27, 32, 36, 41, 42)

RESPONSE: Prior to the proposed amendment to N.J.A.C. 7:31-5.2(b)4iii(1), EHS releases that had no potential offsite impact were exempt from the notification provisions of the rule. Although owners and operators did not need to notify the Department of these releases, they were still subject to the TCPA accident investigation requirements, including preparation of a summary report. The amendment reflects the new “industrial complex” definition, which allows individual TCPA stationary sources to use the original property boundary of the site that was formerly occupied by the company from which these new regulated sources have evolved. These individual companies typically share equipment and infrastructure, making it difficult and burdensome to report every release, however minute, that goes beyond the individual property boundary. The industrial complex definition is very restrictive, making this exemption available only to very few companies co-occupying the site of a former parent company. Item 4 of the “industrial complex” definition at N.J.A.C. 7:31-1.5 requires that owners and operators give employees of each stationary source access to all accident investigation reports as well as all information required to be developed under the TCPA rules. Therefore, N.J.A.C. 7:31-5.2(b)4iii(1) does not reduce the information available to employees.

#### Threshold Quantity Determination

46. COMMENT: Several commenters asked the Department to change the language at N.J.A.C. 7:31-6.2(h) regarding threshold determination from “...the greatest amount of RHS mixture contained in a process vessel...” to “...the greatest amount of RHS mixture contained in a single vessel, or group of interconnected vessels where there are no isolation valves between the vessels, or if isolation valves are



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present, they are normally in the open position.” These commenters stated that if the vessels are interconnected, the entire amount is subject to release or explosion. (5-7, 9, 12-15, 17, 19-25, 27, 32, 36, 41, 42)

RESPONSE: As explained in the response to comment 24, the Department believes that the proposed method for determining whether a threshold quantity of an RHS mixture is present is correct because it is the amount in the vessel containing the mixture that presents the initial reactive hazard for explosion or over-pressurization. Although the contents of the associated equipment may subsequently be released or explode it is the explosion occurring in the original vessel that presents the worst case scenario. Other explosions are likely to be smaller and will not add to the effects of the worst case scenario.

47. COMMENT: Many commenters questioned the Department’s rationale for prohibiting the use of administrative controls to limit the maximum quantity in the process vessel for the purpose of threshold determination at N.J.A.C. 7:31-6.2(h).(8, 16, 28, 29, 30, 35, 38, 39, 40) Since the Department has allowed such controls for toxic and flammable substances in the past, several of these commenters asked the Department to allow the regulated community to consider administrative controls for reactive hazard substances, if those controls could never be breached.(8, 16, 30, 35, 38, 39)

RESPONSE: As explained in the response to comment 23, administrative controls are procedures designed to limit certain activities as opposed to engineering controls which include installed equipment and hardware limitations. Administrative controls are designed to work under normal conditions to reduce the risk of an accidental release. Reactions that involve unstable chemicals are more complex and subject to many factors that can contribute to catastrophic accidents. Accidental releases that result

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from chemical reactions occur because existing controls on the process, including operator intervention, have failed. The Department has determined through review of accident investigation reports that administrative controls can be breached and often fail under unusual circumstances contributing to a catastrophic release. Therefore, the Department is adopting N.J.A.C. 7:31-6.2(h) as proposed, prohibiting the use of administrative controls for the purpose of threshold determination for RHS mixtures.

#### Extraordinarily Hazardous Substances List

48. COMMENT: Several commenters suggested that the Department regulate combustible liquids as flammable materials since combustible materials are often processed above the flash point and within their flammable range and have all the hazards associated with flammable materials.(5-7,9,12-15,17,19-25,27,32,34,36,41,42) These commenters suggested regulating as EHSs all materials that are present, or potentially present, in a process if they are within 30°F of their flash point.(5-7, 9, 12-15, 17, 19-25, 27, 32, 34, 36, 41, 42)

RESPONSE: In 1998, the Department incorporated by reference at N.J.A.C. 7:31-6.3(a) the Federal ARP rules at 40 CFR 68 for flammable substances, with the exception of liquefied petroleum gas (LPG). The Federal flammable substances have an NFPA rating of 4, on the NFPA's scale of 1(least dangerous) to 4 (most dangerous). Combustible liquids have an NFPA rating of 3. The goal of the program is to regulate facilities handling extraordinarily hazardous substances which are those substances posing the greatest risk to the public. Also, toxic and flammable substances are included on the EHS list based on their inherently hazardous individual properties, not on the operating conditions under which they may be processed, such as handling within 30° F of their flashpoint. Therefore, the Department has not included combustible liquids as EHSs in this rulemaking.

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### Liquefied Petroleum Gas

49. COMMENT: Several commenters questioned the benefit to the public and the environment of regulating liquefied petroleum gas (LPG) sites under the TCPA program when they are already covered under the LPG Act of 1950, the Federal Accidental Release Prevention Program, OSHA Process Safety Management, and many other local and fire protection codes (NFPA, BOCA building codes, Uniform Fire Code etc).(3, 8, 10, 30, 38)

RESPONSE: The Department reviewed the regulatory status of LPG under the local, State and Federal programs cited by these commenters and determined that the current level of LPG regulation is sufficient to ensure the public is protected from accidental LPG releases. In addition to the current laws and regulations governing the handling and storage of LPG, the New Jersey Department of Community Affairs recently adopted new regulations for LPG handlers, which were published on May 19, 2003 at 35 N.J.R. 2187(a). Those rules are more stringent than the previous rules for implementing the LPG Act of 1950. The Department has therefore determined to not adopt the proposed addition of the constituents of LPG to the list of flammable gases at N.J.A.C. 7:31-6.3(a) Table I, Part C. In reaching this decision, the Department determined that the costs to the regulated community of including the substances in the list for purposes of the TCPA program would outweigh any limited additional benefit to the public of listing LPG constituents as EHSs. The proposed provisions at N.J.A.C. 7:31-1.1(c)3ii, 6.1(c)5ii, and 7.5(b), (c), and (d) are modified on adoption to reflect the continued exemption for LPG.

50. COMMENT: Several commenters were concerned about the impact of the Department's proposal to delete the current exemption for liquefied petroleum gases (LPG) in N.J.A.C. 7:31-6.3(a) Table I, Part C. These commenters cited additional regulatory requirements, additional program fees, and higher

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administrative costs . (3, 4, 8, 10, 11, 30, 39) One commenter stated that the only justification for regulating LPG under TCPA is an attempt to increase fees.(10)

RESPONSE: As stated in the response to comment 49, the Department has reconsidered the need to regulate LPG under the TCPA program since LPG is regulated under various other local, State and Federal regulatory programs. All of the facilities that would have been covered under the TCPA rules for LPG are already covered under the Federal ARP program and have implemented risk management programs. By allowing LPG gases to remain unregulated as flammable gases under the TCPA, facilities handling LPG will not be assessed annual TCPA fees, or incur the costs of compliance with the TCPA program.

51. COMMENT: Several commenters suggested the Department consider an exemption from regulation for LPG in finished consumer products stored in retail sized containers.(4, 8, 30, 39)

RESPONSE: As discussed above, the Department will continue to exempt LPG from regulation as flammable EHSs, making this suggested exemption for consumer products unnecessary.

52. COMMENT: Three commenters stated that use of LPG for purposes other than as fuel be treated the same as a bulk LPG storage facility.(4, 10, 11)

RESPONSE: The Federal Chemical Safety Information, Site Security, and Fuels Regulatory Relief Act (CSISSAFRRA) exempts from regulation under the Federal ARP program, flammable substances when used, or held for retail sale, as fuel. All other uses of regulated flammable substances are subject to the risk management program requirements of the Federal ARP program. Therefore, LPG used for purposes other than fuel are regulated by USEPA. The Department is not adopting its proposal to list LPG as

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flammable EHSs. Uses of LPG, other than as fuel, will continue to be regulated under the Federal program.

53. COMMENT: Two commenters asked the Department to clarify that facilities storing and handling LPG for purposes other than use as fuel, have a single covered process.(10, 11)

RESPONSE: The rules governing whether a stationary source has one or more covered processes is the same for all sources including those storing or handling LPG. Interconnected vessels or vessels located such that EHSs could be involved in a potential release are considered to be a single process.

54. COMMENT: Several commenters questioned the Department's authority to regulate reactive hazard substances under the Toxic Catastrophe Prevention Act (TCPA). (8, 30, 33, 38, 39)

RESPONSE: The intent of the TCPA is to prevent catastrophic accidents that can cause death or permanent disability to citizens beyond the property boundary of the stationary source.

As stated at N.J.S.A. 13:1K-20, "The Legislature finds and declares that... the single most effective effort to be made is toward prevention of those environmental accidents by anticipating the circumstances that could result in their occurrence and taking those precautionary and preemptive actions required." The TCPA, at N.J.S.A. 13:1K-22(c), gives the Department ... "the power to amend, by regulation, the extraordinarily hazardous substance list to accommodate new chemical compounds that may be developed or reflect new information or scientific data that may become available to the Department." Because reactive hazard substances are known to have caused such accidents including those at Napp Technologies in 1995 and Morton International in 1998, the Department believes that regulating these substances will enhance public health and safety.

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55. COMMENT: Several commenters stated that the regulation of reactive substances is a major departure from the original legislative intent of the TCPA, which was a list based approach to regulation with the list containing specific substances and their associated threshold quantities for coverage under the rule. These commenters stated that they believed a statutory amendment was needed prior to rulemaking of this nature and the Department should withdraw the portions of the rule concerning reactive substances. (8, 30, 39)

RESPONSE: In developing the proposal to regulate reactive hazard substances, the Department initially intended to incorporate a substance list with corresponding threshold quantities to determine applicability under the TCPA program. The Department prepared such a list for the specific substances listed in Table I, Part D, Group I that exhibit instability because of their properties. These unstable substances are likely to react when exposed to air or water or subjected to shock. However, a list of chemicals that have the potential to produce an undesired reaction when intentionally mixed with other chemicals, would have resulted in an extremely long EHS list of substances with assigned threshold quantities. The assigned threshold quantities for this extensive list might be over or under estimated since the degree of hazard posed by these chemicals is determined by the properties of the substances in the mixture. Accordingly, to correlate the combinations of substances or compounds on the EHS list appropriately with the quantities required to produce the potentially catastrophic circumstances, the Department took the following approach. First, the rule lists in Group II those classes of chemicals containing functional groups that have the potential to cause adverse reactions. Second, the rule provides for the corresponding threshold quantities to be based on the amount of heat of reaction capable of being generated by a particular combination of substances. This approach better addresses the thousands of potential reactions involving substances with the listed functional groups. Because a higher heat of reaction presents a greater risk of a catastrophic accident, the table of threshold quantities

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at N.J.A.C. 7:31-6.3(c) correlates lower threshold quantities with higher heats of reaction. Therefore, the RHS mixture list is correlated with a corresponding threshold quantity, and the intent of the Act to correlate the list of substances with their corresponding threshold quantities is met.

56. COMMENT: One commenter suggested the Department develop a performance-based approach to regulating reactive substances rather than a list-based approach. (35)

RESPONSE: The Department is following the mandates of the TCPA to develop a list of EHSs and correlating the list with the threshold quantities that present a hazard to the public. Using the EHS list and thresholds enables the Department to identify those sources having the potential for a catastrophic release.

57. COMMENT: Several commenters suggested that the endpoint used for determining threshold quantities for the reactive hazard substances listed at N.J.A.C. 7:31-6.3 (a) Table I, Part D, Group I, be the distance to the stationary source fence-line, if that distance is closer than the 100 meter distance used in the proposed rule. These commenters stated that many New Jersey facilities store and use chemicals at distances that are much closer to the public than the 100 meter average used in the rule. (5-7, 9, 12-15, 17, 19-25, 27, 32, 34, 36, 41, 42)

RESPONSE: The Department selected 100 meters as the endpoint used for determining threshold quantities for the reactive hazard substances listed at N.J.A.C. 7:31-6.3 (a) Table I, Part D, Group I, following a review of information from current and past TCPA registrants that showed 100 meters as the median property-line distance for the registrants' covered processes. The median means there are an equal number of facilities having a greater distance to the property line and an equal number having a lesser distance. The Department believes that the median value of 100 meters is the appropriate value to

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be applied uniformly to all regulated sources. In the data reviewed by the Department in deriving this median value, a few facilities had extremely large property line distances. Since the number of facilities was relatively small, these few facilities with large property line distances disproportionately skewed the average property-line value to a much larger value. The proposal summary at 35 NJR 937 should have stated that the 100 meters is the median value to the property boundary used by the Department for threshold determination.

58. COMMENT: Several commenters stated that the Department grossly underestimated the economic impact on the regulated community of the reactive hazard mixture functional groups at Table I, Part D, Group II.(2, 8, 28, 29, 30, 38, 39, 40)

RESPONSE: The costs for program implementation were based on the best estimates available to the Department. For owners and operators required to develop and implement risk management programs for RHS mixtures, the estimates of the time required to accomplish each task were derived from the estimates set forth in the Economic Impact analysis contained in the 1998 TCPA rule proposal, which were based on USEPA's 1996 Economic Analysis Report for the 112(r) Clean Air Act Rule. For the Economic Impact analysis for this proposal, the estimates were updated to reflect program experience. The cost of testing was based on estimates from laboratory representatives attending the workgroup meetings held in the summer and fall of 2002. In addition, many workgroup members stated that the chemistry of the reactions taking place and the properties of the reactants, products and by-products, including their stability characteristics, are already known to the owners and operators. The Department considered this information in developing the proposal and concluded that the benefits of developing the program for managing the risks of these substances to the public, balanced the costs to the regulated community.



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59. COMMENT: The Department underestimated the number of facilities that will be impacted by the reactive hazardous substances portions of the rule.(2, 8, 29, 30, 37, 38, 39)

RESPONSE: The Department used the Community Right to Know chemical inventory information collected for the 2000 reporting year to estimate the number of facilities that will be affected by the program. The Department generated reports of all facilities reporting chemicals containing at least one functional group. These reports formed the basis of the estimates of the number of facilities that could be brought into the program. Until the amendments become effective and the actual reporting begins, the community Right to Know data is the most accurate information on which to base these estimates.

