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DELAWARE DEPARTMENT OF NATURAL RESOURCES AND ENVIRONMENTAL CONTROL

DIVISION OF AIR AND WASTE MANAGEMENT

Regulation in Deletion as of Sept 89.
PROPOSAL

REGULATION FOR THE MANAGEMENT
OF EXTREMELY HAZARDOUS SUBSTANCES

Date: June 30, 1989

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FORMOSA.

CTL020332

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EXTREMELY HAZARDOUS SUBSTANCES
RISK MANAGEMENT REGULATIONS

Section 1. STATEMENT OF AUTHORITY

Pursuant to 7 Delaware Code, Chapter 77, the General Assembly of the State of Delaware has directed that regulations be prepared and adopted by the Department of Natural Resources and Environmental Control to require facilities having quantities and types of extremely hazardous substances subject to this regulation to take actions, subject to Department approval, to control and minimize the chances of sudden, accidental and catastrophic releases of such substances.

Section 2. PURPOSE

The purpose of this regulation is to protect the health and lives of persons in the vicinity of facilities having extremely hazardous substances on site from accidental, catastrophic releases of such substances beyond the facility boundary.

Section 3. POLICY

It is the obligation of the owner or operator of facilities having regulated quantities and types of extremely hazardous substances on site to take preventive actions required by this regulation to minimize the chances of sudden, accidental, catastrophic releases of such substances. The owner or operator of every regulated facility must prepare and implement a risk management program appropriate to the facility risk subject to Department inspection and approval.

Section 4. DEFINITIONS

"Act" means the Extremely Hazardous Substances Risk Management Act, Chapter 77 of Title 7, Delaware Code.

"Actual Distance to the Facility Boundary" means the distance from the nearest potential release point capable of generating a sufficient quantity to the property line or a public road whichever is closer.

"Actual Quantity" (AQ) means the sum of all the physical quantities of an extremely hazardous substance in whatever form at the maximum design capacity of the facility.

"Artificial Barricade" means an artificial mound or revetted wall of earth of a minimum thickness of three feet.

"Background Information Document" means a document that, among other things, contains the rationale for listing of EHS, provides acceptable methods for calculating sufficient quantities and potential release quantities, and provides additional information to assist the Registrant in developing a risk management program. The Background Information Document is for information purposes only and is not part of this regulation.

"Board" means the Environmental Appeals Board

"Catastrophic Event" means a sudden release of a sufficient quantity of an extremely hazardous substance, a pressure wave or a thermal exposure beyond the property boundaries of a facility which will cause death or permanent disability to a person because of a single, short term exposure.

"Combustible Liquid" means a liquid having a flash point at or above 100°F and below 140°F.

"Commence Construction" means the date of a legally binding contract signed by facility management for any phase of construction including, but not limited to, site clearing and grading.

"Consequence Analysis" means a review of the potential effects of an EHS release on surrounding populations.

"Critical" means those elements such as equipment, piping, alarms, interlocks, or controls determined by the registrant to be essential to preventing the occurrence of a catastrophic event.

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"Department" means the Department of Natural Resources and Environmental Control.

"Dispersion Analysis" means the calculation, by means of a model of the ambient concentrations of an EHS after its release, taking into account, when appropriate, the physical and chemical state and properties of the EHS, the release scenario, and the geographical, topographical, geological and meteorological characteristics of the environment which will influence the migration, movement, dispersion, or degradation of the EHS in the environment.

"Effective Quantity" (EQ) means that portion of the actual quantity of an extremely hazardous substance to be considered when calculating whether a sufficient quantity could be released. It may be less than the actual quantity if conditions, such as temperature, pressure and physical form would limit its rate of release to the atmosphere.

"Extremely Hazardous Substance" (EHS) means a substance in the form of a gas, liquid, solid, vapor, powder, aerosol, or mixture of these states which has a Substance Hazard Index above 8,000 or has the potential to create a pressure wave or thermal exposure which may cause death or permanent disability to persons beyond the facility.

"EHS Facility" means a facility having on-site extremely hazardous substances which require registration pursuant to these regulations.

"EHS Process" means any activity or operation conducted by a registrant that involves an extremely hazardous substance, including any use, storage, manufacture, movement or handling, or any combination of these activities or operations.

"EHS Process Unit" means components assembled to handle, use, store or produce, as intermediate or final products, one or more of the regulated EHS. An EHS process unit can operate independently if supplied with sufficient fuel or raw materials and sufficient storage facilities for the product.

"Existing EHS Process" means any process involving an EHS in operation or under construction and having all required construction permits as of the effective date of this regulation.

"Facility" means an area bounded by a property line where a person has EHS present, or the sum of adjacent such areas separated by less than 100 meters under common management control.

"Flammable Gas" means a gas or vapor which when mixed with air or oxygen in certain concentrations will ignite and burn on contact with a source of ignition. Such gases have lower and upper explosive limits which are usually expressed in terms of percentage by volume of gas or vapor in air.

"Flammable Liquid" means a liquid having a flash point below 100°F.

"Initiate" means to commence construction of an EHS process, or to add to an existing EHS process.

"Interim EHS Process" means any EHS Process which is initiated within 12 months after the effective date of this regulation.

"Modification" means any change in existing EHS equipment or procedures including additions or deletions. Modification does not include routine maintenance or replacement in-kind.

"Natural Barricade" means natural features of the ground, such as hills, or timber of sufficient density that the surroundings which require protection cannot be seen from the EHS process unit when the trees are bare of leaves.

"New EHS Process" means a process involving regulated extremely hazardous substances for which construction was commenced after the initial 12 month period following the effective date of this regulation.

"Potential Release Quantity" (PRQ) means that sum of effective quantities of a specific EHS which might be involved in a catastrophic event. This would not include those effective quantities which are separated by more than 100 meters or are held within appropriate containment as defined herein. For flammable and combustible substances, the potential release quantity is

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expressed as a release rate. For toxic and explosive substances, it is expressed as a distinct quantity.

"Process Hazard Review" means a systematic identification of the potential sources and conditions that may result in the release of an EHS and determination of the effects of the release on the surrounding environment using generally accepted methods of risk assessment.

"Registrant" means an owner or operator of a facility who has registered one or more EHS at that facility with the Department pursuant to this regulation.

"Registration Quantity" (RQ) means the actual quantity of EHS at or above which a person must register a facility with the Department on an annual basis. For a given EHS, the registration quantity equals one-half of its sufficient quantity.

"Release" means the introduction of an EHS into the atmosphere that, by means of atmospheric dispersion under average atmospheric conditions for Delaware, will cause an EHS to be conveyed outside of a facility, will generate a pressure wave, or will cause a thermal exposure beyond the facility boundary.

"Risk Assessment" means an evaluation of the results of a release of an EHS. A risk assessment shall consist of:

- o An estimate of the PRQ
- o Dispersion analysis (for toxics, flammables, combustibles) showing down wind effects
- o Consequence analysis involving potentially exposed population

"Risk Management Program" means all activities intended to reduce risk of a catastrophic event including, but not limited to, the consideration of technology, personnel and facilities.

"Secretary" means the Secretary of the Department of Natural Resources and Environmental Control.

"Separate Containment Area" means an area which is separated from other areas by 100 meters or which is separated from adjoining areas by 4 hour fire rated walls resistant to blast pressures of 3 psig; in addition, such areas cannot have common piping containing EHS.

"Substance Hazard Index" (SHI) means a calculated number which relates the relative danger of a substance considering toxicity and ability to disperse in the atmosphere.

"Sufficient Quantity" (SQ) means the amount of extremely hazardous substance sufficient to cause a catastrophic event. The sufficient quantity shall be calculated based on commonly recognized atmospheric modeling procedures and mortality/exposure probabilities calculated for an average individual. Flammable and combustible substances, the sufficient quantity is expressed as a release rate. For toxic and explosive substances it is expressed as a distinct quantity.

Section 5. REGULATED EXTREMELY HAZARDOUS SUBSTANCES

5.1 Three types of extremely hazardous substances are regulated. These are toxics, explosives, and flammables and combustibles.

5.1.1 Substances in pipelines regulated by the Department of Transportation are not subject to this regulation. Extremely hazardous substances in a pipeline shall be subject to the regulation when the substance is transferred to a facility. Except as assigned by DOT, an extremely hazardous substance stored in a tank truck or trailer or rail car shall be subject to this regulation whenever the container is within a facility boundary.

5.2 Extremely Toxic Substances

5.2.1 Table I lists the extremely toxic substances governed by this regulation.

5.2.2 Calculation of Sufficient Quantity and Registration Quantity.

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5.2.2.1 If the actual distance from the potential release point to the facility boundary is 100 meters or less, the sufficient quantity (SQ₁₀₀) is listed in Table I.

