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Health Safety & Environment Manual

Vestas Americas

Vestas American Wind Technology
Vestas Canadian Wind Technology

"At Vestas we will never compromise when it comes to safety - it will always have top priority - no matter what!"
Ditlev Engel – President & CEO – Vestas Wind Systems

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Health Safety & Environmental Manual

History of this Document

Rev. no.:	Date:	Description of changes
Old rev. 24	2009-09-03	HSE055 revised; HSE007 revised
Old rev. 25	2009-10-22	HSE073 revised; addition of new HSE018
Old rev. 26	2009-11-04	HSE016 & HSE019 added; HSE066 & HSE014 revised
Old rev. 27	2009-12-23	HSE018 & HSE073 updated; HSE095 & HSE098 under revision
DMS ver. 00	2010-01-01	Complete HSE Manual revamp / revalidation
DMS ver. 01	2010-04-15	Job Safety Analysis (JSA) (DMS# 0008-7897), Tower Climbing Practical Test (DMS# 0008-7965), PPE Plan (DMS# 0008-6837), and Pre-Lift Job Briefing Form (DMS# 0008-7980) updated.
DMS ver. 02	2010-05-07	Revisions to LOTO Program (DMS# 0008-7997) and Electrical Safety Program (DMS# 0008-7990).
DMS ver. 03	2010-05-14	New First Aid document (DMS# 0010-8007) added. Company Vehicles (DMS# 0008-7969) made obsolete and removed from manual.
DMS ver. 04	2010-07-09	JSA form (DMS# 0008-7897), PPE Plan (DMS# 0008-6837), Confined Space Permit (DMS# 0008-8016), Code of Safe Practices (DMS# 0008-7923), Extreme Weather Conditions (DMS# 0008-7907), Used Antifreeze and Glycol Management (DMS# 0008-8009), Site Safety Rules (DMS# 0008-7944), Respiratory Protection Plan (DMS# 0008-7994), Subcontractor Safety Plan (DMS# 0008-6835), and Hazard Identification and Control (DMS# 0008-7993) revised.
DMS ver. 05	2010-07-16	PPE Plan (DMS# 0008-6837) updated.
DMS ver. 06	2010-07-27	Extreme Weather Conditions (DMS# 0008-7907) updated.
DMS ver. 07	2010-09-10	Control of Hazardous Energy Program (DMS# 0008-7997; former title: LOTO Manual) updated.
DMS ver. 08	2010-10-01	VAME Electrical Safety Manual (DMS# 0008-7990), HSE Inspection Checklist (DMS# 0008-8003), Code of Safe Practices (DMS# 0008-7923), LOTO Manual (DMS# 0008-7997) revised. Preliminary Incident Report (DMS# 0008-7914) and Incident Report Investigation (DMS# 0008-7912) removed.

T09 0008-8000 Ver 08 - Approved - Exported from DMS: 2010-10-05 by ASUER

Contents of This Document

Foreword: Safety First 3
Scope 4
Contents of This Manual 5

T09 0008-8000 Ver 08 - Approved - Exported from DMS: 2010-10-05 by ASUER

Foreword: Safety First

At Vestas, we do not compromise on safety.

Safety is a deeply held value for us, serving as the foundation for all we do at Vestas.

The hallmark of all our activities is daily excellence in the protection of our employees, the public and the environment. Fundamental to the attainment of this vision are personnel commitment, mutual trust, open communications, continuous improvement and the involvement of all interested parties.

Vestas Americas is committed to being a safe company, preserving the natural environment while conducting our operations in adherence with all applicable laws, regulations and standards.

It is the policy of Vestas Americas that we meet the following principles:

- A safe and healthy work environment will be provided for the protection of our most vital resource—our employees. Employee safety is of the greatest importance to all levels of management and supervision, ranking in importance above production, quality, costs, and service. People are the most critical factor in a safety effort. Personal safety will not be compromised for any reason.
- While the responsibility for safety begins and ends with management, all Vestas employees share that responsibility. All employees, at every level, are fully responsible for their own safety and for the safety of those with whom they work. All injuries are preventable.
- Employees must perform all work tasks in a safe manner, and working safely is a condition of employment. Management will take disciplinary action against an employee who willfully or repeatedly violates workplace safety rules. This action may include verbal or written reprimands and may ultimately result in termination of employment.
- If an incident occurs, immediate reporting of the incident is required by US occupational health, safety and environmental laws. Employees must report all incidents, injuries, and unsafe conditions to their supervisors, and will not be subject to retaliation, penalty, or other disincentive for making such a report.
- Management must develop and communicate clear goals and objectives, and provide the financial resources and authority necessary to correct unsafe conditions and implement changes to improve workplace safety.
- Managers and supervisors will be held accountable for ensuring employees are aware of workplace hazards and are trained to work safely. We must think "safety first" in all our processes and prevent employees from being tempted or feeling obliged to ignore safety requirements. Every hazard can be managed.
- Employee recommendations to improve health and safety conditions will be given full consideration by management.
- Management will be actively involved with employees in establishing and maintaining an effective safety program in accordance with all applicable OSHA and EPA regulations.

	2/23/10		2/22/10
Signature	DATE	Signature	DATE
Bobbi Stedman, Senior VP, People & Culture		Martha Wyrsch, President, Vestas Americas	

Vestas American Wind Technology 1881 SW Naito Pkwy Portland Oregon - www.vestas.com

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Scope

This HSE manual describes the general occupational health, safety and environmental guidelines for transportation, erection on-site, operation and decommissioning of Vestas Wind Turbines in the United States.

This manual outlines the general guidelines for ensuring safe working practices. This manual is aligned with Vestas specific work instructions. For the areas where this manual differs from the turbine-specific manual, this manual prevails.

All Vestas Americas employees and Vestas subcontractors are subject to the relevant requirements contained in the Vestas Americas HSE Manual.

T09 0008-8000 Ver 08 - Approved - Exported from DMS: 2010-10-05 by ASJER

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Contents of This Manual

Section	Title	Item & Rev	Rev Date
1.0	**Occupational Health &Safety Management System**		
1.1	Vestas Americas HSE Plan	DMS 0008-6844.R1	01-Jan-10
1.2	VAME HSE Definitions	DMS 0009-2994.R0	01-Jan-10
2.0	**Workplace Expectations**		
2.1	Drug-Free Workplace Policy	DMS 0008-7991.R2	01-Jan-10
2.2	VCWT Drug-Free Workplace Policy	DMS 0008-7899.R1	01-Jan-10
3.0	**Safety Program Management**		
3.1	Site Inspection Checklist (Form)	DMS 0008-8003.R3	01-Oct-10
3.2	Site Safety Meetings	DMS 0008-6845.R1	01-Jan-10
3.3	Safety Meeting Attendance Record (Form)	DMS 0008-6846.R1	01-Jan-10
3.4	Job Safety Analysis (JSA)	DMS 0008-7897.R5	09-July-10
3.5	Pre-Task Planning Form (PTP)	DMS 0008-7900.R1	01-Jan-10
3.6	Safety Walks Template	DMS 0008-8013.R3	01-Jan-10
4.0	**Emergency Response**		
4.1	Extreme Weather Conditions	DMS 0008-7907.R3	27-July-10
4.2	Pre-Work Ice Checklist (Form)	DMS 0008-7909.R2	01-Jan-10
4.3	Site Emergency Response Plan - Template	DMS 0008-7901.R2	01-Jan-10
4.4	Emergency Response Equipment – Monthly Checklist	DMS 0008-7902.R1	01-Jan-10
4.5	Descent Device Inspection (Form)	DMS 0008-7903.R1	01-Jan-10
5.0	**Incident Reporting & Investigation**		
5.1	HSE Incident Report (Form)	DMS 0008-7917.R3	01-Jan-10
5.2	Witness Statement (Form)	DMS 0008-7921.R2	01-Jan-10
5.3	Release to Return to Work	DMS 0008-8015.R1	01-Jan-10
6.0	**Subcontractor Safety**		
6.1	Subcontractor Safety Plan – CWT	DMS 0008-7999.R1	01-Jan-10
6.2	Subcontractor Safety Plan – AWT	DMS 0008-6835.R2	09-July-10
6.3	Contractor Qualifications Questionnaire	DMS 0008-8014.R1	01-Jan-10
7.0	**General Safety**		
7.1	Code of Safe Practices	DMS 0008-7923.R4	01-Oct-10
7.2	Code of Safe Practice Acknowledgement (Form)	DMS 0008-7939.R1	01-Jan-10

T09 0008-8000 Ver 08 - Approved - Exported from DMS: 2010-10-05 by ASUER

7.3 Site Safety Rules ..... DMS 0008-7944.R3 ..... 09-July-10
7.4 New Employee Safety Orientation Record (Form) ..... DMS 0008-7947.R2 ..... 01-Jan-10
7.5 Hot Work ..... DMS 0008-8001.R1 ..... 01-Jan-10
7.6 Hot Work Permit (Form) ..... DMS 0008-7949.R1 ..... 01-Jan-10

8.0 Guest Worker
8.1 Guest Agreement and Release of Liability (Form) ..... DMS 0008-7954.R1 ..... 01-Jan-10

9.0 Hazard Identification & Control
9.1 Hazard Identification & Control Plan ..... DMS 0008-7993.R5 ..... 09-July-10
9.2 Unsafe Conditions Report (Form) ..... DMS 0008-8002.R1 ..... 01-Jan-10
9.3 Risk Assessment (Form) ..... DMS 0008-8004.R1 ..... 01-Jan-10

10.0 Chemical Inventory Management
10.1 Chemical Inventory List Template ..... DMS 0008-7987.R2 ..... 01-Jan-10
10.2 New Material Review (Form) ..... DMS 0008-7957.R1 ..... 01-Jan-10

11.0 Personal Protective Equipment /Personal Safety
11.1 Personal Protective Equipment Plan ..... DMS 0008-6837.R6 ..... 16-July-10
11.2 Respiratory Protection Plan ..... DMS 0008-7994.R6 ..... 09-July-10
11.3 Occupational Noise Exposure Program ..... DMS 0008-7995.R3 ..... 01-Jan-10
11.4 Equipment Defect Record (Form) ..... DMS 0008-6839.R1 ..... 01-Jan-10
11.5 PPE Inspection Record (Form) ..... DMS 0008-6840.R2 ..... 01-Jan-10
11.6 PPE Issue Record (Form) ..... DMS 0008-6841.R2 ..... 01-Jan-10
11.7 Respirator Fit Test Record (Form) ..... DMS 0008-7962.R1 ..... 01-Jan-10
11.8 Respirator Protection Questionnaire (Form) ..... DMS 0008-7960.R1 ..... 01-Jan-10
11.9 PPE Hazard Certification (Form) ..... DMS 0009-2995.R0 ..... 01-Jan-10

12.0 Fall Protection Policy
12.1 Fall Arrest System Inspection Record (Form) ..... DMS 0008-6842.R2 ..... 01-Jan-10
12.2 Fall Arrest System Equipment Register (Form) ..... DMS 0008-6843.R1 ..... 01-Jan-10
12.3 Tower Climbing Practical Test (Form) ..... DMS 0008-7965.R3 ..... 15-Apr-10

13.0 Vehicle Safety
13.1 Daily Company Vehicle Inspection (Form) ..... DMS 0009-2996.R0 ..... 01-Jan-10
13.2 Crane Safety Program ..... DMS 0008-7996.R3 ..... 01-Jan-10
13.3 Crane Inspection (Form) ..... DMS 0008-7972.R1 ..... 01-Jan-10
13.4 Pre-Lift Job Briefing (Form) ..... DMS 0008-7980.R2 ..... 15-Apr-10
13.5 Critical Lift Checklist (Form) ..... DMS 0008-7982.R1 ..... 01-Jan-10
13.6 Powered Industrial Trucks/Forklifts – Inspection Form ..... DMS 0008-7985.R1 ..... 01-Jan-10

T09 0008-8000 Ver 08 - Approved - Exported from DMS: 2010-10-05 by ASUER

VESTAS PROPRIETARY NOTICE

13.7 Accident Report Cover Sheet (Form) ..... DMS 0008-7989.R1 ..... 01-Jan-10
13.8 Vehicle/Equipment Accident Report (Form) ..... DMS 0008-7919.R4 ..... 01-Jan-10
13.9 Transportation Security Plan ..... DMS 0008-8011.R1 ..... 01-Jan-10

14.0 Control of Energy (Lockout/Tagout)
14.1 Control of Hazardous Energy Program ..... DMS 0008-7997.R8 ..... 10-Oct-10

15.0 Excavation, Trenching, and Ground Disturbances
15.1 Excavation and Trenching ..... DMS 0008-7998.R3 ..... 01-Jan-10

16.0 Confined Space Entry
16.1 Confined Space Policy and Program ..... DMS 0008-8012.R3 ..... 01-Jan-10
16.2 Confined Space Policy and Program – Canadian Provinces DMS 0008-8017.R1 ..... 01-Jan-10
16.3 Confined Space Entry Permit ..... DMS 0008-8016.R2 ..... 09-July-10

17.0 Environmental Management System
17.1 Universal Waste Management ..... DMS 0008-8005.R1 ..... 01-Jan-10
17.2 Hazardous Material Handling & Storage ..... DMS 0008-8006.R1 ..... 01-Jan-10
17.3 Aerosol Can Management ..... DMS 0008-8007.R1 ..... 01-Jan-10
17.4 Used Antifreeze & Glycol Management ..... DMS 0008-8009.R2 ..... 09-July-10
17.5 Used Oil Management ..... DMS 0008-8010.R1 ..... 01-Jan-10

18.0 Electrical Safety Program
18.1 VAME Electrical Safety Manual ..... DMS 0008-7990.R3 ..... 01-Oct-10

19.0 Fire Protection and Prevention
19.1 Fire Protection and Prevention ..... DMS 0009-2997.R0 ..... 01-Jan-10

20.0 First Aid
20.1 First Aid / CPR Procedures – Medical Emergencies ..... DMS 0010-8007.R0 .... 14-May-10

T09 0008-8000 Ver 08 - Approved - Exported from DMS: 2010-10-05 by ASUER

Vestas

Vestas Americas HSE Plan

Contents

1. Purpose **2**
2. Scope **2**
3. Definitions **2**
4. References **2**
5. General Requirements **2**
5.1 Localization 2
5.2 All Vestas Employees 2
5.3 The following are prohibited at all Vestas Americas workplaces 3
6. Responsibilities **3**
6.1 Vestas Americas Executive Management 3
6.2 Safety / Environmental Department: 4
6.3 Supervisory Personnel: 4
6.4 Employees 5
6.5 Subcontractors 5
6.6 Visitors 6
7. History of this Document **6**

T09 0008-6844 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

1. Purpose

To ensure that Vestas Americas maintains an Occupational Safety, Health and Environmental program that creates a safe work environment for Vestas Americas employees and others on Vestas Americas worksites, meets the needs of the communities in which we do business and is compliant with all applicable governmental regulations.

2. Scope

Vestas Americas – All locations

3. Definitions

Word:	Definition
None	N/A

4. References

- OSHA 29 CFR Parts 1910 and 1926 (United States)
- Occupational Health and Safety Act, Regulation and Code (Canada)
- OHSAS 18001 Clause 4.2 Occupational Health & Safety Policy
- Vestas Demand – Environmental and Occupational Health and Safety Legislation

5. General Requirements

5.1 Localization:

5.1.1 For those areas where this Safety Handbook differs from the Vestas Group requirements, this Handbook shall prevail.

5.1.2 In some cases, Vestas Americas has implemented a requirement that may exceed a state or provincial requirement – the higher level requirement in the Safety Handbook will prevail.

5.1.3 In the event that a state or provincial requirement exceeds a Safety Handbook procedure – the higher level requirement will prevail.

5.2 All Vestas Employees

5.2.1 Worker safety is of vital importance and will not be compromised.

5.2.2 All personnel must use approved personal protective equipment (PPE) and clothing where hazards or conditions warrant its use.

5.2.3 Immediately report to the respective supervisor any unsafe acts, unsafe conditions and near-miss incidents.

5.2.4 Immediately report to the respective supervisor all injury or property damage accidents.

5.2.5 Perform all work in accordance with safe work practices and supervisor's direction.

T09 0008-6844 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

5.2.6 Maintain good housekeeping in the work area.

5.2.7 Operate all vehicles and mobile equipment in accordance with applicable laws, site rules, manufacturer's specifications, and company-safety policies.

5.2.8 Competent, trained personnel are expected to perform their jobs in a safe and proper manner.

5.2.9 All personnel shall be expected to conduct themselves courteously and in a manner that promotes positive public relations with fellow employees, supervisors, customers, subcontractors, government officials and the public.

5.2.10 All pertinent personnel are required to actively participate in safety inspections, safety meetings, incident / accident reporting and investigative requirements.

5.2.11 Any person using prescription and / or non-prescription over the counter medications, that may cause drowsiness or other side effects, which could influence their ability to work safely, are to notify their supervisor prior to beginning any safety sensitive task or working near others who are performing such tasks.