60. COMMENT: Several commenters stated that the TCPA program should be expanded to cover more than 40 facilities, the number of facilities the Department projected could potentially be brought into the TCPA program as a result of expanding the EHS list. These commenters suggested targeted audit techniques as a means for the Department to effectively enforce the rules with limited staff resources. (5-7, 9, 12-15, 19-25, 27, 32, 34, 36, 41, 42) One commenter further stated that a rule that would only cover an additional 40 facilities is far too limiting and not protective of the public and of workers.(34)

RESPONSE: In developing the proposed rules, the Department first developed the criteria to be used for selecting substances to be included as EHSs. Next, the Department identified the substances meeting the selection criteria. The final step was projecting the number of facilities that may be affected by determining which facilities reported inventories of the new EHSs on their Community Right to Know surveys for 2000. Covering a larger number of facilities under the TCPA program by expanding the EHS list with substances that do not meet the selection criteria would be difficult to justify and reconcile with the intent of the TCPA. The Department appreciates the commenters' suggestion to implement an

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expanded program through the use of targeted audits, but believes that, with limited resources, the focus of the TCPA program should be upon the facilities posing the greatest risk to the public.

61. COMMENT: Several commenters stated that the rules regarding the functional groups in Table I, Part D, Group II is a deviation from the current list-based approach and will cause confusion when facility owners and operators try to determine applicability of the rules. (8, 29, 30, 38, 39)

RESPONSE: Reactive hazard substance mixtures result from the intentional mixing of two (or more) substances, at least one of which contains a functional group identified as having the potential to detonate or explode. The chemistry of the reactants used in industrial processes should already be known to the facility owner or operator. Under N.J.A.C. 7:31-7.5(b), owners or operators with covered processes with newly listed EHSs from Table I, Part D, at or above threshold quantities must comply with the TCPA rules by September 30, 2004. Prior to that date, the Department will conduct outreach activities and develop compliance assistance guidance documents for owners and operators of processes that have the potential to be affected by these new requirements.

62. COMMENT: Several commenters suggested that the Department list the following additional (molecular structures) functional groups at N.J.A.C. 7:31-6.3(a) Table I, Part D, Group II: aziridines, diazonium salts, triazenes, triazoles, nitroalkenes, halites and halite salts, perchlorates, nitrogen trihalide. These commenters also recommended the Department show several different structures for the alkylhydroperoxide, peroxyacids, peroxide, and peroxyesters listed at numbers 23 and 24 of N.J.A.C. 7:31-6.3(a) Table I, Part D, Group I. (5-7, 9, 12-15, 17, 19-25, 27, 32, 34, 36, 41, 42)

RESPONSE: The Department reviewed L. Bretherick's Handbook of Reactive Chemical Hazards (Sixth Edition, 1999) to identify functional groups to include in the Table I, Part D, Group II list. The

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additional functional groups suggested by the commenters were listed in earlier editions of Bretherick's but were deleted from the later edition. The Department relied on the 1999 edition of Brethrick's handbook since it contains the most current information on reactive hazards.

63. COMMENT: Several commenters asked whether N.J.A.C. 7:31-6.3(a) Table I, Part D, Group II should be amended to add H5N2+Z-at Item 31 (hydrazinium salts) and to list H3N→M+EON at Item 34 (amminemetal oxosalts) (5-7, 9, 12-15, 17, 19-25, 27, 32, 34, 36, 41, 42)

RESPONSE: The Department acknowledges that these are alternate forms of the listed functional groups listed in L. Bretherick's Handbook of Reactive Chemical Hazards (Sixth Edition, 1999), which are shown in Table I, Part D, Group II with their generic formulas. Since these generic formulas include the alternate forms suggested by the commenters, the suggested changes are unnecessary.

64. COMMENT: Many commenters advised the Department to show the monomer structures of alkene, amide, and ester instead of the polymer structures at Items 40, 41, and 42 at N.J.A.C. 7:31-6.3(a) Table I, Part D, Group II. (5-7, 8, 9, 12-15, 17, 19-25, 27, 30, 32, 34, 36, 39, 41, 42)

RESPONSE: The varied types of polymerization reactions would require an extensive listing of monomer structures, including various combinations of monomer structures. Instead of listing all these monomer structures, the Department has clarified the descriptions for these items in the Reactive Substance Class column of Table I, Part D, Group II to include the monomers as well as the polymers that are formed since the monomers and polymers both are present in the process vessel as part of the reactive hazard substance mixture during a polymerization reaction. Accordingly, the Department has clarified the Reactive Substance Class listing for item 40 to "Polymerization, alkene (vinyl) polymers and monomers thereof." The word "vinyl" has been included as a clarification since this Reactive

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Substance Class is typically named vinyl polymers as a term of art. The Department has clarified the Reactive Substance Class listing for item 41 to “Polymerization, polyamide polymers and monomers thereof.” The Department has clarified the Reactive Substance Class listing for item 42 to “Polymerization, polyester polymers and monomers thereof.”

Also, as a result of reviewing the table in response to this comment, the Department has made a technical correction to the functional group symbol for item 40. The proposed symbol for item 40 was incorrect and inconsistent with the proposed description for the Reactive Substance Class. The Department’s intent for listing this Reactive Substance Class was to include polymerization reactions involving alkene monomers, which are substances that have a carbon-carbon double bond. This symbol has been modified to exclude the hydrogen atom, which was shown combined to the carbon atoms. No hydrogen atoms should have been shown since elements other than hydrogen may be bound to the carbon in an alkene monomer. The proposed Reactive Substance Class description included all alkene monomers rather than only those containing hydrogen.

65. COMMENT: Three commenters questioned the Department’s use of the TNT equivalent equation to determine threshold quantities of reactive hazard substances listed in N.J.A.C. 7:31-6.3(a) Table I, Part D, Group I. These commenters stated that use of the TNT equivalent equation is inappropriate for reactive compounds and not scientifically defensible. They recommended the Department use other methodologies such as CHETAH or the Baker-Strehlow model for a more appropriate evaluation of hazard potential.(8, 30, 39)

RESPONSE: The TNT equivalency method is an industry accepted method described in consequence analysis literature. The TNT equivalency method is used by USEPA in its guidance document for the performance of an off site consequence analysis for flammable substance explosions. In the TNT

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equivalency method, the explosive energy of a reactive hazard substance is related to an equivalent amount of TNT. Members of the work group who assembled in the summer of 2002 to assist in the drafting of the proposed rule agreed that the TNT equivalency method is acceptable as a screening method which could be used for threshold quantity determination. More detailed methodologies such as CHETAH or the Baker-Strehlow model may be used to evaluate specific release scenarios in the risk assessment study.

66. COMMENT: Many commenters supported the Department's proposal to regulate reactive hazard substances and agreed that all of the functional groups listed in N.J.A.C. 7:31-6.3(a) Table I, Part D, Group II are extremely hazardous; however, they stated that the list is not comprehensive. They suggested the Department list many additional functional groups in the following categories: peroxide forming materials, pyrophoric materials, and water reactive materials.(5-7, 9, 12-15, 17,19-25, 27, 32, 34, 36, 41, 42). Several of these commenters stated that the methodology used for selecting the reactive hazard substances to be covered was not comprehensive and that additional classes of hazardous materials (such as the unstable substances with National Fire Protection Association (NFPA) hazard ratings of 1,2,or 3) should be incorporated into the TCPA program. These commenters asked the Department to consider listing additional reactive hazard substances as EHSs in a future rulemaking. (5-7, 9, 12-15, 17, 19-25, 27, 32, 34, 36, 41, 42) One of these commenters suggested that persulfates and like structures be added to Table I, Part D, Group II because of their potential to undergo autocatalysis when exposed to water, heat extremes, and other substances or conditions. (34)

RESPONSE: The Department appreciates the support of these commenters for the regulation of reactive hazard substances under the TCPA program. The Department acknowledges that there are additional reactive hazard substances that were not proposed for coverage under TCPA . For this rulemaking, the

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Department focused on the reactive hazards posing the greatest risk to the public. As stated in the proposal, the Department reviewed the NFPA unstable substances having a rating of 4 (the highest rating), the NFPA water reactive lists and the spontaneously combustible, dangerous when wet, and flammable solids on the United States Department of Transportation's (USDOT) Hazardous Materials Table. It then selected for inclusion on the extraordinarily hazardous substances list (EHS) only those listed substances containing at least one of the functional groups or molecular structures identified as presenting an inherent hazard by themselves or when reacted with other chemicals. In addition to this criterion, the Department proposed to list several substances that had a history of accidents. This methodology allows the Department and the regulated community to concentrate their resources on the processes containing the reactive hazard substances that pose the greatest risk to the public. Similar rationales were used when the TCPA toxic and flammable substances were listed as EHSs. After the reactive hazard substances program is implemented and evaluated, the Department will determine the need to modify the reactive hazard substances listed in Table I, Part D.

67. COMMENT: Two commenters stated that the Department's use of a heat of reaction of 100 calories per gram of reactive hazard substance mixture for triggering the need to evaluate a process for TCPA coverage is arbitrary and unsubstantiated. These commenters did not offer an alternative to the 100 calories per gram heat of reaction.(28, 35, 40)

RESPONSE: The Department believes that an exothermic reaction releasing 100 calories per gram of RHS Mixture is the appropriate value for the selection of RHS mixtures to be covered under the rules. The National Fire Protection Association (NFPA) in its NFPA 704, Identification of the Hazards of Materials for Emergency Response, (2001 Edition), defines substances that have an exothermic heat of reaction of greater than 100 calories per gram when combined with water as being in the Water

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Reactivity Hazard Degree Two category. Materials that have the water reactivity rating of 2 or higher are identified as reacting violently or explosively with water. Also, calculations show that a reaction with an exothermic heat of reaction of 100 calories per gram or greater would generate sufficient heat to raise the temperature of the contents in a vessel to a point where decomposition of the contents, runaway reaction, or excessive pressure generation could occur and cause an explosive over-pressurization of the vessel.

68. COMMENT: Several commenters stated that reactive hazard substance mixtures functional groups will add a tremendous cost burden to perform tests to demonstrate compliance or meet the risk management requirements of the rules.(8, 28, 29, 30, 38, 39, 40) Several of these commenters stated that many companies will have to test 20 or more process streams at a cost of \$3000 per stream to determine if they are covered by the rule since there is a lack of literature data on their products. These commenters suggested a simplified screening test method, such as the differential screening calorimetry (DSC) method, to assess reactivity; only those streams exhibiting reactivity would be subject to additional testing, thus reducing the number of streams that would be subject to more rigorous testing.(8, 30, 39)

RESPONSE: It is necessary for an owner or operator handling an RHS mixture to determine the heat of reaction under the conditions specified in the rule because this determination identifies those reactive mixtures that present a severe reactive hazard. The rule allows the owner or operator to make this determination by various methods: testing, literature search or calculation.

The Department acknowledges that screening tests such as the DSC are available to make the heat of reaction determination. To clarify this, the Department has revised N.J.A.C. 7:31-6.3(b)2iv(1) to state that if testing is performed, it must be an acceptable calorimetry test over the specified temperature ranges. The proposal required that the calorimetry test be made under adiabatic (no heat loss or heat

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gain) conditions, which is a more rigorous and expensive test than the DSC. With the modification made on adoption, the DSC is now an acceptable test.

The DSC costs approximately \$500-\$1,000 per test. The DSC provides limited reaction data. If the owner or operator uses the DSC test and determines that the mixture exceeds the 100 calorie/gram limit and that the mixture is subject to the rule, a more detailed calorimetry test may need to be performed to obtain the required process safety information. The more rigorous calorimetry test costs approximately \$2,500.

The knowledge made available by these tests will help facility operators become better informed of the potential consequences of mixing specified chemicals, and better able to minimize or avoid those consequences. Having that knowledge is essential to responsible and safe operation of a facility that does not unnecessarily endanger people and property outside the facility boundary.

69. COMMENT: Many commenters stated that the use of the heat of reaction to determine threshold exceedance of mixtures containing one or more functional groups listed at N.J.A.C. 7:31-6.3(a) Table I, Part D, Group II, ignores the complexity of chemical processing and does not adequately address the number of tests that will be required, the costs of such testing, and the impact of this testing on industry resources. (2, 8, 28, 29, 30, 37, 38, 39, 40)

RESPONSE: The Department believes that because of the complexity of chemical processing, owners and operators should be aware of the risks to the public associated with their processes. In order to ensure the risks of accidental releases are minimized, the owners and operators must have complete knowledge of the properties of the chemicals in their processes, including whether the chemicals are unstable and at what temperature they pose a risk to the public. During the workgroup meetings that preceded the development of the proposal, several workgroup members advised the Department that this



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information is already known and available to process owners and operators. The Department realizes that those sources that do not already have this information will incur additional costs for literature searches or actual testing to determine the heats of reaction for the intentional reactions taking place in their processes. The costs of obtaining this information, which are discussed in detail in the Economic Impact statement of the proposal, are not excessive when compared to the costs to the owner or operator and the public of a catastrophic accidental EHS release.

70. COMMENT: One commenter asked the Department how many processes would need to be registered if several regulated RHS mixtures are present for a single product in a batch process. The commenter also asked the Department how many processes would need to be registered if the process vessels are used for more than one batch process. (29)

RESPONSE: N.J.A.C. 7:31-7.2(a)3iii requires the owner or operator to identify and register each covered process having an RHS mixture and provide in the Risk Management Plan registration section the heat of reaction range in calories/gram of RHS mixture as listed at Table II of N.J.A.C. 7:31-6.3(c). Furthermore, the rule states that if more than one RHS mixture is present in the process vessel at different times, the owner or operator shall register the RHS mixture having the highest heat of reaction range as shown on Table II. Therefore, if an owner or operator runs a series of steps of reactions that include RHS mixtures in a particular process vessel in making a particular product, the owner or operator should register one process with the RHS mixture that has the highest heat of reaction. If the owner or operator manufactures other products that include other RHS mixtures in this same process vessel at another time (as in a campaign basis for batch processes), the owner or operator should register only one process under the RHS mixture with the highest heat of reaction of all the different products.

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“Process” is defined at 40 CFR 68.3 and incorporated by reference with changes at N.J.A.C. 7:31-1.1(c)2 as “any activity at a facility involving a regulated substance including any use, storage, manufacturing, handling, or on-site movement of such substances, or combination of these activities. For the purposes of this definition, any group of vessels that are interconnected, or separate vessels that are located such that a regulated substance could be involved in a potential release, shall be considered a single process.” Therefore, if the owner or operator handles other RHS mixtures that meet or exceed the threshold quantity in additional process vessels that are interconnected, this would be one process as stated in the “process” definition, and should be registered as one process in the Risk Management Plan.

