

**From:** "DeWald, Lynn" <ldewald@entergy.com>  
**To:** "Richard Emch" <RLE@NRC.GOV>  
**Date:** Mon, Sep 18, 2006 12:58 PM  
**Subject:** air emissions inventory report for 2005 and MSDS for Nalco H-550

Rich, I don't seem to have kept Sam's email address and although I think it is SHQ@nrc.com, I wasn't positive and didn't want someone to get this who wasn't expecting it. Can you please forward to Sam?

As discussed, we no longer use Nalco H-550 but even when we did, any product that was not consumed in the service water system had to be maintained below 2.0 ppm as a discharge to the CT River and as such was well below Vermont's action level for gluteraldehyde in cooling tower drift.

Lynn

Lynn DeWald

Entergy Nuclear Vermont Yankee, LLC

320 Governor Hunt Road

Vernon, VT 05354

802-258-5526 (phone)

802-258-5865 (fax)

802-380-4493 (cell)

**Mail Envelope Properties** (450ED012.1ED : 20 : 29165)

**Subject:** air emissions inventory report for 2005 and MSDS for Nalco H-550  
**Creation Date** Mon, Sep 18, 2006 12:56 PM  
**From:** "DeWald, Lynn" <[ldewald@entergy.com](mailto:ldewald@entergy.com)>

**Created By:** [ldewald@entergy.com](mailto:ldewald@entergy.com)

**Recipients**

nrc.gov  
OWGWPO02.HQGWDO01  
RLE (Richard Emch)

**Post Office**

OWGWPO02.HQGWDO01

**Route**

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| Files  | Size   | Date & Time                         |
|--|--------|-------------------------------------|
| MESSAGE  | 675    | Monday, September 18, 2006 12:56 PM |
| TEXT.htm   | 5044   |                                     |
| Final 2005 emissions inventory report for Entergy VY 1 26 2006.pdf | 556268 |                                     |
| H550.pdf   | 65385  |                                     |
| Mime.822   | 1      |                                     |

**Options**

**Expiration Date:** None  
**Priority:** Standard  
**ReplyRequested:** No  
**Return Notification:** None

**Concealed Subject:** No  
**Security:** Standard

**Junk Mail Handling Evaluation Results**

Message is eligible for Junk Mail handling  
This message was not classified as Junk Mail

**Junk Mail settings when this message was delivered**

Junk Mail handling disabled by User  
Junk Mail handling disabled by Administrator  
Junk List is not enabled  
Junk Mail using personal address books is not enabled  
Block List is not enabled



**Entergy Nuclear Northeast**  
 Entergy Nuclear Operations, Inc.  
 Vermont Yankee  
 322 Governor Hunt Rd.  
 P.O. Box 157  
 Vernon, VT 05354  
 Tel 802-257-7711

26 January 2006

Mr. Daniel Riley, Environmental Engineer  
 Vermont Agency of Natural Resources  
 Department of Environmental Conservation  
 Air Pollution Control Division  
 Building 3 South  
 103 South Main Street  
 Waterbury, VT 05671-0402

**Subject: 2005 Air Pollutant Emissions Inventory Report for Entergy Nuclear Vermont Yankee, LLC. Facility ID WM 2335.**

Dear Mr. Riley:

Enclosed is Entergy Nuclear Vermont Yankee's air emissions inventory report for 2005. Total air emissions from significant activities, which includes the house heating boilers and the waste oil burners, was 9.07 tons for the year. Vermont Yankee does not include emissions from the emergency diesel generators (A and B), the John Deere diesel, or the emergency diesel fire pump toward the total tonnage in this inventory report as these emergency generators, each of which operate less than one hundred hours per year, are considered insignificant activities under the State regulations.

The cooling tower particulate emissions calculations for the mechanical draft cooling towers are based on the drift and drift rate, and as in 2004, remain conservatively high. The cooling towers operated for 2,149 hours during 2005. The operating hours were utilized in calculating the 2005 PM emissions.

$$\begin{aligned}
 \text{PM Emissions (TPY)} &= \text{Drift gpm} \times 8.33 \text{ lbs/gal} \times \text{TDS} \times 60 \text{ min/hr} \times \text{hrs/yr of operation} \\
 &\quad \times 1 \text{ ton/2000 lbs} \\
 &= 72.0 \text{ gpm} \times 8.33 \text{ lbs/gal} \times (62 \text{ lbs/1000000 lbs}) \times 60 \text{ min/hr} \times \\
 &\quad 2149 \times 1 \text{ ton/2000 lbs}
 \end{aligned}$$

The calculations for the 2005 emission data for cooling tower hazardous air contaminants (HAC) consider the miscibility of the product constituent and the water circulated through the cooling towers versus percentage of water loss through evaporation when the towers are running. The circulating water flow through the cooling towers is approximately 360,000 gallons per minute (gpm), and based on the *Final Environmental Statement Related to the Operation of Vermont Yankee Nuclear Power Corporation*


published by the Nuclear Regulatory Commission, 5,000 gpm is lost through cooling tower evaporation. The HAC emissions from the cooling towers are insignificant and do not exceed any action levels outlined in Appendix C of the Vermont Air Pollution Control Regulations.


| Pollutant                      | Cooling Towers |             | Action level (lbs/8hrs) |
|--------------------------------|----------------|-------------|-------------------------|
|                                | Tons           | lbs/8 hours |                         |
| Particulate Matter             | 2.4            |             |                         |
| Dodecylguanidine Hydrochloride | 0.001          | 0.002       | 0.025                   |
| Ethyl Alcohol                  | 0.0004         | 0.001       | 2,330                   |
| Glutaraldehyde                 | 0.008          | 0.015       | 340                     |
| Isopropyl Alcohol              | 0.0005         | 0.001       | 63                      |
| <b>Total</b>                   | <b>2.41</b>    |             |                         |

This submittal does not include additional hazardous air contaminant (HAC) emissions inventory, as those would be associated with routine maintenance activities, such as painting and cleaning, and are therefore not subject to any State reporting requirements.