5.2.12 Telecommunication equipment such as cellular telephones, pagers, or similar equipment, must not be taken into a potentially explosive environment. i.e. electrical cabinet

5.3 The following are prohibited at all Vestas Americas workplaces:

5.3.1 Possession, sales, consumption or being under the influence of alcohol and/or illegal drugs

5.3.2 Riding any hook, hoist or other material handling equipment which is not specifically designed to carry riders

5.3.3 Fighting, horseplay, practical jokes and

5.3.4 Gambling

5.3.5 Theft and vandalism

5.3.6 Cleaning, adjusting or repairing of machinery while in operation

5.3.7 Operating any tool, piece of equipment or machinery without proper training

5.3.8 Firearms or hunting equipment

5.3.9 Removing and not replacing guards on moving belts, drive chains and reciprocated parts

5.3.10 Damaging, disabling or interfering with safety, fire fighting or first aid equipment

5.3.11 Arriving for work or remaining at work when ability to perform the job safely is impaired

5.3.12 Smoking in non-designated areas and

5.3.13 Possession of "strike anywhere" matches

5.3.14 Unauthorized alteration or removal of locks or tags

6. Responsibilities

6.1 Vestas Americas Executive Management:

6.1.1 Encourage employee and subcontractor involvement in the safety process.

6.1.2 Provide appropriate supervision at worksites.

T09 0008-6844 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

6.1.3 Ensure that all operations including those of subcontractors meet government mandated safety requirements.

6.1.4 Ensure performance and behavior meet the requirements of the Vestas Americas Occupational Safety and Health Program.

6.1.5 Communicate with employees, customers, subcontractors, and vendors regarding their corporate commitment to safety.

6.2 Safety / Environmental Department:

6.2.1 Develop and maintain effective written programs for all types of hazards that employees may be exposed to. Each program will be reviewed regularly and revised as needed based on regulatory or process changes.

6.2.2 Communicate each program to all personnel affected by the program.

6.2.3 Conduct and document regular audits of all Vestas Americas workplaces to identify areas of concern / non compliance and to continually improve the overall safety program.

6.2.4 Issue a Safety Alert or Bulletin when a serious safety concern is identified. Safety Alerts and Bulletins remain active / open until such time as the hazard is eliminated or the safety issue and its control processes are incorporated into service, safety or training documentation. (Refer to AME-BP.11.11.00 – Safety Alerts and Bulletins.)

6.2.5 Maintain all safety and environmental records in accordance with applicable governmental regulations.

6.2.6 Report safety performance to Vestas group, Vestas Americas management, employees of Vestas Americas and as required by governmental regulations.

6.3 Supervisory Personnel:

6.3.1 Ensure all incidents / accidents are reported, properly investigated and that corrective action is taken to prevent a recurrence.

6.3.2 Corrective actions taken must be documented and provided to the Safety Department.

6.3.3 Ensure workers are adequately qualified to perform assigned work.

6.3.4 Ensure training needs are identified and met.

6.3.5 Take the necessary action to correct any unsafe working conditions brought to their attention by workers.

6.3.6 Correct unsafe acts and behaviors in a proactive and positive manner.

6.3.7 Implement and use appropriate Codes of Safe Practice and associated Safe Work Procedures (service documentation / work instructions).

6.3.8 Ensure appropriate and well-maintained equipment is available and utilized to perform the work activity.

6.3.9 Be aware of applicable regulatory requirements.

6.3.10 Ensure workers are informed about job hazards and are prepared to deal with any site specific hazards on the worksite.

6.3.11 Ensure personal protective equipment (PPE) is readily available at the worksite, correctly used, stored, maintained, inspected and replaced when necessary.

T09 0008-6844 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

6.3.12 Communicate with employees, customers, subcontractors, and vendors regarding their corporate commitment to safety.

6.3.13 Use safety meetings as one of the primary methods of dealing with safety performance, including the review and discussion of Codes of Safe Practice, Safe Work Procedures (service documentation / work instructions), corporate expectations, hazardous conditions and corrective measures.

6.4 Employees

6.4.1 Adhere to regulations, guidelines, and safety standards as required by government regulatory agencies, and those communicated by management and supervisors.

6.4.2 Follow all appropriate Codes of Safe Practice, Safe Work Procedures (installation and service documentation / work instructions) contained in this manual and in the installation and service documentation.

6.4.3 Report any hazardous or unsafe condition to an immediate supervisor.

6.4.4 Observe activities of fellow employees and subcontractors to ensure their safety and the safety of those around them, and correct unsafe acts in a proactive, positive manner to prevent an incident from occurring.

6.4.5 Respectfully refuse to perform work when unsafe conditions exist or when they are unable to perform the task competently.

6.4.6 Report all incidents / accidents, near misses, injuries, and illnesses to a supervisor.

6.4.7 Participate in, and use, all training offered by Vestas Americas.

6.4.8 Use and properly maintain the required personal protective equipment (PPE).

6.5 Subcontractors

6.5.1 Insist on safe performance throughout their operations by ensuring subcontractors and employees are competent to do their work properly.

6.5.2 Have effective health and safety programs that include programs for all hazards employees may be exposed to.

6.5.3 Ensure employees and subcontractors meet all the Vestas safety expectations.

6.5.4 Ensure their safety programs and operations comply with contractual and regulatory requirements.

6.5.5 Provide the time and resources required to enable subcontractors and employees to conduct their activities safely.

6.5.6 Identify and correct hazards, unsafe work conditions and unsafe acts.

6.5.7 Ensure appropriate and well-maintained equipment is available and utilized to perform the work activity.

6.5.8 Ensure all incidents / accidents are reported and investigated and that corrective action is taken to prevent a recurrence.

6.5.9 Ensure workers are informed about job hazards and are prepared to deal with any site specific hazards on the worksite.

6.5.10 Ensure personal protective equipment (PPE) is readily available at the worksite, correctly used, stored, maintained, inspected and replaced when necessary.

T09 0008-6844 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

6.6 Visitors

6.6.1 When visitors are present on worksites, they are required to meet the following safety responsibilities:

a) Follow the instructions of the site supervisor or personal escort.
b) Wear personal protective equipment (PPE) correctly and when required.
c) Never walk about a worksite unescorted.

7. History of this Document

Rev. no.:	Date:	Description of changes
00	26-Sep-2005	First edition – Reformatted & new number 11-Apr-2007
01	23-Nov-09	Editing and updating
02	01-Jan-2010	Content and template updates

T09 0008-6844 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

Contents

1. Purpose 2
2. Scope 2
3. References 2
4. Responsible Manager 2
5. Competent Person 2
6. History of this Document 2

T09 0009-2994 Ver 00 - Approved - Exported from DMS: 2010-03-09 by ASUER

1. Purpose

To ensure that Vestas Americas maintains an Occupational Safety, Health and Environmental program that creates a safe work environment for Vestas Americas employees and others on Vestas Americas worksites, meets the needs of the communities in which we do business and is compliant with all applicable governmental regulations.

2. Scope

Vestas Americas – All locations

3. References

3.1 OSHA 29 CFR Parts 1910 and 1926 (United States)

3.2 Occupational Health and Safety Act, Regulation and Code (Canada)

3.3 OHSAS 18001 Clause 4.2 Occupational Health & Safety Policy

3.4 Vestas Demand – Environmental and Occupational Health and Safety Legislation

4. Responsible Manager

4.1 Throughout this manual, the designations "Service Manager" and "Construction Manager" will be used for the manager who is responsible for the specific activity or workplace.

4.2 The responsible managers will have different titles depending on the geographical location and depending on whether the specific activity is a service or construction activity.

4.3 Typical titles for employees involved in service and construction activities are: "Site Manager", "Site Supervisor", "Supervisor", "Project Manager" and "Project Supervisor".

5. Competent Person

5.1 In the context of this manual, a "competent person" is defined as a person who has sufficient qualifications, technical knowledge or experience to enable him/her to avoid safety related risks and who has been appointed to carry out duties specified in writing.

6. History of this Document

Rev. no.:	Date:	Description of changes
00	01-Jan-2010	First Edition

T09 0009-2994 Ver 00 - Approved - Exported from DMS: 2010-03-09 by ASUER

Vestas®

Drug-Free Workplace Policy

Contents

1. Drug and Alcohol-Free Workplace 1
2. Drug and Alcohol Testing 2
3. Reasonable Suspicion 2
4. Post-Accident 2
5. Drug Testing Procedures 3
6. Security Inspections 3

1. Drug and Alcohol-Free Workplace

Vestas prohibits drugs and alcohol anytime, anywhere business is conducted. Vestas prohibits the unlawful possession, use or distribution of illicit drugs and/or alcohol on company worksites at any time or by employees conducting company business at any time, in any location.

This policy helps to maintain a safe, healthful and efficient working environment for everyone and protect the company's property, equipment and operations, and the public at large. Vestas reserves the right to search and inspect an employee's work area and personal belongings to maintain a safe workplace.

Here are some of the actions expected of you:

- Employees may not use, sell, distribute or possess illegal drugs, including any drug illegal under any law, or controlled substances, during working hours or on Vestas or Company property or while using Vestas equipment or vehicles. Employees may not report to work under the influence of a controlled substance.
- Employees may not consume alcohol during working hours or report to work under the influence of alcohol. Employees may not possess open containers of alcoholic beverages in company vehicles and equipment, around the worksite or on company property, or while conducting business on behalf of Vestas.
    - The only exception to this rule is when alcohol is being consumed as part of an approved company social function. In such an event, employees must ensure that they act reasonably and responsibly and at no time become intoxicated or otherwise consume excessive amounts of alcohol.
- **Sales/Service Business Unit Only:** Employees working at a project or service site should use caution when consuming alcohol outside of work hours. Vestas will not reimburse any employees working at a project or service site for the cost of alcohol purchased while assigned to or visiting the site, regardless of their job classification or if they are there on a temporary or full-time basis.
- Employees must notify their manager within five days of any conviction related to violating any state and/or federal statute relating to the use, production, possession, processing, manufacturing, selling, disposition, transportation or importation of any illicit or controlled substances, or alcohol. Employees whose position requires them to drive a vehicle must notify their manager within five days of any restriction, revocation or suspension of their license. Employees may appropriately use prescription drugs prescribed by a health care provider or over-the-counter

T09 0008-7991 Ver 02 - Approved - Exported from DMS: 2010-03-09 by ASUER

medications, provided they can satisfactorily and safely perform all of the essential functions of their job while using the medication. Vestas may require an employee to see a health care provider at Vestas' expense, to confirm whether the employee can satisfactorily and/or safely perform the essential functions of the job while using the medication.

- Employees must comply with Vestas' drug testing program as a condition of employment. Refusal to take a required drug test or failure of a drug test will result in disciplinary action. Refusal to test includes, but is not limited to, adulteration or substitution of a urine sample.
- Employees who work off premises are subject to the same Drug- and Alcohol-Free Workplace policy as other employees. Employees who violate any aspect of this policy may be subject disciplinary action, up to and including termination, and referral for prosecution for any violations of the law. Vestas may reasonably accommodate any employee who wishes to voluntarily enter and participate in a drug or alcohol rehabilitation program, in accordance with all applicable laws. Rehabilitation, however, is not a substitute for discipline.

2. Drug and Alcohol Testing

As allowed by applicable job, candidates for employment are required to submit to a post-offer, pre-employment drug test. All Vestas employees are subject to drug and alcohol testing when there is reasonable cause to suspect violation of company policy or anytime a work-related accident occurs.

3. Reasonable Suspicion

Employees may be required to submit to a drug or alcohol test when there is a reasonable suspicion that they have violated the Drug- and Alcohol-Free Workplace policy, or are under the influence of drugs, including illegal drugs, prescription drugs for which the employee does not have a prescription or prescription drugs that are not being taken in accordance with a health care provider's direction, and/or alcohol while working, on Vestas' property or while operating Vestas' vehicles, machinery or equipment. "Reasonable suspicion" means suspicion based on specific personal observations that a Vestas manager or supervisor can describe concerning the appearance, behavior, speech or odor of the employee.

When reasonable suspicion exists, Vestas will transport the employee to the specimen collection site. After specimen collection is completed, the employee will be transported to his/her residence at Vestas' expense.

4. Post-Accident

All employees involved with a work-related accident may be required to submit to a drug or alcohol test. This includes employees who sustain a work-related personal injury, cause another employee to sustain a work-related personal injury, cause a work-related accident, or employees who were operating or helping to operate machinery, equipment or vehicles involved in a work-related accident that results in an injury.

An employee who is subject to post-accident testing who fails to remain readily available for such testing, including notifying Vestas of his/her location if he/she leaves the scene of the accident prior to submission to such test, may be considered by Vestas to have refused to submit to testing.

T09 0008-7991 Ver 02 - Approved - Exported from DMS: 2010-03-09 by ASUER

If there is suspicion of alcohol involvement, the employee may be required to submit to an alcohol test within two hours of the accident. An employee has the right to refuse to submit to drug and alcohol testing; however, refusal by an employee to submit to such a test will result in disciplinary action up to and including termination. Refusal to test includes, but is not limited to, adulteration or substitution of a urine sample.

5. Drug Testing Procedures

A health care provider acting as a Medical Review Officer (MRO) will review all positive controlled substance test results before they are reported to Vestas.

If the testing laboratory reports a positive result to the MRO, the MRO will contact the affected employee (in person or by telephone) and conduct an interview to determine if there is an alternative medical explanation for the controlled substance found in the employee's results.

Employees will be given an opportunity to discuss the use of medically authorized drugs and any over-the counter drugs with the MRO prior to any positive test result being reported to Vestas.

If the affected employee provides appropriate documentation and the MRO determines that legitimate medical reason for the presence of the controlled substance exists, the controlled substance test result shall be reported as negative to Vestas. In the event of positive test results, Vestas shall inform the employee of the positive test result and the employee's right to request an additional test of the same specimen at a different certified laboratory at his or her own expense. The employee must notify Vestas of his/her intention to obtain the additional test within 24 hours after notice of the positive test result. The employee will be suspended without pay pending the result of the additional test. In the event of a positive test result on the additional test, the employee will be disciplined, up to and including termination of employment. In the event of a negative test result, Vestas shall pay for the additional testing and any lost wages based on the employee's regular work schedule.

6. Security Inspections

Drugs, alcohol or weapons are prohibited at work. Vestas will conduct security inspections in order to maintain a work environment that is free of illegal drugs, alcohol, weapons or other improper materials. To this end, the company prohibits the control, possession, transfer, sale or use of such materials on its premises. Employees should not expect privacy in their workspace, including desks and lockers. Security inspections may be conducted on any package (including purses, bags, briefcases, backpacks, etc.) and person entering and/or leaving the premises. Here are some of the actions expected of you:

- Do not bring prohibited items onto the company's premises.
- Be prepared to submit to random security inspections with or without reasonable suspicion of possession of prohibited items.
- Employees must accommodate the inspection of desks, lockers and other storage devices by any agent or representative of the company at any time, either with or without prior notice.
- Understand that Vestas may inspect not only desks and lockers, but also packages and persons entering and/or leaving the premises.

T09 0008-7991 Ver 02 - Approved - Exported from DMS: 2010-03-09 by ASUER

Vestas will confiscate prohibited items and conduct an investigation regarding any items found in an employee's possession. Employees who violate any company policies are subject to disciplinary action and referral for prosecution for violating the law.

T09 0008-7991 Ver 02 - Approved - Exported from DMS: 2010-03-09 by ASUER

Vestas®

VCWT Drug-Free Workplace Policy

Contents

1. Drug and Alcohol-Free Workplace 1
2. Drug and Alcohol Testing 1
3. Reasonable Suspicion 2
4. Post-Accident 2
5. Drug Testing Procedures 3
6. Security Inspections 3

1. Drug and Alcohol-Free Workplace

Vestas prohibits drugs and alcohol anytime, anywhere business is conducted. Vestas prohibits the unlawful possession, use, or distribution of illicit drugs, misuse of prescription drugs, and/or alcohol on company worksites at any time or by employees conducting company business at any time, in any location.

This policy helps to maintain a safe, healthful and efficient working environment for everyone and protect the company's property, equipment and operations, and the public at large. In order to maintain a safe workplace, Vestas reserves the right to conduct reasonable searches of an employee's work area and personal belongings to maintain a safe workplace for legitimate business purposes in the least invasive way possible in the circumstances.

Here are some of the actions expected of you:

- Employees may not use, sell, distribute or possess illegal drugs, including any drug illegal under any law or controlled substances, during working hours or on Vestas or Company property or while using Vestas equipment or vehicles. Employees may not report to work under the influence of a controlled substance.
- Employees may not consume alcohol during working hours or report to work under the influence of alcohol. Employees may not possess open containers of alcoholic beverages in company vehicles and equipment, around the worksite or on company property, or while conducting business on behalf of Vestas.
    - The only exception to this rule is when alcohol is being consumed as part of an approved company social function. In such an event, employees must ensure that they act reasonably and responsibly and at no time become intoxicated or otherwise consume excessive amounts of alcohol.
    - SBU Only: Employees working at a project or service site should use caution when consuming alcohol outside of work hours. Vestas will not reimburse any employees working at a project or service site for the cost of alcohol purchased while assigned to or visiting the site, regardless of their job classification or if they are there on a temporary or full-time basis.
- Employees must notify their manager within five days of any conviction related to violating any federal and/or provincial legislation relating to the use, production, possession, processing, manufacturing, selling, disposition, transportation or importation of any illicit or controlled substances, or alcohol. Employees whose

T09 0008-7899 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

position requires them to drive a vehicle must notify their manager within five days of any restriction, revocation or suspension of their license.