71. COMMENT: One commenter asked the Department whether documentation would need to be submitted to the Department under N.J.A.C. 7:31-3.4(b) 90 days prior to manufacturing a new product that results in a new RHS mixture if 1) the functional groups do change and 2) if the functional groups do not change.(29)

RESPONSE: The answer to the question depends on whether the process is registered and approved or if it is a new covered process. The requirement at N.J.A.C. 7:31-3.4(b) applies to an approved Program 2 covered process. If the new product is being manufactured in a previously approved process that is included in the approved risk management program, manufacturing a new product with a new RHS mixture (regardless of whether the functional groups do or do not change) in the vessel would constitute a change to the existing process requiring the owner or operator to implement Program 2 change procedures. Although the owner or operator would be required to review this change and update the appropriate risk management program documents, the owner or operator would not have to comply with the 90 day requirements for a new covered process under N.J.A.C. 7:31-3.4(b). If the new product will be manufactured in a vessel that was not previously part of a covered process with an approved risk

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management program, it would be considered a new covered process requiring the owner or operator to comply with the requirements of N.J.A.C. 7:31-3.4. It should be noted that similar requirements for Program 3 covered processes are found at N.J.A.C. 7:31-4.11

72. COMMENT: One commenter supported the use of heat of reaction if it is used only as a screening tool to aid in determining process coverage since heat of reaction alone does not provide adequate information about the hazards of a reaction.(35)

RESPONSE: The Department believes that using the heat of reaction criterion to determine which RHS mixtures having a listed functional group are to be subject to the rule is an appropriate method for determining applicability since the listed functional groups are known to impart instability. Once it is determined that the substance an owner or operator is using is subject to the rule, the owner or operator must then develop more detailed reactivity data in the safety information (for Program 2) or process safety information (for Program 3). The owner or operator must then evaluate the hazards, risks and potential release scenarios involved with handling the reactive hazard substance or RHS mixture in the hazard review (for Program 2) and process hazard analysis and risk assessment (for Program 3).

73. COMMENT: Several commenters stated that the Department failed to demonstrate that the presence of functional groups will cause accidental releases of EHSs.(8, 16, 29, 30, 38, 39) Many of these commenters stated that the functional groups at N.J.A.C. 7:31-6.3(a) Table I, Part D, Group II are a tool for evaluating potential reactive hazards but they have to be applied practically and within the context of their intended role.(8, 29, 30, 38, 39)

RESPONSE: The functional groups listed in Table I, Part D, Group II are those that are known to impart instability when combined with other substances. By applying the criterion of the exothermic heat of

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reaction of 100 calories per gram of RHS mixture the owner or operator will identify those combinations of substances that pose a severe reactive hazard that could result in a catastrophic accident. The Department believes that this is a practical approach for determining coverage under the rule.

74. COMMENT: Several commenters requested that the Department extend the exemption at N.J.A.C. 7:31-6.3(b)1 for Group I reactive hazard substances specifically formulated to inhibit the reactive hazard to include Group II functional group substances that are specifically formulated with other substances to inhibit the reactive hazard.(8, 30, 39)

RESPONSE: Group I substances that are handled in combination with an appropriate inhibitor are exempt because they do not present a reaction risk. However, Group II substances are intentionally mixed with other substances. If an inhibitor is initially included with a reactant during its shipping or storage, steps must be taken to deactivate the inhibitor to initiate the reaction in the process vessel. The reaction could then proceed to generate heat and to become hazardous if not properly controlled. Consequently, the inhibitor exemption is not appropriate for Group II reactive hazard substance mixtures.

75. COMMENT: Several commenters asserted that the Department should delete the exemption at N.J.A.C. 7:31-6.3(b)1 for individual EHSs listed in Table I, Part D, Group I combined with chemical substances that act as inhibitors because inhibitors are unreliable safeguards that need to be monitored to ensure the proper concentration of the inhibitor is maintained. These commenters stated that the only way to ensure that the concentration of the inhibitor is maintained is to regulate process equipment, procedures and operator training under the TCPA program.(5-7, 9, 12-15, 17, 19-25, 27, 32, 34, 36, 41, 42)

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RESPONSE: The Department believes that the risk of a catastrophic accident is minimized if the inhibitor concentration is monitored and maintained. However, in response to this comment, N.J.A.C. 7:31-6.3 (b)1 is revised on adoption to clarify that owners or operators utilizing this exemption must document that the inhibitor concentration is maintained.

76. COMMENT: Many commenters asked the Department to reconsider the requirement at N.J.A.C. 7:31-6.3(b)2iv(1) to determine the heat of reaction over a temperature range that is 300°C higher than the maximum projected or observed processing temperature and to modify the language in the rule to require testing over a lower temperature range. These commenters asserted that the Department provided no rational basis for this requirement in the rule and suggested that the rule language should reflect testing alternatives and current testing methodologies. (8, 28, 29, 30, 35, 37, 38, 39, 40)

RESPONSE: The Department, after reviewing these comments, acknowledges that the rule as proposed required the determination of the heat of reaction to be made at temperatures that exceed acceptable standards and practices. The Department is therefore revising N.J.A.C. 7:31-6.3(b)2iv(1) and (2) on adoption to reflect testing alternatives and current testing methodologies. N.J.A.C. 7:31-6.3(b)2iv requires that the owner or operator determine and document the heat of reaction either by testing (under N.J.A.C. 7:31-6.3(b)2iv(1)) or by another generally accepted practice such as literature review or engineering calculations (under N.J.A.C. 7:31-6.3(b)2iv(2)). Both N.J.A.C. 7:31-6.3(b)2iv(1) and (2) have been revised to state that the heat of reaction must be determined over the lowest temperature range of the following: up to 400° C, 100° C higher than the maximum projected or observed processing temperature, or the maximum achievable temperature.

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77. COMMENT: Two commenters stated that since color pigments are always used in intentional mixtures, the testing process required in proposed N.J.A.C. 7:31-6.3(b)2, which may assume unrealistic maximum vessel temperatures, could result in an unwarranted regulatory burden. The commenters noted that the term “maximum achievable temperature” is not defined at N.J.A.C. 7:31-6.3(b)2. (28, 40)

RESPONSE: As stated in a previous response, N.J.A.C. 7:31-6.3(b)2iv requires that the owner or operator determine and document the heat of reaction either by testing or by another generally accepted practice such as literature review or engineering calculations. In response to the comments received, both N.J.A.C. 7:31-6.3(b)2iv(1) and (2) have been revised to state that the heat of reaction must be determined over the lowest temperature range of the following: up to 400° C, 100° C higher than the maximum projected or observed processing temperature, or the maximum achievable temperature. These temperature ranges are consistent with current calorimetric testing practices. Therefore, the Department believes that the specified temperatures required to determine the heat of reaction of an RHS mixture are now realistic and appropriate.

The maximum achievable temperature is the highest temperature that could be attained in the process vessel taking into consideration the vessel design and assuming abnormal conditions affecting the heating and cooling systems connected to the vessel or the potential chemical reactions involving the vessel’s contents. Examples of abnormal conditions include: 1) a vessel having a steam heating system where maximum heating is applied to the vessel; 2) a vessel having a cooling system where there is a total loss of cooling; 3) an exothermic reaction generating heat that takes place inside the vessel; and 4) credible scenarios of contamination causing an unintended exothermic reaction that can occur to the normally non-reacting vessel contents.

In addition, it is important to note that calorimetry testing may not need to be performed. Engineering calculations or information from a literature search may be used to document the heat of

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reaction instead of performing the calorimetry test. Also, the rule specifies that the heat of reaction be determined over the lowest of the three temperature ranges discussed above. It is possible that the maximum achievable temperature may be the lowest of the three temperature ranges for a particular owner or operator. For example, an RHS mixture may be handled in a process vessel in which no reaction takes place up to the maximum achievable temperature. If the owner or operator provides documentation that verifies that there is no reaction (thus the heat of reaction is less than the 100 calories/gram of RHS mixture) up to the maximum achievable temperature, no further action is required. The owner or operator would not be required to perform calorimetry testing and the mixture would not be subject to the rule.

78. COMMENT: Two commenters stated that the Department should clarify whether RHS mixtures resulting from unintended reactions will be covered under the rules since the proposal summary discusses the Department's intent to regulate "intentional reactions." These commenters stated that since the summary indicates that only a small number of facilities are intended to be regulated, there is no indication that the proposed rule is intended to include regulation of all ink, paint, plastic, wax, and foodstuff industries. They suggested that, if this is the case, the rule should be amended to remove this unnecessary ambiguity in calculating the maximum temperature of a process vessel. If the process vessel is operated at ambient temperature and ambient pressure and no reactions occur, or the boiling point of water is the maximum operating temperature, the process should be exempt from further analysis or regulation.(28, 40)

RESPONSE: The intent of this rule is to regulate those facilities handling reactive hazard substances at or above defined threshold quantities that have the potential for a catastrophic accident. The number of facilities the Department expected to regulate under the rule was an estimate based on available

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information. Since not all mixtures will result in intentional reactions under normal conditions, the Department's intent is to regulate mixtures that may or may not undergo a chemical reaction (under their normal operating condition) but which are capable of undergoing an exothermic chemical reaction (under abnormal conditions). The definition of reactive hazard substance mixture at N.J.A.C. 7:31-1.5 and at N.J.A.C. 7:31-6.3(b)2, shows the Department is regulating a combination of substances intentionally mixed in a vessel that is capable of undergoing an exothermic chemical reaction. Therefore, owners or operators of covered processes in the ink, paint, plastic, wax and foodstuff industries that have an RHS mixture that meets the criteria of N.J.A.C. 7:31-6.3(b)2 will be regulated.

79.COMMENT: Several commenters suggested the insertion of the phrase ...“as appropriate for the reaction being evaluated” ...at N.J.A.C. 7:31-6.3(b)2i to ensure the owner or operator uses the appropriate heat of reaction for the type of reaction being considered. (5-7, 9, 12-15, 17, 19-25, 32, 36, 41, 42)

RESPONSE: The Department agrees that the heat of reaction should be appropriate for the reaction being evaluated. However, as explained in response to comment 6, the Department is modifying N.J.A.C. 7:31-6.3(b)2i to delete the terms “heat of combustion,” “heat of decomposition,” and “heat of explosion,” since the definition of “heat of reaction” at N.J.A.C. 7:31-1.5 includes the heat energies (such as heat of combustion, heat of decomposition and heat of explosion) for the type of reaction taking place. To be consistent with the change made at N.J.A.C. 7:31-6.3(b)2i, the Department has also deleted the terms “heat of combustion,” “heat of decomposition,” and “heat of explosion” at N.J.A.C. 7:31-7.2(a)3iii.



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80. COMMENT: Several commenters asked the Department to delete N.J.A.C. 7:31-6.3(b)2ii since the heat of solution or dilution can be significant in some chemical reactions and should be considered in order to properly determine coverage under the program. (5-7, 9, 12-15, 17, 19-25, 27, 32, 36, 41, 42)

RESPONSE: The Department is adopting N.J.A.C. 7:31-6.3(b)2ii as proposed. The intent of these rules is to cover potential uncontrolled or runaway chemical reactions that could cause a catastrophic accident. Heats of solution or dilution are heats that are generated during the mixing of liquid substances. The heat generated by solution or dilution are not the same as the heat of reaction and do not pose the same degree of hazard. The Department's intent is to regulate reactive hazard substances that have a potential for a catastrophic accident.

81. COMMENT: Several commenters asked the Department to change Heat of Reaction (Exothermic) ( $-\Delta H_R$ ) to Heat of Reaction ( $\Delta H_R$ ) at N.J.A.C. 7:31-4.2(c) [sic] and change the values in the table accordingly, to be consistent with common scientific and engineering practices and to prevent confusion of scientists and engineers.(5-7, 9, 12-15, 17, 19-25, 27, 32, 36, 41, 42)

RESPONSE: The Department believes that the commenters were referring to N.J.A.C. 7:31- 6.3(c). The format of Table II and the designations of the heat of reaction are consistent with common scientific and engineering practices as shown in textbooks, such as Chemical Engineers' Handbook by Robert H. Perry and Cecil H. Chilton, and other technical literature. Therefore, this change has not been made.

82. COMMENT: Several commenters asked the Department to correct Table II at N.J.A.C. 7:31-6.3(c) to prevent confusion where the heat of reaction falls within two listed ranges. (8, 30, 35, 39)

RESPONSE: The Department has corrected the heat of reaction ranges in Table II upon adoption to avoid the ambiguity the commenters identify by replacing the second " $\leq$ " in each line by " $<$ ".

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83. COMMENT: Several commenters suggested that the Department withdraw the reactive hazard substance mixtures component of the proposal, citing various reasons such as faulty estimations of the rule's impact, failing to recognize real-world reactive chemistry and proposing unreasonable requirements without adequate discussion. (2, 8, 29, 30, 35, 38, 39)

RESPONSE: In the interest of public safety, the Department is committed to requiring risk management programs to prevent industrial accidents caused by intentional or unintentional chemical reactions. Historically, reactive hazard substances have been involved in industrial accidents, making their regulation under TCPA appropriate. The dangers of reactive chemicals have been recognized. For example, as described in the December 2002 report issued by the United States Chemical Safety and Hazard Investigation Board entitled Improving Reactive Hazard Management, reactive incidents are a significant chemical safety problem and the hazards from combinations of chemicals must be addressed by industry and regulatory agencies. The impact of complying with the rules was discussed in the four workgroup meetings and was again discussed in the Economic Impact statement in the rule proposal at 35 NJR 942-945. The Department understands that owners and operators may incur additional costs to comply with TCPA program requirements but believes that the reduction in the risk to the public outweigh these costs.