Please do not hesitate to call if you have questions or concerns with the enclosed information.

Sincerely,  
Entergy Nuclear Vermont Yankee, LLC

  
Lynn DeWald  
Environmental Specialist  
802-258-5526

  
Samuel A. Wender IV  
Chemistry Superintendent  
802-258-5650

### Supporting Calculations

#### A. SPECTRUS NX-1104

##### Isopropyl Alcohol

$$(400 \text{ gals/yr}) \times (8.24 \text{ lbs/gal}) \times (2.4\%) \times (1 \text{ ton}/2,000 \text{ lbs}) \times (5,000 \text{ gpm}/360,000 \text{ gpm}) = 0.0005 \text{ tons/yr}$$

##### Ethyl Alcohol

$$(400 \text{ gals/yr}) \times (8.24 \text{ lbs/gal}) \times (1.8\%) \times (1 \text{ ton}/2,000 \text{ lbs}) \times (5,000 \text{ gpm}/360,000 \text{ gpm}) = 0.0004 \text{ tons/yr}$$

##### Dodecylguanidine Hydrochloride

$$(400 \text{ gals/yr}) \times (8.24 \text{ lbs/gal}) \times (5\%) \times (1 \text{ ton}/2,000 \text{ lbs}) \times (5,000 \text{ gpm}/360,000 \text{ gpm}) = 0.001 \text{ tons/yr}$$

#### B. NALCO H-550

##### Glutaraldehyde (50% Solution)

$$(250 \text{ gals/yr}) \times (9.4 \text{ lbs/gal}) \times (50\%) \times (1 \text{ ton}/2,000 \text{ lbs}) \times (5,000 \text{ gpm}/360,000 \text{ gpm}) = 0.008 \text{ tons/yr}$$

**CERTIFICATION OF DATA ACCURACY****For Purposes of Emission Calculations**

This form must be signed by an individual responsible for the completion and certification of the data contained in the forms attached which are intended to meet both the requirements of State Statute {10 V.S.A. 555 (c) and 3 V.S.A. 2822 (j)(1)(B)} and the requirements for "Emission Statements" contained in the Federal Clean Air Act as amended in 1990. Certification indicates that the signatory takes legal responsibility for the accuracy of the information on the form.

*The data presented herein represents the best available information and is true, accurate, and complete to the best of my knowledge.*

Lynn Dewald Environmental Specialist  
Print Full Name Print Full Title

Lynn Dewald 1/25/06  
Signature Date of Signature

802-258-5526  
Telephone Number

Received

JAN 4 2006

By Lynn Dewald

**Vermont Agency of Natural Resources      Combustion Source**  
**2005 Air Pollutant Emissions Inventory      For Criteria Pollutants**

The information displayed on this form is that which is currently on file for your facility. It is based on inventory forms completed for calendar year 2004 or the most recent year available. The information must be updated to calendar year 2005. Please review the information contained in the boxes. If there is no value in a box, write in the correct 2005 value. If there is a value, but it is incorrect for 2005, cross out the value and in its place write the correct value.

If you have questions, or desire assistance with completing the inventory, please call Dan Riley at (802)-241-3858.

Facility Name :    ENTERGY NUCLEAR VERMONT YANKEE

Person Completing Inventory Form

Lynn Dewald

Facility ID      WM2335

Source Description: house heating boilers (2)

Stack Number:                    1

Source Number:                   1

Segment Number:                 1

Source Classification Code: 1-03-005-01

**Operational Data:**

Hours Per Day:

Winter Throughput (%) :

Days Per Week:

Spring Throughput (%) :

Weeks Per Year:

Summer Throughput (%) :

Hours Per Year:

Autumn Throughput (%) :

(Over)

**Combustion Source (continued)**

Fuel Type :

2005 Fuel Consumption : (supply units) :

Av. Sulfur Content of Fuel (%) :  Ash Content of Fuel (%) :

*(Please supply a current estimate of mid-range sulfur content)*

Maximum Heat Input (million BTU/hr) :

Burner Rating:

Boiler Rating:

Maximum Actual Firing Rate (million BTU/hr):

Percent Space Heat:

Percent Process Heat:

**Stack Parameters:**

Stack Number:

Stack/Duct Discharge Height (feet) :

Stack/Duct Inner Diameter at Exit (inches) :

Exit Gas Temperature (deg. F) :

Flow Rate at Exit (actual FT3/min) :

**If an air pollution control device for the source exists inspect the following information and correct if necessary :**

TSP Control Device:  Theoretical Efficiency:

SO2 Control Device:  Theoretical Efficiency:

NOx Control Device:  Theoretical Efficiency:

VOC Control Device:  Theoretical Efficiency:

CO Control Device:  Theoretical Efficiency:

**If an estimated emission rate exists, please supply the information below :**

Estimated Emission Rate\* :

Basis of Estimate :

\* If test data 4 years old or less is available.