Table I

TOXIC EXTREMELY HAZARDOUS SUBSTANCES

Substance	CAS #	Sufficient Quantity At 100 Meters (Pounds)
Acrolein	107-02-8	150
Acrylyl Chloride	814-68-6	200
Allylamine	107-11-9	1500
Ammonia (anhydrous)	7664-41-7	16000
Arsine	7784-42-1	70
BIS (Chloromethyl Ether)	542-88-1	80
Boron Trichloride	10294-34-5	2200
Boron Trifluoride	7637-07-2	250
Bromine Pentafluoride	7789-38-2	1700
Bromine	7726-95-6	1500
Bromine Chloride	13863-41-7	1100
Carbonyl Fluoride	353-58-4	2200
Chlorine	7782-50-5	1300
Chlorine Dioxide	10049-04-4	600
Chlorine Pentafluoride	13637-63-3	700
Chlorine Trifluoride	7790-91-2	800
Chloromethyl Methyl Ether	107-30-2	400
Chloropicrin	76-06-2	450
Cyanogen	460-19-5	1700
Cyanogen Chloride	506-77-4	300
Cyanuric Fluoride	675-14-9	40
Diazomethane	334-88-3	400
Diborane	19287-45-7	80
Dichloroacetylene	7572-29-4	175
Dichlorosilane	4189-96-8	2600
Dimethyl Sulfide	75-18-3	70
Dimethyldichlorosilane	75-78-5	700
Ethylene Oxide	75-21-8	3500
Ethylamine	75-04-7	5300
Ethylene Fluorohydrin	371-62-8	20
Ethyleneimine	151-56-4	1000
Fluorine	7782-41-4	600
Formaldehyde	50-00-0	700
Furan	110-00-9	300
Hexafluoroacetone	684-16-2	4300
Hydrogen Bromide	10035-10-6	3800
Hydrogen Chloride	7647-01-0	3500
Hydrogen Cyanide	74-90-8	800
Hydrogen Fluoride	7664-39-3	900
Hydrogen Selenide	7783-07-5	150

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Table I Cont.

Substance	CAS #	Sufficient Quantity At 100 Meters (Pounds)
Hydrogen Sulfide	778306-4	1400
Iron Pentacarbonyl	13463-40-6	175
Isopropyl Formate	625-55-8	350
Isopropylamine	75-35-1	4200
Ketene	463-51-4	70
Methacryloyl Chloride	920-46-7	150
Methacryloyloxethyl Isocyanate	30674-00-7	60
Methyl Acrylonitrile	126-98-7	250
Methyl Bromide	74-83-9	2300
Methyl Chloride	74-87-3	15000
Methyl Chloroformate	75-22-1	450
Methyl Disulfide	624-92-0	25
Methyl Fluoroacetate	453-18-9	60
Methyl Fluorosulfate	421-20-5	60
Methyl Hydrazine	60-34-4	90
Methyl Isocyanate	624-83-9	250
Methyl Mercaptan	74-93-1	4600
Methyl Vinyl Ketone	78-94-4	15
Methyltrichlorosilane	75-79-6	400
Nickel Carbonyl	13463-39-3	150
Nitric Acid	7697-37-2	300
Nitric Oxide	10102-43-9	200 as NO ₂
Nitrogen Oxides	10102-44-0	200 as NO ₂
Oleum (65%)	8014-95-7	700 as SO ₃
Osmium Tetroxide	20816-12-0	25
Oxygen Difluoride	7783-41-7	11
Ozone	10028-15-6	20
Pentaborane	19624-22-7	20
Perchloromethyl Mercaptan	594-42-3	150
Perchloryl Fluoride	7616-94-6	3700
Phosgene	75-44-5	90
Phosphine	7803-51-2	35
Phosphorous Trichloride	7719-12-2	600
Propargyl Bromide	106-96-7	11
Sarin	107-44-8	15
Selenium Hexafluoride	7783-79-1	900
Stibine	7803-52-3	350
Sulfur Dioxide (Liquid)	7446-09-5	900
Sulfur Pentafluoride	5714-22-7	250
Sulfur Tetrafluoride	7783-60-0	200
Sulfur Trioxide	7446-11-9	700
Tellurium Hexafluoride	7783-80-4	250
Tetrafluorohydrazine	10086-47-2	4900
Thionyl Chloride	7719-09-7	200
Trichloro (Chloromethyl) Silane	1558-25-4	70
Trichloro (Dichlorophenyl) Silane	27137-85-5	1900
Trichlorosilane	10025-78-2	3500
Trifluorochloroethylene	79-38-9	9600
Trimethoxysilane	2487-98-3	1400

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5.2.2.2 If the actual distance from the potential release point to the facility boundary is greater than 100 meters, the sufficient quantity shall be calculated by the following formula:

$$SQ = SQ_{100} \times \text{Distance Multiplier}$$

The distance multipliers are contained in Table II.

Table II
DISTANCE MULTIPLIERS

<u>Actual Distance To Facility Boundary (Meters)</u>	<u>Distance Multiplier</u>
100	1.00
150	2.16
200	3.69
250	5.56
300	7.72
350	10.16
400	12.84
450	15.75
500	18.87
550	22.17
600	25.65
650	29.29
700	33.00
750	37.01
800	41.87
850	45.25
900	49.55
950	53.95
1000	58.46

5.2.2.3 The registration quantity shall be one-half of the sufficient quantity.

5.2.3 Calculation of Potential Release Quantity

5.2.3.1 Any person responsible for a facility handling, using, producing, or storing an extremely hazardous substance listed in Table I equal to or greater than the sufficient quantity shall calculate their worst case potential release quantity for a period up to one hour.

In calculating the potential release quantity, the following scenarios are to be considered as possibilities:

- o Catastrophic line failure (flow from both ends);
- o Catastrophic hose failure (flow from both ends);
- o Exposure of vessels and equipment to fire if material is flammable or if flammable or combustible substances are handled or stored nearby;
- o Venting of pressure relief valve at relief system design basis; and
- o Failure of mitigating systems such as flares, scrubbers, isolation valves, excess flow valves, cooling systems.

Guidance for calculating the potential release quantity as gas or vapor is contained in the Background Information Document attached to this regulation.

5.2.3.2 If any potential release quantity calculated as gas or vapor exceeds the sufficient quantity then the registrant shall develop and implement a risk management program in accordance with section 9 of this regulation.

5.2.3.3 If the registrant has a sufficient quantity on site, and if the potential release quantity calculated as gas or vapor is less than the sufficient quantity, then the registrant shall document the calculations along with the basis and attach it to the registration form.

5.2.4 Calculation of Sufficient Quantity and Registration Quantity for Toxic Mixtures.

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5.2.4 To determine whether a mixture containing an EHS is to be regulated the registrant shall calculate the substance hazard index (SHI) as follows:

$$SHI_{\text{mixture}} = SHI_{\text{pure EHS}} \times \text{Mole fraction of EHS in mixture}$$

As an alternative the registrant may calculate the SHI of the mixture using equilibrium vapor pressure of the pure EHS above the mixture at 20°C.

5.2.4.2 If the SHI calculated for the mixture is ≥ 8000 then the mixture shall be subject to the provisions of this regulation.

5.2.4.3 The sufficient quantity for the mixture shall be calculated as follows:

$$SQ_{\text{mixture}} = \frac{SQ_{\text{EHS}}}{\text{Mole fraction EHS in mixture}}$$

The registration quantity is one-half of the SQ_{mixture} .

5.2.4.4 Registrants with a SQ_{mixture} onsite shall calculate the PRQ in accordance with the provisions of paragraph 5.2.3.

5.3 Flammables and Combustible Substances

5.3.1 The following flammable and combustible liquids and gases being handled, used, produced, or stored shall be regulated.

5.3.1.1 Flammable and combustible liquids at or above their atmospheric boiling point;

5.3.1.2 Flammable and combustible liquids which are subcooled, but whose vapor pressure at 86°F is greater than one atmosphere; and

5.3.1.3 Flammable gases.

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5.3.2 Flammable and combustible liquids handled, used, produced or stored below their atmospheric boiling point without the benefit of chilling or refrigeration are not regulated herein.

5.3.3 Determination of Sufficient Quantity Release Rate and Registration Quantity Release Rate

5.3.3.1 Table III lists the sufficient quantity release rate for common flammable and combustible substances at a distance of 100 meters from the facility boundary.

Table III

<u>Substance</u>	<u>Sufficient Quantity Release Rate</u> <u>Pounds/minute (Vapor or Gas)</u>
Acetaldehyde	2600
Acetylene	2600
Ammonia	3600
Benzene	2800
Butadiene	2700
Butane	2700
Butene	2700
Carbon Monoxide	4400
Cyclohexane	2700
Decane	2700
Dimethylamine	2300
Ethane	2600
Ethanol	3100
Ethylene	2600
Ethylene Oxide	2500
Ethyl Chloride	2200
Formaldehyde	3800
Gasoline	2700
Hexane	2700
Hydrogen	2000
Hydrogen Sulfide	3800
Methyl Bromide	2500
Methane	2600
Methanol	3400
Octane	2700
Pentane	2700
Propane	2600
Propylene	2600
Styrene	2800
Toluene	2700
Vinyl Chloride	2800
Xylene	2700

5.3.3.2 The sufficient quantity release rate for all other flammable and combustible substances at a distance of

100 meters from the facility boundary shall be calculated by the Registrant using the following formula and by using propane as the release rate reference substance:

$$SQRR_x = SQRR_p \left(\frac{MW_x}{MW_p} \right)^{1.25} \left(\frac{LFL_x}{LFL_p} \right)^{1.15} \left(\frac{BP_p + 294}{BP_x + 294} \right)^{0.70}$$

where:

$SQRR_x$ - Sufficient Quantity Release Rate for Substance X in lbs vapor/min

$SQRR_p$ - Sufficient Quantity Release Rate for Propane in lbs vapor/min

MW_x - Molecular weight substance X

MW_p - Molecular Weight Propane = 44

LFL_x - Lower Flammable Limit of Substance x

LFL_p - Lower Flammable Limit of Propane = 2.1%

BP_x - Boiling Point of Substance X in °K

BP_p - Boiling Point of Propane in °K

5.3.3.3 If the actual distance from the potential release point to the facility boundary is greater than 100 meters, the sufficient quantity release rate shall be calculated by the following formula:

$$SQ = SQ_{100} \times \text{Distance Multiplier}$$

The distance multipliers are contained in Table IV.