84. COMMENT: Several commenters asked the Department to withdraw the rules regarding reactive hazard substance mixtures, functional groups and heats of reaction. These commenters stated that reactive hazard substance mixture rules are overly broad to be effective, difficult for the regulated community to understand and follow, and will negatively impact the regulated community. (2, 8, 16, 30, 35, 38, 39)

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RESPONSE: The Department believes that the rule clearly identifies RHS mixtures and corresponding threshold quantities for the purpose of determining the facilities that will be covered under the program. The facilities that will be subject to the rules are those posing a serious risk of a catastrophic accidental release to the surrounding community. The rules detail how to determine whether or not a facility is covered under the program. Companies handling RHS mixtures should already employ personnel with sufficient technical expertise to implement these rule requirements. Members of the workgroup assembled in the summer of 2002, which consisted of representatives of industry, environmental groups, labor unions, and consultants, indicated that the intent and requirements in pre-proposal draft versions of the rule were understood. Under N.J.A.C. 7:31-7.5(b), owners or operators with covered processes with newly listed EHSs from Table I, Part D, at or above threshold quantities must comply with the TCPA rules by September 30, 2004. Prior to that date, the Department will prepare guidance documents and hold workshops to assist the regulated community in understanding and complying with the rules.

85.COMMENT: One commenter asked the Department to postpone regulation of reactive hazard substances until the issue is addressed by USEPA in the Federal Accidental Release Prevention Program and the Occupational Safety and Health Administration (OSHA) in the Process Safety Management Program. This will avoid problems with possible inconsistencies between State and Federal programs. This commenter recommended a “sunset” clause that would allow new Federal regulations to supersede the State rules for reactives.(35)

RESPONSE: Although the United States Chemical Safety and Hazard Investigation Board (CSIB) has recommended to OSHA and USEPA that they address reactive hazard substances in their regulatory programs, neither agency has yet done so. If USEPA promulgates rules for reactive hazard substances, the Department will evaluate those rules in light of the incorporation by reference of 40 CFR 68 to

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determine if changes are needed to the State rules. The Department does not believe it should wait for the Federal agencies to act, given the recent history of industrial accidents in New Jersey.

86. COMMENT: Two commenters suggested the Department provide specific exemptions from the reactive hazard substance mixture requirements. (29,35) One commenter suggested exempting facilities that have implemented the Responsible Care Process Safety Management Code and OSHA Voluntary Protection Program (VPP) Merit and Star facilities.(29). Other commenters recommended that the Department exempt facilities that can document best management practices (BMPs) and have a strong safety record.(8, 30, 39)

RESPONSE: Programs such as the Responsible Care Process Safety Management Code and OSHA Voluntary Protection Program (VPP) Merit and Star programs are voluntary and an owner or operator may opt to discontinue participation at any time. Also, the owner or operator participating in one of these programs may not be currently required under those programs to implement all the requirements for reactive hazard substances included in these rules.

Companies that can document best management practices and have a strong safety record also may not be currently implementing all requirements in these rules, which the Department has determined necessary as part of a risk management program. Also, the Department has found in its implementation of the TCPA program that companies have experienced decreases in risk management program performance during periods of personnel turnover, management change, or change in ownership, even for companies that had previous documented best management practices and strong safety records. Therefore, no exemptions are provided for participants in these voluntary programs.

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87. COMMENT: One commenter asked the Department to exempt aqueous solutions in atmospheric process vessels. This commenter suggested a test to confirm that the heat of reaction up to the boiling point of the solution would not cause the boiling point to be exceeded. This commenter also proposed a definition for “Atmospheric process vessel” as a process vessel which is vented to the atmosphere, and cannot be sealed and pressurized beyond 14.7 psig.(29)

RESPONSE: As stated in the response to comment 76, adopted N.J.A.C. 7:31-6.3(b)2iv requires that the owner or operator determine and document the heat of reaction either by testing or by another generally accepted practice such as literature review or engineering calculations. Both N.J.A.C. 7:31-6.3(b)2iv(1) and (2) have been revised to state that the heat of reaction must be determined over the lowest temperature range of the following: up to 400° C, 100° C higher than the maximum projected or observed processing temperature, or the maximum achievable temperature. The Department believes that these temperature ranges are consistent with current calorimetric testing practices.

The owner or operator can determine the heat of reaction up to the maximum achievable temperature, as it is defined. If the owner or operator determines that the heat of reaction over this temperature range does not result in an exothermic reaction that meets or exceeds the 100 calories per gram of RHS mixture criterion, or if the process vessel’s capacity is less than the specified threshold quantity, the process would not be subject to the rule. If an atmospheric vessel contains an RHS mixture and is subject to the rule, it is still important for the owner or operator to implement the various elements of the risk management program. For example, the venting system must be properly designed and maintained, operators must be properly trained, and emergency procedures must be in place. Therefore, the Department does not believe any other specific exemptions for RHS mixtures such as for atmospheric vessels are necessary or appropriate.

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88. COMMENT: Several commenters asked the Department to consider exempting certain applications.

Four commenters suggested an exclusion for intrinsically low or non-gaseous/pressure producing exothermic reactions that can be contained within the design of the process or do not present a credible release scenario, thus meeting the intent of the TCPA. (8, 30, 35, 38, 39) One of these commenters suggested language for the exemption if no credible catastrophic release scenario can be developed and/or the process has been engineered to ensure there will be no loss of containment under any circumstances.(35)

RESPONSE: Although a process containing reactive hazard substances can be designed to ensure that there will be no loss of containment under any circumstances, the Department believes that it still is important for such processes to be maintained and operated under a risk management program.

Although these processes may be designed, built, and operated with various safeguards, most of the prevention program elements still must be implemented to verify the proper functioning of the process equipment and safeguards.

89. COMMENT: Several commenters asked the Department to include a de minimis value of 10% or greater for by-products formed as a result of an intentional reaction. These commenters stated that requiring facilities to evaluate the product of the reaction, the reactants and more significant by-products is not cost effective since these small quantities are not likely to result in an RHS incident.(8,30,39)

RESPONSE: If an RHS mixture has only a small amount or percentage of the functional group present but still meets the heat of reaction criterion, then the RHS mixture still presents a hazard for a catastrophic accidental release and should be subject to the rule.

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90. COMMENT: One commenter urged the Department to delete peracetic acid from Table I, Part D, Group I, and to delete peroxyacids, which includes peracetic acid, and chlorite salts from Group II, until it can investigate the situation with industry, assess the actual hazards, and propose a more focused approach. The commenter stated that the use of peracetic acid solution as a sanitizer and disinfectant is widespread and will impact many users having to comply with TCPA program requirements. This commenter stated that “chlorite salts”, which are used as cleaners, sanitizers, and disinfectants, and sodium hypochlorite, more commonly known as bleach, are ubiquitous in industry and society. Sodium chlorite, a common disinfectant, is used by mixing it with an acid such as hydrochloric acid – an activity that could now fall within the Department’s TCPA program. The commenter urged the Department to withdraw this listing until it can assess the actual hazards of the group of chemicals and their uses and propose a more focussed approach. (2)

RESPONSE: The listing of peracetic acid (less than 40%) was based on the National Fire Protection Association’s standard NFPA 49, Hazardous Chemicals Data, 1994 edition, amended 2001. The Department believes that clarification is needed about the way this substance has been listed by NFPA. Peracetic acid typically is mixed with acetic acid as a carrier during shipping, since the acetic acid inhibits the explosivity of the peracetic acid. The NFPA 49 states that peracetic acid is thermally unstable, shock and friction sensitive if it exceeds 56% concentration of peracetic acid, due to evaporation of the acetic acid carrier. The commenter is correct that peracetic acid is an ingredient of commercial sanitizers where the peracetic acid is typically 5 to 15 percent of the product by weight, and other ingredients such as hydrogen peroxide, acetic acid, and water make up the rest of the product. On adoption, the Department is revising the listing in Table I, Part D, Group I for peracetic acid to provide that the substance of interest is greater than 56% peracetic acid. Therefore, commercial sanitizers having a concentration of under 56% will not be covered.

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The Department believes that the listing of chlorite salts in the list of Table I, Part D, Group II functional groups is appropriate. Chlorite salts include compounds such as copper chlorite, nickel chlorite, silver chlorite, ammonium chlorite, potassium chlorite, and sodium chlorite. These chlorite salts are explosive and sensitive to heat or impact. Sodium hypochlorite (bleach) has the chemical formula NaOCl, and so is not included in the chlorite salt functional group ( $\text{ClO}_2^-$ ). Concerning the comment on the mixing of sodium chlorite with hydrochloric acid, the Department believes that this intentional combination should be regulated as an RHS mixture if all the applicable criteria of N.J.A.C. 7:31-6.3(b)2 are met because of its potential for a reaction with catastrophic consequences.

91. COMMENT: Many commenters stated that color pigments, such as azo, diazo and nitroaryl compounds, are not reactive and should be withdrawn from the TCPA list of functional groups at N.J.A.C. 7:31-6.3(a) Table I, Part D, Group II (4, 6, 16). Because of their widespread use, regulating these stable compounds will impact many different industries including printing, food, and cosmetics. (2, 8, 28, 29, 30, 37, 39, 40)

RESPONSE: The Department recognizes that many azo, diazo, and nitroaryl compounds may be extremely stable. The owner or operator may rely on technical source material to document the stability of these compounds in accordance with N.J.A.C. 7:31-6.3(b)2iv(2). If documentation is not available, the owner or operator is required to determine the  $\Delta H_R$  to prove the stability of the compound of interest.

92. COMMENT: Several commenters asked the Department to delete the prohibition of the use of administrative controls that limit the maximum quantity in the reaction vessel at N.J.A.C. 7:31-7.2(a)3ii for consistency with the rules for registration of toxic and flammable substances. (8, 30, 35, 39)



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RESPONSE: As stated in the response to comment 23, the Department believes the properties of reactive EHSs are sufficiently different from those of toxic and flammable EHSs to warrant differences in the manner in which they are regulated. Reactions involving reactive hazard substances are more complex, making them subject to more errors and failures. Therefore, the Department is adopting N.J.A.C. 7:31-7.2(a)3ii as proposed.

#### TCPA Risk Management Plan submission and updates

93. COMMENT: Several commenters stated that flammable materials that are already listed in Table I have the potential to be explosive and should have their hazards evaluated. These commenters asked the Department to amend N.J.A.C. 7:31-7.2(a)3iv to incorporate these flammable materials into the reactive hazard substance program.(5-7, 9, 12-15, 17, 19-25, 27, 32, 36, 41, 42)

RESPONSE: Flammable substances listed on Table I are currently subject to the TCPA risk management planning requirements. Also, the reactivity hazards of flammable substances must be evaluated for process safety information in accordance with 40 CFR 68.65(b), incorporated (with changes) at N.J.A.C. 7:31-4.1(c)24. The Department believes flammable substances are adequately covered under the TCPA program and that additional regulatory requirements for flammable substances are unnecessary at this time.

94. COMMENT: Several commenters asked the Department to clarify how it intends to segregate reactive hazard substances from flammables to avoid a facility having to register twice for the same compound. (8, 16, 30, 39)

RESPONSE: For RHS mixtures containing a toxic or flammable substance listed in Table I, the rules at N.J.A.C. 7:31-7.2(a)3iv require that the owners and operators register only the toxic or flammable

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substance and identify the covered process and number of vessels containing the RHS mixture at or above threshold quantities(see N.J.A.C. 7:31-7.2(a)2v). This will avoid the registering of the same substance twice and having to pay the hazard unit fee twice for the same substance.

95. COMMENT: Several commenters requested that the Department change the proposed rule at N.J.A.C. 7:31-7.2(b) to allow owners and operators 90 days, rather than the 30 days, to submit updates for increases of maximum inventory. These commenters stated that the 30 day requirement will be difficult to implement since many facilities use a monthly accounting system to reconcile their raw material and product inventories. Since the current rule allows 180 days to submit the update, the proposed reduction to 30 days would be drastic with no real benefit.(8, 30, 35, 38, 39)

RESPONSE: The Department believes that inventory information should be able to be compiled in 30 days. An update may reflect a projection of a planned future increase in maximum registered inventory in the Risk Management Plan or a past exceedence of the registration quantity. The owner or operator should know of a planned inventory increase from the projections of the process inputs and outputs. Also, under N.J.A.C. 7:31-1.1(c)5ii, the owner or operator is required to develop a management system to record the daily quantity of each EHS contained in storage vessels and shipping containers. Therefore, the owner or operator should know the quantity of EHSs on site every day and be aware of any unplanned increase in maximum inventory above the registered quantity. Data on the actual quantity of EHSs should always be known and available to emergency responders, who need information on the magnitude of risk to the neighboring community. The Department also needs this information to help prioritize and schedule its audits and inspections.

The decrease in the time period for submitting maximum inventory updates was also intended to facilitate the calculation of the annual fees and prepare the fee assessment bills. Changes in the

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maximum inventory affects the number of regulated EHS hazard units in the State and ultimately the fee charged per hazard unit. An increase in the number of hazard units at a stationary source may mean a lower fee value for each hazard unit assessed. Therefore, inventory increases that occur near the end of the year have the potential to impact the fee assessment of all other regulated sources. The Department proposed the 30 day notification to ensure inventory increases that occur after October 1<sup>st</sup> would be reflected in the assessment. In response to the comment, however, the Department is modifying the notification period at N.J.A.C. 7:31-7.2(b) to 60 days. Increasing the notification period to 60 days will give owners and operators more time to gather the needed information while still accomplishing the Department's objective of obtaining more timely updates of inventory increases.

### Penalties

96. COMMENT: One commenter asked the Department to increase all penalties listed in Table III at N.J.A.C. 7:31-11.4(c) by 1000%. This commenter stated that penalties are so minor that people routinely ignore them and are not prosecuted enough for violations.(31)

RESPONSE: The revised penalty table, which specifies each individual violation with a separate penalty amount, will enable the Department to assess a penalty for each item of non-compliance. For example, an owner or operator of a Program 2 covered process who fails to investigate an accident or potential catastrophic event may be assessed a penalty not only for failing to comply with N.J.A.C. 7:31-3.1(c)7 (see N.J.A.C. 7:31-11.4(c) 152) but also for each of the violations listed in Table III at N.J.A.C. 7:31-11.4(c) associated with the accident investigation, preparation of the summary report, and review of the findings (see N.J.A.C. 7:31-11.4(c)153-161). Therefore, the penalty could be as high as \$16,000 rather than the \$5,000 penalty for failure to investigate the accident. The new penalty table enables the

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Department to assess penalties that are commensurate with the violations. The TCPA penalty table, Table III, will be reviewed again when the Grace Period rules for the program are proposed.