- Employees may appropriately use prescription drugs prescribed by a health care provider or over-the-counter medications, provided they can satisfactorily and safely perform all of the essential functions of their job while using the medication. Vestas may require an employee to see a health care provider at Vestas' expense, to confirm whether the employee can satisfactorily and/or safely perform the essential functions of the job while using the medication.
- Employees in a safety-sensitive position must comply with Vestas' drug testing program as a condition of employment. Refusal to take a required drug test or failure of a drug test will result in disciplinary action. Refusal to test includes, but is not limited to, adulteration or substitution of a urine sample.
- Employees who work off premises are subject to the same Drug- and Alcohol-Free Workplace policy as other employees.
- Employees who violate any aspect of this policy may be subject disciplinary action, up to and including termination, and referral for prosecution for any violations of the law.
- Vestas may reasonably accommodate any employee who wishes to voluntarily enter and participate in a drug or alcohol rehabilitation program, in accordance with all applicable laws. Rehabilitation, however, is not a substitute for discipline.

2. Drug and Alcohol Testing

As allowed by applicable job, candidates for employment are required to submit to a post-offer, pre-employment drug test. All Vestas employees are subject to drug and alcohol testing when there is reasonable cause to suspect violation of company policy or anytime a work-related accident occurs.

3. Reasonable Suspicion

In accordance with applicable provincial law, employees in a safety sensitive position may be required to submit to a drug or alcohol test when there is a reasonable suspicion that they have violated the Drug- and Alcohol-Free Workplace policy, or are under the influence of drugs, including illegal drugs, prescription drugs for which the employee does not have a prescription or prescription drugs that are not being taken in accordance with a health care provider's direction, and/or alcohol while working, on Vestas' property or while operating Vestas' vehicles, machinery or equipment.

"Reasonable suspicion" means suspicion based on specific personal observations that a Vestas manager or supervisor can describe concerning the appearance, behavior, speech or odor of the employee.

When reasonable suspicion exists, Vestas will transport the employee to the specimen collection site. After specimen collection is completed, the employee will be transported to his/her residence at Vestas' expense.

4. Post-Accident

In accordance with applicable provincial law, employees involved with a work-related accident may be required to submit to a drug or alcohol test where impairment is reasonably suspected to be a contributing factor. This includes employees who sustain a work-related

T09 0008-7899 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

personal injury, cause another employee to sustain a work-related personal injury, cause a work-related accident, or employees who were operating or helping to operate machinery, equipment or vehicles involved in a work-related accident that results in an injury.

An employee who is subject to post-accident testing who fails to remain readily available for such testing, including notifying Vestas of his/her location if he/she leaves the scene of the accident prior to submission to such test, may be considered by Vestas to have refused to submit to testing.

If there is suspicion of alcohol involvement, the employee may be required to submit to an alcohol test within two hours of the accident.

An employee has the right to refuse to submit to drug and alcohol testing; however, refusal by an employee to submit to such a test will result in disciplinary action up to and including termination. Refusal to test includes, but is not limited to, adulteration or substitution of a urine sample.

5. Drug Testing Procedures

A health care provider acting as a Medical Review Officer (MRO) will review all positive controlled substance test results before they are reported to Vestas.

If the testing laboratory reports a positive result to the MRO, the MRO will contact the affected employee (in person or by telephone) and conduct an interview to determine if there is an alternative medical explanation for the controlled substance found in the employee's results.

Employees will be given an opportunity to discuss the use of medically authorized drugs and any over-the counter drugs with the MRO prior to any positive test result being reported to Vestas.

If the affected employee provides appropriate documentation and the MRO determines that legitimate medical reason for the presence of the controlled substance exists, the controlled substance test result shall be reported as negative to Vestas.

In the event of positive test results, Vestas shall inform the employee of the positive test result and the employee's right to request an additional test of the same specimen at a different certified laboratory at his or her own expense.

The employee must notify Vestas of his/her intention to obtain the additional test within 24 hours after notice of the positive test result. The employee will be suspended without pay pending the result of the additional test.

In the event of a positive test result on the additional test, and if deemed to be appropriate, the employee will be disciplined, up to and including termination of employment. In the event of a negative test result, Vestas shall pay for the additional testing and any lost wages based on the employee's regular work schedule.

6. Security Inspections

Drugs, alcohol or weapons are prohibited at work.

Where Vestas concludes it is reasonable and necessary to do so, Vestas will conduct random security inspections in order to maintain a work environment that is free of illegal drugs, alcohol, weapons or other improper materials. To this end, the company prohibits the control, possession, transfer, sale, or use of such materials on its premises.

T09 0008-7899 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

While Vestas will, in each case, determine the most appropriate and least intrusive method necessary in the circumstances of carrying out a search, employees should not expect privacy in their workspace, including desks and lockers. Security inspections may be conducted on any package (including purses, bags, briefcases, backpacks, etc.) and person entering and/or leaving the premises.

Here are some of the actions expected of you:

- Do not bring prohibited items such as guns, drugs or alcohol onto the company's premises.
- Be prepared to submit to random security inspections where Vestas has reasonable suspicion of possession of prohibited items.
- Employees must accommodate the inspection of desks, lockers and other storage devices by any agent or representative of the company at any time, either with or without prior notice.
- Understand that Vestas may inspect not only desks and lockers, but also packages and persons entering and/or leaving the premises.

Vestas will confiscate prohibited items and conduct an investigation regarding any items found in an employee's possession. Employees who violate any company policies are subject to disciplinary action and referral for prosecution for violating the law.

T09 0008-7899 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

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HSE Site Inspection Checklist

Site: _____ **Date:** _____

Site Supervisor: _____

Complete ALL applicable checklist items.
Note: All **"NO"** answers will require corrective action.

Slips, Trips And Falls - Slips, trips and falls account for nearly a quarter of workplace injuries. Ensure that the workplace is maintained free of hazards that could result in slip trip or fall incidents.

	YES	NO
Floors		
1. Are floor surfaces free of water, ice, oil or other fluids?		
2. Are floor surfaces even? (e.g. no loose tiles or carpet that is torn or has ridges or holes?		
3. Are ramps designed to prevent slips and falls?		
Housekeeping		
4. Are aisles, walkways and doorways clear of obstructions?		
5. Are leaks and spills cleaned up immediately?		
6. Are substance specific spill clean-up supplies readily available to respond to a spill?		
7. Are the responsibilities for cleaning floors, clearing work areas and walkways clearly specified?		
Stairs		
8. Are any changes in pathway elevation clearly or conspicuously marked?		
9. Are stairways kept clear of boxes, equipment other obstructions?		
10. Is the tread on stairs adequate to minimize slipping?		
11. Is the foot-space on each stair adequate?		
12. Are the handrails adequate?		
Lighting		
13. Are work areas, walkways and stairs well lit?		
14. Does the lighting enable workers to move between indoor and outdoor tasks safely?		
15. Are all light fixtures operable and equipped with working bulbs?		

Emergency Procedures - To ensure the safe evacuation of all affected personnel in case of an emergency. This checklist will help you evaluate your current emergency response procedures. Multi-employer worksites can use the checklist to coordinate your emergency response procedures.

Evacuation		
16. Have known or potential emergencies that could require an evacuation of the working area been identified and evaluated? Example: fire, explosion, chemical spills, earthquakes, flooding, tornados,		
17. Have all site employees reviewed the emergency response plans for such events?		
Responsibility		
18. Have you nominated a person(s) to be responsible for managing the evacuation?		
Signal to evacuate		
19. Have you identified what device or method will be used to signal an evacuation?		
20. Have you identified where these signals will be located?		
21. Is someone authorized to be responsible for activating the signal?		
22. Have you identified how people will evacuated from the workplace (e.g. the shortest and most direct route to safety, the routes people should use, how people with disabilities would evacuate?		
23. Do you have a primary and secondary assembly place for evacuation?		
24. Have you identified the checks that should be followed to ensure everyone is accounted for?		
25. Have you identified a signal that gives the all clear in return, and nominated who will give it?		
26. *Re-entry* - Have you established re-entry management procedures?		
27. Are emergency procedures displayed in your workplace?		
28. Are fire extinguishers in compliance and easily accessible?		

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T09 0008-8003 Ver 03 - Approved - Exported from DMS: 2010-10-05 by ASUER

29. Is there documentation of the plan being tested?		
30. Are all employees aware of the emergency procedures?		

Chemical Inventory Management – Every chemical substance used at Vestas worksites should have a supplier provided Material Safety Data Sheet (MSDS) which defines any safety risks and how to manage them. A current Chemical Inventory List for the site should be available

31. Are chemicals used in the workplace?		
32. Is a Chemical Inventory List available and kept current for the site?		
33. Is there a document custodian for the MSDS binder?		
34. Are all chemical substance used at this site properly labelled per regulations?		
35. Is a current (3 years or less) MSDS available for each chemical substance?		
36. Have all current site employees reviewed the MSDS binder and know where to find it?		
37. Is PPE defined by the MSDSs available for employee use?		
38. Is proper containment and storage (compatibility) practiced?		
39. Are employees informed of any new products, or reformulations?		

Machinery And Equipment - Ensure that machinery and equipment in your workplace are safe, used properly and maintained in good repair.

Safety Device &, Guards		
40. Are machine guards in place on all operating equipment?		
41. Are belts, pulleys, and other rotating parts properly guarded?		
42. Are emergency stop buttons clearly visible and operational?		
Work Areas		
43. Is there adequate clearance/aisle space around machinery and equipment?		
44. Are machinery and equipment areas kept clean?		
45. Is ventilation appropriate and adequate for the work area?		
46. Is noise reduced by mufflers, baffles, or isolation of the machinery or equipment?		
47. Are tools and equipment stored in their proper places?		
Safe Operation		
48. Are records available to show that workers are trained to operate machinery safely?		
49. Are workers trained in proper equipment and site access procedures?		
50. Are workers supervised to ensure correct operating procedures are followed?		
51. Is task or hazard appropriate personal protective equipment issued, worn properly, inspected regularly for damage and wear, and maintained in good condition?		
52. Are forklift operators trained on or evaluated to safely operate the specific equipment at the site?		
53. Are forklift training records available and current (every three years)?		
54. Is access to forklift operation controlled?		

Personal Protective Equipment

55. Hard hats are issued, and worn correctly and as required?		
56. Is task/hazard appropriate footwear worn by all workers in the workplace?		
57. Is task/hazard appropriate eye/face protection (goggles, glasses, shields) issued and worn?		
58. Is task/hazard appropriate hand/arm protection issued and worn?		
59. Are LOTO sets (lock, hasp & tags) issued to each authorized employee and applied correctly.		
60. Is training (initial and annually thereafter) available for all (authorized and affected) employees?		
61. Is personal fall protection equipment issued, worn properly, inspected regularly (quarterly) for damage and wear, and maintained in good condition?		
62. Is training (initial and annually thereafter) available for all affected employees? Training records include the PPE Issue & Training AND Fall Arrest System Inspection forms.		

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T09 0008-8003 Ver 03 - Approved - Exported from DMS: 2010-10-05 by ASUER

Vestas®

HSE Site Inspection Checklist

ELECTRICAL - ensure that the electrical equipment and other energy sources in your workplace are safe and inspected and maintained regularly.

63. Are circuit breaker panels accessible and free of obstacles? (Minimum 36" directly in front)		
64. Is portable electrical equipment protected by safety switches? (mandatory for construction work)		
65. Are all power points, fittings and switches in a safe place and free of obvious defects *mounted securely, no loose covers, wires, broken or damaged fittings, or signs of overheating*?		
66. Are panels, circuit breakers, main and isolating switches clearly labelled and accessible?		
67. Are corded devices (vacuums, drills, grinders, etc) properly inspected and tagged in accordance with DMS 0008-7990?		
68. Are extension cords and power boards routed safely to prevent mechanical or other damage?		
69. Are extension cords used in lieu of permanent wiring (in place for greater than 30 days)		
70. Are the electrical fittings and electrical equipment, including portable power tools, regularly inspected and maintained?		
71. Does the site have at least one Energy Control Coordinator (ECC) for each platform?		
72. Are LOTO forms correctly filled out and returned to the ECC in a timely manner? (sample work orders, view LOTO forms and JSA for this work) Does LOTO boundary match the task		
73. Does the site have sufficient quantities of Arc Flash clothing?		
74. Are there adequate levels of Class 2 & 4 PPE to support operations - Class 4 - two per site 1 per 10 technicians - Class 2 – one per technician		
75. Determine if HV gloves are safe for use and in certification date?		
76. Is there an area identified to quarantine HV gloves that are not safe to use?		
77. Check for foreign material between leather and HV gloves		
78. Are electrical safety gloves (1 Kv) properly stored in a way to keep them safe from damage?		
79. Group lockout kits are available, properly marked, and correctly used?		
80. Are personal LOTO sets (blue locks, hasp & tags) issued to each authorized employee, properly marked?		
81. Do the technicians should have Blue locks with their name on them and Personal tags that have the technician's name and picture		
82. Does site have a centrally located, controlled, and inventoried LOTO center for guests, visitors, and traveling/visiting technicians? (Blue locks no name and generic tags no name or picture)		
83. Is there a process for issuing and tracking temporary Blue personal locks?		
84. Is LOTO program level 0 & 1 training being conducted for guests and visitors?		
85. Are annual retraining documents available?		
86. Are all site technicians qualified level 2 or higher?		
87. Are LOTO devices being used in accordance with OSHA or Provincial/ Territorial OHS regulations (Blue personal or Red control locks not fond on lockers, plastic tuff totes, etc.)		
88. Are portable electrical tools and equipment properly grounded or of the double insulated type?		
89. Are up to date turbine single line and plant outlines available, current, and posted (if possible)? Can a technician locate and explain them?		
90. Have a level 3 or ECC qualified technician demonstrate locating a schematic on the tech doc disk or on the HUB.		
91. Are building earthing/grounding systems intact, clean, and secure? Does the site have a method of verifying that the earthing/grounding systems are intact?		
92. Are computer and electrical equipment cords secure to prevent strain or to prevent trip hazards?		
93. Are extension cords daisy chained together?		
94. Are there any loose, taped, unprotected, or exposed wiring in the facility?		
95. Have all voltage testers been calibrated in within the last year?		
96. Are personal Work practice audits being performed by the Site manger?		
97. Are site electrical audits being complete by the Site Manager on a Quarterly basis?		

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T09 0008-8003 Ver 03 - Approved - Exported from DMS: 2010-10-05 by ASUER

ENVIRONMENTAL MANAGEMENT – ensure that procedures are followed in your workplace in accordance with ISO 14001.

98. Are employees aware of where they can find the Vestas environmental policy?		
99. Are employees aware of what activities they perform that could have an impact on the environment?		
100. If there was an environmental accident at the site do employees know how to communicate the details of the accident with HSE?		
101. Have all employees completed the general awareness training for ISO 14001 EMS?		
102. Do employees know what the HSE objectives and targets are and where to find them?		
103. Are bulk fluids being stored with secondary containment?		
104. Are all chemicals accurately labelled with their contents?		

NOTES *("NO" answers will require Corrective Action)*:

Concern Or Issue	Corrective Action	Assigned To (Initials)	**Proposed** Completion Date

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T09 0008-8003 Ver 03 - Approved - Exported from DMS: 2010-10-05 by ASUER

Vestas

Site Safety Meetings

Contents

1. Purpose 2
2. Scope 2
3. Definitions 2
4. Regulatory References 2
5. General Requirements 2
5.1 Localization 2
5.2 Weekly Safety Meetings 2
5.3 Post Incident Safety Meetings 3
6. Responsibilities 3
6.1 Site/Construction Managers Shall: 3
7. Instructions 3
7.1 Completing the Safety Meeting Attendance Record (SMAR) Form 3
7.2 Guidelines for Completing SMAR Form 3
8. History of this Document 4

T09 0008-6845 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

1. Purpose

Vestas Americas requires site supervisors to hold or arrange weekly safety meetings at all sites. The Safety Meeting Attendance Record (SMAR) (DMS 0008-6846) form has been prepared as the official company record keeping document for tracking frequency and duration, topics discussed and recording attendance at safety meetings.

2. Scope

Vestas Americas – All locations

3. Definitions

Word:	Definition
None	N/A

4. Regulatory References

- OSHA 29 CFR Parts 1904 and 1952
- AME-HB.HSE.01 – 3.4 Safety Meeting Attendance Record - Form
- AME-HB.HSE.01 – 3.8 Safety Records Management and Reporting

5. General Requirements

5.1 Localization

5.1.1 For those areas where this Safety Manual differs from the Vestas Group requirements, this manual shall prevail.

5.1.2 In some cases, Vestas Americas has implemented a requirement that may exceed a state or provincial requirement – the higher level requirement in the Safety Manual will prevail.

5.1.3 In the event that a state or provincial requirement exceeds a Safety Manual procedure – the higher level requirement will prevail.