Table IV

Distance Multipliers

Actual Distance To Facility Boundary (Meters)	Distance Multiplier
100	1.00
150	2.08
200	3.49
250	5.21
300	7.23
350	9.52
400	12.10
500	18.04
750	37.50
1000	63.37

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5.3.3.4 The registration quantity release rate shall be one-half of the sufficient quantity release rate.

5.3.4 Calculation of Potential Release Quantity

5.3.4.1 Any person responsible for a facility in which a flammable or combustible substance as defined in Section 5.3.1 is handled, used, produced, or stored, shall calculate the maximum potential release quantity within the facility considering the following scenarios:

- o Catastrophic line failure (flow from both ends);
- o Catastrophic hose failure (flow from both ends);
- o Exposure of vessels and equipment to fire;
- o Venting of pressure relief valve at relief system design basis; and
- o Failure of mitigating systems such as flares, scrubbers, isolation valves, excess flow valves, cooling systems.

Guidance for calculating the potential release quantity as gas or vapor is contained in the Background Information Document attached to this regulation.

5.3.4.2 If any potential release quantity equals or exceeds the sufficient quantity then the Registrant shall develop and implement a risk management program in accordance with section 9 of this regulation.

5.3.4.3 If the potential release quantity is less than the sufficient quantity but greater than registration quantity, the registrant shall submit the calculation with the registration form.

5.4 Explosive Substances

5.4.1 Table V lists the explosive substances governed by this regulation.

Table V

Substance	CAS #	Sufficient Quantity At 100 Meters or Less (Pounds)
Ammonium Perchlorate	7790-98-9	6900
3-Bromopropyne	106-96-7	6100
Butyl Hydroperoxide (Tertiary)	75-91-2	3600
Butyl Perbenzoate (Tertiary)	614-45-9	6300
Butyl Peroxyacetate (Tertiary)	107-71-1	4300
Butyl Peroxypivalate (Tertiary)	927-07-1	8600
1-Chloro-2,4-Dinitrobenzene	97-00-7	3000
Cumene Hydroperoxide	80-15-9	4400
Diacetyl Peroxide (55% solution)	110-22-5	4200
Dibenzoyl Peroxide	94-36-0	6100
Dibutyl Peroxide (Tertiary)	110-05-4	4700
Diisopropyl Peroxydicarbonate	105-64-6	5200
Dinitrobenzene	See Note 1	2700
Ethyl Methyl Ketone Peroxide	19393-67-0	2700
Ethyl Nitrite	109-95-5	2800
Peroxyacetic Acid (60% acetic acid solution)	79-21-0	3200
Picric Acid	88-89-1	2500
1,2,4-Trinitrobenzene		2300
2,4,6-Trinitrotoluene	118-96-7	2600
Acetylene	74-86-2	4000
Alkylaluminums (As tri-n-Butylaluminum)	1116-70-7	4700
Ammonium Nitrate	6484-52-2	6200
Ammonium Permanganate	13446-10-1	6900
Bromine Pentafluoride	7789-30-2	10000
Bromine Trifluoride	7787-71-5	15000
Cellulose Nitrate (Not Explosive Grade)	9004-70-0	2300
Chlorine Trifluoride	7790-91-2	6000
Chlorodiethylaluminum	96-10-6	4100
Chloropicrin	76-06-2	2600*
Diborane	19287-45-7	2600*
Diethylzinc	557-20-0	7700
Dilauroyl Peroxide	105-74-8	5800
2, 4-Dinitroaniline	97-02-9	3000
Dinitrotoluene	121-14-2	3100
Ethylene Oxide	75-21-8	3100
Fluorine	7782-41-4	2500
Hydrogen Peroxide (52% by weight or greater)	7722-84-1	5700
Hydroxylamine	7803-49-8	2500
Motor Fuel Antiknock Compounds (Contain Lead)	78-00-2	9600
Nickel Carbonyl	13463-39-3	5500
Nitroaniline (para Nitroaniline)	See Note 4	3800

Table V Cont.

Substance	CAS #	Sufficient Quantity At 100 Meters or Less (Pounds)
Nitroethane	79-24-3	2800
Nitromethane	75-52-5	2300
Perchloric Acid	7601-90-3	12000
Propyl Nitrate (Normal)	627-13-4	2700
Tetrafluoroethylene Monomer	116-14-3	7500
Note 1:		
Ortho (1,2-)Dinitrobenzene	528-29-0	
Meta(1,3-)Dinitrobenzene	99-65-0	
Para(1,4-)Dinitrobenzene	100-25-4	
Note 2:		
2,3,4-Trinitrotoluene	602-29-3	
2,3,5-Trinitrotoluene		
2,3,6-Trinitrotoluene		
2,4,5-Trinitrotoluene	610-25-3	
2,4,6-Trinitrotoluene	118-96-7	
3,4,5-Trinitrotoluene		
Note 3:		
2,3-Dinitrotoluene	602-01-7	
2,4-Dinitrotoluene	121-14-2	
2,5-Dinitrotoluene	619-15-8	
2,6-Dinitrotoluene	606-20-2	
3,4-Dinitrotoluene	610-39-9	
3,5-Dinitrotoluene	618-85-8	
Note 4:		
Ortho(2-)Nitroaniline	88-74-4	
Meta(3-)Nitroaniline	90-09-2	
Para(4-)Nitroaniline	100-01-6	

* Data not available. TNT equivalents assumed to be 1:1. Registrant may use actual data in calculating sufficient quantity.

5.4.2 Explosive substances which have as their primary or common purpose to function by explosion are regulated under Title 16, Chapter 71 of the Delaware Code and are not regulated herein.

5.4.3 Calculation of Sufficient Quantity and Registration Quantity

5.4.3.1 If the actual distance from the potential release point to the facility boundary is 100 meters or less, the sufficient quantity (SQ₁₀₀) is listed in Table V.

5.4.3.2 If the actual distance from the potential release point to the facility boundary is greater than 100 meters, the sufficient quantity may be calculated by the following formula:

$$SQ = SQ_{100} \times \text{Distance Multiplier}$$

The distance multipliers are contained in Table VI.

Table VI
DISTANCE MULTIPLIERS
USED FOR CALCULATING INDIVIDUAL SUFFICIENT QUANTITIES
(SQ) FOR EXPLOSIVE SUBSTANCES

Actual Distance to Facility Boundary (Meters)	Distance Multiplier
100	1.00
150	3.38
200	8.00
250	15.63
300	27.00
350	42.88
400	64.00
450	91.13
500	125.00
550	166.38
600	216.00
650	274.63
700	343.00
750	421.88
800	512.00
850	614.13
900	729.00
950	857.38
1000	1000.00

5.4.3.3 The registration quantity is one-half of the sufficient quantity.

5.4.4 Determination of the Potential Release Quantity

5.4.4.1 The potential release quantity for explosive substances is the sum of all physical quantities which are used, handled, produced, or stored by the Registrant and which are neither separated by a distance of 100 meters nor by natural or artificial barricades.

5.4.4.2 If the potential release quantity exceeds the sufficient quantity then the registrant shall develop and implement a risk management program in accordance with section 9 of this regulation.

5.5 When new information or scientific data become available, the Department may amend the list of extremely hazardous substances contained in sections 5.2, 5.3 and 5.4 if in its judgment the new information or scientific data justify such changes.

5.6 Facilities which have ten pounds or less of EHS are not regulated. At a given facility, multiple inventories of EHS need not be added together to determine the PRQ, provided such inventories are present in separate containment areas with a risk management program approved by the Department in accordance with section 9 of this regulation.

Section 6. REGULATED SUBSTANCES CHANGED CIRCUMSTANCES

6.1 Where circumstances change at facilities having regulated extremely hazardous substances which would affect the calculation of the registration quantity or the sufficient quantity of on site extremely hazardous substances, the Registrant shall notify the Department of the nature and extent of the change(s). The Registrant shall recalculate the RQ and SQ and request Department approval where the changed distance from the site of a sufficient quantity of an extremely hazardous substance to the nearest facility property line exceeds 100 meters or where the distance between locations on site of EHS sufficient quantities become separated by more than 100 meters.

Section 7. SCHEDULE OF REGISTRATION AND RISK MANAGEMENT PROGRAM DEVELOPMENT

7.1 Every facility having extremely hazardous substances on site in quantities equal to or greater than the registration quantity must be registered annually with the Department.

7.2 The schedule of facility registration and preparation of a risk management program varies as follows according to whether the EHS process (1) exists on the effective date of this regulation; (2) is initiated following but

within twelve (12) months of the effective date; or (3) is initiated later than twelve (12) months after the effective date.