97. COMMENT: Several commenters asked the Department why it did not develop and promulgate, at N.J.A.C. 7:31-11.4(c), minor/non-minor violations pursuant to the Fast Track Compliance Law of 1995. These commenters stated that the establishment of grace periods, as intended in that Act, would allow new registrants to concentrate on protecting the environment from accidental releases rather than on minor items that would not compromise the program. (8, 16, 30, 38, 39)

RESPONSE: The Department anticipates proposing minor/non-minor violations for the TCPA program pursuant to the Fast Track Compliance Law in 2004. Because of the complexity of the TCPA readoption, the Department determined to propose the readoption separate from the grace period rules in another rulemaking. The grace period rules will focus on designating each violation listed in Table III as either a minor violation, subject to a grace period, or a non-minor violation.

### **Summary of Agency- Initiated Changes**

The Department is making the following changes upon adoption to correct or clarify the language in the proposal:

1. At N.J.A.C. 7:31-1.5 item 1 of the proposed definition of “industrial complex” the Department is changing “catastrophe” to “catastrophic” for grammatical sense.
2. At N.J.A.C. 7:31-2.2(b)2 the Department is clarifying that the worst case release quantity is the maximum capacity of the largest process vessel containing an RHS or RHS Mixture. This

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revision is needed for consistency with the changes made at N.J.A.C. 7:31-6.2(h) in response to comments received on the proposal and the language as proposed at N.J.A.C. 7:31-7.2(a)3ii.

3. At N.J.A.C. 7:31-3.1(c)1ii(5), the Department is deleting the requirement for owners and operators to provide information concerning the amount of toxic or flammable EHSs capable of being generated for individual RHSs due to inadvertent mixing with incompatible substances, decomposition and self-reaction. This change is being made for consistency with a similar requirement at N.J.A.C. 7:31-4.1(c)26, which requires the identity, but not the amount of the toxic or flammable EHSs capable of being generated to be included in the reactivity data of the safety information.
4. At N.J.A.C. 7:31-6.2(g) the Department is correcting the reference to Table A with Table II.
5. At N.J.A.C. 7:31-9.1(a) the Department is correcting the term “Environment Hazardous Substance Accident Risk Assessment (EHSARA)” to “Extraordinarily Hazardous Substance Accident Risk Assessment (EHSARA)”.
6. At N.J.A.C. 7:31-11.4(c) Table III, the Department is changing the descriptions of eleven categories of offense in the penalty table to reflect language changes made to the corresponding rule requirements in response to the comments received and changes initiated by the Department discussed above. The changes to the penalty table are at N.J.A.C. 7:31-11.4(c) 102,104-106, 118, 184, 245, 259, 555, 557, and 570.
7. At N.J.A.C. 7:31-11.4(c) Table III, Category of Offense item number 118, the Department is deleting the word “potential” to be consistent with revisions made upon adoption of the corresponding rule requirement at N.J.A.C.7:31-3.1(c)1ii(5).

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### Federal Standards Analysis

The portion of the Federal Standards Analysis in the proposal that addressed the exceedance of the TCPA risk management requirements as compared with the Federal program did not expressly note that for Program 3 and Program 2 the amended TCPA rules require reactivity data related to EHSs. The Federal Standards Analysis below includes a paragraph discussing those requirements.

Executive Order No. 27 (1994) and P.L.1995, c.65 require State agencies that adopt, readopt, or amend State regulations that exceed any Federal standard or requirements to include in the rulemaking document a comparison with Federal law. This readoption of the TCPA rules at N.J.A.C. 7:31 with amendments includes the requirements of the federal accidental release prevention program (ARP) program at 40 CFR 68, which were incorporated by reference into the TCPA rules in 1998. Based on its past experience in implementing a release prevention program since 1988 and the mandates of the TCPA, the Department supplemented the Federal rules with additional requirements at that time. The TCPA rules contain requirements that are more stringent and/or broader in scope than the Federal rules at 40 CFR 68. Many of these requirements are statutory mandates from the TCPA that predate Section 112(r) of the Federal Clean Air Act Amendments of 1990 that established the Federal ARP program. Other requirements that exceed Federal standards are needed to protect the public from the threat of accidental releases of EHSs in New Jersey, which is more highly industrialized and densely populated than other states.

The TCPA rules and the Federal ARP rules currently regulate toxic and flammable substances. There are more toxic substances regulated as EHSs under New Jersey's TCPA Accidental Release Prevention program than under the Federal program. Listed below are the toxic substances on the TCPA

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EHS list that are not regulated toxic substances under the Federal program. The basis for the selection criteria used for listing substances is found in the TCPA definition of extraordinarily hazardous substance (EHS). The TCPA list is comprised of toxic substances at threshold quantities that meet the statutory definition of EHS which is any substance “. . . in sufficient quantities . . . such that its release into the environment would produce a significant likelihood that persons exposed will suffer acute health effects resulting in death or permanent disability.” The selection criterion used by the Department in 1988 for including substances on the EHS list, the Substance Hazard Index (SHI), fulfills the statutory requirement to regulate substances having significant potential for lethal acute toxicity and high volatility.

The SHI is a single value computed for a substance based on the following two factors combined as a ratio: equilibrium vapor concentration at 20 degrees Celsius divided by the Acute Toxicity Concentration (ATC) or the lethal concentration to five percent of the exposed population (LC<sub>5</sub>). The greater the volatility and the greater the acute toxicity (that is, the lower the acute toxicity concentration), the greater the SHI of a substance will be. The TCPA SHI criterion used for selecting TCPA toxic substances is the specific SHI value of 1,388, which reflects the equilibrium vapor concentration and ATC of 36 percent concentration solution of hydrogen chloride (hydrochloric acid). All toxic substances regulated under TCPA are as hazardous as this substance, which in itself is highly hazardous and regulated as an EHS.

SUBSTANCES ON THE TCPA EHS LIST THAT ARE NOT  
ON THE  
USEPA

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TOXIC SUBSTANCES LIST  
(Note: Substances with asterisks are also listed on  
the  
EPA flammable substances list.)

<u>NAME OF EHS</u>	<u>CAS NUMBER</u>	<u>SHI</u>
ACETALDEHYDE*	00075-07-0	6579
ALLYL CHLORIDE	00107-05-1	13384
BORON TRIBROMIDE	10294-33-4	1447
BROMINE CHLORIDE	13863-41-7	10000
BROMINE	07789-30-2	45132
PENTAFLUORIDE		
CARBON MONOXIDE	00630-08-0	1751
(10% by volume or greater)		
CARBONYL FLUORIDE	00353-50-4	27778
CHLORINE	13637-63-3	175439
PENTAFLUORIDE		
CHLORINE TRIFLUORIDE	07790-91-2	104167
CHLOROPICRIN	00076-06-2	6579
CHLOROPRENE	00126-99-8	1419
CYANOGEN*	00460-19-5	28571
DIAZOMETHANE	00334-88-3	100000
DICHLOROACETYLENE	07572-29-4	346260
DICHLOROSILANE*	04109-96-0	36765
DIETHYLAMINE	00109-89-7	1493
DIMETHYLAMINE*	00124-40-3	4975
ETHYL MERCAPTAN*	00075-08-1	2100
ETHYLAMINE*	00075-04-7	8157
HEXAFLUOROACETONE	00684-16-2	36364
HYDROBROMIC ACID	10035-10-6	2105
(conc. 62% or greater)		
HYDROGEN BROMIDE	10035-10-6	20000
(anhydrous)		
ISOPROPYLAMINE*	00075-31-0	8103
KETENE	00463-51-4	588235
METHACRYLALDEHYDE	00078-85-3	6316
METHYL BROMIDE	00074-83-9	38462
METHYL	00075-54-7	1548
DICHLOROSILANE		
METHYL	00453-18-9	39277
FLUOROACETATE		
METHYL	00421-20-5	92105
FLUOROSULFATE		
METHYL IODIDE	00074-88-4	18716
METHYL VINYL KETONE	00078-94-4	389254
METHYLAMINE*	00074-89-5	10000
NITROGEN DIOXIDE	10102-44-0	141398
(10% by volume or greater)		
NITROGEN TETROXIDE	10544-72-6	141398
10% by volume or greater)		
NITROGEN TRIFLUORIDE	07783-54-2	5000
NITROGEN TRIOXIDE	10544-73-7	141398
OSMIUM TETROXIDE	20816-12-0	95943
OXYGEN DIFLUORIDE	07783-41-7	6666667



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OZONE	10028-15-6	2083333
PENTABORANE	19624-22-7	750000
PERCHLORYL FLUORIDE	07616-94-6	25974
PHOSPHORUS	07783-55-3	1890
TRIFLUORIDE		
PROPYLAMINE	00107-10-8	1413
SELENIUM	07783-79-1	200000
HEXAFLUORIDE		
STIBINE	07803-52-3	333333
SULFUR MONOCHLORIDE	10025-67-9	1864
SULFUR PENTAFLUORIDE	05714-22-7	738158
SULFURYL FLUORIDE	02699-79-8	3311
TELLURIUM	07783-80-4	1000000
HEXAFLUORIDE		
TETRAFLUROHYDRAZIN	10036-47-2	20000
E		
THIONYL CHLORIDE	07719-09-7	73680
TRICHLOROSILANE*	10025-78-2	25155
TRIFLUOROCHLOROETHY	00079-38-9	11547
LENE*		
TRIMETHOXYSILANE	02487-90-3	9474
TRIMETHYLAMINE*	00075-50-3	4022
VINYL TRICHLOROSILANE	00075-94-4	1551

USEPA's criteria for selecting substances differ from TCPA's SHI criterion. In developing the Federal rules, USEPA used two separate criteria, one representing substance toxicity, and the other volatility.

The USEPA criteria are not based on a specific substance, but are designed to limit the list to a practical number of the most hazardous substances. The USEPA criteria for selecting substances are a median lethal concentration (LC<sub>50</sub>) of 2.0 grams per cubic meter (g/m<sup>3</sup>) or lower in all but the case of chloroform and a vapor pressure of 10 torr or higher at 25 degrees Celsius.

A total of 47 substances meet both TCPA's and USEPA's selection criteria. For example, a substance such as acrylonitrile is listed by USEPA because it has an LC<sub>50</sub> of 1.27 g/m<sup>3</sup> and a vapor pressure of 115 torr at 25 degrees Celsius. The SHI for acrylonitrile is 1,896 and, therefore, it is listed in the TCPA regulations.

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A total of 57 substances meet the TCPA SHI criterion but not USEPA criteria. For example, boron tribromide was selected for the TCPA list because it has an SHI of 1,447. It has sufficient vapor pressure, 55 torr, to meet the first part of the USEPA criteria, but with an  $LC_{50}$  of  $5.2 \text{ g/m}^3$ , it does not meet the second part of the USEPA criteria.

Finally, 30 substances meet USEPA criteria but not the TCPA SHI criterion. For example, carbon disulfide meets USEPA criteria with an  $LC_{50}$  of  $1.0 \text{ g/m}^3$  and a vapor pressure of 360 torr at 25 degrees Celsius, but its SHI of 1,236 falls just below the TCPA SHI criterion of 1,388. These 30 substances are included in the readopted Table I, Part B list because the TCPA program must regulate all Federally regulated toxic substances.

The threshold quantities assigned to the toxic EHSs were established to attain the statutory goal and were individually set by using the TCPA threshold determination method. Each threshold quantity established under this method is that quantity whose potential release over a one hour period at a point 100 meters from the property boundary would result in a death beyond the boundary. This method assumes a population density of 10,000 persons per square mile, a value chosen to reflect the average population density of New Jersey cities. The 100 meter distance between the point of potential release and the site boundary was chosen as representative of distances to property boundaries in New Jersey. Each threshold quantity was calculated using dispersion modeling and mortality curves that directly reflect the ATC of the respective substance, and its equilibrium vapor pressure at 20 degrees Celsius for substances that are normally liquid.

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USEPA also determines threshold quantity of a substance by a method different from that used by the TCPA program. While substances regulated by both programs represent hazard to the community at specific acute toxicity concentrations, in the TCPA program each substance is assigned a unique threshold value. The TCPA program determined the threshold value as the quantity whose release would disperse as a cloud covering an area having specified population density to result in a consequence of death or permanent disability. In contrast, the USEPA method ranks substances by a toxicity/volatilization ratio into classes to which arbitrary threshold values have been assigned. Thus, USEPA assigns several substances with disparate characteristics to share the same threshold value.

As a result of the differences in threshold quantity determination, the TCPA threshold quantity is lower than the USEPA threshold quantity in 54 out of 58 cases where the toxic substance is listed on the readopted TCPA list (Table I, Part A) and the readopted USEPA list (Table I, Part B). There are 12 sources currently regulated under TCPA that would be unregulated if the Department adopted the Federal thresholds for toxic substances.

The Department believes the existing TCPA threshold quantity values are appropriate for New Jersey because of the number of small congested industrial sites in New Jersey handling such substances and its high population density in areas surrounding those industrial sites, which the TCPA threshold determination method takes into account. A TCPA threshold quantity release modeled by this method would result in the potential for 15 persons to suffer from acutely toxic effects with, statistically, one fatality. By comparison, the average USEPA threshold quantity of a substance when modeled by the same TCPA threshold determination method shows the potential for 606 persons to suffer from acutely toxic effects with statistically 108 fatalities. For 33 of the 47 toxic substances listed by both TCPA and

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USEPA, the USEPA threshold quantity, if released, based on the same acute toxic effect criteria would potentially affect from 127 persons to as many as 11,426 persons, as compared to 15 persons potentially affected by the release of the TCPA threshold quantity of the same substance.

The TCPA toxic substances that are not also on the USEPA toxic substances list, but which meet the SHI criteria, represent hazards at least as severe as those of substances on the USEPA list. The benefits of their continued inclusion as EHSs are significant reductions of scientifically supported estimates of potential deaths or permanent disability in the communities surrounding these existing sites.

Owners and operators having EHSs regulated only under TCPA or having EHSs at lower State thresholds incur the costs of implementing a risk management program and paying annual fee assessments. The Department believes the benefits of protecting the public and the environment outweigh any incurred costs, which were described fully in the Economic Impact statement at 35 N.J.R. 942-945 in the proposal published on February 18, 2003.

Several owners or operators are subject to these rules because one or more of their processes generates, or is capable of generating, an EHS at threshold quantities over a one-hour period of time. The TCPA statute explicitly includes “generation” of extraordinarily hazardous substances as a regulated activity as well as storage and handling, while the Federal ARP program does not include generation. One group that may be affected by this if their processes are capable of generating ozone at threshold quantities is New Jersey water purveyors using ozone to disinfect potable water. Because ozone is not a Federally regulated substance, these owners and operators come under the purview of TCPA solely because ozone is a State regulated EHS generated by their processes.