**Vermont Agency of Natural Resources      Combustion Source**  
**2005 Air Pollutant Emissions Inventory      For Criteria Pollutants**

The information displayed on this form is that which is currently on file for your facility. It is based on inventory forms completed for calendar year 2004 or the most recent year available. The information must be updated to calendar year 2005. Please review the information contained in the boxes. If there is no value in a box, write in the correct 2005 value. If there is a value, but it is incorrect for 2005, cross out the value and in its place write the correct value.

If you have questions, or desire assistance with completing the inventory, please call Dan Riley at (802)-241-3858.

Facility Name :      ENTERGY NUCLEAR VERMONT YANKEE

Person Completing Inventory Form

Lynn DeWald

Facility ID      WM2335

Source Description: <sup>used</sup> waste oil furnace (2)

Stack Number: <sup>LOD</sup> 2

Source Number: 2

Segment Number: 1

Source Classification Code: 1-02-004-01

**Operational Data:**

Hours Per Day:

Winter Throughput (%) :

Days Per Week:

Spring Throughput (%) :

Weeks Per Year:

Summer Throughput (%) :

Hours Per Year:

Autumn Throughput (%) :

(Over)

**Combustion Source (continued)**Fuel Type : 2005 Fuel Consumption : (supply units) :  gallonsAv. Sulfur Content of Fuel (%) :  Ash Content of Fuel (%) : *(Please supply a current estimate of mid-range sulfur content)*

Maximum Heat Input (million BTU/hr) :

Burner Rating:  Boiler Rating: Maximum Actual Firing Rate (million BTU/hr): Percent Space Heat: Percent Process Heat: **Stack Parameters:**Stack Number: Stack/Duct Discharge Height (feet) : Stack/Duct Inner Diameter at Exit (inches) : Exit Gas Temperature (deg. F) : Flow Rate at Exit (actual FT<sup>3</sup>/min) : 

If an air pollution control device for the source exists inspect the following information and correct if necessary :

TSP Control Device:  Theoretical Efficiency: SO<sub>2</sub> Control Device:  Theoretical Efficiency: NO<sub>x</sub> Control Device:  Theoretical Efficiency: VOC Control Device:  Theoretical Efficiency: CO Control Device:  Theoretical Efficiency: 

If an estimated emission rate exists, please supply the information below :

Estimated Emission Rate\* : Basis of Estimate : 

\* If test data 4 years old or less is available.

**Vermont Agency of Natural Resources**  
**2005 Air Pollutant Emissions Inventory**

**Process Source**  
**For Criteria Pollutants**

The information displayed on this form is that which is currently on file for your facility. It is based on inventory forms completed for calendar year 2004 or the most recent year available. The information must be updated to calendar year 2005. Please review the information contained in the boxes. If there is no value in a box, write in the correct 2005 value. If there is a value, but it is incorrect for 2005, cross out the value and in its place write the correct value.

If you have questions, or desire assistance with completing the inventory, please call Dan Riley at (802)-241-3858.

Facility Name: ENTERGY NUCLEAR VERMONT YANKEE

Person Completing Inventory Form :

Lynn Dewald

Facility ID : WM2335

Source Description: Particulate Emissions from Cooling Tower

Stack Number: 5

Source Number: 5

Segment Number: 1

Source Classification Code: 3-85-001-01

**Operational Data :**

|                |       |                         |                                  |
|----------------|-------|-------------------------|----------------------------------|
| HoursPerDay :  | 0     | Winter Throughput (%) : | 0                                |
| DaysPerWeek :  | 0     | Spring Throughput (%) : | 6% <del>of</del> May 2005        |
| WeeksPerYear : | 0     | Summer Throughput (%) : | 85% <del>of</del> June-Sept 2005 |
| HoursPerYear : | 2,147 | Autumn Throughput (%) : | 99% <del>of</del> Oct 2005       |

(Over)

LED  
1/20/06

**Process Source (continued)****Raw Materials Input\*:**

| Type | Quantity |
|------|----------|
|      |          |
|      |          |
|      |          |

**Product Materials Output\* :**

| Type | Quantity |
|------|----------|
|      |          |
|      |          |
|      |          |

\*Information in this section only necessary if accurate figures for stack flow rate and hours of operation cannot be supplied.

**Stack Parameters :**

Stack Number: 5

Stack/Duct Discharge Height (Feet) : Stack/Duct Inner Diameter at Exit (Inches) : Exit Gas Temperature (Deg F) : Flow Rate at Exit (Actual FT<sup>3</sup>/Min) : 

If there is an air pollution control device on this source inspect the following information and correct if necessary :

PM Control Device: Theoretical Efficiency (%): 

If available, supply theoretical efficiencies for :

PM10 Efficiency (%): PM2.5 Efficiency (%): 

(NOTE: This information will not affect the Air Registration Fee Estimate).

If an estimated emission rate exists for PM, supply the information below :

Estimated Emission Rate\* Basis of Estimate : 

\*If test data 4 years old or less is available.

**Vermont Agency of Natural Resources      Combustion Source**  
**2005 Air Pollutant Emissions Inventory      For Criteria Pollutants**

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If you have questions, or desire assistance with completing the inventory, please call Dan Riley at (802)-241-3858.