5.2 Weekly Safety Meetings

5.2.1 Conduct weekly safety meeting with all personnel

5.2.2 Document the weekly safety meeting with the Safety Meeting Attendance Record (SMAR) (DMS 0008-6846) form.

5.2.3 Maintain site records of all safety meetings held per the Safety Records Management and Reporting procedure.

5.2.4 Forward a copy of the completed SMAR (DMS 0008-6846) form to their respective site folder in the X: Drive.

T09 0008-6845 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

5.3 Post Incident Safety Meetings

5.3.1 Conduct a post incident safety meeting as immediately after each incident or near miss as is practical (in no case later than the beginning of the next business day).

5.3.2 Document the post incident safety meeting with the Safety Meeting Attendance Record (SMAR) (DMS 0008-6846) form.

5.3.3 Maintain site records of all post incident safety meetings held per the Safety Records Management and Reporting procedure.

5.3.4 Forward a copy of the completed SMAR (DMS 0008-6846) form to the respective site folder in the X: Drive.

6. Responsibilities

6.1 Site/Construction Managers Shall:

6.1.1 Ensure safety meetings are scheduled, held and documented.

6.1.2 Ensure all personnel on site at the time of the meeting – attend and participate in the safety meeting.

6.1.3 Document the safety meeting using the SMAR (DMS 0008-6846) form and forward a copy to the respective site folder in the X: Drive.

6.1.4 File original SMAR (DMS 0008-6846) form in the site safety records.

7. Instructions

7.1 Completing the Safety Meeting Attendance Record (SMAR) Form

7.1.1 The SMAR (DMS 0008-6846) form serves as a record of the regular opportunity to share safety information with all employees and for employees to voice their concerns and / or make suggestions to the site management in regard to improving environment, health and / or safety conditions or practices.

7.1.2 The form requires fields to be completed that identify the site, the date and week of the meetings, what was discussed and who attended. The form also provides a space for recording concerns or suggestions.

7.1.3 When completed, the SMAR (DMS 0008-6846) form is a legal document and shall be filed with the site safety records – and a copy forwarded to the respective site folder in the X: Drive. It is important therefore that the SMAR (DMS 0008-6846) form be completed accurately and legibly.

7.2 Guidelines for Completing SMAR (DMS 0008-6846) Form

The first column lists the SMAR (DMS 0008-6846) form fields; the second column provides recommendations to enter and / or examples.

7.2.1 When the meeting is finished and all participants have signed, the site manager shall ensure that the names of persons who did not attend are listed, and that all applicable fields of the form are completed.

7.2.2 The completed form shall be filed with the site safety records – and a copy forwarded to the respective site folder in the X: Drive.

T09 0008-6845 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

8. History of this Document

Rev. no.:	Date:	Description of changes
00	2005-09-21	First edition – Reformatted, renumbered 12-Apr-2007
01	2010-01-01	Content and template updated.

T09 0008-6845 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

SAFETY MEETING ATTENDANCE RECORD

Vestas

MEETING TYPE: ☐ Weekly Safety ☐ Post Incident CONDUCTED BY: _____

SITE/PROJECT: _____ CITY/STATE: _____

DATE: _____ WEEK #: _____ TIME (FROM/TO): _____

SAFETY TOPIC(S) ADDRESSED:

CREW SAFETY CONCERN(S) or SUGGESTIONS:

PARTICIPANTS:

NAME (PRINTED)	SIGNATURE	COMPANY (if other than Vestas)
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		

LIST EMPLOYEE(s) WHO WERE ABSENT FROM THIS TRAINING SESSION:

IS MEETING INFORMATION AVAILABLE (ATTACHED) FOR REVIEW BY PERSON(S) ABSENT? ☐ YES ☐ NO

When completed, SCAN and EMAIL Signed COPY TO safety@vestas-awt.com, attach any additional sheets.
FILE ORIGINAL completed report in Site Safety Records

Page _____ of _____

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Safety Meeting Attendance Record

Vestas

MEETING TYPE: ☐ Weekly Safety ☐ Post Incident CONDUCTED BY: _____

SITE/PROJECT: _____ CITY/STATE: _____

DATE: _____ WEEK #: _____ TIME (FROM/TO): _____

SAFETY TOPIC(S) ADDRESSED:

CREW SAFETY CONCERN(S) or SUGGESTIONS:

PARTICIPANTS:

	NAME (PRINTED)	SIGNATURE	COMPANY (If other than Vestas)
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			

LIST EMPLOYEE(s) WHO WERE ABSENT FROM THIS TRAINING SESSION:

IS MEETING INFORMATION AVAILABLE (ATTACHED) FOR REVIEW BY PERSON(S) ABSENT? ☐ YES ☐ NO

When completed, SCAN and EMAIL Signed COPY TO safety@vestas-awt.com, and attach any additional sheets.
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PARTICIPANTS (cont'd):

	NAME (PRINTED)	SIGNATURE	COMPANY (If other than Vestas)
13			
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42			
43			

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Vestas

JSA - Job Safety Analysis

The JSA is to be used daily prior to each activity / bundle assignment.

Objective: Ensure everyone engaged in the work activity has fully evaluated the hazards that could occur, the controls that are in place, mitigated risk, stop cards and potential risks

Date:

Location/Turbine ID:

Wind Speed

Description of Work/Task:

Safe Work Approach: Process Decision Tree	Yes (mark X)
1 Are all team members qualified (certification level) to perform the task assignments? (If yes, continue on to Q2; if no, stop and contact a Lead or Supervisor)	
2 Has the team performed this task safely in the last 6 months? (If yes, continue on to Q3, if no, contact a Lead or Supervisor)	
3 Is there a AME released work instruction, Site approved Pre-Task Plan (PTP) or HSE policy / procedure that directly matches this task? (If yes, continue on to Q4; if no, create/modify PTP with appropriate oversigh, and approvals and then complete a new JSA)	
+ The equipment configuration (CIM, Mark Version, BoP, Other upgrades/retrofits) matches the task document?	
+ Team member certification level > = the task document level?	
4 Are you confident that there are not multiple problems contributing to the symptom? (If yes, continue on to Q5; if no, contact a Lead or Supervisor)	
5 Do you have the tools and PPE specified in the task documentation (calibrated/certified)? (If yes, continue; if no address the gaps before continuing)	
6 Are you working with someone you haven't worked with recently. (If yes, completed new Team Member Considerations sections)	

TO BE COMPLETED PRIOR TO ENGAGING IN WORK ACTIVITY

Minimum requirement: identify top 3 highest potential risks

	Additional Risks ("What If" perspective) Potential unplanned, unexpected risks that are not documented. See below yellow highlighted for required considerations areas	Prevention Methods Special or additional protocol, test, procedure, PPE, tool, approach, breaks, streches, etc (Use HECC for LOTO related items)	Risk Prevention Verified (initials)	Risk Prevention measures removed / Ready to run (initials)
1				
2				
3				
4				
5				
6				
7				

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Vestas

JSA - Job Safety Analysis

The JSA is to be used daily prior to each activity / bundle assignment.

Hazardous Conditions Reference Sheet (Not an all-inclusive list - intended to stimulate ideas for possible risks / hazards)

Preconditions: Unusual failure mode that could present additional / unknown risks (stored electrical, mechanical, fluid energy)
+ Review VTM, / VIS: alarm logs, operational data, past SAP Service Orders, prior failures, software changes, prior operational issues, open punch list and CIM items
+ Lack of WTG communications
+ Uncertain / Unusual alarm / problem situation
+ Turbine not visited in long time (critters, insects, mold)
+ Weather issue in turbine (e.g. water, dirt, ice)

All typical risk mitigation covered in released or PTP documentation
+ Configuration specific considerations (WTG or Customer BOP)
+ Remote operations LOTO, parameter settings

Physical and mental status of each team member
+ Stiff, sore, tired, sick, other

Grid related issue, External generator hook-up

Current or forecasted environmental challenges

+ How will this effect your functionality and operations (extra clothing, sweat, mud, ice, oil, water, slip risk)
+ Winds
+ Lightning
+ Temperature (heat, cold, humidity)
+ Ice (roads, nacelle & blades)
+ Ice (roads, nacelle & blades)
+ Elements (rain, snow, fog)
+ Uneven Ground
+ Animals (e.g. deer, moose, elk)
+ Road and path conditions (including mud)

Electrical Safety	Bloodborne Pathogens	Lifting, Rigging, Handling
Shock	Sharp Objects	Hand Signals
Arc Flash	Pinch Points	Load Limits
Burns	Rotating Equipment	Internal Crane Inspection
Equipment Damage	Shock	Lift Bags Inspected
Hearing Loss	Crushing	Loose Items Secure
	Burns	
Stored Energy	Asphyxiation	Transportation
Electrical		Gravel Roads
Hydraulic	Confined Space	Speed Limits
Rotating	One point of entry/exit	Backing Up
Pneumatic	Decontamination	Animals (deer/elk)
Chemical	Ergonomics	Weather (rain, snow, ice, fog)
Gravity		Load Secure
Grid	Housekeeping	
OEM	Organization	Ergonomics
Operations	Trips	Pushing
Mechanical Stress	Slips	Pulling
Pressure		Lifting
	Falling Objects	Animals (deer/elk)
Rotating Parts	Tools	Weather (rain, snow, ice, fog)
Loose Clothing/Jewelry	Equipment	Load Secure
Long Hair	Tag Lines	
Hand Access	Head Injury	
Crushing		
Amputation		

Safety Tools and Equipment List (Minimums)

Communications	Emergency Equipment	PPE
Cell Phones/Radios	First Aid Kit	Safety Shoes
Emergency Contacts	Fire Extinguishers	Eye And Face Protection (goggles/glasses)
Emergency Radio Channel	Descent Device (Tirfor)	Fall Protection (harness/lanyards)
Evacuation Routes	Eye Wash	Head & Ear Protection
Emergency Signals (code, Blue)		Gloves (cloth, electrical, chemical)
		Respirator

New Team Member Considerations - Required if "Yes" to Q6		
Emergency Call Number / Method Documented and Known by all?	Y	N
Emergency Call Number:		
New Team Members Qualified and Certified for Task Scope (Includes Vestas Technician, Loan Labor, DK, or Third Party)?	Y	N
New Team Members Compliant with Required Safety Training?	Y	N
Confirm Each Team Member has:		
Proper PPE?	Y	N
Communications (Radio, Channels, etc.)?	Y	N
Defined Emergency Response Roles (Evacuation, Medical, Equipment Shutdown, Fire Response Coordinators, etc.), Inc. backups?	Y	N

Pre-Use Inspection / Pre-Activity Preparation (check box with "X" when complete)

Check Standard PPE (both yours and your teammate's) - including Harness, Lad-safe, Lanyards, Gloves, Helmet, Boots, Eye Wear, Ear Protection
Check Standard Emergency Equipment - including Fire Extinguisher, Eye Wash, First Aid Kit, Decent Device
Check Electrical Equipment - including Voltage Gloves, Arc Flash Clothing, Arc Flash Hood, Multimeter, Extension Cords
Check LOTO Equipment - including Special Devices, Lockbox Inventory (control locks, non-conductive hasps, metal hasps, cable lockout device, breaker lockout devices)
Check Lifting and Rigging Equipment - including lifting yokes, tag lines, straps, hasps, specialized rigging or tools, etc.
Check Proper Tools (Confirmed, Tested/Calibrated)?
Permits Required: Hot Work Permit # _____ Confined Space Permit # _____ Lift Plan Permit # _____ Other Permit # _____
Stretching / Warm-up (Back, Arms, Legs) Prior to Climbing / Physical Task Activity

TO BE COMPLETED FOLLOWING WORK ACTIVITY OR RETURN FROM TOWER

	Risk/Hazard Source	Prevention Methods Special or additional protocol, test, procedure, PPE, tool, approach, breaks, streches, etc	LOTO/Risk Prevention Verified (Initials)	LOTO/Risk Prevention measures removed / Ready to run (Initial)
1				
2				
3				
4				
5				
6				

By signature below, I verify participation in, understanding of the risks / hazards identified in this JSA and that I am physically and emotionally able to perform the job safely. I understand my responsibility to stop work and call supervisor if any Work Area Hazards, Unsafe Conditions, or Safe Work Practices are observed. I will not perform any work that I feel is unsafe. I understand my right to refuse unsafe work.

JSA/Task Team Leader Name: _____ Signature _____
Team Print Name _____ Signature _____
Team Print Name _____ Signature _____
Team Print Name _____ Signature _____
Management/Lead Technician Review/Audit of JSA: _____ Date: _____

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Vestas

PRE-TASK PLANNING WORKSHEET

STOP! PLAN! THEN ACT!

Created on: **Last Modified on:** **Date:**
Work Instruction(s): **Turbine Model:** **CIM #:**

Description of work:

A. Safety Risk Factors: Please describe control measures in Section B for any item checked off √

potential "BIG 5 issues" in bold

Can employee slip or trip?	☐	Is rotating equipment in area?	☐
Can employee fall?	☐	If moving or travelling, is the path free of obstructions?	☐
Can employee strain by pushing, pulling, twisting, lifting?	☐	Are appropriate tools/equipment available, in good condition (and power tools grounded)?	☐
		Is barricading and or signage required to protect personnel, facilities or equipment?	☐
Can employee be exposed to chemicals?	☐	Do mobile equipment operators have the appropriate certifications?	☐
Are sources of fire/explosion present?	☐	Is lockout / tag out of energized systems required?	☐
Is employee near electrical source or working on electrical equipment?	☐	Are there adequate employees (number and qualifications) to complete the job/task?	☐
		Are you or any coworkers in "the line of fire"	☐
Can employee be caught in, on, or between objects?	☐	Is there adequate ventilation?	☐
		Is there adequate ambient lighting?	☐
Can an employee's head or body be impacted laterally or vertically?	☐	Can employee encounter hot or cold objects?	☐
		Do you know where your closest eyewash station is and is it in good condition?	☐
Are ALL the equipment calibration /certifications current?	☐	Is the clothing being worn rated high enough for the potential calorie of energy exposure level	☐
Are any sharp edges present?	☐	Do you know where your closest fire extinguisher is and is it in good condition?	☐
Is any part of work performed "blind" (are your hands obscured while you're working)?	☐	Will any interlocks need to be defeated?	☐
		Is there any work adjacent/near to your work area that may cause a hazard?	☐
Does the area need to be barricaded to prevent hazard to others?	☐	Is there an exposure risk to stored energy? (hydraulic, pneumatic, kinetic, thermal, gravitational, electrical, etc)	☐
		Are you working alone?	☐
Is there potential for material to be thrown out of area?	☐	If manual material handling is required, does material exceed 35 lbs. in weight or have awkward lift?	☐
		Do you have ability to contact emergency services (cell service in area)	☐
Is there potential for a spill or leak?	☐	Will the task involve the use or introduction of hazardous chemicals or new chemicals not previously used?	☐

T09 0008-7900 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

Possible allergic reactions? (bees, snakes, spiders)	☐	(a) Do you need to have Material Safety Data Sheets reviewed with crew?	☐
Is there a first aid kit available?	☐	Does this task require periodic stretching and/or breaks?	☐

B. DOCUMENT HAZARDS: List IN DETAIL hazards and control measures below for any checked "Yes" answers in "Section A" and any "No" answers on the "Area Familiarization" table below.

Area Familiarization	*Yes/No*
Locate the closest working phone. Have you verified there is a dial tone/cell service?	
Fire Extinguisher: Is the certificate signed off in current or previous month and pressure in appropriate band?	
Do you know the escape route and know the evacuation assembly area? (Verify unimpeded access to outside)	
Are all appropriate permits completed? (Hot Work, Confined Space, Trenching, Critical lift, etc)	

Work Instruction Reference	Hazard Identified	Method Of Elimination.	Method Of Verification	Initial when Verified

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C. PPE: (Personal Protective Equipment): Are any of the following PPE required to perform task?

Job Specific PPE:	Head	☐ side impact	☐ PETZL	☐ Standard		
	Eye	☐ standard	☐ goggles	☐ welding mask	☐ cutting glasses	☐ non-conductive spectacles
	Ear	☐ plugs	☐ muffs	☐ both (if over 100 decibels)		
	Foot	☐ standard	☐ rubber (CSA)	☐ electrical (Ohm res.)		
	Face	☐ full shield				
	Hands	☐ standard	☐ Kevlar	☐ rubber	☐ high voltage	☐ propane
	Other ☐					
	Respirator	☐ Dust Mask	☐ Air Purifying	☐ Full face	☐ Half mask	☐ Self Contained Breathing Apparatus (SCBA)
	Body	☐ Arc Flash Suit	☐ FR clothing	☐ Tyvek	☐ Chainsaw Chaps	☐ Leather Apron
	Sleeves	☐ Kevlar	☐ Leather	☐ Standard		
	Fall Protection	☐ standard issue	☐ climb gear			
	Other ☐					

D. Pre-work Briefing. All persons performing this task must print their name, initials and date.

Name:	Initials:	Date:
Have all affected areas / personnel been notified prior to the commencement of work? (Insert "Yes" after everyone has been notified)		

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E. Signatures

Technician (s): Date:	Regional Manager *if "Big 5" issue*: Date: (write name/time if phone authorization was used)
Vestas Lead or Authorized SME: Date:	Other: Date:

Technology has been made aware of these hazards and recommended WI additions		
	Regional Manager	Date

F. Task Completion – Return to Operational Status. **Ensure equipment is returned to safe operational condition.**

Please Initial

Technician (s): Date:	Site HSE Coordinator: Date:
Vestas Lead: Date:	Vestas Manager: Date:

Signing this form only acknowledges awareness of the activity. The maintenance technician is responsible for ensuring that the equipment is returned back to a safe state when the activity is completed ***or*** anytime the equipment is left unattended.