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There is a possibility that an owner or operator can be subject to TCPA and not be subject to the Federal ARP program because New Jersey regulates EHSs at quantities that meet or exceed the threshold quantity while Federal program applicability is based on exceeding, rather than meeting, the threshold. While the chances are small of an owner or operator having the threshold quantity of a regulated substance without exceeding it, it is possible that this difference in determining program applicability may subject an owner or operator to the TCPA rules.

As discussed above, the TCPA rules list a greater number of toxic substances as EHSs than the number of toxic substances regulated under the Federal ARP program. Also, some of the toxic substances regulated under both programs have lower State thresholds. Because of this, the TCPA program is broader in scope than the Federal program and affects more owners and operators. Present owners or operators that are affected by New Jersey's more inclusive EHS list or lower thresholds are already regulated under TCPA and have existing approved risk management programs.

In addition, owners or operators in New Jersey may come under the purview of TCPA because of their EHS mixtures. Under the Federal program, amounts of regulated substances contained in mixtures where the concentration of the regulated substance is below one percent by weight or its partial pressure is less than 10 millimeters of mercury, need not be considered when determining whether more than a threshold quantity is present at the stationary source. TCPA requires that amounts of EHSs contained in mixtures at a concentration at or above the ATC must be considered when determining whether more than a threshold quantity is present. In general, the ATC of EHSs are much less than one percent. However, the stricter requirement for determining thresholds for EHSs in mixtures

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should have very little effect on the scope of stationary sources subject to the rules since EHSs are generally found stored at much higher concentrations. The different concentration cutoffs may affect whether equipment in a downstream process is subject to the rules.

Owners and operators regulated under TCPA but not the Federal ARP program for any of the reasons discussed above (EHS list and threshold differences, EHS generation, having an EHS at, but not above, the threshold quantity, or differences in calculating EHSs in mixtures) will be expected to continue to implement their risk management programs, and incur the costs associated with these activities. These costs were discussed in the Economic Impact statement in the February 18, 2003 rule proposal.

The Department will continue to regulate flammable substances at the current 10,000 pound threshold, which is the same threshold as the Federal program.

The listing of reactive chemicals as EHSs is the most significant amendment to the TCPA rules. Regulation of reactive substances is not part of the Federal ARP rules. The listing of reactive substances as EHSs, subject to the TCPA rules, is due to their identification as contributors to the cause of recent industrial accidents. The Department has determined that TCPA coverage of reactive substances is warranted to protect the public and the environment from accidental releases. Adding reactive hazard substances to the EHS list will ensure that owners or operators handling reactive substances at quantities that meet or exceed the thresholds develop and implement risk management programs to minimize the risk of an accidental release.

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The Department considered the causes of past industrial accidents and weighed the projected cost of compliance against the costs to the public and the environment associated with a reactive hazard substance accident and determined that the benefit to the public derived from regulation outweighs the cost of compliance. For example, two such incidents occurred at Napp Technologies in Lodi (1995) and Morton International in Paterson (1998). These incidents were the result of reactive chemistry interactions and demonstrate the need to regulate reactive hazard substances under the State accidental release prevention program. The incident at Napp killed five workers, sent 40 residents to hospitals, generated smoke that required the evacuation of hundreds more residents, and required action by over 900 emergency response workers from 30 municipalities and the Department. In addition to the fatalities and injuries that resulted from the accident, 110 jobs were lost as well as \$20-\$50 million in annual revenue from the sale of Napp's products. The Morton explosion injured nine employees, two seriously. In addition, the explosion spattered the adjacent neighborhood with a yellow-brown mixture of hazardous materials, requiring extensive remediation of the site by Morton and staff resources from the Department for clean-up supervision and monitoring.

The readopted rule will also require owners and operators of New Jersey stationary sources to comply with additional State risk management program requirements due, in part, to the statutory mandates of the TCPA and to the experience gained by the Department in implementing its accidental release prevention program over the past 15 years.

The TCPA statute defines a risk management program as containing eight elements designed to minimize the risk of EHS accidents. The Federal ARP program, which mirrors the State TCPA program

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in its intent and scope, contains similar elements but lacks the detail for developing and implementing these risk management program elements.

In developing the TCPA rules in 1998 and 2003, the Department evaluated the Federal rules against the TCPA rules and found that the State program defines, with more specificity, how to develop program elements that reach risk management goals. Wherever the Department believed a performance based, less prescriptive Federal regulatory approach would not compromise public safety, the Federal rules were incorporated by reference with no changes. This gives owners and operators the latitude to develop individual risk management programs and maintain program documentation in accordance with company policies and procedures as long as all aspects of the eight required elements are reflected and properly documented.

There are several TCPA program elements that are more stringent than their Federal counterparts. The State requirement for the performance of a risk assessment as part of the process hazard analysis at N.J.A.C. 7:31-4.2 is one such element. Risk assessment is one of the eight risk management program elements originally mandated by the TCPA statute. The risk assessment element reflects TCPA statute requirements to anticipate circumstances that could result in environmental accidents and take the necessary steps to prevent their occurrence. Risk assessment is commonly defined as a quantitative analysis to determine risk reduction measures that should be implemented by identifying release scenarios, estimating their consequences, and calculating their likelihood. For Program 2 covered processes, there are no additional risk assessment requirements. The Department determined that since Program 2 processes are generally less complex, the information obtained from the USEPA's hazard assessment and hazard review is sufficient to comply with the TCPA mandated risk



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assessment requirement. However, the Department currently requires that for Program 3 covered processes an estimate of the consequences be made by performing dispersion modeling to determine whether a toxic concentration of the EHS will extend beyond the source boundary, and an estimate of the likelihood of equipment failure. The Federal rules require that only a process hazard analysis be performed, but do not specify that dispersion modeling or likelihood analysis be included. Personnel to perform the TCPA risk assessment may be supplied by the owner or operator's staff or by consultants. There is a cost estimated at \$240.00 (6 hours x 40/hr) to update the risk assessment every five years. In addition to these periodic updates, it may also be necessary for New Jersey owners and operators to perform a process hazard analysis with risk assessment if an anticipated process or equipment change is likely to have offsite impacts.

The Department is adopting an amendment requiring a state-of-the-art evaluation of risk reduction options for owners and operators of Program 3 covered processes as part of their process hazard analysis with risk assessment (PHA/RA). As discussed above, risk assessment is one of the eight risk management program elements mandated by the TCPA statute. An evaluation of options for risk reduction is part of the risk assessment. State-of-the-art is defined in the context of risk reduction as current technology that is readily available at reasonable cost. Although these adopted rules require an evaluation of currently available technologies to reduce the risk of accidental releases, an owner or operator is not required to incorporate these measures if they determine the technology will not be cost effective. The Department estimates owners and operators will incur costs once every five years to research and evaluate state of the art options for risk reduction. The cost of researching state-of-the-art technologies depends on the expertise of the reviewer and the complexity of the covered process. The additional cost of a state-of-the-art evaluation is anticipated to be under \$1000 every five years. The

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potential benefit to the public of the use of state- of-the-art technologies exceeds the cost of the evaluation of new technologies.

Another adopted TCPA amendment that is more stringent than the Federal rules is the State requirement to evaluate the use of inherently safer technologies when designing and building new covered processes. The concept of inherently safer technologies incorporates risk reduction by minimizing or eliminating the threat of EHS releases by substituting less hazardous substances or reducing the quantity of EHSs used in a process or designing the process to minimize the potential for an accidental EHS release. The federal Accidental Release Prevention program at 40 CFR 68 contains no risk reduction requirements. Designing and incorporating inherently safer technologies into a new process before it is built will lower operational costs and protect the public and the environment by minimizing the use of EHSs and limiting the potential for accidental releases.

The TCPA rules also contain additional risk management program requirements, readopted at N.J.A.C. 7:31-3 and 4, which are described below, that are more comprehensive than the Federal program. A comparison of the TCPA rules to the Federal rules by the Department determined that additional requirements are needed in order to implement the goals of State law. The cost of these additional requirements is expected to be minimal for currently regulated owners and operators since they are already complying with the requirements of the rule.

Under the Program 2 safety information required at 40 CFR 68.48, the Department has amended N.J.A.C. 7:31-3.1(c) to include reactivity data for EHSs. The Program 3 process safety information required at 40 CFR 68.65 Federal requirement of reactivity data has been modified at N.J.A.C. 7:31-4.1(c)24 to require more detailed information. The Department has determined from its studies related

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to reactivity data that this information is necessary to understand the hazards and risks involved with all EHSs that undergo chemical reactions. The Department believes that the ability to identify and prevent possible catastrophic release scenarios is essential for public safety.

The TCPA rules supplement Federal requirements for the Program 2 and Program 3 release prevention programs. For Program 2, the Department requires the submittal of reports every three years (triennial reports) containing program information updates and describing significant program changes, EHS accidents, hazard review results, and compliance audits that occurred over the past three years (See N.J.A.C. 7:31-3.3). There is no Federal requirement for the submittal of reports for Program 2. The TCPA rules require owners and operators of Program 3 covered processes to submit annual reports to the Department. The annual or triennial report is a program update and summary of certain required activities that the Department uses to prepare for and conduct on-site audits, which will continue under these rules. The Department is adopting amendments which specify the information that must be submitted for the annual or triennial reports. The minimal cost of such reporting is the cost for gathering and submitting the required information.

Owners and operators of Program 2 covered processes are subject to more emergency response planning than is required under the Federal program. While the Federal program allows any owner or operator whose employees will not respond to emergencies to coordinate response activities with local agencies, the readopted TCPA rules offer this option only for Program 2 covered processes and only after coordination with local agencies is documented. The Department also requires owners and operators of Program 2 and Program 3 covered processes, whose employees will respond to emergencies, to conduct a full scale drill annually. The Department believes regular drills are necessary to ensure the adequacy of the owner or operator's emergency response plan and these drills are effective

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in protecting public safety. The Federal program does not specify the frequency of full scale drills. At a source with complex Program 3 covered processes, this cost could be as high as \$6,500 per drill based on two technical effort hours at \$40.00 per hour and 256 production effort hours at \$25.00 per hour.

The TCPA readopted rules also specify that an owner or operator of a Program 3 covered process shall conduct an internal compliance audit annually rather than every three years as required under the Federal program. See N.J.A.C. 7:31-4.1(c)13. Annual audits enable owners and operators to monitor their programs frequently and make necessary changes to ensure the risk of accidental releases is minimized. The cost of performing an audit is minimal, approximately \$3,300, when compared to the benefits derived from the avoidance of an accidental release.

Owners and operators of New Jersey stationary sources will continue to comply with additional state requirements because the additional information or activity required has been beneficial to ensure public safety, to enhance the quality of risk management programs beyond what is specified in the Federal rules, or to enable the Department to adequately monitor risk management programs for covered processes. These requirements are not expected to significantly raise the cost of program implementation, but will ensure that owners and operators develop meaningful, effective risk management programs that ensure the safety of the public by reducing the risk of a catastrophic accidental EHS release.

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**Full text** of the readoption can be found in the New Jersey Administrative Code at N.J.A.C. 7:31.

**Full text** of the adopted amendments and new rules follows (additions to proposal indicated in boldface with asterisks **\*thus\***; deletions from proposal indicated in brackets with asterisks **\*[thus]\*** ):

## SUBCHAPTER 1. GENERAL PROVISIONS

### 7:31-1.1 Incorporation by reference

(a)-(b) (No change from proposal.)

(c) The following provisions of 40 CFR 68 Subpart A are incorporated by reference with the specified changes:

1.-2. (No change from proposal.)

3. 40 CFR 68.10, Applicability:

i. (No change from proposal.)

ii. At 40 CFR 68.10(a)1, delete June 21, 1999 and add the following, “September 30, 2004, for covered processes with EHSs listed in N.J.A.C. 7:31-6.3 in Table I, Part D **\*[or LPG gases listed in Part C]\***. For covered processes with EHSs listed in N.J.A.C. 7:31-6.3 Table I Part A, B, or C **\*[(except for LPG gases listed in Part C)]\***, the obligation to comply with this chapter shall continue and the obligation to revise an owner or operator’s risk management program shall be in accordance with the schedule set forth in N.J.A.C. 7:31-7.5.”

iii.-iv. (No change from proposal.)

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4.-5. (No change from proposal.)

7:31-1.5 State definitions

...

“Heat of reaction” or  $\Delta H^*_R$  means the change in the amount of heat energy of the substances contained in a process vessel that occurs during a chemical reaction expressed as calories per gram[.]\*; **or specifically, the energy content of the reaction products minus the energy content of the reactants.**\* The heat of reaction includes **heat energies such as**\* the heat of decomposition, heat of explosion or heat of combustion depending on the chemical reaction(s) taking place.

“Industrial complex” means the overall property of at least two contiguous TCPA regulated stationary sources which meet the following criteria:

1. Owners and operators of each source provide **access to**\* the hazard review, process hazard analysis with risk assessment and accident or potential \*[catastrophe]\* **catastrophic**\* event investigation reports to the qualified person or the assigned designee of each of the other stationary sources **, and the qualified person or the assigned designee of each source signs a certification statement annually that the records have been reviewed**\*:

2.-4. (No change from proposal.)

“Inherently safer technology” means the \*[design of a new]\* **principles or techniques incorporated in a newly designed and constructed**\* covered process to minimize or eliminate the potential for an EHS accident \*[by utilizing techniques]\* that include, but are not limited to, the following:

1.-4. (No change from proposal.)

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...

**\*“Maximum achievable temperature” means the highest temperature that can be attained during abnormal conditions in the process vessel taking into consideration the vessel design, heating and cooling systems connected to the vessel, and the potential chemical reactions involving the vessel’s contents.\***

...

“Reactive hazard substance (RHS) mixture” means an EHS that is a combination of substances intentionally mixed in a process vessel and is capable of undergoing \*[a]\* **\*an exothermic\*** chemical reaction which produces toxic or flammable EHSs or energy. \*[The negative value of the heat of reaction of an RHS mixture is greater than or equal to 100 calories per gram of RHS mixture.]\* **\*An RHS mixture has a heat of reaction which, by convention, is expressed as a negative value for an exothermic reaction, that has an absolute value greater than or equal to 100 calories per gram of RHS mixture.\*** RHS mixtures include a reactant, product, or byproduct that is a chemical substance or a mixture of substances having one or more chemical functional groups specified in N.J.A.C. 7:31-6.3 (a), Table I, Part D, Group II.