7.2.1 Registrants with existing EHS processes shall comply with the following schedule:

- o Registration: Submit within sixty (60) days after public notice by the Department of required registration.
- o Risk Management Program: Complete within twelve (12) months of the effective date of this regulation.
- o Audit Checklist: Submit within twelve (12) months of the effective date of this regulation.
- o Process Hazard Analysis: Complete within twenty-four (24) months of the effective date of this regulation.

7.2.2 Registrants with interim processes shall comply with the following schedule:

- o Registration: Submit within sixty (60) days after public notice by the Department or not less than thirty (30) days prior to introduction of a process involving a regulated extremely hazardous substance, whichever is later.
- o Risk Management Program: Complete within twelve (12) months of the effective date of this regulation or prior to introduction of a new EHS, whichever is later.
- o Audit Checklist: Submit within twelve (12) months of the effective date of this regulation or not less than thirty (30) days prior to introduction of a new EHS, whichever is later.
- o Process Hazard Analysis: Complete prior to introduction of the new EHS or within twelve (12) months of the effective date of this regulation, whichever is later.

7.2.3 Registrants proposing new processes shall comply with the following schedule:

- o Registration: Submit not less than thirty (30) days prior to introduction of a new EHS.
- o Risk Management Program: Complete prior to introduction of a new EHS.
- o Audit Checklist: Submit not less than thirty (30) days prior to introduction of a new EHS.
- o Process Hazard Analysis: Complete prior to introduction of a new EHS.

Section 8. STATE AGENCY NOTIFICATION

Every State agency having authority to grant construction or operating permits to facilities having regulated extremely hazardous substances on site shall notify the Department in writing prior to granting any permits and shall confirm that the facility Registrant has been informed of the regulatory requirements of the Act and this regulation.

Section 9. RISK MANAGEMENT PROGRAM

9.1 Design Standards Review

Each Registrant shall maintain a compilation of design standards information. The design standards shall include an assessment of the hazards of all materials used in the process, the technical design basis, the equipment design basis, equipment quality assurance, and pre-startup safety review in accordance with paragraphs 9.1.1 through 9.1.5 of this section. The assessment of hazards of materials used in the process, the technical design basis, and equipment design basis shall be documented and made available to those with direct line management responsibility for the process.

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9.1.1. Hazard Assessment for Materials:

The hazard assessment for materials shall include toxicity information, personnel exposure limits, physical data, thermal and chemical stability data, reactivity data, corrosivity data, and hazardous effects of inadvertent mixing of differing materials that could foreseeably occur.

9.1.2 Technical Basis for Process Design:

9.1.2.1 The technical basis for process design shall include, where applicable, a block flow diagram or simplified process flow diagram; the process chemistry; maximum intended inventory; the safe upper and lower limits for items such as temperatures, pressures, flows, and/or compositions; and the consequences of deviations where safety considerations are present.

9.1.2.2 When the technical design basis is changed, it shall be updated and appended with the appropriate documentation produced under paragraph 9.2.1 of this section.

9.1.2.3 For processes in operation before the effective date of this regulation, the technical basis may be developed from a process hazard analysis which shall be in sufficient detail to support that analysis.

9.1.3. Equipment Design Basis

9.1.3.1 The equipment design basis shall include, where applicable, materials of construction, piping and instrument diagram(s) (P&ID), electrical classification, relief system design and design basis, ventilation system design, and the design codes employed. For those facilities where the Registrant commences construction after the effective date of this regulation, the equipment design information shall include

appropriate material and energy balances. The material and energy balances shall be updated only for major revisions with small changes documented via the management of change documentation specified in paragraph 9.2.2.

9.1.3.2 The design basis should be consistent with applicable consensus codes and standards where they exist or, in their absence, recognized and generally accepted engineering practices. (See Background Information Document for examples.) When the design basis is not consistent with applicable consensus codes and standards, the deviation and the design basis shall be documented.

9.1.3.3. When the equipment design basis is changed, it shall be updated and appended with appropriate documentation produced under paragraph 9.2.2 of this section.

9.1.4 Equipment Quality Assurance.

9.1.4.1 The Registrant shall establish a quality assurance program to ensure that critical equipment handling EHS is fabricated and installed consistent with design specifications. The quality assurance program shall include:

- o Written quality control procedures regarding the fabrication of equipment in critical service to ensure that the equipment as fabricated meets design specifications; and
- o Appropriate checks and inspections to ensure that critical equipment is installed properly i.e., consistent with design specifications and vendor's instructions.

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9.1.5 Pre-startup Safety Review.

9.1.5.1 Pre-startup safety reviews are required for new facilities and for those modified facilities where the modification requires a change in either the equipment design basis or technical design basis.

9.1.5.2 The pre-startup safety review shall confirm and document that after construction and prior to the introduction of extremely hazardous substances that:

- o Construction is in accordance with specifications;
- o Appropriate testing and inspection has been performed;
- o Safety, operating, maintenance, and emergency procedures are in place and adequate;
- o Process hazard analysis recommendations have been addressed and actions required for start-up have been completed; and
- o Operating procedures are in place and training of operating personnel has been completed.

9.2 Modification Control and Documentation of Equipment and Procedural Changes

9.2.1. Management of Change in Process Technology.

9.2.1.1 This section applies to all changes to the technical design basis and equipment design basis as described in the design information document(s). Examples of such changes include, but are not limited to, feedstocks, catalysts, operating conditions, equipment and product specifications, by-products, waste products, maximum intended inventory, equipment size and type, and materials of construction.

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9.2.1.2 The Registrant shall establish and implement procedures to manage change to the technical design basis and the equipment design basis. Such procedures shall address:

- o The technical basis for the proposed change;
- o Safety, health and environmental considerations, which shall be of a depth and extent consistent with the degree of hazard involved and broad enough to include foreseeable upstream or downstream effects of the change;
- o Modifications to operating procedures;
- o Communication of and training in the proposed change in process technology and the consequences of that change to appropriate personnel involved in the operation;
- o Documentation requirements for proposed changes prior to the test period, if any, and following formal adoption of the change;
- o Allowable time period for change; and
- o Authorization requirements for proposed changes.

9.2.1.3 All of the items listed in paragraph 9.2.1.2 must be completed prior to implementation of the change.

9.2.2 Management of Field Changes.

9.2.2.1 The Registrant shall establish and implement procedures to review all field changes but excluding those which are replacement-in-kind.

- o For those field changes that involve a change in either the technical or equipment design bases, the Registrant shall comply with paragraph 9.2.1.

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- o For those field changes that fall within the documented design basis of the EHS process but are not replacement-in-kind, paragraph 9.2.2.2 shall apply.

9.2.2.2 The Registrant shall establish and implement written procedures to manage changes that fall within the documented design basis but are not replacement-in-kind. Such procedures shall address:

- o Safety, health, and environmental considerations which shall be of a depth and extent consistent with the degree of hazard involved and broad enough to include foreseeable upstream or downstream effects of the change;
- o Modifications of operating procedures;
- o Communication of, and training in, the change and the consequences of that change, including operating procedures, to appropriate personnel involved in the operation;
- o Documentation of changes; and
- o Authorization of changes.

9.2.2.3 All the items in paragraph 9.2.2.2 of this section must be implemented prior to the initiation of the change.

9.3 Hazard Review of All Processes and Equipment Associated with EHS

9.3.1 Where extremely hazardous substances are present, Registrants shall perform a process hazard analysis to identify, evaluate, and control associated hazards. The process hazard analysis will provide a clear understanding of:

9.3.1.1 The hazards and risks associated with the process;

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- 9.3.1.2 The engineering and administrative controls applicable to the process hazards, and their interrelationships; and
- 9.3.1.3 The consequences of failure of these controls.
- 9.3.2 The process hazard analysis shall consist of:
- 9.3.2.1 A risk assessment which shall include:
- o An estimate of the potential release quantity;
 - o A dispersion analysis in the case of toxics or flammables and combustibles;
 - o An overpressure grid in the case of explosive substances;
 - o A consequence analysis of the effects on surrounding populations; and
- 9.3.2.2 A process hazards review which is an orderly, systematic approach to identify and evaluate potential hazards. The process hazards review should follow one or more methods acceptable to the Department. See Background Information Document for examples of acceptable methods.
- 9.3.3 The process hazard analysis shall be conducted by a team of persons knowledgeable in engineering, operations, process, and other specialties deemed necessary by the Registrant. One or more persons conducting the process hazard analysis shall have knowledge specific to the process being evaluated.
- 9.3.4 A written process hazard analysis report that describes the findings and recommendations of the analysis shall be prepared and approved by the Registrant.
- 9.3.4.1 The written process hazard analysis report shall be maintained at least until completion of the next

process hazard analysis or update and revalidation of the process hazard analysis.

9.3.4.2 The Registrant shall establish a system and schedule to:

- o Address the findings and recommendations in the process hazard analysis report
- o Document actions taken
- o Communicate them to operating, maintenance, and other personnel whose work assignments are in the facility and who are affected by the recommendations or actions
- o Ensure satisfactory implementation of the recommendations.