T09 0008-7900 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

Vestas	Safety Walk Template	DMS 0008-8013 R03 Date: 01-01-2010 Page 1 of 2

Name:	Date of conducted Safety Walk:	
Location name:	Conducted in own area (yes,no)	
Location representative(s):		

General Comments:

No.	Category*	Positive / Negative (Mark the box)		Observation (Include specific location of observation and task being observed)
1.		☐	☐	
2.		☐	☐	
3.		☐	☐	
4.		☐	☐	
5.		☐	☐	
6.		☐	☐	
7.		☐	☐	

* Use category list below as reference:

CATEGORY A	CATEGORY B	CATEGORY C	CATEGORY D	CATEGORY E	CATEGORY F
Personal Protective Equipment	***Safe behaviour***	**Reactions of people**	***Tools and Equipment***	***Procedures***	***Ergonomics/ Physical conditions***
Use of PPE , eyes, face, ears, head, hands and arms, feet and legs, respiratory system etc.	Risk awareness, attitude towards safety, taking risks/chances, unnecessary speed and lack of planning before start up etc.	Adjusting personal protective equipment, changing position. rearranging job, stopping job, changing tools etc.	Right for the job, used correctly, in safe condition, maintenance, are user instructions used etc.	Adequate procedures, procedures in place, procedures followed, updated and implemented etc.	Noise, type & number of motions, load handing, work area design, tools & grips, vibration, temperature, dust, lightning etc.
CATEGORY G	**Category H**	**CATEGORY I**	**CATEGORY J**	**Category K**	
House keeping (5S)	***Environmental Management***	***Psychological Work Environment***	***Management Support/ Communication***	***Basic Safety***	
Obstruction of passageways, organisation of workplace, general house keeping etc.	Chemical storage, waste storage, flammable liquid storage, MSDS available, spill kits, recycling etc.	Atmosphere, stress, harassment etc.	Safety first, management involvement, general communication to the organisation, incident follow-up	Overview of emergency exit, meeting place in case of emergency, fire extinguisher, first aid kit, contact	

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Vestas	Safety Walk Template	DMS 0008-8013 R03 Date: 01-01-2010 Page 2 of 2

			etc.	numbers etc.

Safety Walks at Vestas:

Safety Walks provide Managers at Vestas an informal and constructive means of strengthening our Safety Culture. Use this Safety Walk Template to guide and focus your observations of key aspects of workplace safety. As much as possible, reinforce desired behaviour by recognizing co-workers for safe actions and safe working conditions. Safety Walks are not intended to be formal audits or reviews. If possible, avoid writing on this template while you are in front of co-workers. Remember to use the note section to capture additional information. Please write your name clearly on this template so that you receive credit for conducting the Safety Walk.

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Contents

1. Purpose 2
2. Scope 2
3. Definitions 2
4. Regulatory References 2
5. General Requirements 2
5.1 Localization 2
6. Responsibilities 2
6.1 Service / Construction Managers 2
6.2 Technicians 3
7. Instructions for Extreme Weather Conditions 3
7.1 Cold 3
7.2 Heat 4
7.3 Wet Bulb Globe Temperature Index 5
7.4 Measurement 7
7.5 Heat Stress Best Practices 8
7.6 Heat Specific Procedures 9
7.7 Electrical Storms (Lightning) 9
7.8 Tornadoes / Hurricanes 10
8. History of this Document 11

T09 0008-7907 Ver 03 - Approved - Exported from DMS: 2010-07-28 by ASUER

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1. Purpose

The purpose of this procedure is to ensure a safe work environment prior to and during the performance of work, to prevent exposure to hazards while working in extreme weather conditions, and to identify hazards and restrict work where necessary to ensure the safety of Vestas employees.

2. Scope

Vestas Americas – All locations

3. Definitions

Word:	Definition
Heat	The measure of energy in terms of quantity
JSA	Job Safety Analysis (DMS# 0008-7897)
LCTU	Lightning Current Transfer Units
OSHA	Occupational Safety and Health Administration
PTP	Pre Task Plan

4. Regulatory References

- OSHA Act 1970 Section 5(a)(1)
- OSHA 3156
- OSHA Tech Manual Directive Number: TED 01-00-015

5. General Requirements

5.1 Localization

5.1.1 For those areas where this Safety Manual differs from the Vestas Group requirements, this manual shall prevail.

5.1.2 In some cases, Vestas Americas has implemented a requirement that may exceed a state or provincial requirement. The higher level requirement in the Safety Manual will prevail.

5.1.3 In the event that a state or provincial requirement exceeds a Safety Manual procedure, the higher level requirement will prevail.

6. Responsibilities

6.1 Service / Construction Managers

It is the responsibility of Service and Construction Managers to:

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6.1.1 Recognize environmental and workplace conditions that lead to potential hazards, illnesses or injuries and take measures to mitigate those risks.

6.1.2 Train the workforce about extreme weather conditions and appropriate actions.

6.1.3 Select and supply proper PPE and clothing for applicable weather conditions.

6.1.4 At the beginning of the work shift, give an overview of the working conditions and weather concerns to the work group.

6.1.5 Allow a period of adjustment to hot weather conditions before embarking on a full work schedule and permit employees to set their own pace and take extra work breaks when needed.

6.1.6 Notify the customer under the terms of the customer contract - explain our safety policy regarding hazards and actions taken to mitigate the risks.

6.1.7 Monitor conditions and update customer as conditions change or if further delays are needed.

6.1.8 Once conditions have improved and it is determined that it's safe to work, providing clearance for work and notifying the customer.

6.2 Technicians

The following are the responsibilities of Technicians:

6.2.1 If conditions are determined to be unsafe, do not proceed with work; notify your supervisor and note this condition on a Service Report if appropriate.

6.2.2 If any adverse weather conditions are spotted in your immediate surrounding area, contact the Site Manager immediately.

6.2.3 Do not start work in a turbine until the clearance for work has been approved by the Service/Construction Manager or designee.

6.2.4 Each crew must acknowledge all warnings either by radio or cell phone.

6.2.5 All personnel in the field and towers must be prepared to seek cover on short notice if lightning occurs.

6.2.6 Wear the appropriate PPE for the existing and anticipated weather conditions.

6.2.7 Complete a JSA (DMS# 0008-7897) and PTP (DMS# 0008-7900) as required to document hazardous conditions and actions.

7. Instructions for Extreme Weather Conditions

7.1 Cold

7.1.1 In regions relatively unaccustomed to winter weather, near freezing temperatures are considered "extreme cold." Whenever temperatures drop decidedly below normal and as wind speed increases, heat can leave your body more rapidly. This weather-related condition known as wind chill or exposure can accelerate the onset of hypothermia and lead to serious health problems. Workers should familiarize themselves with the early symptoms of Hypothermia and be prepared to seek shelter and treatment immediately. The scope of work performed must also be limited dependent upon the specific conditions present. **(See Appendix A "Cold Stress Equation")** Layer clothing to adjust to changing temperatures and conditions so body core temperature can be maintained without overheating (perspiration).

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T09 0008-7907 Ver 03 - Approved - Exported from DMS: 2010-07-28 by ASUER

7.1.2 During freezing temperatures with high humidity, ice is likely to accumulate on wind turbine blades and nacelles. This ice can be thrown off blades and / or fall from nacelles (whether the turbines are operating or not) during icing conditions or while the ice is melting. This presents a significant hazard to any personnel working in the area. Special precautions must be taken prior to performing any work on or near any turbine during these conditions.

7.1.3 Prior to starting work perform an Ice Check per Pre-Work Ice Checklist (DMS# 0008-7909)

a) A visual inspection is to be completed prior to performing work whenever there is a risk of ice build-up on a turbine (binoculars may be necessary).

b) Turbines should be ***remotely stopped*** before inspection. This will include any turbine not being inspected, but in close proximity to where personnel might be stationed to complete the ice check.

c) Park a minimum of 300' away from the turbine to be inspected (or any other turbine).

d) If the flowchart ends in a "STOP" message (see Pre-Work Ice Checklist (DMS# 0008-7909)), the risk of ice is considered too high for work to safely continue. Notify Lead Tech / Site Manager / Customer of hazardous conditions.

e) If ice is discovered after completion of the ice check (build-up throughout the day, previously unseen ice on nacelle roof, etc.); a look-out must be established before exiting the base of the turbine.

f) The lookout will remain a minimum of 300' away from the turbine, observe through binoculars and advise affected personnel by radio when it appears clear to exit the turbine.

g) If any dangers present themselves during exiting the turbine, the lookout will immediately warn the affected personnel via vehicle horn, air horn, radio or other effective means previously established to remain in the turbine.

7.2 Heat

Age, weight, degree of physical fitness, degree of acclimatization, metabolism, use of alcohol or drugs, and a variety of medical conditions such as hypertension all affect a person's sensitivity to heat. However, even the type of clothing worn must be considered. Prior heat injury predisposes an individual to additional injury.

It is difficult to predict just who will be affected and when, because individual susceptibility varies. In addition, environmental factors include more than the ambient air temperature. Radiant heat, air movement, conduction, and relative humidity all affect an individual's response to heat. **See Appendix B of this document ("Heat Index Chart").**

7.2.1 Heat disorders and health effects

a) Heat Stroke - Occurs when the body's system of temperature regulation cannot cope with ambient conditions and body temperature rises to critical levels.

Heat stroke is a medical emergency. The primary signs and symptoms of heat stroke are confusion, irrational behavior, loss of consciousness, convulsions, a lack of sweating (usually), hot, dry skin, and an abnormally high body temperature, e.g., of 41°C (105.8°F).

b) Heat Exhaustion - The signs and symptoms of heat exhaustion are headache, nausea, vertigo, weakness, thirst, and giddiness.

This condition responds readily to prompt treatment. Heat exhaustion should not be dismissed lightly; fainting is associated with heat exhaustion. Also, signs and symptoms of heat exhaustion are similar to those of heat stroke.

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c) Heat Cramps – Usually caused by performing hard physical labor in a hot environment. These muscle cramps have been attributed to an electrolyte imbalance caused by sweating. Cramps can be caused by both too much and too little salt.

d) Heat Collapse ("Fainting") - In heat collapse, the brain does not receive enough oxygen because blood pools in the extremities. As a result, the exposed individual may lose consciousness. This reaction is similar to that of heat exhaustion and does not affect the body's heat balance. However, the onset of heat collapse is rapid and unpredictable. To prevent heat collapse, the worker should gradually become acclimatized to the hot environment.

e) Heat Rashes – Heat rashes are the most common problem in hot work environments. Prickly heat is manifested as red papules and usually appears in areas where the clothing is restrictive. As sweating increases, these papules give rise to a prickling sensation. Prickly heat occurs in skin that is persistently wetted by unevaporated sweat, and heat rash papules may become infected if they are not treated. In most cases, heat rashes will disappear when the affected individual returns to a cool environment.

f) Heat Fatigue - A factor that predisposes an individual to heat fatigue is lack of acclimatization. The use of a program of acclimatization and training for work in hot environments is advisable. The signs and symptoms of heat fatigue include impaired performance of tasks that require mental alertness or fine motor skills. There is no treatment for heat fatigue except to remove the heat stress before a more serious heat-related condition develops.

7.2.2 Workers should not be permitted to work when their deep body temperature exceeds 38°C (100.4°F).

7.3 Wet Bulb Globe Temperature Index

Wet Bulb Globe Temperature (WBGT) should be calculated using the appropriate formula in Equation III: 4-2. The WBGT for continuous all-day or several hour exposures should be averaged over a 60-minute period. Intermittent exposures should be averaged over a 120-minute period.

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TABLE III:4-1 ASSESSMENT OF WORK

Body position and movement	*kcal/min**
Sitting	0.3
Standing	0.6
Walking	2.0-3.0
Walking uphill	add 0.8 for every meter (yard) rise

Type of work	*Average kcal/min*	*Range kcal/min*
Hand work		
Light	0.4	0.2-1.2
Heavy	0.9	
Work: One arm		
Light	1.0	0.7-2.5
Heavy	1.7	
Work: Both arms		
Light	1.5	1.0-3.5
Heavy	2.5	
Work: Whole body		
Light	3.5	2.5-15.0
Moderate	5.0	
Heavy	7.0	
Very heavy	9.0	

* For a "standard" worker of 70 kg body weight (154 lbs) and 1.8m^2 body surface (19.4 ft^2).

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Equation III: 4-2. Average Web Bulb Globe Temperature (WBGT)

$$Average_{WBGT} = \frac{(WBGT_1)(t_1)+(WBGT_2)(t_2)+\ldots+(WBGT_n)(t_n)}{(t_1)+(t_2)+\ldots(t_n)}$$

For indoor and outdoor conditions with no solar load, WBGT is calculated as:

$$WBGT = 0.7NWB + 0.3GT$$

For outdoors with a solar load, WBGT is calculated as:

$$WBGT = 0.7NWB + 0.2GT + 0.1DB$$

where:

WBGT	=	**Wet Bulb Globe Temperature Index**
NWB	=	**Nature Wet-Bulb Temperature**
DB	=	**Dry-Bulb Temperature**
GT	=	**Globe Temperature**

The exposure limits in Table III: 4-2 (see below) are valid for employees wearing light clothing. They must be adjusted for the insulation from clothing that impedes sweat evaporation and other body cooling mechanisms. Use Table III: 4-3 (below) to correct Table III: 4-2 (see below) for various kinds of clothing.

Use of Table III: 4-2 (see below) requires knowledge of the WBGT and approximate workload. Workload can be estimated using the data in Table III: 4-1.

Heat Stress Meters (Extech HT30) are available through Grainger (Grainger part number 2LVT5. A).

7.4 Measurement

Portable heat stress meters or monitors are used to measure heat conditions. These instruments can calculate both the indoor and outdoor WBGT index according to established ACGIH Threshold Limit Value equations. With this information and information on the type of work being performed, heat stress meters can determine how long a person can safely work or remain in a particular hot environment.

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TABLE III: 4-2. PERMISSIBLE HEAT EXPOSURE THRESHOLD LIMIT VALUE

	---------- Work Load* ----------		
Work/rest regimen	**Light**	**Moderate**	**Heavy**
Continuous work	30.0°C (86°F)	26.7°C (80°F)	25.0°C (77°F)
75% Work, 25% rest, each hour	30.6°C (87°F)	28.0°C (82°F)	25.9°C (78°F)
50% Work, 50% rest, each hour	31.4°C (89°F)	29.4°C (85°F)	27.9°C (82°F)
25% Work, 75% rest, each hour	32.2°C (90°F)	31.1°C (88°F)	30.0°C (86°F)

*Values are in °C and °F, WBGT. These TLV's are based on the assumption that nearly all acclimatized, fully clothed workers with adequate water and salt intake should be able to function effectively under the given working conditions without exceeding a deep body temperature of 38°C (100.4° F). They are also based on the assumption that the WBGT of the resting place is the same or very close to that of the workplace. Where the WBGT of the work area is different from that of the rest area, a time-weighted average should be used (consult the ACGIH *1992-1993 Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices* (1992)).

These TLV's apply to physically fit and acclimatized individuals wearing light summer clothing. If heavier clothing that impedes sweat or has a higher insulation value is required, the permissible heat exposure TLV's in Table III: 4-2 must be reduced by the corrections shown in Table III: 4-3.

TABLE III:4-3, WBGT CORRECTION FACTORS IN °C

Clothing type	Clo* value	WBGT correction
Summer lightweight working clothing	0.6	0
Cotton coveralls	1.0	-2
Winter work clothing	1.4	-4
Water barrier, permeable	1.2	-6

*Clo: Insulation value of clothing. One clo = 5.55 kcal/m^2/hr of heat exchange by radiation and convection for each degree °C difference in temperature between the skin and the adjusted dry bulb temperature.

Note: Deleted from the previous version are trade names and "fully encapsulating suit, gloves, boots and hood" including its clo value of 1.2 and WBGT correction of -10.

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7.5 Heat Stress Best Practices

7.5.1 Utilize engineering controls whenever possible to move and cool the work area (i.e. fans, A/C units, insulating hot surfaces etc.)

7.5.2 Utilize Auxiliary body cooling devices (see list of VAME HSE APPROVED ITEMS):

a) Ice vests
b) Wetting clothes
c) Water cooled garments

7.5.3 Permit workers to drink water at liberty. In the course of a day's work in the heat, a worker may produce as much as 2 to 3 gallons of sweat. Personnel should not depend on thirst to signal when and how much to drink. Instead, the worker should drink 5 to 7 ounces of fluids every 15 to 20 minutes to replenish the necessary fluids in the body lost due to sweat.