## SUBCHAPTER 2. HAZARD ASSESSMENT

### 7:31-2.2 Reactive hazard substance (RHS) hazard assessment

- (a) (No change from proposal.)
- (b) The owner or operator shall use the following parameters and methods for the RHS hazard assessment:
  - 1. (No change from proposal.)

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2. Worst case release quantity: the\*[ greatest amount contained in a single vessel]\*

**\*maximum capacity of the largest process vessel containing an RHS or RHS**

**mixture\***, not taking into account administrative controls that limit the maximum quantity.

3. TNT-equivalent explosion method or any commercially or publicly available explosion modeling techniques, provided the techniques account for the modeling conditions and are recognized by industry as practicable as part of current practices. Proprietary models that account for the modeling conditions may be used provided the owner or operator allows the implementing agency access to the model and describes model features and differences from publicly available models upon request. When using a TNT-equivalent explosion method, the owner or operator shall use the following parameters:

- i. The heat of \*[combustion]\* **\*reaction\*** of the RHS or RHS mixture;
- ii. One hundred percent \*[yield factor]\* **\*of the potential heat release (heat of reaction) assumed to contribute to the explosion\*** for an RHS mixture in a process vessel;
- iii. Twenty-eight percent \*[yield factor]\* **\*of the potential heat release (heat of reaction) assumed to contribute to the explosion\*** for a N.J.A.C. 7:31-6.3

Table I, Part D Group I RHS in a storage vessel; and

4. (No change from proposal.)

(b) (No change from proposal.)



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### SUBCHAPTER 3. MINIMUM REQUIREMENTS FOR A PROGRAM 2 TCPA RISK MANAGEMENT PROGRAM

#### 7:31-3.1 Incorporation by reference

(a)-(b) (No change from proposal.)

(c) The following provisions are incorporated by reference with the specified changes:

1. 40 CFR 68.48 (a), Safety information, at the end add the following:

i. (No change from proposal.)

ii. Reactivity data applicable to the process in which an EHS is being used, handled, stored or generated that includes the following:

(1)-(2) (No change from proposal.)

(3) Thermodynamic and reaction kinetic data including: heat of reaction, temperature at which instability (uncontrolled reaction, decomposition, and/or polymerization) initiates, and rate of energy release **\*at that temperature\***;

(4) (No change from proposal.)

(5) Information showing the identity **\*[and amount]\*** of toxic or flammable EHSs capable of being generated for individual RHSs listed at N.J.A.C. 7:31-6.3(a), Table I, Part D, Group I due to inadvertent mixing with incompatible substances, decomposition, and self-reaction.

2.-10. (No change from proposal.)

#### 7:31-3.3 Triennial reports

(a)-(b) (No change from proposal.)

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#### 7:31-3.5 Hazard review report

(a) The owner or operator shall prepare a hazard review report which includes:

1.-3. (No change from proposal.)

4. The names\* **positions**\* and affiliation of the hazard review participants;

5.-9. (No change from proposal.)

(b) (No change from proposal.)

### SUBCHAPTER 4 – MINIMUM REQUIREMENTS FOR A PROGRAM 3 TCPA RISK MANAGEMENT PROGRAM

#### 7:31-4.1 Incorporation by reference

(a)-(b) (No change from proposal.)

(c) The following provisions of 40m CFR 68 Subpart D are incorporated by reference with the specified changes:

1.-23. (No change from proposal.)

24. 40 CFR 68.65(b)(4) after “Reactivity data” add “applicable to the process in which an EHS is being used, handled, stored or generated that includes the following:

i. (No change from proposal.)

ii. Thermodynamic and reaction kinetic data including: heat of reaction, temperature at which instability (uncontrolled reaction, decomposition, and/or polymerization) initiates, and rate of energy release data **\*at that temperature\***; and

iii. (No change from proposal.)

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25.-26. (No change from proposal.)

#### 7:31-4.2 Process hazard analysis with risk assessment for specific pieces of EHS

equipment or operating alternatives.

(a)-(b) (No change from proposal.)

(c) The owner or operator shall identify all release scenarios that have an offsite impact of the endpoint criteria specified at (b)3iii and iv above.

1.-2. (No change from proposal.)

3. The owner or operator shall develop a risk reduction plan for the release scenarios requiring state-of- the-art evaluation determined pursuant to (c)1 and 2.\*[ The owner or operator shall utilize state-of–the-art risk reduction measures that will reduce the likelihood or consequence of the release.]\*

(d)-(f) (No change from proposal.)

(g) The owner or operator shall evaluate inherently safer technology for \*[new]\* **newly designed and constructed**\* covered processes in addition to performing the state-of-the-art evaluation pursuant to N.J.A.C. 7:31-4.2(c)1, 2i, and 2ii. The owner or operator shall document recommendations from the inherently safer technology evaluation in accordance with N.J.A.C. 7:31-4.2(c), (d) and (e).

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## SUBCHAPTER 6. EXTRAORDINARILY HAZARDOUS SUBSTANCES

### 7:31-6.1 Incorporation by reference

(a)-(b) No change

(c) The following provisions are incorporated by reference with the specified changes:

1.-4. (No change from proposal.)

5. 40 CFR 68.130, all substances and their specified threshold quantities are incorporated by reference into two lists as follows:

- i. (No change from proposal.)
- ii. 40 CFR 68.130 Table 3 (and 4), List of Regulated Flammable Substances, including all future amendments and supplements **\*with the exception of propane (CAS No. 74-98-6), propylene (CAS No. 115-07-1), butanes (normal butane (CAS No. 106-97-8) or isobutane (CAS No. 75-28-5), and butylenes (1-butene (CAS No. 106-98-9, 2-butene (CAS No. 107-01-7), butene (CAS No. 25167-67-3), 2-butene-cis (CAS No. 590-18-1), 2-butene-trans (CAS No. 624-64-6), and 2-methylpropene (CAS No. 115-11-7))\*** are incorporated as N.J.A.C. 7:31-6.3(a), Table I, Part C.

### 7:31-6.2 Threshold quantity determination

(a)-(f) (No change from proposal.)

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(g) For intentional mixtures involving one or more functional groups listed in Table 1, Part D, Group II, the threshold quantity shall be based on the heat of reaction  $[(\Delta H)] \cdot (\Delta H_R)$  of the intended mixture as determined in accordance with N.J.A.C. 7:31-6.3(b)2iv and shall be derived from Table  $[A] \cdot II$  at N.J.A.C. 7:31-6.3(c).

(h) For the purpose of determining whether a threshold quantity of an RHS mixture is present in a process, the  $[\text{greatest amount of RHS mixture contained in a process vessel}] \cdot \text{maximum capacity of the process vessel containing the RHS mixture}$  shall be used. Administrative controls that limit the maximum quantity in the process vessel shall not be taken into account.

#### 7:31-6.3. Extraordinarily hazardous substances

(a) The substances listed in Table I, Parts A, B, and C, and D Group I and Group II (with its correlated thresholds listed in Table II at N.J.A.C. 7:31 6.3(c)) constitute the Department's extraordinarily hazardous substance list.

##### Table I

Part A ---EHS List (No change from proposal.)

Part B (No change from proposal.)

Part C

40 CFR 68.130 Table 3 (and 4) incorporated by reference with the exception of propane (CAS No. 74-98-6), propylene (CAS No. 115-07-1), butanes (normal butane (CAS No. 106-97-8) or isobutane

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**(CAS No. 75-28-5), and butylenes (1-butene (CAS No. 106-98-9, 2-butene (CAS No. 107-01-7), butene (CAS No. 25167-67-3), 2-butene-cis (CAS No. 590-18-1), 2-butene-trans (CAS No. 624-64-6), and 2-methylpropene (CAS No. 115-11-7)) \***

Table I, Part D, Group I

List of Individual Reactive Hazard Substances

	Substance	CAS #	Threshold Quantity (pounds)	Basis for Listing
1.	Acetyl Peroxide	110-22-5	2500	e
2.	Butyl Hydroperoxide tertiary	75-91-2	2500	e
3.	Butyl hypochlorite tertiary	none	2500	b
4.	Calcium dithionite or Calcium hydrosulfite	15512-36-4	5000	b
5.	Chlorodinitrobenzenes	97-00-7	2500	d, e
6.	Cumene Hydroperoxide	80-15-9	2500	e
7.	Dibenzoyl peroxide	94-36-0	2500	f
8.	Diethyl Peroxide	628-37-5	2500	e
9.	Diisopropyl Peroxydicarbonate	105-64-6	2500	e
10.	Dinitro phenol, dry or wet, less than 15% water as 2,4	51-28-5	2500	a
11.	Dinitro resourcinol (wetted with not less than 15% water)	35860-81-6	2500	a
12.	Dipicryl sulfide	2217-06-3	2500	a
13.	Di-tert-butyl Peroxide	110-05-4	2500	e
14.	Divinyl Acetylene	821-08-9	2500	e

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	Substance	CAS #	Threshold Quantity (pounds)	Basis for Listing
15.	Ethyl Nitrate	625-58-1	2500	e
16.	Ethyl Nitrite (solutions)	109-95-5	2500	d, e
17.	Isosorbide dintrate	88-33-2	2500	a
18.	Magnesium diamide	7803-54-4	2500	b
19.	m-Dinitrobenzene	99-65-0	2500	d
20.	Nitroglycerine (alcohol solution)	55-63-0	2500	e
21.	Nitromethane	75-52-5	2500	d, e
22.	o-Dinitrobenzene	528-29-0	2500	e
23.	p-Dinitrobenzene	100-25-4	2500	d
24.	Peracetic acid (*[less than 40%]* <b><u>greater than 56% peracetic acid</u></b> *)	79-21-0	2500	d, e
25.	Picric acid (wet, with not less than 10% water)	88-89-1	2500	d
26.	Potassium dithionite or Potassium hydrosulfite	14293-73-3	5000	b
27.	Propargyl bromide (3-Bromopropyne)	106-96-7	2500	d, e
28.	Silver picrate wetted with not less than 30% water	146-84-9	2500	a
29.	Sodium dithionite or Sodium hydrosulfite	7775-14-6	5000	b
30.	Trinitro benzene as 1,3,5 (wetted not less than 30 % water)	99-35-4	2500	a

*Basis for listing:*

*a = DOT 4.1*

*b = DOT 4.2*

*c = DOT 4.3*

*d = NFPA 49*

*e = NFPA 325*

*f = NFPA 432*

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Table I, Part D, Group II

Reactive Hazard Substance Mixtures Functional Groups

(For Threshold Quantity Determination See N.J.A.C. 7:31-6.3(b) and N.J.A.C. 7:31-6.3(c))

Functional Group(s)	Reactive Substance Class
1. $-C\equiv C-$	Acetylenic compounds
2. $-C\equiv C-M$	Metal acetylides
3. $-C\equiv C-X$	Haloacetylene derivatives
$\begin{array}{c} N=N \\ \diagdown \quad / \\ C \end{array}$	Diazirines
4. $CN_2$	Diazo compounds
5. $-C-N=O$	Nitroso compounds
$-N-N=O$	
6. $-C-NO_2$	Nitroalkanes, C-nitro and
$Ar-NO_2, Ar(NO_2)_n$	Nitroaryl and Polynitroaryl compounds
$C(NO_2)_n$	Polynitroalkyl compounds
$O_2NC-CNO_2$	Trinitroethyl orthoesters
$HC[OCH_2C(NO_2)_3]_3,$	
$C[OCH_2(NO_2)_3]_4$	
7. $-C-O-N=O$	Acyl or alkyl nitrites
8. $-C-O-NO_2$	Acyl or alkyl nitrates
9. $\begin{array}{c} >C-C< \\ \diagdown \quad / \\ O \end{array}$	1,2-Epoxides



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	Functional Group(s)	Reactive Substance Class
10.	MCN O C=N-O-M	Metal fulminates or aci-nitro salts, oximates
11.	$\begin{array}{c} \text{NO}_2 \\   \\ \text{C-F} \\   \\ \text{NO}_2 \end{array}$	Fluorodinitromethyl compounds
12.	-N-M	N-metal derivatives
13.	-N=Hg <sup>+</sup> =N-	Poly(dimercuryimmonium salts)
14.	-N-NO <sub>2</sub>	N-nitro compounds
15.	=N <sup>+</sup> -N-NO <sub>2</sub>	N-Azolium nitroimidates
16.	-C-N=N-C-	Azo compounds
17.	Ar-N=N-O-R	Arenediazoates
18.	ArN=N-S-Ar	Arenediazo aryl sulfides
19.	Ar-N=N-O-N=N-Ar	Bis(arenediazo) oxides
20.	Ar-N=N-S-N=N-Ar	Bis(arenediazo) sulfides
21.	$\begin{array}{c} \text{>C-N=N-N-C<} \\   \\ \text{R} \end{array}$ (R=H, CN, OH, NO)	Trizenes
22.	-N=N-N=N-	High-nitrogen compounds
	$\overline{\text{N-N=N-N=C-}}$	Tetrazoles
23.	-C-O-O-H	Alkylhydroperoxides
	$\begin{array}{c} \text{O} \\    \\ \text{R-C-O-OH} \end{array}$	Peroxyacids
24.	-C-O-O-C-	Peroxides (cyclic, diacyl, dialkyl,), peroxyesters
	$\begin{array}{c} \text{O} \\    \\ \text{-C-O-OR} \end{array}$	
25.	-O-O-M EOO <sup>-</sup> MOO <sup>-</sup>	Metal peroxides, peroxyacid salts