9.3.5 Initial Process Hazard Analysis Completion Schedule

9.3.5.1 For processes existing on the effective date of this regulation, the process hazard analysis shall be completed within two years of that date. If the owner or operator of an EHS facility is not able to comply with the two year deadline for completion of the initial process hazard analysis required by these regulations, the owner or operator, for good cause, may petition the Secretary for an appropriate adjustment of the schedule. The facility owner or operator shall attest that all other components of the risk management program for all EHS processes have been implemented. The Secretary may grant an extension when in his/her judgement extenuating circumstances particular to the petitioner's facility justify the time extension.

9.3.5.2 For processes being designed on or after the effective date of this regulation, the process hazard analysis shall be completed before startup.

9.3.6 Registrants who have performed a process hazard analysis meeting the requirements of this section within four years prior to the effective date of this regulation are not required to perform an initial process hazard analysis, but shall perform a periodic process hazard analysis update and revalidation in accordance with paragraph 9.3.7.

9.3.7 The process hazard analysis shall be updated and revalidated by the Registrant at least every five years, except for facilities in which any single regulated EHS is present in amounts greater than 100 times the sufficient quantity at any one time. In such cases the Registrant shall update and revalidate that process hazard analysis at least every three years. The update and revalidation shall include a review of all technical and process changes that have taken place since the previous update and revalidation.

9.4 Operating Instructions

- 9.4.1 The Registrant shall develop written operating procedures that:
- o Clearly describe in process conditions and operating steps necessary for safe operation consistent with the design standards information;
 - o Specify responses to process deviations where significant safety hazards are present;
 - o Contain a catastrophic release hazard section or reference available documents that describe:
 - . Properties and hazards of materials;
 - . Special precautions to prevent community exposure;

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- . Remedial measures if contact or airborne exposure occurs;
 - . Any special or unique hazards; and
 - . Emergency operating and shutdown procedures
 - o Apply to all anticipated conditions of the process including, where applicable, startup, normal operation, shutdown, or emergency.
- 9.4.2 The Registrant shall develop special safety procedures that provide for the control of hazards during nonroutine work including lockout and/or tagout, opening process equipment or piping, and control of ignition sources (hot work).
- 9.4.3 The Registrant shall identify those raw materials and other substances critical to the safety of the process and shall implement procedures for quality control of incoming materials to ensure that predetermined specifications are met, and control over predetermined inventory limits.
- 9.4.4 All operating procedures shall be reviewed to ensure that they address current operating practice, including changes in process technology or equipment. The Registrant shall establish the review interval in accordance with the degree of hazard, but not exceeding an interval of three years. Each procedure or manual must include the date and authorization signature(s) of the last review.
- 9.5 Maintenance and Inspection Procedures and Requirements for All Equipment in EHS Service
- 9.5.1 The Registrant shall establish maintenance systems for critical equipment to ensure ongoing mechanical integrity. The maintenance systems shall include:

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- o Establishment of maintenance procedures necessary to ensure mechanical integrity of equipment handling EHS;
- o Training of personnel in the application of such procedures;
- o Establishment of quality control procedures to ensure that maintenance materials and spare equipment and parts meet design specifications and protect against inadvertent use of improper materials;
- o Procedures to ensure that all changes in technology and facilities are appropriately reviewed in accordance with paragraph 9.2 of this regulation.

9.5.2 The Registrant shall develop and implement an inspection and test program of critical service equipment to maintain mechanical integrity. Tests and inspections shall be performed on:

- o Pressure vessels and storage tanks;
- o Critical piping;
- o Relief and vent systems and devices;
- o Emergency shutdown systems; and
- o Critical controls, alarms, and interlocks.

9.5.2.1 For each test and/or inspection the registrant shall document:

- o The equipment and systems subject to tests and inspections;
- o The method of testing and/or inspection;
- o The frequency of testing and/or inspection; and
- o Acceptable limits or criteria for passing the test or inspection.

9.5.2.2 Testing and/or inspection procedures and frequencies shall follow commonly accepted standards and codes,

where applicable, or be governed by good engineering practice.

9.5.2.3 The Registrant shall document the tests and inspections and maintain the documentation at least until the next test or inspection is performed, or longer if needed, to comply with the requirements of paragraph 9.5.2.4.

9.5.2.4 The documentation required by part 9.5.2.3 shall be used to determine the condition of the equipment to ensure that it is fit for its intended service, and to determine any needed changes in the frequency of testing and inspection procedures and preventive maintenance.

9.5.2.5 The Registrant shall develop and implement plans to correct equipment deficiencies or operations.

9.5.2.6 The Registrant shall develop a system for reviewing and authorizing changes in equipment tests and inspections.

9.6 Training

9.6.1 The Registrant shall provide training for all personnel responsible for operating the process appropriate to their duties and responsibilities. Such training shall include:

- o The operating procedures established in paragraph 9.4;
- o Any changes in process technology or equipment; and
- o Training in emergency operating and emergency shutdown procedures.

9.6.2 Initial Training. The Registrant shall develop qualification criteria for operating personnel. The employer shall ensure that before any employee is deemed qualified to operate the process, the employee possesses the required knowledge, skills, and

abilities to carry out his or her duties and responsibilities including startup and shutdown.

9.6.3 Refresher Training. The Registrant shall provide a refresher training program that shall ensure that operating personnel understand and adhere to the current operating procedures and continue to meet the qualification criteria established under paragraph 9.6.2. This requirement shall be satisfied by an ongoing training program or by periodic training conducted at least every three years.

9.6.4 Change In Operating Procedures. Whenever a change is made in the operating procedures required in paragraph 9.4 all operating personnel whose duties involve the areas of change shall be trained in, or otherwise informed of, the change prior to implementation to ensure that they understand the change.

9.6.5 Instructor Qualifications. The registrant shall develop written criteria for instructor qualifications and shall ensure that instructors are qualified.

9.6.6 Documentation. Any training or communication performed pursuant to these training requirements shall be documented.

9.7 Incident Investigation Procedures and Remedial Action Requirement

9.7.1 The Registrant shall investigate every incident which either results in, or could reasonably have resulted in, a catastrophic release. The Background Information Document contains guidelines for conducting incident investigations.

9.7.2 Incident investigations shall be initiated as promptly as possible, but not later than 48 hours following discovery of the incident.

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- 9.7.3 An incident investigation team shall be established and shall consist of persons knowledgeable in the process involved and other specialties deemed necessary by the Registrant.
- 9.7.4 A report shall be prepared based on the investigation. The report shall include:
- o A description of the incident and findings;
 - o A description of any recommended changes in process hazard management made as a result of the investigation to prevent recurrence; and
 - o The identities of the persons who participated on the investigation team.
- 9.7.5 The report shall be reviewed with all appropriate operating, maintenance, and other personnel whose work assignments involve the EHS process where the incident occurred.
- 9.7.6 The Registrant shall establish a system to determine and document the appropriate response to any recommendations in the incident investigation report and to ensure that the actions are completed.
- 9.7.7 A Registrant may assert a "work-in-process privilege" covering any documents generated during the course of the incident investigation. DNREC will not assert a right to any documents generated in preparation of the report required by this section.
- 9.7.8 Incident investigation reports shall be maintained on site for five years from the date of issue.

9.8 Inspection and Auditing Requirements

- 9.8.1 For covered processes, the registrant shall evaluate compliance with the provisions of this section using the site audit checklist contained in Appendix A.

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- 9.8.2 A team selected by the Registrant shall conduct the audit review. This team shall be composed of one or more persons knowledgeable about the process involved and other specialties deemed necessary by the Registrant. The team shall include at least one person not associated with the day-to-day operations of EHS process being reviewed.
- 9.8.3 An initial audit of each EHS process shall be conducted and the audit checklist submitted within 12 months of the effective date of this regulation. Subsequently, an audit review shall be conducted and the audit checklist submitted to the Department at least once every three years.
- 9.8.4 A report of the findings of the compliance audit shall be provided to persons having direct line management responsibility for the EHS process.
- 9.8.5 The Registrant shall establish a system to determine and document the appropriate response to each of the findings of the compliance audit and to ensure that the actions are completed in accordance with a timetable established by the Registrant.
- 9.8.6 Deficiencies or discrepancies identified by the Registrant as a result of a compliance audit performed in accordance with this section will not be used by a Department compliance inspector as the basis for a violation citation unless the Registrant fails to correct such deficiencies or address them by the date of the Department inspection. However, the Department may specify an abatement schedule for any uncorrected items.
- 9.8.7 The compliance audit report and any appropriate response shall be maintained until the completion of the next compliance review.

Section 10. INSPECTIONS

10.1 Minimum Inspection Components. All documentation required by this regulation shall be maintained by the Registrant and shall be available on site for review by the Department. At a minimum, inspections of facility risk management programs include:

- 10.1.1 Review of selected risk management program documentation including evidence of the application of engineering and maintenance standards associated with EHS;
- 10.1.2 A physical onsite inspection of equipment associated with EHS; and
- 10.1.3 Selected interviews of facility personnel involved with EHS.

10.2 Inspection Program Priorities

Facilities with the highest risk of catastrophic event shall be inspected before facilities with lower risk. The inspection priorities shall be based on the following considerations:

- o Relative toxicity, flammability, combustibility, or explosiveness of the EHS; and
- o Potential release quantity; and
- o Potential number of people exposed.