7.5.4 Establish provisions for a work/rest regimen so that exposure time to high temperatures and/or the work rate is decreased; work-rest cycles give the body an opportunity to get rid of excess heat, slow down the production of internal body heat, and provide greater blood flow to the skin.

7.6 Heat Specific Procedures

7.6.1 Heat Stroke – Contact supervisor immediately and call 911

a) Move person to a cool place indoors or under a shady tree. Place feet higher than head to avoid shock.

7.6.2 Heat Exhaustion

a) Move to a cool place indoors or in the shade. Lie down.
b) Loosen clothing.
c) Drink fluids, such as cool or cold water. Add 1/2 teaspoon of salt to 1 quart of water. Sip this, or drink sport drinks, such as Gatorade, etc.
d) Have salty foods, such as saltine crackers, if you tolerate them.
e) Massage and stretch cramped muscles.
f) Remove clothing. Wrap person in cold, wet sheet, sponge with towels or sheets soaked in cold water, or spray person with cool water. Fan the person to promote evaporative cooling.
g) Put ice packs or cold compresses on neck, under armpits, and on the groin area.
h) Do not give fever reducing medicine.

7.7 Electrical Storms (Lightning)

In the event of lightning, the following guidelines are to be followed and enforced by all Vestas Americas field employees. During an electrical storm, there is a risk of lightning striking the turbine, which brings about danger of electrical shock to anyone in close proximity to the turbine.

7.7.1 All sites must have a way of monitoring for risk of lightning strikes. Sites located in areas of frequent lightning activity should consider a commercial weather alert service.

7.7.2 Ensure no personnel are permitted to be in or around a turbine during a lightning storm. During an electric storm, there is a risk of serious injury or death as a result of lightning striking a turbine.

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T09 0008-7907 Ver 03 - Approved - Exported from DMS: 2010-07-28 by ASUER

7.7.3 Sites with lightning advisory system installed at site (e.g.: LDSS, weather detection radar system, etc.) shall issue a lightning advisory for any lightning strikes within a 30 mile radius. Site manager will alert all technicians/subcontractors of the strike and evacuate the turbines. The advisory shall remain in effect until 30 minutes after the last known strike is reported within the 30 mile radius.

7.7.4 Sites without a lightning advisory system installed at site shall issue a lightning advisory for any lightning strikes within a 60 mile radius. Site manager will alert all technicians/subcontractors of the strike and evacuate the turbines. The advisory shall remain in effect until 30 minutes after the last known strike is reported.

7.7.5 All personnel in the field and at the towers need to be prepared to seek cover on short notice.

7.7.6 If lightning activity has stopped but there is still severe weather in the area, the site manager has authority to keep the lightning stand down in effect until he/she feels it is safe to resume normal operation.

7.7.7 Hub Entry is restricted if LCTU (Lightning Current Transfer Unit) *"pucks"* are popping. Work in the Nacelle is permitted ONLY if WKI 961248 is followed (only use most current version). Discharge of static electricity includes following precautions:

a) **Do not** touch the lightning conductors on the blade before the blade is discharged.

b) Discharge the blade with grounding cables/jump start cable as described in WKI 961248.

c) Wear appropriate electrical HV gloves when working on installation of grounding straps.

7.8 Tornadoes / Hurricanes

A tornado is defined as a violently rotating column of air extending from a thunderstorm to the ground. The most violent tornadoes are capable of tremendous destruction with wind speeds of 250 mph or more. Damage paths can be in excess of one mile wide and 50 miles long.

A hurricane is a type of tropical cyclone, the generic term for a low pressure system that generally forms in the tropics. A typical cyclone is accompanied by thunderstorms, and in the Northern Hemisphere, a counterclockwise circulation of winds near the earth's surface. All Atlantic and Gulf of Mexico coastal areas are subject to hurricanes or tropical storms. Parts of the Southwest United States and the Pacific Coast experience heavy rains and floods each year from hurricanes spawned off Mexico. The Atlantic hurricane season lasts from June to November, with the peak season from mid-August to late October.

7.8.1 **Tornado Watch:** A tornado watch is issued when weather conditions are favorable for the development of severe thunderstorms that are capable of producing tornadoes. If a watch is issued, be prepared to take cover in the event a tornado warning is issued or if a tornado is spotted.

7.8.2 **Tornado warning:** A tornado warning is an alert issued by government weather services to warn an area that a tornado may be imminent. It can be issued after either a tornado or funnel cloud has been spotted, of if there are radar indications that a tornado may be possible. If a tornado warning is issued, seek shelter immediately.

7.8.3 **Hurricane warning**: This is a communication issued by NOAA whenever a hurricane is between 12 and 24 hours from and approaching the U.S. coast and comprises an area approximately 50 miles either side of the expected place where the hurricane will strike coastal areas. This warning also gives the expected time and location where the hurricane will strike the coast, as well as the size, maximum winds, direction, and he speed of travel.

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T09 0008-7907 Ver 03 - Approved - Exported from DMS: 2010-07-28 by ASUER

The warning may also describe where high water (storm surge), floods or high waves can be expected.

a) For sites that may be affected by hurricanes, a preparedness plan shall be established. All Local, State and Federal rules and regulations shall be followed. During hurricane season, a hurricane-tracking map will be kept in the management and safety areas.

7.8.4 Hurricane Preparedness Team:

a) Shall consist of sufficient numbers to physically complete its task;
b) Shall have employees who are familiar with the Hurricane Preparedness Plan to fill in for essential team members in the event team members are not present;
c) Shall have a designated primary and secondary team manager for the Hurricane Preparedness Team;
d) Shall maintain a detailed list of assets that will be removed from site in the event of evacuation;
e) Shall maintain a list of vehicles and personnel that will be utilized to evacuate assets; and
f) Shall pre-determine the state the turbines will be placed in during a hurricane and evaluate a "safe to return" inspection of the site.

7.8.5 The Team leaders shall designate appropriate emergency supplies and storage place. The team shall review the current year FEMA Emergency Management Guide for Business & Industry (www.fema.gov/business/guide/index.shtm).

8. History of this Document

Rev. no.:	Date:	Description of changes
00	2005-Sep-26	First edition - Reformatted & new number 13-Apr-2007
01	2010-Jan-01	Content regarding extreme weather conditions added. Title changed from "Snow and Ice Hazards" to "Extreme Weather Conditions".
02	2010-July-09	Major revision to include all extreme weather conditions.
03	2010-July-27	General process updates. Tables III: 4-1 and III: 4-3 updated. Section 7.4.5 deleted.

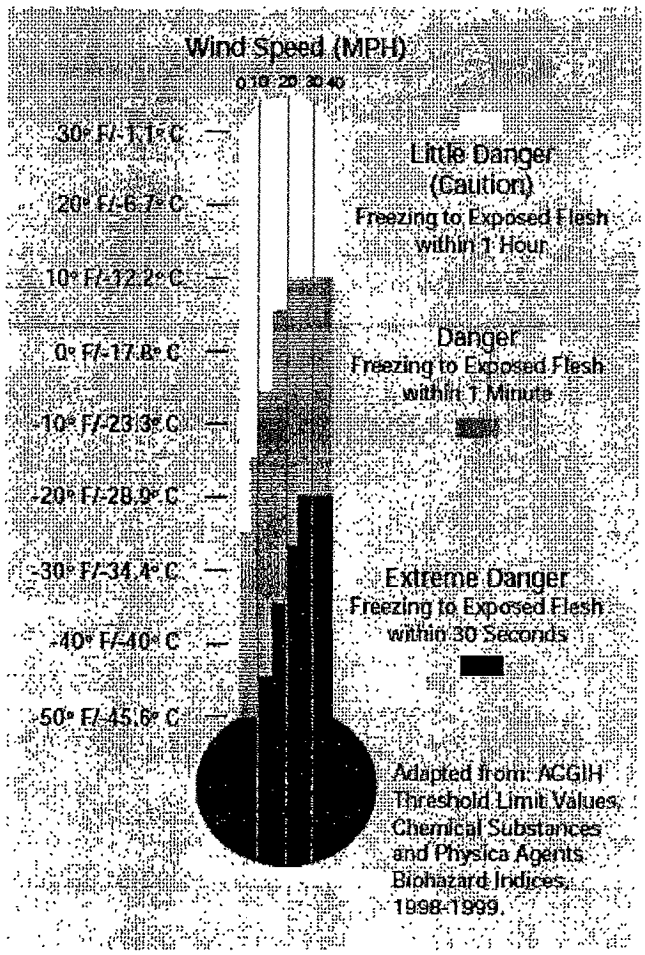
T09 0008-7907 Ver 03 - Approved - Exported from DMS: 2010-07-28 by ASUER

Appendix A (Cold Stress Equation)

THE COLD STRESS EQUATION

LOW TEMPERATURE + WIND SPEED + WETNESS = INJURIES & ILLNESS

When the body is unable to warm itself, serious cold-related illnesses and injuries may occur, and permanent tissue damage and death may result. **Hypothermia** can occur when *land temperatures* are **above** freezing or *water temperatures* are below 98.6°F/ 37°C. Cold-related illnesses can slowly overcome a person who has been chilled by low temperatures, brisk winds, or wet clothing.



U.S. Department of Labor
Occupational Safety and Health Administration

OSHA 3156
1998

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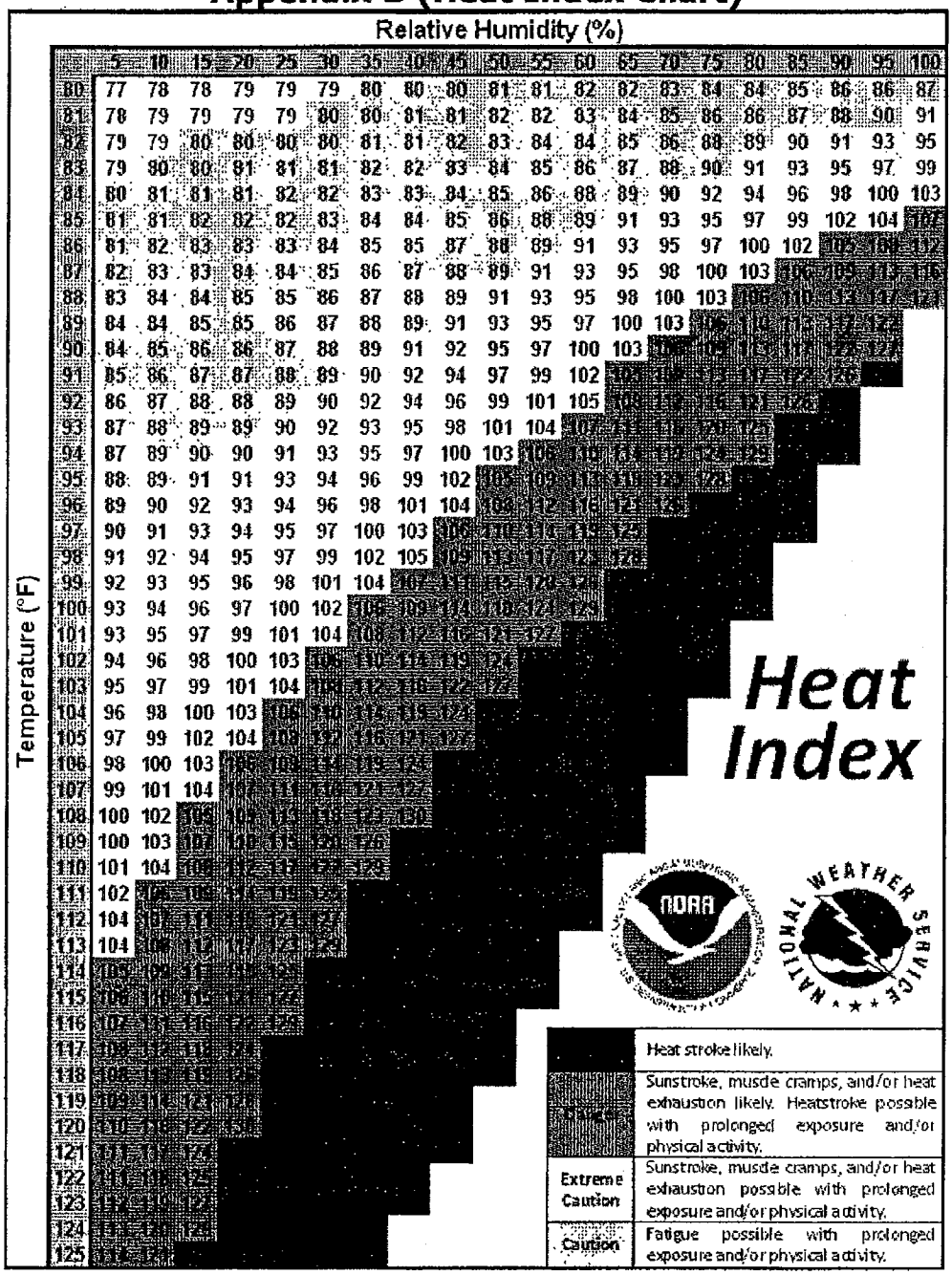
Appendix B (Heat Index Chart)



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Pre-Work Ice Checklist

Contents

1. **Process Flowchart** 2
2. **Guidelines** 3

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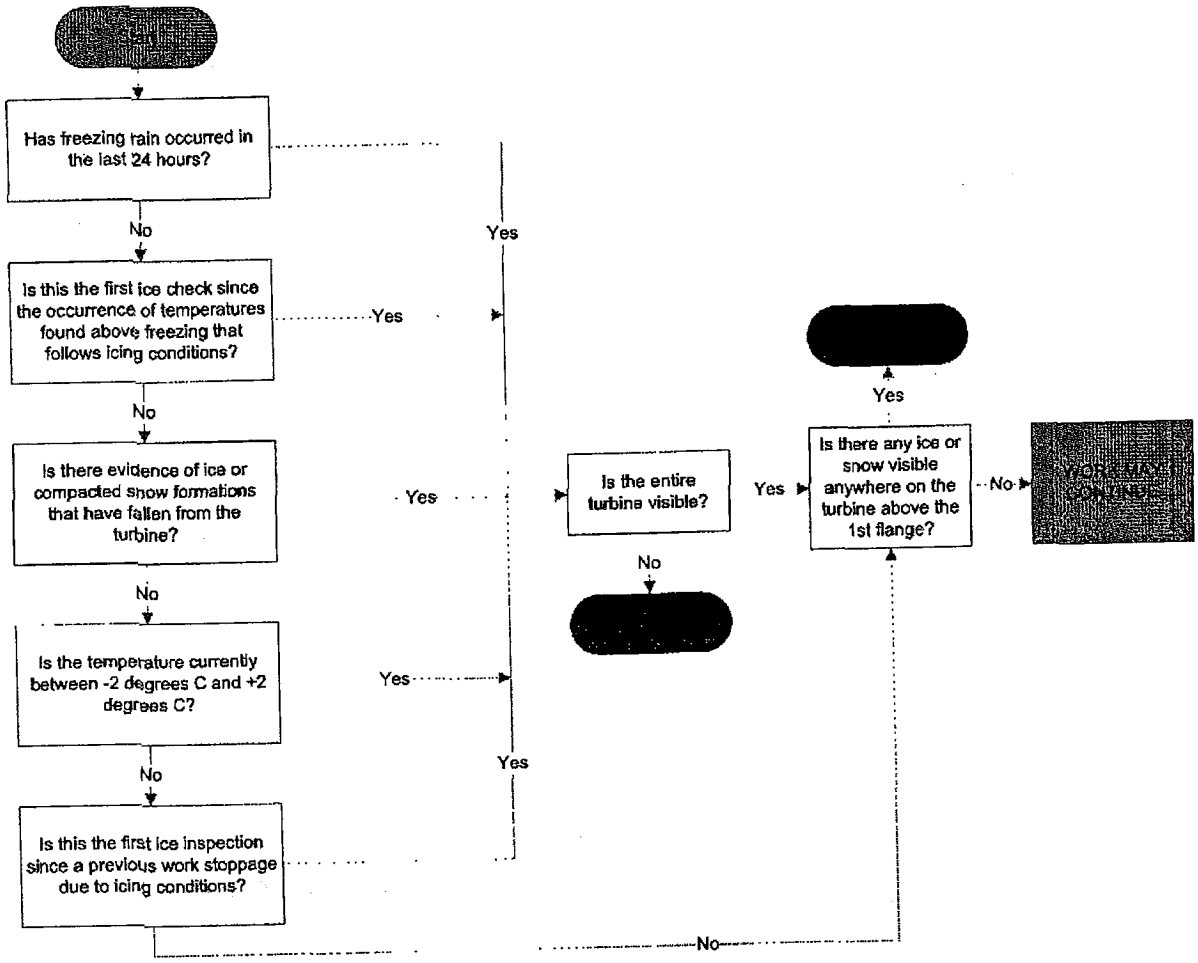
1. Process Flowchart



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2. Guidelines

The following guidelines should be followed to safely perform an ice check:

- Turbines should be ***remotely stopped*** before inspection. This will include any turbine not being inspected, but in close proximity to where personnel might be stationed to complete the ice check. (Close proximity = 1000')
- Park a minimum of 300' away from the turbine to be inspected (or any other turbine).
- Use binoculars or other magnifying visual aids to effectively inspect the turbine.
- If the flowchart ends in a "STOP" message, the risk of ice is considered too high for work to safely continue. Notify Lead Tech / Site Manager / Customer of hazardous conditions.