Facility Name :      ENTERGY NUCLEAR VERMONT YANKEE

Person Completing Inventory Form

*Lyan Dewald*

Facility ID      WM2335

Source Description:      Emergency Diesels (2) - 1675 hp

Stack Number:                      3

Source Number:                      3

Segment Number:                      1

Source Classification Code:      2-02-004-01

**Operational Data:**

Hours Per Day:

Winter Throughput (%) :

Days Per Week:

Spring Throughput (%) :

Weeks Per Year:

Summer Throughput (%) :

Hours Per Year:

Autumn Throughput (%) :

"A"  
Diesel Generator  
47.6 hrs

(Over)

"B"  
Diesel Generator  
46.5 hrs

**Combustion Source (continued)**Fuel Type: 2005 Fuel Consumption : (supply units) : Av. Sulfur Content of Fuel (%) :  Ash Content of Fuel (%) : *(Please supply a current estimate of mid-range sulfur content)*

Maximum Heat Input (million BTU/hr) :

Burner Rating: Boiler Rating: Maximum Actual Firing Rate (million BTU/hr): Percent Space Heat: Percent Process Heat: **Stack Parameters:**Stack Number: Stack/Duct Discharge Height (feet) : Stack/Duct Inner Diameter at Exit (inches) : Exit Gas Temperature (deg. F) : Flow Rate at Exit (actual FT<sup>3</sup>/min) : **If an air pollution control device for the source exists inspect the following information and correct if necessary :**TSP Control Device:  Theoretical Efficiency: SO<sub>2</sub> Control Device:  Theoretical Efficiency: NO<sub>x</sub> Control Device:  Theoretical Efficiency: VOC Control Device:  Theoretical Efficiency: CO Control Device:  Theoretical Efficiency: **If an estimated emission rate exists, please supply the information below :**Estimated Emission Rate\* : Basis of Estimate : 

\* If test data 4 years old or less is available.

**Vermont Agency of Natural Resources      Combustion Source**  
**2005 Air Pollutant Emissions Inventory      For Criteria Pollutants**

The information displayed on this form is that which is currently on file for your facility. It is based on inventory forms completed for calendar year 2004 or the most recent year available. The information must be updated to calendar year 2005. Please review the information contained in the boxes. If there is no value in a box, write in the correct 2005 value. If there is a value, but it is incorrect for 2005, cross out the value and in its place write the correct value.

If you have questions, or desire assistance with completing the inventory, please call Dan Riley at (802)-241-3858.

Facility Name :    ENTERGY NUCLEAR VERMONT YANKEE

Person Completing Inventory Form

*Lynn Dewald*

Facility ID    WM2335

Source Description: 235 hp John Deere Diesel

Stack Number:                    4

Source Number:                   4

Segment Number:                1

Source Classification Code: 2-01-001-02

**Operational Data:**

Hours Per Day:

Winter Throughput (%) :

Days Per Week:

Spring Throughput (%) :

Weeks Per Year:

Summer Throughput (%) :

Hours Per Year:

Autumn Throughput (%) :

(Over)

**Combustion Source (continued)**Fuel Type: 2005 Fuel Consumption : (supply units) : Av. Sulfur Content of Fuel (%) :  Ash Content of Fuel (%) : *(Please supply a current estimate of mid-range sulfur content)*

Maximum Heat Input (million BTU/hr) :

Burner Rating:  Boiler Rating: Maximum Actual Firing Rate (million BTU/hr): Percent Space Heat: Percent Process Heat: **Stack Parameters:**Stack Number: Stack/Duct Discharge Height (feet) : Stack/Duct Inner Diameter at Exit (inches) : Exit Gas Temperature (deg. F) : Flow Rate at Exit (actual FT<sup>3</sup>/min) : **If an air pollution control device for the source exists inspect the following information and correct if necessary :**TSP Control Device:  Theoretical Efficiency: SO<sub>2</sub> Control Device:  Theoretical Efficiency: NO<sub>x</sub> Control Device:  Theoretical Efficiency: VOC Control Device:  Theoretical Efficiency: CO Control Device:  Theoretical Efficiency: **If an estimated emission rate exists, please supply the information below :**Estimated Emission Rate\* : Basis of Estimate : 

\* If test data 4 years old or less is available.




**MATERIAL SAFETY DATA SHEET**
**PRODUCT**
**H-550**
**EMERGENCY TELEPHONE NUMBER(S)**

(800) 424-9300 (24 Hours) CHEMTREC

**1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION**

**PRODUCT NAME :** H-550  
**APPLICATION :** MICROBIOCIDES  
**COMPANY IDENTIFICATION :** Nalco Company  
 1601 W. Diehl Road  
 Naperville, Illinois  
 60563-1198  
**EMERGENCY TELEPHONE NUMBER(S) :** (800) 424-9300 (24 Hours) CHEMTREC  
**NFPA 704M/HMIS RATING**  
**HEALTH :** 3/3 **FLAMMABILITY :** 1/1 **INSTABILITY :** 0/0 **OTHER :**  
 0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme

**2. COMPOSITION/INFORMATION ON INGREDIENTS**

Our hazard evaluation has identified the following chemical substance(s) as hazardous. Consult Section 15 for the nature of the hazard(s).

| Hazardous Substance(s) | CAS NO   | % (w/w)     |
|------------------------|----------|-------------|
| Glutaraldehyde         | 111-30-8 | 30.0 - 60.0 |

**3. HAZARDS IDENTIFICATION**
**\*\*EMERGENCY OVERVIEW\*\***
**DANGER**

Corrosive. Causes irreversible eye damage. Causes skin burns. Harmful if inhaled. May be fatal if swallowed. Harmful if absorbed through skin. Prolonged or frequently repeated skin contact may cause allergic reactions in some individuals. Causes asthmatic signs and symptoms in hyper-reactive individuals.  
 Do not get in eyes, on skin, on clothing. Avoid breathing vapor. Do not swallow. Wear goggles, protective clothing, and rubber gloves. Wash thoroughly with soap and water after handling. Remove contaminated clothing and wash before reuse.  
 Not flammable or combustible. May evolve oxides of carbon (COx) under fire conditions.