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Functional Group(s)	Reactive Substance Class
26. -O-O-E	Peroxoacids, peroxyesters
27. H <sub>3</sub> N Cr-OO-	Amminechromium peroxocomplexes
28. -N <sub>3</sub>	Azides (acyl, halogen, nonmetal, organic)
29. $\text{C}-\text{N}_2^+\text{O}^-$	Arenediazonium oxides
30. -C-N <sub>2</sub> <sup>+</sup> S <sup>-</sup>	Diazonium sulfides and derivatives, "Xanthates"
31. N <sup>+</sup> -HZ <sup>-</sup>	Hydrazinium salts
N <sup>+</sup> EO <sub>n</sub> <sup>-</sup>	Oxosalts of nitrogenous bases
32. -N <sup>+</sup> -OH Z <sup>-</sup>	Hydroxylaminium salts
33. -C-N <sub>2</sub> <sup>+</sup> Z <sup>-</sup>	Diazonium carboxylates or salts
34. [N Metal] <sup>+</sup> Z <sup>-</sup>	Amminemetal oxosalts
35. Ar-Metal-X	Halo-arylmets
X-Ar-Metal	Haloarenemetal δ-complexes
36. -N-X	Halogen azides
XN <sub>3</sub>	N-halogen compounds
$\begin{array}{c} \text{O} \quad \text{X} \quad \text{O} \\   \quad   \quad   \\ \text{C}-\text{N}-\text{C} \\   \quad   \quad   \\ \text{O} \quad \text{O} \quad \text{O} \end{array}$	N-haloimides
37. -N-F <sub>2</sub>	Difluoroamino compounds
-C(NF)NF <sub>2</sub>	<i>N,N,N</i> -trifluoroalkylamidines
38. N-O-	N-O compounds
39. -O-X	Hypohalites
XO <sub>n</sub>	Halogen oxides
-Cl-O <sub>3</sub>	Perchloryl compounds
ClO <sub>2</sub> <sup>-</sup>	Chlorite salts
R-O-Cl-O <sub>3</sub>	Alkyl perchlorates
RN <sup>+</sup> H <sub>3</sub> ClO <sub>4</sub> <sup>-</sup>	Aminium perchlorates

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Functional Group(s)	Reactive Substance Class
40. $* \left[ \left( \text{CH}-\text{CH} \right)_n \right] *$  $* \left( \text{C}-\text{C} \right)_n *$	Polymerization, alkene <b><u>*(vinyl) polymers and*</u></b> monomers <b><u>*thereof*</u></b>
41. $\left( \text{C}-\text{C} \begin{array}{l} \text{O} \\ \parallel \\ \text{N} \end{array} \right)_n$	Polymerization, *[amide]* <b><u>*polyamide polymers and*</u></b> monomers <b><u>*thereof*</u></b>
42. $\left( \text{C}-\text{C} \begin{array}{l} \text{O} \\ \parallel \\ \text{O} \end{array} \right)_n$	Polymerization, *[ester]* <b><u>*polyester polymers and*</u></b> monomers <b><u>*thereof*</u></b>
43. $\text{S}_2\text{O}_4^{--}$	Dithionites

Abbreviations: Ar = aromatic (benzene); M = metal; R = organic chain; X = halogen; E = nonmetal; Z = anion; n = integer variable; all other abbreviations are for the element symbols from the periodic table of elements

Note: Not all chemical bond symbols are shown.

(b) The following conditions apply for determining whether RHSs or RHS mixtures listed in Part D of Table I are subject to the requirements of this chapter.

1. Individual RHSs listed in Table I, Part D, Group I that are received, stored, and handled in combination with one or more other chemical substances specifically formulated to inhibit the reactive hazard (such as water reactivity, pyrophoric, or self-reacting) of the RHS shall be exempt from this chapter as long as the appropriate inhibitor concentration is maintained. **\*The owner or operator shall document that the inhibitor concentration is maintained.\***

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2. An RHS Mixture is a \*[chemical substance or]\* combination of substances that is intentionally mixed in a process vessel and is capable of undergoing \*[a]\* **an exothermic**\* chemical reaction which produces toxic or flammable EHSs or energy.

\*[The negative value of the heat of reaction of an RHS Mixture is]\* **An RHS mixture has a heat of reaction which, by convention, is expressed as a negative value for an exothermic reaction, that has an absolute value**\* greater than or equal to 100 calories per gram of RHS mixture. RHS mixtures include a reactant, product, or byproduct that is a chemical substance or a mixture of substances having one or more of the chemical functional groups specified in Table I, Part D, Group II.

i. The heat of reaction \*[ , heat of combustion, heat of decomposition, or heat of explosion]\* shall be \*[used]\* **determined**\* in accordance with (b)2iv below.

ii.-iii. (No change from proposal.)

iv. The owner or operator shall determine and document the heat of reaction by using one of the following methods:

(1) Testing the intended combination \*[under adiabatic conditions (no heat loss or heat gain)]\* in an acceptable calorimetry test over \*[a]\* **the lowest**\* temperature range \*[that is 300°]\* **of the following: up to 400° Celsius, 100°**\* Celsius higher than the maximum projected or observed processing temperature\*<sub>1</sub>\* or the maximum achievable temperature in the process vessel \*[ , whichever is lower]\*<sub>2</sub>;

(2) A generally accepted practice such as a literature review or engineering calculations applicable to the RHS Mixture over \*[a]\* **the lowest**\* temperature

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range \*[that is 300°]\* **of the following: up to 400° Celsius, 100°** Celsius higher than the maximum projected or observed processing temperature\* or the maximum achievable temperature in the process vessel \*, whichever is lower]\*;

(c) Table II – Reactive Hazard Substance Mixture Threshold Quantities

<u>Heat of Reaction (Exothermic) (-ΔH<sub>R</sub>)</u> <u>(calories/g of RHS Mixture)</u>	<u>Threshold Quantity(Pounds)</u>
100 ≤ - ΔH <sub>R</sub> * [≤] * * ≤ * 200	13,100
200 ≤ - ΔH <sub>R</sub> * [≤] * * ≤ * 300	8,700
300 ≤ - ΔH <sub>R</sub> * [≤] * * ≤ * 400	6,500
400 ≤ - ΔH <sub>R</sub> * [≤] * * ≤ * 500	5,200
500 ≤ - ΔH <sub>R</sub> * [≤] * * ≤ * 600	4,400
600 ≤ - ΔH <sub>R</sub> * [≤] * * ≤ * 700	3,700
700 ≤ - ΔH <sub>R</sub> * [≤] * * ≤ * 800	3,300
800 ≤ - ΔH <sub>R</sub> * [≤] * * ≤ * 900	2,900
900 ≤ - ΔH <sub>R</sub> * [≤] * * ≤ * 1000	2,600
-ΔHR ≥ 1000	2,400

(d) (No change from proposal.)

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#### 7:31-7.1 Incorporation by reference

(a)-(c) (No change from proposal.)

#### 7:31-7.2 TCPA risk management plan submission and updates

(a) All owners and operators of a covered process shall submit the following to the Department in a format to be specified:

1.-2. (No change from proposal.)

3. The owner or operator shall identify and register each covered process having an individual RHS or RHS mixture and provide the following information in the RMP registration section pursuant to 40 CFR 160(b)(7) incorporated at N.J.A.C. 7:31-7.1(a):

i.-ii. (No change from proposal.)

iii. For RHS mixtures, the heat of reaction range \*[(or heat of combustion, heat of decomposition, or heat of explosion, as applicable)]\* in calories/gram of RHS mixture as listed at Table II of N.J.A.C. 7:31-6.3(c). If more than one RHS mixture is present in the process vessel at different times, the owner or operator shall register the RHS mixture having the highest heat of reaction range as shown on Table II.

(b) In addition to the updates required by N.J.A.C. 7:31-7.1(c)3 through 5, all owners or operators of a covered process shall submit an update to the department within \*[30]\* **\*60\*** days of an increase in maximum inventory of a covered process.

#### 7:31-7.5 Schedule for risk management program implementation

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(a) (No change from proposal.)

(b) All owners or operators of covered processes having newly listed EHSs on Table I, \*[Part C or Table I]\* Part D, at or above threshold quantities, shall be in compliance with this chapter by [June 21, 1999] September 30, 2004.

(c) Owners or operators planning to put into EHS service a new covered process for an EHS listed in N.J.A.C. 7:31-6.3, Table I, Parts A, B, and/or C \*[(except for newly listed LPG EHSs),]\* shall comply with N.J.A.C. 7:31-3.4 for Program 2 covered processes or N.J.A.C. 7:31-4.11 for Program 3 covered processes.

(d) Owners or operators planning to put into EHS service a new covered process for an EHS listed in N.J.A.C. 7:31-6.3, Table I, Part D \*[or the newly listed LPG EHSs in Part C]\* on or after September 30, 2004, shall comply with N.J.A.C. 7:31-3.4 for Program 2 covered processes or N.J.A.C. 7:31-4.11 for Program 3 covered processes.

## SUBCHAPTER 9. WORK PLAN/ EHSARA

### 7:31-9.1 Work plan preparation

(a) An owner or operator who does not have an established risk management program as determined by the Department pursuant to N.J.A.C. 7:31-7.3 shall assist the Department in developing a work plan to perform an [Environmental] **Extraordinarily** Hazardous Substance Accident Risk Assessment (EHSARA) and develop a risk reduction plan.

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(b)-(d) (No change).

SUBCHAPTER 11. CIVIL ADMINISTRATIVE PENALTIES AND REQUESTS FOR  
ADJUDICATORY HEARINGS

7:31-11.4 Civil administrative penalty determination

(a)-(b) (No change from proposal.)

(c) The Department shall determine the amount of the civil administrative penalty for the offenses described in Table III below on the basis of the category of offense and the frequency of the violation as follows:

Categories of Offense	Cite	First Offense	Second Offense	Third and each Subsequent Offenses
1. – 101. (No change from proposal.)				
102. Failure to use the *[greatest amount held in a single vessel]* <b><u>*maximum capacity of the largest process vessel containing an RHS or RHS mixture*</u></b> , not taking into account administrative controls that limit the maximum quantity, as the worst case release quantity for the RHS hazard assessment.	N.J.A.C. 7:31-2.2(b)2	4,000	8,000	20,000
103. (No change from proposal.)				
104. Failure to use the heat of *[combustion]* <b><u>*[reaction]*</u></b> of the RHS or RHS Mixture when using a TNT-equivalent explosion method for the RHS hazard assessment.	N.J.A.C. 7:31-2.2(b)3i	4,000	8,000	20,000



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Categories of Offense	Cite	First Offense	Second Offense	Third and each Subsequent Offenses
105. Failure to use *[a]* 100 percent *[yield factor]* <b><u>*of the potential heat release (heat of reaction) assumed to contribute to the explosion*</u></b> for an RHS Mixture in a process vessel when using a TNT-equivalent explosion method for the RHS hazard assessment.	N.J.A.C. 7:31-2.2(b)3ii	4,000	8,000	20,000
106. Failure to use *[a]* 28 percent *[yield factor]* <b><u>*of the potential heat release (heat of reaction) assumed to contribute to the explosion*</u></b> for an RHS Mixture in a process vessel when using a TNT-equivalent explosion method for the RHS hazard assessment.	N.J.A.C. 7:31-2.2(b)3iii	4,000	8,000	20,000
107. – 117. (No change from proposal.)				
118. Failure to include information showing the identity of *[potential]* toxic or flammable EHSs capable of being generated for individual RHSs listed at N.J.A.C. 7:31-6.3(a) Table I, Part D, Group I due to inadvertent mixing with incompatible substances, decomposition, and self-reaction in the reactivity data applicable to the process in which an EHS is used, handled, stored or generated required to be compiled and maintained in the up-to-date-safety information for the regulated substances, processes, and equipment.	40 CFR 68.48(a), N.J.A.C. 7:31-3.1(c)1ii(5)	2,000	4,000	10,000
119.- 183. (No change from proposal.)				
184. Failure to prepare a hazard review report which includes the names*, <b><u>positions</u></b> *, and affiliation of the hazard review participants.	N.J.A.C. 7:31-3.5(a)4	500	1,000	2,500
185. – 244. (No change from proposal.)				

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Categories of Offense	Cite	First Offense	Second Offense	Third and each Subsequent Offenses
245. Failure to develop a risk reduction plan for release scenarios requiring a state of the art evaluation *[or Failure to utilize in the risk reduction plan state of the art risk reduction measures which will reduce the likelihood or consequence of the release.]*	N.J.A.C. 7:31-4.2(c)3	2,000	4,000	10,000
246. – 258. (No change from proposal.)				
259. Failure to evaluate inherently safer technology for *[new]* <b>*newly designed and constructed*</b> covered processes in addition to performing the state of the art evaluation pursuant to N.J.A.C. 7:31-4.2(c)1, 2i, and 2ii. or Failure to document recommendations from the inherently safer technology evaluation in accordance with N.J.A.C. 7:31-4.2(c), (d), and (e) for a new covered process.	N.J.A.C. 7:31-4.2(g)	2,000	4,000	10,000
260. – 554. (No change from proposal.)				
555. Failure to identify and register each regulated individual RHS and RHS mixture and provide in the RMP registration section pursuant to 40 CFR 68.160(b)(7) incorporated at N.J.A.C. 7:31-7.1(a) the heat of reaction range for RHS mixtures *[or heat of combustion, heat of decomposition, or heat of explosion, as applicable)]* in calories/gram of RHS mixture as listed at Table II of N.J.A.C. 7:31-6.3(c). or Failure to identify and register the RHS mixture having the highest heat of reaction range as shown on Table *[A]* <b>*II*</b> in the RMP registration section pursuant to 40 CFR 68.160(b)(7) incorporated at N.J.A.C. 7:31-7.1(a) when more than one RHS mixture is present in the process vessel at different times.	N.J.A.C. 7:31-7.2(a)3iii	1,000	2,000	5,000

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Categories of Offense	Cite	First Offense	Second Offense	Third and each Subsequent Offenses
556. (No change from proposal.)				
557. Failure to submit an update to the Department within *[30]* <b>*60*</b> days of an increase in maximum inventory of a covered process in addition to the updates required by N.J.A.C. 7:31-7.1(c)3 through 5.	N.J.A.C. 7:31-7.2(b)	2,000	4,000	10,000
558. – 569. (No change from proposal.)				
570. Failure to assist the Department in developing a work plan to perform an *[Environmental]* <b>*Extraordinarily*</b> Hazardous Substance Accident Risk Assessment (EHSARA) and develop a risk reduction plan.	N.J.A.C. 7:31-9.1(a)	2,000	4,000	10,000
571. – 592. (No change from proposal.)				

Based on consultation with staff, I hereby certify that the above statements, including the Federal Standards Analysis addressing the requirements of Executive Order 27 (1994), permit the public to understand accurately and plainly the purpose and expected consequences of this readoption with amendments. I hereby authorize this readoption.

\_\_\_\_\_  
Date

\_\_\_\_\_  
Bradley M. Campbell  
Commissioner