If ice is discovered *after* completion of the ice check (build-up throughout the day, previously unseen ice on nacelle roof, etc.), work is to stop ***immediately***, all affected personnel are to climb down-tower and a look-out will obtained *before* exiting the base of the turbine. The lookout will remain a minimum of 300' away from the turbine, observe through binoculars and advise affected personnel by radio when it appears clear to exit the turbine. If any dangers present themselves during evacuation, the lookout will immediately warn the affected personnel via vehicle horn, air horn, radio or other effective means to be previously established.

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Vestas Americas Emergency Response Plan (ERP) Template

Site Name

Site Office Address
Site Office Longitude and Latitude
Site Office Phone Number

Emergency Contacts

IN AN EMERGENCY, DIAL XXX/XXX-XXXX

Local Emergency Contact Number:

Local Law Enforcement:
Name, Sheriff
Address
Phone Number

Medical Center:
Address
Phone Number

Customer's Office:
Address
Phone Number

Fire & Emergency Services (Transport):
Address
Phone Number

Helicopter Service:
Name
Address
Phone Number

Attach a copy of the map to the Medical Care Facility(s) as appropriate.

Critical Contact Information - Customer and Vestas Service Site

Customer O&M Building:
Office

Customer O&M Manager:
Name
Office
Cell Phone Number

Customer Rep:
Name
Office
Cell Phone Number

Vestas Site Office Coordinator:
Name
Office
Cell Phone Number
Email

Vestas Site Manager:
Name
Office

Vestas Lead Technician:
Name
Office
Cell Phone Number
Email

HSE Coordinator:
Name
Office
Cell Phone Number
Email

T09 0008-7901 Ver 02 - Approved - Exported from DMS: 2010-03-09 by ASUER

Specific Tower Siting:

In this section, please remove example and add all towers' longitude and latitude locations.

Site Name:

B-15: N45 39' 15" W119 29' 13"
B-16: N45 39' 8" W119 29' 5"
B-17: N45 39' 1" W119 28' 5"
B-18: N45 38' 55" W119 28' 51"
B-19: N45 38' 48" W119 28'43"
B-20: N45 38' 41" W119 28' 36"
B-21: N45 38' 34" W119 28' 28"
B-22: N45 38' 28" W119 28' 21"
B-23: N45 38' 21" W119 28' 13"
C-17: N45 39' 30" W119 28' 7"
C-18: N45 39' 24" W119 28' 00"
C-19: N45 39' 17" W119 27' 53"
C-20: N45 39' 11" W119 27' 45"
C-21: N45 39' 4" W119 27' 38"

T-4: N45 40' 29" W119 56' 4"
T-5: N45 40' 33" W119 56' 15"
T-6: N45 40' 39" W119 56' 20"
T-7: N45 40' 44" W119 56' 23"
T-8: N45 40' 49" W119 56' 27"
T-9: N45 40' 56" W119 56' 32"

ERP Rally Points:

Emergency Assembly Areas: The place where site employees will gather during an emergency or after a disaster to take roll, organize rescue, first aid, and support teams. Designate a primary and secondary EAP for your site. Attach a map with these areas clearly marked:

Location #1:
Location #2:

Emergency Routes / Exits (attach map of site AND building floor plan, indicating emergency escape routes and exits, and locations of fire extinguishers, first aid kits, eyewash stations or showers, etc.):

ON-SCENE SUPERVISOR: TAKE HEAD COUNT AT ERP RALLY POINT AND IMMEDIATELY REPORT TO MANAGEMENT

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Shelter for Severe Weather Events/Earthquakes

Employees should move to an interior, windowless room on the main or lower floor as quickly as possible. If time does not allow for movement, cover should be taken away from glass and under protective items such as sturdy desks. Once individuals have reached the shelter locations, they should assume a seated position on the floor with their heads down and their hands over their heads or place themselves under a desk. If they are wearing heavy clothing or have access to heavy clothing, they should use these items to cover their upper bodies and heads. Hallways and enclosed stairwells are also acceptable shelter areas. Once the disaster area is stabilized, exit from the building to the Emergency Assembly Point.

1. **Proceed to the nearest Emergency Shelter - assist those who request your help if you can.**
2. **Stay with other people in the area if you cannot evacuate.**
3. **Report to the Primary Assembly Point - DO NOT LEAVE unless it becomes unsafe to stay.**
4. **Check In with the Emergency Coordinator and notify the Site Management.**
5. **Wait for further instruction or All Clear (clearance to re-enter).**

On-site Emergency Shelter Location #1:
On-site Emergency Shelter Location #2:

Emergency Response Supplies

Emergency Response Supplies include First Aid/CPR/BBP kits, Fire Extinguishers, Eyewash Stations, Tower Rescue Devices, Spill Cleanup Kits, etc. - Emergency response supplies are also kept in Service Vehicles.

Monthly Inspection Completed by:

Location of Nearest Equipment

Telephone:
First Aid Kit:
Eye Wash or Shower:
Spill Kit:
Rescue Device:
Chemical Inventory & MSDS Binder:
Safety Manual:

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Vestas Americas Emergency Response Plan (ERP) Template

Emergency Response Team

Emergency Response Team - Trained in CPR/First Aid/Fire Safety, Spill Response, etc.

Name:	**Title:**
	24 Hour Contact Numbers:

Name:	**Title:**
	24 Hour Contact Numbers:

Name:	**Title:**
	24 Hour Contact Numbers:

Name:	**Title:**
	24 Hour Contact Numbers:

Evacuation Signal: General Alarm Signal to Evacuate:

Semi-annual drills will be practiced and documented on Safety Meeting Attendance Record (SMARs) so employees become better prepared for real emergencies and so that any deficiencies in the plan can be identified and corrected.

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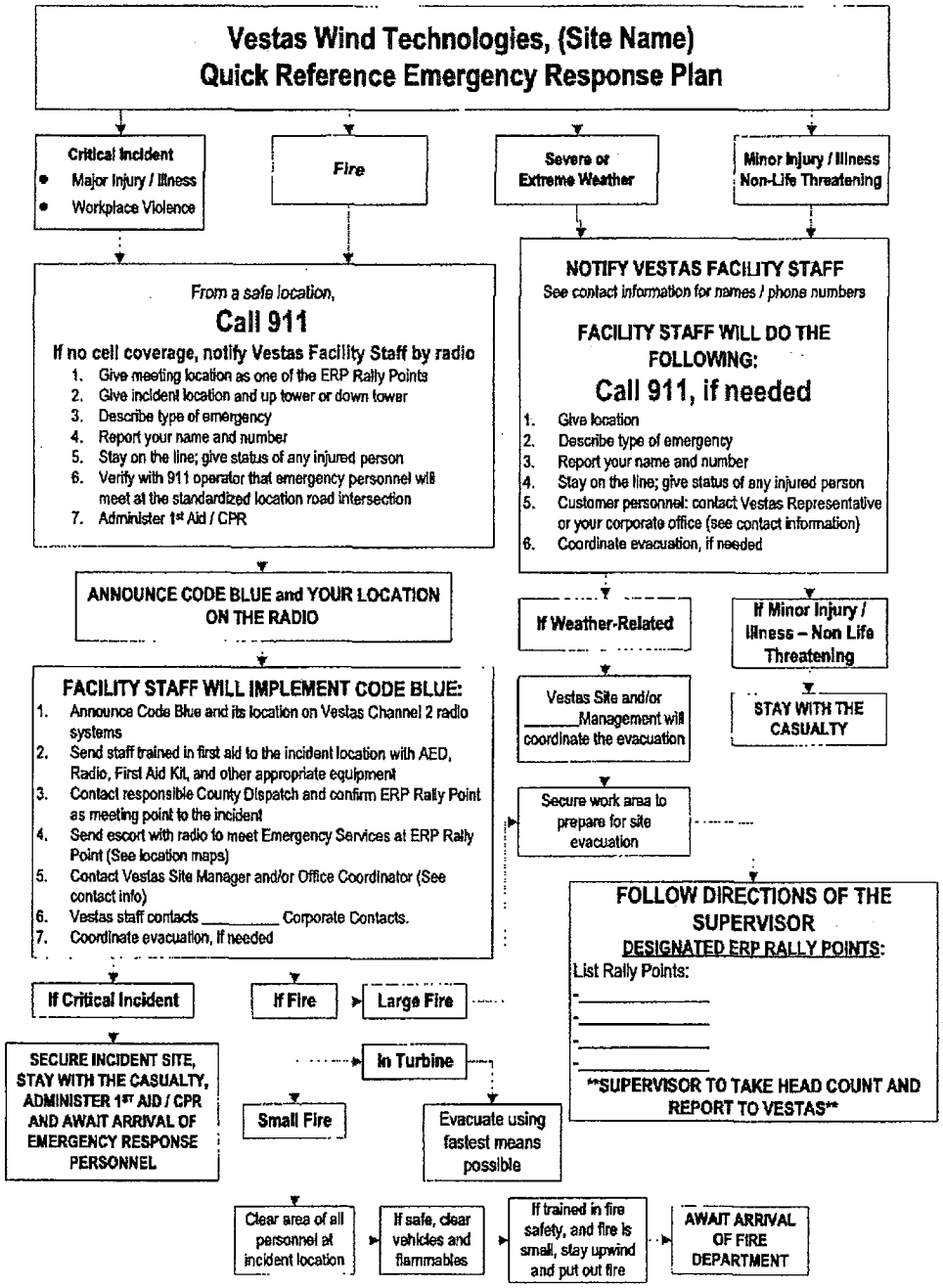
Vestas Americas Emergency Response Plan (ERP) Template



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[redacted]ergency Response Equipment - Monthly [redacted]ecklist

Vesta

2010

SITE/PROJECT: _____ **INSPECTOR (s):** _____

SITE SUPERVISOR: _____

EXTINGUISHERS (■ = Month for Annual Professional Inspection): Inspector shall enter initials in box after each monthly inspection

ID#	Location	MFR	Style/Model #	Size/SN	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1																
2																
3																
4																
5																
6																
7																
8																

Contact Info for Annual Professional Fire Inspection:

EYEWASH STATIONS (wall mounted) Inspector shall enter initials in box after each monthly inspection

ID#	Location	MFR	Style/Model #	Size/SN	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1																
2																

FIRST AID KITS Inspector Shall Enter Initials In Box After Each Monthly Inspection

ID#	Location	MFR	Style/Model #	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1															
2															
3															
4															
5															
6															

VEHICLES - Incident forms, Eyewash Bottles, Spill Kit,

Fire Extinguisher, Emergency Response Kit: Inspector shall enter initials in box after each monthly inspection

ID#	Make/Model	Year	Assigned to	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1															
2															
3															
4															
5															
6															
7															
8															
9															
10															
11															
12															

**Service Vehicles are equipped with: (1) Copy of Emergency Response Plan - site specific plan, (1) Fire Extinguisher, (1) small First Aid Kit w/ Incident Report Forms, (2) 32 oz bottles of Eyewash, (1) Disposable Emergency Blanket, and other site hazard specific items (i.e. snake bite kits).*

**At year end, file this sheet in the Site Safety Records, Inspections - Emergency Response Equipment. Update/reprint if equipment is added or RFS (RFS = Removed From Service.)*

Descent Device Inspection Record

Vestas

SITE: _____ LOCATION: _____

INSPECTOR NAME: _____ SIGNATURE: _____

DATE OF THIS INSPECTION: _____ DATE OF NEXT INSPECTION: _____

A Tower Descent Device is designed for ready availability/emergency use and must be checked after EVERY unpacking/use.
This device MUST BE INSPECTED ANNUALLY by an authorized person.
All documented inspections of this equipment shall be filed in the Site Safety Records.

DESCENT DEVICE INFORMATION:

MAKE/MODEL NUMBER: _____

SERIAL # or IDENTIFYING MARK(s): _____

INSPECTION CHECKLIST *(X if no defect, and/or comment. Attach a Safety Equipment Defect form to promptly address any noted defects)* :

1 ROPE - *Visually inspect the entire length of the rope for cuts, areas of excessive chafing, soft or hard spots, glazed or melted surface areas, discolorations or variations in diameter. Along with this visual inspection, feel the rope to detect possible damage to the core. Pay special attention to any areas that may have been knotted or that were drawn over or against edges. Putting tension on the rope can help you feel irregularities. Some wear to the sheath is normal, but when 50% of the fibers at any point on the sheath are worn through, the rope must be retired from service.*

a. Length of rope: _____ _____

b. Free of ruptures ☐ _____

c. Free of holes on the sheath ☐ _____

d. Free of knots ☐ _____

e. Free of kinks ☐ _____

f. No deformities ☐ _____

2 METAL COMPONENTS:

a. Free of corrosion ☐ _____

b. Free of defects or flaws ☐ _____

c. Functions correctly ☐ _____

d. Fasteners secure and tight ☐ _____

3 MECHANICAL CHECK *(After visually inspecting the rope and metal components, check the brake mechanism by pulling the rope forwards and backwards through the brake unit):*

a. Device is operational ☐ _____

b. Resistance occurs when rope is pu ☐ _____

REPACKING FOR STORAGE *(If the unit is wet after use, all metal components should be wiped dry with a clean dry cloth, and allowed to dry thoroughly at room temperature, protected from light, and never in a hot cabinet, boiler room or likewise. Also note, the brake vents must be closed when the device is stored. Immediately after the inspection, the equipment must be repacked into the carry bag as follows):*

a. Pull the rope through the brake unit on one end of the rope with the snap hook hanging approximately 30 cm from the brake unit.
b. The long end of the rope will be packed (wound) into the bag with the attachment snap hook first.
c. The rope is packed (wound) into the bag on top of the snap hook.
d. After each ten windings, press the rope with your hand to compress in the bag.
e. Repeat steps 2 and 3 until the entire length of the rope is packed into the bag.
f. Place the descent device on top of the packed rope.
g. Cinch the bag closed and return the device to its proper storage area, protected from sunlight.
h. Complete the inspection form and file in the Site Safety Records.
i. If any deficiencies are noted, complete and attach a Safety Equipment Defect form.

COMMENTS:

Completed original should be filed in Site Safety Records. If item is removed from service - note and date on Site Safety Equipment Register.

T09 0008-7903 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

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Health Safety Environment Incident Report

Incident Date: Time:

Location:

Site Office:

Supervisor:

Park:

WTG Pad/#:

Customer:

Select Incident and Dept. Categories: (check as applicable)

- ☐ Health/Personal Injury
- ☐ WTG/Equipment/Vehicle Damage
- ☐ Environmental
- ☐ Near Miss
- ☐ Service
- ☐ Projects
- ☐ Resource Group/CIM

Hazards/Risks Involved in Incident: (check as many as applicable)

- ☐ Lifting/Strain/Rigging
- ☐ Weather (Hot/Cold/Wet)
- ☐ Stored Energy - Elect/Hyd
- ☐ Repetitive Strain
- ☐ Other
- ☐ Chemical Exposure
- ☐ Vehicles/Transport
- ☐ Crushing
- ☐ Slips
- ☐ Electrical (Shock/Arc Flash)
- ☐ Asphyxiation
- ☐ Fall (Person/Tool/Object)
- ☐ Fire

☐ PPE in Use? List:

High Level Summary:

Associated Actions/Events:

Prior to Incident:

Incident:

After Incident:

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Vestas®

Health Safety Environment
Incident Report

Incident Date: Site Office:
Park: WTG Pad/#:

Documentation (hard/scanned copies attached as checked):

- ☐ Work Instructions in use
- ☐ JHA in use
- ☐ OHSA/WCB documents
- ☐ Driver's License/Relevant Certifications
- ☐ Other
- ☐ No Documents attached Explain:

Photographs:

Copy and Paste with Labels as needed:

Photo A – description, direction of view, wide view

Photo B – description, direction of view, medium view

Photo C – description, direction of view, narrow view

Photo D – description, direction of view, photo of injury/damage

Photo E – description, direction of view, photo of risk elimination reduction

Photo F – etc... as needed

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Health Safety Environment Incident Report

Incident Date: Site Office:
Park: WTG Pad/#:

Site Findings:

Primary Cause(s):

Contributing Factor(s):

Options to Prevent Future Occurrences:

Eliminate the Risk:

Protect against Risk:

Protect Worker:

Site Recommendations:

Further Comments:

Report Prepared by:	Date:
Report Reviewed by:	Date:
Report Approved by:	Date:

T09 0008-7917 Ver 03 - Approved - Exported from DMS: 2010-03-09 by ASUER

HSE Witness Statement

Vestas

I. Witness Information

Name and Address

Home Contact Phone:

Employer:

Employee ID: Hire Date:

Immediate Supervisor:

Job Title:

Work Contact Phone:

II. Incident Information

Date | Time | AM / PM | Worksite

Describe what you were doing at the time the incident occurred:

Describe what attracted your attention to the incident:

Describe what you saw and heard, in chronological order:

Events Before

Incident Event

Events After

I certify that this statement is true and accurate to the best of my recollection.