**PRIMARY ROUTES OF EXPOSURE :**  
 Eye, Skin, Inhalation

**HUMAN HEALTH HAZARDS - ACUTE :**

**EYE CONTACT :**  
 Corrosive. Will cause eye burns and permanent tissue damage.

Nalco Company 1601 W. Diehl Road • Naperville, Illinois 60563-1198 • (630)305-1000  
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**MATERIAL SAFETY DATA SHEET**

PRODUCT

**H-550**

EMERGENCY TELEPHONE NUMBER(S)

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**SKIN CONTACT :**

May cause severe irritation or tissue damage depending on the length of exposure and the type of first aid administered. Prolonged or frequently repeated skin contact may cause allergic reactions in some individuals.

**INGESTION :**

Not a likely route of exposure. Corrosive; causes chemical burns to the mouth, throat and stomach.

**INHALATION :**

Irritating, in high concentrations, to the eyes, nose, throat and lungs. Inhalation of product mist or vapors may cause respiratory allergy.

**SYMPTOMS OF EXPOSURE :****Acute :**

A review of available data does not identify any symptoms from exposure not previously mentioned.

**Chronic :**

A review of available data does not identify any symptoms from exposure not previously mentioned.

**AGGRAVATION OF EXISTING CONDITIONS :**

A review of available data does not identify any worsening of existing conditions.

**HUMAN HEALTH HAZARDS - CHRONIC :**

Prolonged inhalation of product can increase lung injury in persons with emphysema, asthma, or other lung disorders.

**4. FIRST AID MEASURES****EYE CONTACT :**

Get immediate medical attention. **PROMPT ACTION IS ESSENTIAL IN CASE OF CONTACT.** Immediately flush eye with water for at least 15 minutes while holding eyelids open.

**SKIN CONTACT :**

Get immediate medical attention. Immediately flush with plenty of water for at least 15 minutes. For a large splash, flood body under a shower. Remove contaminated clothing. Wash off affected area immediately with plenty of water. Contaminated clothing, shoes, and leather goods must be discarded or cleaned before re-use.

**INGESTION :**

Get immediate medical attention. **DO NOT INDUCE VOMITING.** If conscious, washout mouth and give water to drink.

**INHALATION :**

Remove to fresh air, treat symptomatically. If symptoms develop, seek medical advice.

**IF IN EYES:** Immediately flush with plenty of water for at least 15 minutes. Get immediate medical attention.

**IF ON SKIN:** Immediately wash with plenty of soap and water. Get medical attention.

**IF INHALED:** Remove to fresh air. If breathing is difficult, administer oxygen. If symptoms persist, call a physician.

**IF SWALLOWED:** **DO NOT INDUCE VOMITING.** Do not give anything to drink. Seek medical advice with urgency.

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For additional copies of an MSDS visit [www.nalco.com](http://www.nalco.com) and request access

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**MATERIAL SAFETY DATA SHEET**
**PRODUCT**
**H-550**
**EMERGENCY TELEPHONE NUMBER(S)**
**(800) 424-9300 (24 Hours) CHEMTREC**
**NOTE TO PHYSICIAN :**

Probable mucosal damage may contraindicate the use of gastric lavage. Based on the individual reactions of the patient, the physician's judgement should be used to control symptoms and clinical condition.

**5. FIRE FIGHTING MEASURES**
**FLASH POINT :** None

**EXTINGUISHING MEDIA :**

This product would not be expected to burn unless all the water is boiled away. The remaining organics may be ignitable. Use extinguishing media appropriate for surrounding fire.

**FIRE AND EXPLOSION HAZARD :**

Not flammable or combustible. May evolve oxides of carbon (COx) under fire conditions.

**SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTING :**

In case of fire, wear a full face positive-pressure self contained breathing apparatus and protective suit.

**6. ACCIDENTAL RELEASE MEASURES**
**PERSONAL PRECAUTIONS :**

Restrict access to area as appropriate until clean-up operations are complete. Ensure clean-up is conducted by trained personnel only. Ventilate spill area if possible. Do not touch spilled material. Stop or reduce any leaks if it is safe to do so. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection). Notify appropriate government, occupational health and safety and environmental authorities.

**METHODS FOR CLEANING UP :**

**SMALL SPILLS:** Soak up spill with absorbent material. Place residues in a suitable, covered, properly labeled container. Wash affected area. **LARGE SPILLS:** Contain liquid using absorbent material, by digging trenches or by diking. Reclaim into recovery or salvage drums or tank truck for proper disposal. Wash site of spillage thoroughly with water. Dilute the glutaraldehyde to 5% or less with water. Add sodium bisulfite (2-3 parts by weight per part glutaraldehyde). This will typically reduce the glutaraldehyde concentration to 2 ppm or less in 5 minutes at room temperature. The remaining solution can be disposed of via appropriate means. Contact an approved waste hauler for disposal of contaminated recovered material. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations).

**ENVIRONMENTAL PRECAUTIONS :**

This pesticide is toxic to fish. Do not discharge effluent containing this product into lakes, streams, ponds, estuaries, oceans or other waters, unless in accordance with the requirements of a National Pollutant Discharge Elimination System (NPDES) permit and the permitting authority has been notified in writing prior to discharge. Do not discharge effluent containing this product to sewer systems without previously notifying the local sewage treatment plant authority. For guidance contact your State Water Board or Regional Office of the EPA.