10.3 Inspection Program Frequency

Every facility shall be inspected at least once every three years. Inspections of individual facilities more frequent than the required minimum may be conducted on the basis of:

- o Compliance history with State pollution control and waste management regulations; or
- o Any recent occurrence of an incident involving an extremely hazardous substance release; or
- o Recent noncompliance with provisions of these regulations; or

- o Any other factors deemed by the Department to justify more frequent facility inspections.

10.4 Inspection Protocol

The inspection protocol consists of the audit checklist attached herein as Appendix A, the accuracy of which shall be determined by physical inspections conducted by trained and tested state personnel or their designated representative and interviews with facility personnel.

10.5 Access to Facilities and Records

The Department has the right to enter any facility at any time to verify compliance with this regulation. Inspections for the purpose of document review shall be scheduled with facility management with reasonable advance notice, and when possible, mutual agreement. Inspectors shall comply with all safety requirements of the facility.

10.6 Findings of Compliance or Noncompliance

Department findings of compliance or noncompliance with risk management program requirements shall be provided in writing to the Registrant no later than forty-five (45) days following completion of the inspection. Significant items of noncompliance shall be communicated directly to the Registrant by the Department during an exit interview. If deficiencies or omissions in the risk management program are identified, the Department shall issue a written notice of noncompliance and recommend program improvements. Within sixty (60) days after receiving the Department's recommendations, the Registrant shall notify the Department of changes and additions to improve the risk management program or shall present a remediation plan and schedule for the Department's approval.

10.7 Resolution of Findings of Noncompliance

10.7.1 If the Registrant and the Department agree on measures to correct risk management program deficiencies or omissions, the parties may enter into a written agreement.

- 10.7.2 If the Department and facility management fail to agree on improvements to the risk management program following Department notice of noncompliance as provided above and following an administrative hearing with written findings, the Department shall issue an administrative order requiring correction of risk management program deficiencies including a schedule for corrections.
- 10.7.3 If a functioning risk management program is lacking and a situation exists which threatens real and imminent jeopardy to the lives and health of persons in the vicinity of the facility, the Department shall promptly seek Chancery Court injunctive relief.

Section 11. FEES

11.1 Annual registration fees are required as follows:

- 11.1.1 For each facility having one potential release quantity of an extremely hazardous substance exceeding the sufficient quantity or one process unit handling an EHS exceeding the sufficient quantity there is a fee of one thousand dollars (\$1000).
- 11.1.2 For each additional extremely hazardous substance exceeding the sufficient quantity or one process unit handling an EHS exceeding the sufficient quantity the fee is two hundred and fifty dollars (\$250).

11.2 Additional Fees

- 11.2.1 In addition to the annual registration fees, the Department shall assess a fee to cover additional Department costs incurred for registration or inspection which cannot be accomplished in a timely way due to inaccurate or incomplete facility registration information or records required for inspection.

- 11.2.2 When an additional fee is assessed, the Department shall document its findings justifying the fee assessment, and shall provide a copy to the Registrant.

Section 12. VIOLATIONS AND PENALTIES

Any person who fails to comply with this regulation shall be subject to the enforcement and penalty provisions set forth in 7 Delaware Code, Section 7715.

Section 13. HEARINGS

Hearings held pursuant to this regulation shall be conducted as follows:

- 13.1 Not less than 20 days notice shall be published in a newspaper of general circulation in the county in which the activity occurred or is to occur, and in a daily newspaper of general circulation throughout the State.
- 13.2 Such notification shall include: (1) a brief description of the subject of the hearing; (2) time, date, and place of hearing; and (3) time and place where copies of material may be obtained.
- 13.3 The parties may appear personally or by counsel at the hearing and produce any competent evidence on their behalf. The Secretary or the Board or its duly authorized designee may administer oaths, examine witnesses, and issue, in the name of the Department or the Board, notices of hearings or subpoenae requiring the testimony of witnesses and production of books, records, or other documents relevant to any matter involved in such hearing. In case of refusal to obey a notice of hearing or subpoena under this section, the Superior Court in the county in which the hearing is held shall have jurisdiction upon application of the Secretary or the Chairman of the Board, to issue an order requiring such person to appear and testify or produce evidence as the case may require.

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13.4 A record from which a verbatim transcript can be prepared shall be made of all hearings and shall, along with the exhibits and other documents introduced by the Secretary or other party, constitute the record. The expense of preparing any transcript shall be borne by the person requesting it. The Secretary or the Board or a duly authorized designee shall make findings of fact based on the record. The Secretary or the Board shall then enter an order that will best further the purpose of this regulation, and the order shall include reasons. The Secretary shall promptly give written notice to the persons affected by such order.

13.5 The Secretary may establish a fee schedule for hearings. Any fees collected are hereby appropriated to the Department. Hearing fees are to be paid by the person requesting the hearing.

Section 14. APPEALS

14.1 Any person whose interest is substantially affected by any action of the Secretary may appeal to the Environmental Appeals Board within 20 days after the Secretary has announced the decision.

The Board may affirm, modify, or reverse the decision of the Secretary.

14.2 Whenever a decision of the Secretary is appealed, the Board shall hold a public hearing in accordance with Section 13 of this regulation.

14.3 If the Secretary is overruled by the Board, the Board shall state reasons for its decision.

14.4 Any person or persons, jointly or severally, or any taxpayer, or any officer, department, or board of the State, aggrieved by any decision of the Board, may appeal to the Superior Court in and for the county in which the activity in question is wholly or principally located by filing a petition, duly verified setting forth that such decision is

illegal, in whole or in part, specifying the grounds of the illegality. Any such appeal shall be perfected within 30 days of the decision of the Board. If the Board fails to issue a decision within 90 days following the receipt of the appeal, the decision of the Secretary shall be considered as affirmed by the Board.

14.5 The Court may affirm, reverse, or modify the Board's decision. The Board's findings of fact shall not be set aside unless the Court determines that the record contains no substantial evidence that would reasonably support the findings. If the Court finds that additional evidence should be taken, the Court may remand the case to the Board for completion of the record.

14.6 No appeal shall operate to stay automatically any action of the Secretary but upon application, and for good cause, the Board or the Court of Chancery may stay the action pending disposition of the appeal.

15.0 EMERGENCY RESPONSE AND CONTROL

15.1 Emergency Action Plan. The registrant shall establish an emergency action plan in accordance with the regulations of the Occupational Safety and Health Administration (OSHA) contained in 29 CFR 1910.38(a), "Employee Emergency Plans and Fire Prevention Plans." Where a Registrant is not required to have an emergency action plan based on OSHA requirements, the Registrant shall establish a written plan which addresses the following:

- o Evacuation of employees in the event an incident is detected, and
- o Notification of appropriate emergency response agencies.

15.2 Emergency Response Teams. If the registrant has established fire brigades, they must comply with the OSHA requirements in 29 CFR 1910.156, "Fire Brigades" and OSHA 1910.120, if appropriate.

16.0 Confidential Information

All written, verbal, and observed inspection information obtained by the Department for purposes of this regulation shall be held as confidential unless that information is required to be disclosed by law or is already a matter of public record.

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APPENDIX A

RISK MANAGEMENT PROGRAM AUDIT CHECK LIST

Design Standards Review

Modification Control and Documentation of Equipment and Procedural Changes

Hazard Review of All Processes and Equipment Associated with EHS

Operating Instructions

Maintenance and Inspection Procedures and Requirements for all Equipment
in EHS Service

Training

Incident Investigation Procedures and Remedial Action Requirement

Inspection and Auditing Requirements

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RISK MANAGEMENT PROGRAM AUDIT CHECK LIST
DESIGN STANDARDS REVIEW

	<u>Yes</u>	<u>No</u>	<u>Does Not Apply</u>	<u>Comments</u>	<u>Date</u>	<u>Initial</u>
1. Is there a Hazard Assessment available for all hazardous materials used in the EHS process?	_____	_____	_____	_____ _____ _____	_____	_____
2. Does the Hazard Assessment include toxicity information, personnel exposure limits, physical data, thermal and chemical stability data, reactivity data, corrosivity data, and hazardous effects of inadvertent mixing of differing materials that could foreseeably occur?	_____	_____	_____	_____ _____ _____ _____ _____ _____ _____ _____ _____	_____	_____
3. Does the technical basis for process design include:						
- blockflow diagram or simplified process flow diagram?	_____	_____	_____	_____ _____	_____	_____
- process chemistry?	_____	_____	_____	_____	_____	_____
- maximum intended inventory?	_____	_____	_____	_____	_____	_____
- safe upper and lower limits for temperature, pressure, flow and/or compositions?	_____	_____	_____	_____ _____	_____	_____
- consequences of deviations where safety considerations are present?	_____	_____	_____	_____ _____ _____	_____	_____
4. Where the technical design basis was changed, was there appropriate documentation?	_____	_____	_____	_____ _____ _____	_____	_____
5. Does the equipment design basis include:						