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For additional copies of an MSDS visit [www.nalco.com](http://www.nalco.com) and request access

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**MATERIAL SAFETY DATA SHEET**
**PRODUCT**
**H-550**
**EMERGENCY TELEPHONE NUMBER(S)**
**(800) 424-9300 (24 Hours) CHEMTREC**
**7. HANDLING AND STORAGE**
**HANDLING :**

Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. Avoid generating aerosols and mists. Keep the containers closed when not in use. Have emergency equipment (for fires, spills, leaks, etc.) readily available.

**STORAGE CONDITIONS :**

Store the containers tightly closed. Store separately from oxidizers. Store in suitable labelled containers.

**SUITABLE CONSTRUCTION MATERIAL :**

Compatibility with Plastic Materials can vary; we therefore recommend that compatibility is tested prior to use.

**8. EXPOSURE CONTROLS/PERSONAL PROTECTION**
**OCCUPATIONAL EXPOSURE LIMITS :**

Exposure guidelines have not been established for this product. Available exposure limits for the substance(s) are shown below.

**ACGIH/TLV :**
**Substance(s)**

Glutaraldehyde

**CEILING: 0.05 ppm , 0.2 mg/m<sup>3</sup> 0.05 ppm , 0.2 mg/m<sup>3</sup>**
**OSHA/PEL :**
**Substance(s)**

Glutaraldehyde

**CEILING: 0.2 ppm , 0.8 mg/m<sup>3</sup>**
**ENGINEERING MEASURES :**

General ventilation is recommended. Use local exhaust ventilation if necessary to control airborne mist and vapor.

**RESPIRATORY PROTECTION :**

If significant mists, vapors or aerosols are generated an approved respirator is recommended. A dust, mist, fume cartridge may be used. In event of emergency or planned entry into unknown concentrations a positive pressure, full-facepiece SCBA should be used. If respiratory protection is required, institute a complete respiratory protection program including selection, fit testing, training, maintenance and inspection.

**HAND PROTECTION :**

BUTYL GLOVES, NEOPRENE GLOVES, Viton® gloves

**SKIN PROTECTION :**

Wear chemical resistant apron, chemical splash goggles, impervious gloves and boots. A full slicker suit is recommended if gross exposure is possible.

**EYE PROTECTION :**

Wear a face shield with chemical splash goggles.

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**PRODUCT**
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**(800) 424-9300 (24 Hours) CHEMTREC**
**HYGIENE RECOMMENDATIONS :**

Eye wash station and safety shower are necessary. If clothing is contaminated, remove clothing and thoroughly wash the affected area. Launder contaminated clothing before reuse.

**9. PHYSICAL AND CHEMICAL PROPERTIES**

|                     |                             |
|---------------------|-----------------------------|
| PHYSICAL STATE      | Liquid                      |
| APPEARANCE          | Colorless                   |
| ODOR                | Aldehyde                    |
| SPECIFIC GRAVITY    | 1.11 - 1.13 @ 77 °F / 25 °C |
| DENSITY             | 9.4 lb/gal                  |
| SOLUBILITY IN WATER | Complete                    |
| pH (100 %)          | 3.1 - 4.5                   |
| VISCOSITY           | 21 cps @ 68 °F / 20 °C      |
| FREEZING POINT      | -5.8 °F / -21 °C            |
| BOILING POINT       | 213 °F / 100.5 °C           |
| VAPOR PRESSURE      | 16 mm Hg                    |
| VAPOR DENSITY       | 1.1                         |
| VOC CONTENT         | 54 % EPA Method 24          |

Note: These physical properties are typical values for this product and are subject to change.

**10. STABILITY AND REACTIVITY**
**STABILITY :**

Stable under normal conditions.

**HAZARDOUS POLYMERIZATION :**

Hazardous polymerization will not occur.

**CONDITIONS TO AVOID :**

Freezing temperatures.

**MATERIALS TO AVOID :**

Contact with strong oxidizers (e.g. chlorine, peroxides, chromates, nitric acid, perchlorate, concentrated oxygen, permanganate) may generate heat, fires, explosions and/or toxic vapors.

**HAZARDOUS DECOMPOSITION PRODUCTS :**

Under fire conditions: Oxides of carbon

**11. TOXICOLOGICAL INFORMATION**

The following results are for the product.

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**ACUTE ORAL TOXICITY :**

|         |                   |                        |
|---------|-------------------|------------------------|
| Species | LD50              | Test Descriptor        |
| Rat     | 1,300 mg/kg       | Product Glutaraldehyde |
| Rat     | 1.2 ml/kg         | 45% Active Ingredient  |
| Rat     | 1.54 - 1.87 ml/kg | 25% Active Ingredient  |
| Rat     | 1.07 - 1.62 ml/kg | 10% Active Ingredient  |

Rating : Harmful

**ACUTE DERMAL TOXICITY :**

|         |                   |                        |
|---------|-------------------|------------------------|
| Species | LD50              | Test Descriptor        |
| Rabbit  | 897 mg/kg         | Product Glutaraldehyde |
| Rabbit  | 2.00 - 2.71 ml/kg | 45% Active Ingredient  |
| Rabbit  | 8.0 - 12.8 ml/kg  | 25% Active Ingredient  |

Rating : Harmful

**ACUTE INHALATION TOXICITY :**

|         |              |                 |
|---------|--------------|-----------------|
| Species | LC50         | Test Descriptor |
| Rat     | 0.48 mg/l () | Product         |

Rating : Very Toxic

**PRIMARY SKIN IRRITATION :** At 10% or greater, glutaraldehyde solutions may cause moderate to severe irritation, with possible necrosis after prolonged contact.