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	<u>Yes</u>	<u>No</u>	<u>Does Not Apply</u>	<u>Comments</u>	<u>Date</u>	<u>Initial</u>
- materials of construction?	_____	_____	_____	_____	_____	_____
- piping and instrument diagrams?	_____	_____	_____	_____	_____	_____
- electrical classification?	_____	_____	_____	_____	_____	_____
- design codes employed?	_____	_____	_____	_____	_____	_____
- material balance for facilities constructed after the effective date of the regulation?	_____	_____	_____	_____	_____	_____
- energy balance for facilities constructed after the effective date of the regulation?	_____	_____	_____	_____	_____	_____
6. Is the design basis consistent with applicable consensus codes and standards where they exist or, in their absence, recognized and generally accepted engineering practices?	_____	_____	_____	_____	_____	_____
7. When the design basis is not consistent with applicable consensus codes, are the deviations and design basis documented?	_____	_____	_____	_____	_____	_____
8. When the equipment design basis was changed, was there appropriate documentation?	_____	_____	_____	_____	_____	_____
9. Is there an established quality assurance program to ensure that critical equipment handling EHS substances is fabricated and installed consistent with design specifications?	_____	_____	_____	_____	_____	_____

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	<u>Yes</u>	<u>No</u>	<u>Does Not Apply</u>	<u>Comments</u>	<u>Date</u>	<u>Initial</u>
10. Does the equipment quality assurance program include:						
- written quality control procedures regarding the fabrication stage for equipment in critical service to ensure that the equipment as fabricated meets design specifications?	_____	_____	_____	_____	_____	_____
- appropriate checks and inspections to ensure that critical equipment is installed properly i.e., consistent with design specifications and vendor's instructions?	_____	_____	_____	_____	_____	_____
11. Has a pre-start up safety review been conducted for all new facilities and to those modified facilities where the modification requires a change in either the equipment basis or technical basis for design?	_____	_____	_____	_____	_____	_____
12. Does the pre-start up safety review conform and document that after construction, and prior to the introduction of EHS that:						
- construction is in accordance with specifications?	_____	_____	_____	_____	_____	_____
- appropriate testing and inspection has been performed?	_____	_____	_____	_____	_____	_____

	<u>Yes</u>	<u>No</u>	<u>Does Not Apply</u>	<u>Comments</u>	<u>Date</u>	<u>Initial</u>
- safety, operating, maintenance, and emergency procedures are in place and adequate?	_____	_____	_____	_____ _____ _____	_____	_____
- process hazard analysis recommendations have been addressed and actions required for startup have been completed?	_____	_____	_____	_____ _____ _____	_____	_____
- operating procedures are in place and training of operating personnel has been completed?	_____	_____	_____	_____ _____ _____	_____	_____
13. Is the design standards information, i.e., hazards of materials, technical design basis and equipment design basis documented and readily accessible to those with direct line management responsible for the process?	_____	_____	_____	_____ _____ _____ _____ _____ _____	_____	_____

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CTL020379

MODIFICATION CONTROL AND DOCUMENTATION OF EQUIPMENT AND PROCEDURAL CHANGES

	<u>Yes</u>	<u>No</u>	<u>Does Not Apply</u>	<u>Comments</u>	<u>Date</u>	<u>Initial</u>
1. Has the registrant established and implemented procedures to manage change to the technical design basis and the equipment design basis?	_____	_____	_____	_____ _____ _____ _____	_____	_____
2. Do the procedures address the technical basis for the proposed change?	_____	_____	_____	_____ _____ _____	_____	_____
3. Do the procedures address safety, health and environmental considerations in depth and extent consistent with the degree of hazard involved and broad enough to include foreseeable upstream or downstream effects of the change?	_____	_____	_____	_____ _____ _____ _____ _____ _____ _____	_____	_____
4. Do the procedures address modifications to operating procedures?	_____	_____	_____	_____ _____ _____	_____	_____
5. Do the procedures address communication of and training in the proposed change in process technology and the consequences of that change to appropriate personnel involved in the operation?	_____	_____	_____	_____ _____ _____ _____ _____ _____	_____	_____
6. Do the procedures address documentation requirements for proposed changes during the test period?	_____	_____	_____	_____ _____ _____ _____	_____	_____

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	<u>Yes</u>	<u>No</u>	<u>Does Not Apply</u>	<u>Comments</u>	<u>Date</u>	<u>Initial</u>
7. Do the procedures address documentation requirements for proposed changes following formal adoption of the change?	_____	_____	_____	_____ _____ _____ _____	_____	_____
8. Do the procedures address allowable time period for change?	_____	_____	_____	_____ _____ _____	_____	_____
9. Do the procedures address authorization requirements for proposed changes?	_____	_____	_____	_____ _____ _____	_____	_____
10. Have all of the items in number 3-9 of this section been completed prior to implementation of the change?	_____	_____	_____	_____ _____ _____ _____	_____	_____
11. Have procedures been established and implemented to review all EHS field changes, excluding those which are "replacement in kind"?	_____	_____	_____	_____ _____ _____ _____	_____	_____
12. Have written procedures been established and implemented to manage changes that fall within the documented design basis but are not replacement-in-kind?	_____	_____	_____	_____ _____ _____ _____ _____	_____	_____
13. Have the procedures in part 12 of this section included:						
- safety, health and environmental considerations, in such depth and extent consistent with the degree of hazard				_____ _____ _____ _____		

CTL020381

	<u>Yes</u>	<u>No</u>	<u>Does Not Apply</u>	<u>Comments</u>	<u>Date</u>	<u>Initial</u>
involved and broad enough to include foreseeable upstream or downstream effects of the change?	_____	_____	_____	_____	_____	_____
- modifications of operating procedures?	_____	_____	_____	_____	_____	_____
- communication of, and training in, the change and the consequences of that change, including operating procedures to appropriate personnel involved in the operation?	_____	_____	_____	_____	_____	_____
- documentation of changes?	_____	_____	_____	_____	_____	_____
- authorization of changes?	_____	_____	_____	_____	_____	_____
14. Have all of the items in parts 11-13 of this section been implemented prior to the initiation date?	_____	_____	_____	_____	_____	_____

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	<u>Yes</u>	<u>No</u>	<u>Does Not Apply</u>	<u>Comments</u>	<u>Date</u>	<u>Initial</u>
and follow one or more of the following recognized methodologies:						
- What if check lists?	_____	_____	_____	_____	_____	_____
- HAZOP - hazard and operability study?	_____	_____	_____	_____	_____	_____
- Failure mode and effect analysis?	_____	_____	_____	_____	_____	_____
- Fault tree analysis?	_____	_____	_____	_____	_____	_____
- Other? Please describe.	_____	_____	_____	_____	_____	_____
5. Was the process hazard analysis conducted by a team of persons knowledgeable in engineering, operations, process and other specialties deemed necessary by the registrant?	_____	_____	_____	_____	_____	_____
6. Does one or more of individuals who conducted the process hazard analysis have knowledge specific to the process that was evaluated?	_____	_____	_____	_____	_____	_____
7. Is there a written and approved process hazard analysis report describing the findings and recommendations of the analysis?	_____	_____	_____	_____	_____	_____
8. Has the written process hazard analysis report been maintained until the completion of the next process hazard analysis or update and revalidation of the process hazard analysis?	_____	_____	_____	_____	_____	_____
9. Is there an established system and schedule to address the findings and recommendations in	_____	_____	_____	_____	_____	_____

CTL020384

	<u>Yes</u>	<u>No</u>	<u>Does Not Apply</u>	<u>Comments</u>	<u>Date</u>	<u>Initial</u>
the process hazard analysis report including:						
- documentation of actions taken?						
- communication to operating, maintenance, and other personnel whose work assignments are in the facility and who are affected by the recommendations or actions?						
- ensure satisfactory implementation of the recommendations?						
10. Was the process hazard analysis for an existing process completed within two years of the effective date of the regulation?						
11. Was the process hazard analysis for a process being designed on or after the effective date of the regulation completed before start up?						
12. If the process hazard analysis was performed within four years prior to the effective date of this regulation has there been an update and revalidation within the last five years, or within the last three years for a process having 100 times the sufficient quantity at any one time?						
13. Has the previous process hazard analysis been updated and revalidated at least every five						

CTL020385

	<u>Yes</u>	<u>No</u>	<u>Does Not Apply</u>	<u>Comments</u>	<u>Date</u>	<u>Initial</u>
years, or every three years for facilities which have any single regulated EHS present in amounts greater than 100 times the sufficient quantity at any one time?	_____	_____	_____	_____ _____ _____ _____ _____	_____	_____
14. Does the updated and revalidated process hazard analysis include a review of all process technical and process changes that have taken place since the previous update and revalidation?	_____	_____	_____	_____ _____ _____ _____ _____	_____	_____

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CTL020387

	<u>Yes</u>	<u>No</u>	<u>Does Not Apply</u>	<u>Comments</u>	<u>Date</u>	<u>Initial</u>
5. Are there special safety procedures that provide for the control of hazards during nonroutine work including:						
- lockout and/or tagout?	_____	_____	_____	_____	_____	_____
- opening process equipment or piping?	_____	_____	_____	_____	_____	_____
- control of ignition sources (hot work)?	_____	_____	_____	_____	_____	_____
6. Have the incoming materials and other substances critical to the safety of the process been identified and procedures implemented to:						
- ensure quality control with predetermined specifications?	_____	_____	_____	_____	_____	_____
- control predetermined inventory limits?	_____	_____	_____	_____	_____	_____
7. Have all operating procedures been reviewed to ensure that they address current operating practices, including changes that result from changes in process technology or equipment?	_____	_____	_____	_____	_____	_____
8. Has a review interval appropriate with the degree of hazard been established, but not exceeding an interval of three years?	_____	_____	_____	_____	_____	_____

	<u>Yes</u>	<u>No</u>	<u>Does Not Apply</u>	<u>Comments</u>	<u>Date</u>	<u>Initial</u>
9. Does each procedure or manual include the date and authorization signature(s) of the last review?						

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CTL020389

MAINTENANCE AND INSPECTION PROCEDURES AND REQUIREMENTS FOR ALL EQUIPMENT IN EHS SERVICE

	<u>Yes</u>	<u>No</u>	<u>Does Not Apply</u>	<u>Comments</u>	<u>Date</u>	<u>Initial</u>
1. Is there an established maintenance system for critical EHS equipment to ensure ongoing mechanical integrity?	_____	_____	_____	_____ _____ _____ _____	_____	_____
2. Does the maintenance system include:						
- establishment of maintenance procedures necessary to ensure mechanical integrity of equipment handling extremely hazardous substances?	_____	_____	_____	_____ _____ _____ _____ _____	_____	_____
- training of personnel in the application of the procedures?	_____	_____	_____	_____ _____ _____ _____	_____	_____
- quality control procedures to ensure that maintenance materials, and spare equipment and parts meet design specifications and protect against inadvertent use of improper materials?	_____	_____	_____	_____ _____ _____ _____ _____ _____ _____ _____	_____	_____
- procedures to ensure that all changes in technology and facilities are appropriately reviewed in accordance with "Modification Control and Documentation of Equipment and Procedural Changes"?	_____	_____	_____	_____ _____ _____ _____ _____ _____ _____ _____	_____	_____

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	<u>Yes</u>	<u>No</u>	<u>Does Not Apply</u>	<u>Comments</u>	<u>Date</u>	<u>Initial</u>
3. Has an inspection and test program of critical service equipment to maintain mechanical integrity been implemented?	_____	_____	_____	_____ _____ _____ _____	_____	_____
4. Does the program in part 3 of this section provide for testing and inspection of:						
- pressure vessels and storage tanks?	_____	_____	_____	_____	_____	_____
- critical piping?	_____	_____	_____	_____	_____	_____
- relief and vent systems and devices?	_____	_____	_____	_____	_____	_____
- emergency shutdown systems?	_____	_____	_____	_____	_____	_____
- critical controls, alarms and interlocks?	_____	_____	_____	_____	_____	_____
5. Does each test and/or inspection document the following:						
- the equipment and systems subject to tests and inspections?	_____	_____	_____	_____	_____	_____
- the method of testing and/or inspection?	_____	_____	_____	_____	_____	_____
- the frequency of testing and/or inspection?	_____	_____	_____	_____	_____	_____
- acceptable limits or criteria for passing the test or inspection?	_____	_____	_____	_____	_____	_____
6. Do the testing and/or inspection procedures and frequencies follow commonly accepted standards and codes, stays in or governed by good engineering practice?	_____	_____	_____	_____ _____ _____ _____	_____	_____

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	<u>Yes</u>	<u>No</u>	<u>Does Not Apply</u>	<u>Comments</u>	<u>Date</u>	<u>Initial</u>
7. Are the tests and inspections documented and has the documentation been maintained at least until the next test or inspection, or longer if needed to comply with the requirements of the following part?	_____	_____	_____	_____ _____ _____ _____ _____ _____	_____	_____
8. Is the documentation required in part 7 of this section used to determine the condition of the equipment, to ensure that it is fit for its intended service, and to determine any needed changes in the frequency of testing and inspection procedures and preventive maintenance?	_____	_____	_____	_____ _____ _____ _____ _____ _____ _____ _____	_____	_____
9. Have plans been developed and implemented to correct equipment operations?	_____	_____	_____	_____ _____ _____	_____	_____
10. Has a system been developed for reviewing and authorizing changes in equipment tests and inspections?	_____	_____	_____	_____ _____ _____ _____	_____	_____

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CTL020392

TRAINING

	<u>Yes</u>	<u>No</u>	<u>Does Not Apply</u>	<u>Comments</u>	<u>Date</u>	<u>Initial</u>
1. Has training been provided for all personnel responsible for operating the process appropriate to their duties and responsibilities?	_____	_____	_____	_____ _____ _____ _____	_____	_____
2. Does the training include the following:						
- operating procedures?	_____	_____	_____	_____	_____	_____
- changes in process technology of equipment?	_____	_____	_____	_____	_____	_____
- training in emergency operating and emergency shutdown procedures?	_____	_____	_____	_____	_____	_____
3. Has qualification criteria for operating personnel been developed?	_____	_____	_____	_____ _____ _____	_____	_____
4. Does the qualification criteria ensure that before any employee is deemed qualified to operate the process, the employee possesses the required knowledge, skills, and abilities to carry out his or her duties and responsibilities, including start-up and shutdown?	_____	_____	_____	_____ _____ _____ _____ _____ _____ _____ _____	_____	_____
5. Is refresher training provided that will ensure that process unit personnel understand and				_____ _____ _____		

CTL020393

	<u>Yes</u>	<u>No</u>	<u>Does Not Apply</u>	<u>Comments</u>	<u>Date</u>	<u>Initial</u>
adhere to the current operating procedures and still meet the qualification criteria in part 4?	_____	_____	_____	_____ _____ _____	_____	_____
6. Is the refresher training ongoing or provided at least once every three years?	_____	_____	_____	_____ _____ _____	_____	_____
7. Whenever a change is made in the operating instructions are all operating personnel whose duties involve the areas of change trained in, or otherwise informed of, the change prior to implementation to ensure that they understand the change?	_____	_____	_____	_____ _____ _____ _____ _____ _____ _____ _____	_____	_____
8. Is there written criteria for instructor qualifications that ensure that instructors are qualified?	_____	_____	_____	_____ _____ _____ _____	_____	_____
9. Is there appropriate documentation for all items in this section?	_____	_____	_____	_____ _____ _____	_____	_____

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CTL020394

INCIDENT INVESTIGATION PROCEDURES AND REMEDIAL ACTION REQUIREMENT

	<u>Yes</u>	<u>No</u>	<u>Does Not Apply</u>	<u>Comments</u>	<u>Date</u>	<u>Initial</u>
1. Has there been an investigation of every incident which either resulted in, or could reasonably have resulted in, catastrophic release?	_____	_____	_____	_____ _____ _____ _____	_____	_____
2. Were the incident investigations initiated as promptly as possible, but not later than 48 hours following discovery of the incident?	_____	_____	_____	_____ _____ _____ _____	_____	_____
3. Did the investigation team consist of persons knowledgeable in the process involved and other specialties as deemed necessary by the registrant?	_____	_____	_____	_____ _____ _____ _____ _____	_____	_____
4. Was a report prepared for each incident?	_____	_____	_____	_____ _____	_____	_____
5. Did the report include:						
- a description of the incident and findings?	_____	_____	_____	_____ _____ _____	_____	_____
- a description of any recommended changes in process hazard management made as a result of the investigation to prevent recurrence?	_____	_____	_____	_____ _____ _____ _____ _____	_____	_____
- the identities of the persons who participated on the investigation team?	_____	_____	_____	_____ _____ _____ _____	_____	_____

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	<u>Yes</u>	<u>No</u>	<u>Does Not Apply</u>	<u>Comments</u>	<u>Date</u>	<u>Initial</u>
6. Were the incident reports reviewed with all appropriate operating, maintenance, and other personnel whose work assignments involve the EHS process where the incident occurred?	_____	_____	_____	_____ _____ _____ _____ _____	_____	_____
7. Has a system been established to determine and document the appropriate response to any recommendations in the incident investigation report and to ensure that the actions are completed?	_____	_____	_____	_____ _____ _____ _____ _____	_____	_____
8. Have the incident investigation reports been maintained for five years from the date of issue?	_____	_____	_____	_____ _____ _____	_____	_____

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CTL020396

INSPECTION AND AUDITING REQUIREMENTS

	<u>Yes</u>	<u>No</u>	<u>Does Not Apply</u>	<u>Comments</u>	<u>Date</u>	<u>Initial</u>
1. Has compliance been evaluated by completing all items on the most recent audit check list?	_____	_____	_____	_____ _____ _____	_____	_____
2. Was the team selected by the registrant that conducted the audit review comprised of one or more persons knowledgeable about the process involved and other specialties as deemed necessary?	_____	_____	_____	_____ _____ _____ _____ _____	_____	_____
3. Did the team include at least one person not associated with the day-to-day operations of the EHS process being reviewed?	_____	_____	_____	_____ _____ _____ _____	_____	_____
4. Was an audit review conducted and submitted to the Department within 12 months of adoption of the regulation?	_____	_____	_____	_____ _____ _____ _____	_____	_____
5. Has an audit review been conducted and submitted to the Department at least once every three years since the initial audit was submitted?	_____	_____	_____	_____ _____ _____ _____	_____	_____
6. Has a report of the findings of the compliance audit been provided to persons having direct line management responsibility for the EHS process?	_____	_____	_____	_____ _____ _____ _____	_____	_____
7. Has a system been established to determine and document the appropriate response to each of the findings of the compliance	_____	_____	_____	_____ _____ _____ _____	_____	_____

CTL020397