**PRIMARY EYE IRRITATION :** At levels of 0.2% and below of glutaraldehyde, no eye irritation was noted. Levels above 0.2% of glutaraldehyde produced moderate to severe irritation and corneal injury.

**SENSITIZATION :**

Levels of greater than 0.2% of glutaraldehyde produced allergic contact dermatitis in human studies. May cause sensitization by inhalation and skin contact.

**CARCINOGENICITY :**

None of the substances in this product are listed as carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP) or the American Conference of Governmental Industrial Hygienists (ACGIH).

**HUMAN HAZARD CHARACTERIZATION :**

Based on our hazard characterization, the potential human hazard is: High

**12. ECOLOGICAL INFORMATION**
**ECOTOXICOLOGICAL EFFECTS :**

The following results are for the product along with results on the active substances.

**ACUTE FISH RESULTS :**

| Species           | Exposure | LC50      | Test Descriptor |
|-------------------|----------|-----------|-----------------|
| Bluegill Sunfish  | 96 hrs   | 22.4 mg/l | Product         |
| Fathead Minnow    | 96 hrs   | 10.8 mg/l | Product         |
| Sheepshead Minnow | 96 hrs   | 64 mg/l   | Product         |

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|               |        |         |         |
|---------------|--------|---------|---------|
| Rainbow Trout | 96 hrs | 24 mg/l | Product |
|---------------|--------|---------|---------|

**ACUTE INVERTEBRATE RESULTS :**

| Species                         | Exposure | LC50      | EC50      | Test Descriptor |
|---------------------------------|----------|-----------|-----------|-----------------|
| Daphnia magna                   | 48 hrs   | 11.5 mg/l |           | Product         |
| Shore Crab                      | 96 hrs   | 930 mg/l  |           | Product         |
| Grass Shrimp                    | 96 hrs   | 82 mg/l   |           | Product         |
| Mysid Shrimp (Mysidopsis bahia) | 96 hrs   | 14.2 mg/l |           | Product         |
| American Oyster                 | 96 hrs   |           | 1.56 mg/l | Product         |
| Acartia tonsa                   | 48 hrs   |           | 0.22 mg/l | Product         |

**AQUATIC PLANT RESULTS :**

| Species                             | Exposure | EC50/LC50 | Test Descriptor |
|-------------------------------------|----------|-----------|-----------------|
| Marine Algae (Skeletonema costatum) | 72 hrs   | 1.22 mg/l | Product         |
| Algae (Scenedesmus subspicatus)     | 72 hrs   | 1.7 mg/l  | Product         |

**AQUATIC MICROORGANISM RESULTS :**

| Species               | Exposure | EC50/LC50 | Test Descriptor  |
|-----------------------|----------|-----------|------------------|
| Sewage Microorganisms | 96 hrs   | 34 mg/l   | Active Substance |

**AVIAN RESULTS :**

| Species        | Exposure | LC50       | Test Descriptor       |
|----------------|----------|------------|-----------------------|
| Bobwhite Quail | 8 Days   | 10,000 ppm | Active Substance      |
| Mallard Duck   | 8 Days   | 10,000 ppm | Active Substance      |
| Mallard Duck   |          | 933 mg/kg  | 50% Active Ingredient |

**MOBILITY :**

The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite TM, provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is intended to give the user a general estimate of the environmental fate of this product under the defined conditions of the models. If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages;

| Air | Water    | Soil/Sediment |
|-----|----------|---------------|
| <5% | 30 - 50% | 50 - 70%      |

The portion in water is expected to be soluble or dispersible.

**BIOACCUMULATION POTENTIAL**

This preparation or material is not expected to bioaccumulate.

**ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION**

Based on our hazard characterization, the potential environmental hazard is: Moderate

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If released into the environment, see CERCLA/SUPERFUND in Section 15.

**13. DISPOSAL CONSIDERATIONS**

If this product becomes a waste, it is not a hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA) 40 CFR 261, since it does not have the characteristics of Subpart C, nor is it listed under Subpart D.

As a non-hazardous waste, it is not subject to federal regulation. Consult state or local regulation for any additional handling, treatment or disposal requirements. For disposal, contact a properly licensed waste treatment, storage, disposal or recycling facility.

**CONTAINER DISPOSAL:** Metal Containers or Plastic Containers: Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or other procedures approved by state and local authorities. Plastic Containers: May be incinerated, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke. Metal Containers: Must not be incinerated. Do not cut or weld on or near metal containers.

**14. TRANSPORT INFORMATION**

The information in this section is for reference only and should not take the place of a shipping paper (bill of lading) specific to an order. Please note that the proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are as follows.

**LAND TRANSPORT :**

|                          |   |
|--------------------------|---|
| Proper Shipping Name :   | CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S. |
| Technical Name(s) :      | GLUTARALDEHYDE                            |
| UN/ID No :               | UN 3265                                   |
| Hazard Class - Primary : | 8   |
| Packing Group :          | II  |
| Flash Point :            | None                                      |

**AIR TRANSPORT (ICAO/IATA) :**

|                                   |   |
|-----------------------------------|---|
| Proper Shipping Name :            | CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S. |
| Technical Name(s) :               | GLUTARALDEHYDE                            |
| UN/ID No :                        | UN 3265                                   |
| Hazard Class - Primary :          | 8   |
| Packing Group :                   | II  |
| IATA Cargo Packing Instructions : | 812                                       |
| IATA Cargo Aircraft Limit :       | 30 L (Max net quantity per package)       |

**MARINE TRANSPORT (IMDG/IMO) :**

|                        |   |
|------------------------|---|
| Proper Shipping Name : | CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S. |
| Technical Name(s) :    | GLUTARALDEHYDE                            |
| UN/ID No :             | UN 3265                                   |

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Hazard Class - Primary : 8  
 Packing Group : II

**15. REGULATORY INFORMATION**

NATIONAL REGULATIONS, USA :

OSHA HAZARD COMMUNICATION RULE, 29 CFR 1910.1200 :

Based on our hazard evaluation, the following substance(s) in this product is/are hazardous and the reason(s) is/are shown below.

Glutaraldehyde : Corrosive, Sensitizer

CERCLA/SUPERFUND ND, 40 CFR 117, 302 :

This product contains the following Reportable Quantity (RQ) Substance. Also listed is the RQ for the product.

| <u>RQ Substance</u> | <u>RQ</u> |
|---------------------|-----------|
| Methanol            | 5,000 lbs |

SARA/SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (TITLE III) - SECTIONS 302, 311, 312, AND 313 :

SECTION 302 - EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355) :

This product does not contain substances listed in Appendix A and B as an Extremely Hazardous Substance.

SECTIONS 311 AND 312 - MATERIAL SAFETY DATA SHEET REQUIREMENTS (40 CFR 370) :

Our hazard evaluation has found this product to be hazardous. The product should be reported under the following indicated EPA hazard categories:

|   |                                   |
|---|-----------------------------------|
| X | Immediate (Acute) Health Hazard   |
| X | Delayed (Chronic) Health Hazard   |
| - | Fire Hazard                       |
| - | Sudden Release of Pressure Hazard |
| - | Reactive Hazard                   |

Under SARA 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are: 500 pounds or the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

SECTION 313 - LIST OF TOXIC CHEMICALS (40 CFR 372) :

This product contains the following substance(s), (with CAS # and % range) which appear(s) on the List of Toxic Chemicals

| <u>Hazardous Substance(s)</u> | <u>CAS NO</u> | <u>% (w/w)</u> |
|-------------------------------|---------------|----------------|
| Methanol                      | 67-56-1       | 1.0 - 5.0      |

TOXIC SUBSTANCES CONTROL ACT (TSCA) :

This product is exempted under TSCA and regulated under FIFRA. The inerts are on the Inventory List.

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**FEDERAL INSECTICIDE, FUNGICIDE AND RODENTICIDE ACT (FIFRA) :**

EPA Reg. No. 464-704-1706

In all cases follow instructions on the product label.

This product has been certified as KOSHER/PAREVE for year-round use INCLUDING THE PASSOVER SEASON by the CHICAGO RABBINICAL COUNCIL.

**FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15 / formerly Sec. 307, 40 CFR 116.4 / formerly Sec. 311 :**

None of the substances are specifically listed in the regulation.

**CLEAN AIR ACT, Sec. 112 (40 CFR 61, Hazardous Air Pollutants), Sec. 602 (40 CFR 82, Class I and II Ozone Depleting Substances) :**

This product contains the following substances listed in the regulation:

| Substance(s) | Citations          |
|--------------|--------------------|
| • Methanol   | Sec. 111, Sec. 112 |

**CALIFORNIA PROPOSITION 65 :**

This product does not contain substances which require warning under California Proposition 65.

**MICHIGAN CRITICAL MATERIALS :**

None of the substances are specifically listed in the regulation.

**STATE RIGHT TO KNOW LAWS :**

This product is a registered biocide and is exempt from State Right to Know Labelling Laws.

|                |          |
|----------------|----------|
| Methanol       | 67-56-1  |
| Glutaraldehyde | 111-30-8 |

**NATIONAL REGULATIONS, CANADA :**
**WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS) :**

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

**WHMIS CLASSIFICATION :**

Pesticide controlled products are not regulated under WHMIS.

**CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) :**

The substances in this preparation are listed on the Domestic Substances List (DSL), are exempt, or have been reported in accordance with the New Substances Notification Regulations.

**INTERNATIONAL CHEMICAL CONTROL LAWS**

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**AUSTRALIA**

All substances in this product comply with the National Industrial Chemicals Notification & Assessment Scheme (NICNAS).

**CHINA**

All substances in this product comply with the Chemical Control Law and are listed on the Inventory of Existing Chemical Substances China (IECSC).

**EUROPE**

The substances in this preparation have been reviewed for compliance with the EINECS or ELINCS inventories.

**JAPAN**

All substances in this product comply with the Law Regulating the Manufacture and Importation Of Chemical Substances and are listed on the Ministry of International Trade & Industry List (MITI).

**KOREA**

All substances in this product comply with the Toxic Chemical Control Law (TCCL) and are listed on the Existing Chemicals List (ECL)

**NEW ZEALAND**

This product complies with Parts XI - XV of the HSNO Act (1996).

**THE PHILIPPINES**

All substances in this product comply with the Republic Act 6969 (RA 6969) and are listed on the Philippine Inventory of Chemicals & Chemical Substances (PICCS).

**16. OTHER INFORMATION**

This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to insure safe workplace operations. Please consult your local sales representative for any further information.

**REFERENCES**

Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, American Conference of Governmental Industrial Hygienists, OH., (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Geneva: World Health Organization, International Agency for Research on Cancer.

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

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Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.

Title 29 Code of Federal Regulations, Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA), (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH, (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Ariel Insight# (An integrated guide to industrial chemicals covered under major regulatory and advisory programs), North American Module, Western European Module, Chemical Inventories Module and the Generics Module (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

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