Employee Signature Date

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Release to Return to Work

Return form to:

Name of worker:	Claim number:

Please complete the following information and return to us at the address indicated above.

1. Is the worker medically stationary? ☐ Yes ☐ No Date _____ Next scheduled appointment date _____

2. Worker is released to:
   ☐ full duty without limitations Date _____ (Do not complete lines 3 through 11. Sign below.)
   ☐ modified duty from (date) _____ through (date) _____ (specify limitations below.)
   ☐ modified hours — specify _____ from (date) _____ through (date) _____

Hours:	No limitations	1	2	3	4	5	6	7	8
3. In an eight-hour workday, worker can stand/walk a total of	☐	☐	☐	☐	☐	☐	☐	☐	☐
4. At one time, worker can stand/walk	☐	☐	☐	☐	☐	☐	☐	☐	☐
5. In an eight-hour workday, worker can sit a total of	☐	☐	☐	☐	☐	☐	☐	☐	☐
6. At one time, worker can sit	☐	☐	☐	☐	☐	☐	☐	☐	☐

7. The worker is released to return to work in the following range for lifting, carrying, pushing/pulling:

Pounds	<10	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	>100
Occasionally	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Frequently	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

8. Worker can use hands for repetitive:

	Right	Left
a. Fine manipulation	☐ Yes ☐ No	☐ Yes ☐ No
b. Pushing and pulling	☐ Yes ☐ No	☐ Yes ☐ No
c. Simple grasping	☐ Yes ☐ No	☐ Yes ☐ No
d. Keyboarding	☐ Yes ☐ No	☐ Yes ☐ No

Dominant hand ☐ Right ☐ Left

9. Worker can use feet for repetitive raising and pushing (as in operating foot controls): ☐ Yes ☐ No

10. Worker is able to:

	Continuous 67-100% of the day	Frequently 34-66% of the day	Occasionally 6-33% of the day	Intermittently 1-5% of the day	Not at all
a. Stoop/bend	☐	☐	☐	☐	☐
b. Crouch	☐	☐	☐	☐	☐
c. Crawl	☐	☐	☐	☐	☐
d. Kneel	☐	☐	☐	☐	☐
e. Twist	☐	☐	☐	☐	☐
f. Climb	☐	☐	☐	☐	☐
g. Balance	☐	☐	☐	☐	☐
h. Reach	☐	☐	☐	☐	☐
i. Push/pull	☐	☐	☐	☐	☐

11. Other functional limitations or modifications necessary in worker's employment:

Additional comments may be written on back of form.

Signature of physician	Physician's typed name	Date

T09 0008-8015 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

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Canadian Subcontractor Requirements

Contents

1. Environmental, Health & Safety (EHS) Goals and Expectations 3
2. Federal and Provincial Health & Safety Compliance 3
3. Site Safety Representative 4
4. Program Policies, Practices and Procedures 5
5. EH&S Discipline Policy 5
5.1 First Step: Verbal Warning 5
5.2 Second Step: Written Warning 6
5.3 Third Step: Immediate Removal 6
6. Drug and Alcohol Free Workplace Program 6
6.1 Subcontractor Drug and Alcohol Free Workplace Program Scope 7
6.2 Drug and Alcohol Testing 7
6.3 Random Drug and Alcohol Testing 8
6.4 Reasonable Cause and Post Incident Drug and Alcohol Testing 8
6.5 Follow up Testing 9
6.6 Mandatory Disclosure 9
6.7 Accommodation 9
6.8 Ensuring Compliance 10
6.9 Positive Test Results 10
6.10 Financial Obligations 10
6.11 Subcontractor Non-Compliance 11
7. Training Requirements 11
7.1 New-Hire Safety Orientation 11
7.2 First Aid/CPR 11
7.3 Workplace Hazardous Materials Information System (WHMIS) 11
7.4 Transportation of Dangerous Goods (TDG) 11
7.5 Confined Space Entry 12
7.6 Equipment Training 12
7.7 Hazard Specific Training 12
7.8 Foreman Training/Meetings 12
7.9 Subcontractor Assistance 12
7.10 Training/Meeting Matrix 12
8. Meeting Requirements 13
8.1 Vestas - CWT Weekly Safety Meeting 13
8.2 Subcontractor Weekly Tailgate/Tool Box Safety Meeting 13
8.3 Training/Meeting Matrix 13
9. Documentation 13
9.1 Daily Injury and Illness Reporting 13

T09 0008-7999 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

9.2 First Aid Log 13
9.3 Incident Report 13
9.4 Weekly Safety Meeting Minutes 13
9.5 Material Safety Data Sheets (MSDS) 14
9.6 Phased Safety Plan 14
9.7 Daily Diaries 14

10. Incident, Injury and Emergency Procedures 14
10.1 Incidents and Injury Reporting 14
10.2 Medical Treatment 14
10.3 Early Return to Work 15
10.4 Incident Investigation, Review and Report Out 15
10.5 Injury Management 15
10.6 Emergency Response Plan 15

11. Personal Protective Equipment 15

12. Fall Protection 16

13. Housekeeping 17

14. Additional Program Requirements 17

15. Attachments 19
15.1 Attachment S-1 - Subcontractor Checklist 20
15.2 Attachment S-2 - Training/Meeting Matrix 21
15.3 Attachment S-3 - Job Hazard Analysis 22
15.4 Attachment S-4 - Subcontractor Daily Job Diary 23
15.5 Attachment S-5 - Environmental, Health & Safety (EHS) Orientation Checklist 24
15.6 Attachment S-6 - Exhibit "S" Subcontractor Acknowledgement and Agreement 26

16. History of this Document 27

T09 0008-7999 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

1. Environmental, Health & Safety (EHS) Goals and Expectations

Vestas - Canadian Wind Technology, Inc. expects and requires that the subcontractor develop and implement EHS programs and management systems that accomplish the following:

- Encourage, promote, and establish goals and expectations that the subcontractor and its subcontractors, suppliers, and all their respective employees, agents and representatives will enter into this project with a desire to create and maintain an Injury Free Workplace and a working environment that recognizes the well-being of the people working at the project site and the need to protect the environment from activities at the project site;
- Establish and maintain management commitment, resources, training, site supervision and personnel that not only provide quality work, but also place the safety and well being of the people working at the project site and the protection of the environment from activities at the project site on an uncompromisable standard;
- The subcontractor shall comply with the suggestions and requirements set forth in these Subcontractor Environmental, Health and Safety Requirements (herein "Exhibit "S"). The subcontractor is further obligated and responsible to ensure its employees and representatives that enter onto the project site, embrace the above goals and expectations, and comply with the requirements set forth in this document;
- Subcontractor non-compliance with this document may result in cancellation, termination, or suspension of the subcontract, in whole or in part, and allow Vestas - Canadian Wind Technology, Inc. to complete the work at the subcontractor's cost;
- The subcontractor shall include the provisions of Exhibit "S" in every subcontract with its subcontractors, and its subcontractors shall extend this requirement to their subcontractors; and
- At minimum, the subcontractor environmental, health and safety programs shall meet or exceed the requirements outlined in this document. Where conflicts occur, the most stringent provision shall apply.

2. Federal and Provincial Health & Safety Compliance

The subcontractor, and its employees and representatives, will comply with all applicable federal and provincial environmental, health and safety legislation applicable to the project location.

(Note: When the above standards are exceeded by Vestas - CWT in this Exhibit "S", and/or in other Vestas - CWT environmental, health and safety practices and procedures, the subcontractor, and its employees and representatives, will comply with those higher standards.)

T09 0008-7999 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

3. Site Safety Representative

3.1 Subcontractors performing work at the project site, with less than ten employees will designate a Site Safety Representative. The assigned Safety Representative may be a supervisor, foreman, or working member of the crew. This Safety Representative is directly responsible for implementing and maintaining the project site-specific subcontractor environmental, health and safety programs (see section 4.0), which are designed to meet the goals and expectations of, and the suggestions and requirements set forth in these Subcontractor Environmental, Health & Safety Requirements. At minimum, the Safety Representative is authorized to stop work when an imminent danger situation exists. Additionally, this person may be authorized to implement changes regarding the subcontractor environmental, health and safety programs and their administration, quality of life issues, unsafe acts and conditions, employee non-compliance, disciplinary and last chance programs.

3.2 When a subcontractor has ten or more employees on the project site, in addition to the requirements in paragraph 3.1, a subcontractor safety professional will be available to respond to project safety and health issues. This safety professional, which may be the subcontractor's safety director, manager or safety consultant, is not required to be on site full time. The safety professional's responsibility includes assisting the subcontractor's site superintendent or general foreman, and site safety representative in implementing and maintaining the site-specific subcontractor environmental, health and safety process, designed to meet the goals, expectations, and requirements outlined in this document. Vestas - CWT prior to subcontractor's start-up of work will provide the safety professional's point of contact information.

3.3 The subcontractor safety representative shall provide quality safety training programs for subcontractor employees and representatives, and implement protective measures to prevent damage, injury, or loss to its employees and representatives performing work at the project site, as well as other impacted persons in the subcontractor's area of responsibility.

3.4 If the project requires the staffing of a full-time subcontractor safety representative, the qualifications of the selected individual will be submitted in writing to the Vestas Safety Manager. If during the course of work in the project site, the subcontractor's safety representative is not carrying out his/her obligations to ensure compliance with the subcontractor's environmental, health and safety programs and/or the requirements in Vestas Exhibit "S" (this document), Vestas will report the matter to the subcontractor. The subcontractor shall then take immediate corrective action to ensure its safety representative carries out his/her duties and responsibilities as required by this document.

3.5 Should the unsatisfactory performance continue, Vestas will direct the subcontractor to replace its safety representative.

T09 0008-7999 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

4. Program Policies, Practices and Procedures

4.1 The subcontractor shall develop and enforce environmental, health and safety requirements, policies, practices and procedures for the subcontractor's employees and representatives that encourage, promote, and establish an injury free workplace. Such programs shall include the enhancement of worker quality of life issues and the protection and preservation of the environment from the construction process on the project site.

4.2 To attain this high level of performance, the subcontractor shall train and review its employees and representatives with the requirements of Exhibit "S" and the subcontractor's environmental, health and safety practices and procedures. The subcontractor environmental, health and safety process will include those programs necessary to perform injury free work and comply with federal and provincial legislation. As minimum requirements, the subcontractor will provide procedures and training, and ensure compliance with the environmental, health and safety practices and procedures noted and initialed on the Subcontractor Checklist (Refer to Attachment S-1).

4.3 The subcontractor shall review and integrate the required task specific programs as outlined in the Subcontractor Checklist, into their site environmental, health and safety process. All applicable programs shall comply with federal and provincial legislation, and Vestas - CWT construction environmental, health and safety practices and procedures.

4.4 The subcontractor shall provide employees with training in hazard recognition and identification and the authorization necessary for them to take immediate corrective action of noted unsafe practices and/or conditions.

5. EH&S Discipline Policy

The subcontractor, its employees and representatives, are required to comply with all aspects of Exhibit "S", the Subcontractor Environmental, Health & Safety Requirements. Failure of the subcontractor, its employees and representatives to adhere to, and comply with, the Exhibit "S" requirements, will subject such persons to the environmental, health and safety (EHS) site discipline policy. The EHS discipline policy will utilize a three-step process for minor infractions. The three steps of the process are outlined below.

5.1 First Step: Verbal Warning

The verbal warning shall be considered administered upon acknowledgement and signing of this contract. This warning shall be communicated by the subcontractor to all its employees and representatives prior to commencing work on the project. The verbal warning will again be communicated, and acknowledgement documented, during the subcontractor employee and representative site orientation.

T09 0008-7999 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

5.2 Second Step: Written Warning

The second step in the process is the written warning by the subcontractor to its employee and/or representative. A copy of the written warning will be submitted to the Vestas construction manager for review and appropriate action. Such action by Vestas construction manager, may result in, but not limited to, employee and/or representative re-orientation and/or retraining, removal from the project or other appropriate action as deemed necessary:

- Re-orientation and re-training will be conducted by the subcontractor and be attended by both the violator and his/her supervisor or foreman;
- This re-orientation and re-training will provide the employee and/or representative with a review of the environmental, health and safety practices and procedures to ensure an injury free workplace.

5.3 Third Step: Immediate Removal

Repeat of minor or major infractions will result in the immediate removal of the violator from the project site.

- Vestas reserves the right to demand the removal of a subcontractor employee or representative, for the violation of an environmental, health and safety standard, resulting in imminent danger to the employee and/or others.
- Immediate removal from the project site may include transfer, suspension, or termination of the employee, depending upon the severity of the violation;
- Upon determination for immediate removal, it is the subcontractor's responsibility to expeditiously remove the employee from the project site, with a minimum impact on the order and production of the project;
- Any supervisor, general foreman, superintendent, or construction manager who forces or directs any employee to violate an environmental, health and safety practice and/or procedure, will be removed from the project.

6. Drug and Alcohol Free Workplace Program

The inappropriate use of alcohol or drugs can have serious adverse effects on a person's health, safety and job performance. Safety is of prime consideration for both Vestas - CWT and its subcontractors; however, the need for safety must be balanced against the requirement that employees not be discriminated against on the basis of a prohibited ground of discrimination. Workplace rules and standards that have no demonstrable relationship to job safety and performance have been found to be in violation of an employee's human rights. The subcontractor is responsible to ensure it has its own Drug and Alcohol Free Workplace Program in place, prior to performing work for Vestas - CWT.

The Canadian Human Rights Act prohibits discrimination on the basis of disability and perceived disability. A disability would include those workers with a previous or existing dependence on alcohol or a drug. A perceived disability may include an employer's perception that a person's use of alcohol or drugs makes him or her unfit to work.

T09 0008-7999 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

The Canadian Human Rights Commission view drug testing as generally not accepted, because it does not assess the effect of the drug use on performance. Available drug tests do not measure impairment, how much or when it was used. They can only accurately determine past drug exposure. Therefore, a drug test is not a reliable means of determining whether a person is or is not capable of performing the essential requirements or duties of their position. That said, alcohol testing may be acceptable in some cases, because a properly administered breathalyzer is a minimally intrusive and accurate measure of both consumption of alcohol and actual impairment. The subcontractor must be able to accommodate the needs for those that test positive.

6.1 Subcontractor Drug and Alcohol Free Workplace Program Scope

Subcontractors will ensure all their employees and representatives performing work on the project site, are drug and alcohol free. To support the intent of Vestas - CWT's drug and alcohol free workplace, the subcontractor will have an internal written substance abuse program, which addresses, at minimum, the guidelines and requirements outlined below. Vestas drug and alcohol free workplace administrator will review, approve and file the subcontractor program prior to the commencement of any work on the project site.

Note: The subcontractor shall include the provisions of this Drug and Alcohol Free Workplace Program requirement in every subcontract and require that his subcontractors include it in their contracts so that such provisions will be binding upon each subcontractor.

6.2 Drug and Alcohol Testing

The following types of testing are to be included in the subcontractor's drug and alcohol testing program:

- Random alcohol testing of employees in safety sensitive positions: Alcohol testing has been found to be a reasonable requirement because alcohol testing can indicate actual impairment of ability to perform or fulfill the essential duties or requirements of the job. Random drug testing is prohibited because, given its technical limitations, this form of testing can detect only the presence of drugs and not if or when an employee may have been impaired by drug use;
- Drug or alcohol testing for "reasonable cause" or post incident: Where there are reasonable grounds to believe there is an underlying problem of substance abuse, or where an accident has occurred due to impairment from drugs or alcohol, provided that testing is part of a broader program of medical assessment, monitoring and support;
- Periodic or random testing following disclosure of a current drug or alcohol dependency or abuse problem may be acceptable if tailored to individual circumstances and as part of a broader program of monitoring and support; and
- Mandatory disclosure of present or past drug or alcohol dependency or abuse may be permissible for employees holding safety sensitive positions, within certain limits, and in concert with accommodation measures. Generally, employees not in safety sensitive positions should not be required to disclose past drug alcohol or drug problems.

T09 0008-7999 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

A safety sensitive position is one in which incapacity due to drug or alcohol impairment could result in direct and significant risk of injury to the employee, others or the environment. Safety sensitive positions are defined as 'Occupational positions which are deemed acutely sensitive to safety considerations such as Wind Turbine Generator (WTG) Technicians and tower construction crews, etc'.

The following types of drug and alcohol testing are not acceptable and are not to be conducted by the subcontractor:

- Pre-employment drug testing;
- Pre-employment alcohol testing;
- Random drug testing; and
- Random alcohol testing of employees in non-safety sensitive positions.

6.3 Random Drug and Alcohol Testing

Random drug testing is not acceptable, whether an employee holds a safety sensitive position or not. Since a positive drug test cannot measure present impairment and can only confirm that a person has been exposed to drugs at some point in the past, it cannot identify if a person was impaired on the job.

Alternate methods should be considered other than drug and alcohol testing such as awareness, education and rehabilitation. Enhanced supervision and peer monitoring are the most effective ways of ensuring that performance issues associated with drug and alcohol use are detected and resolved.

Random alcohol testing is permissible for employees in safety sensitive positions as long as employees are notified that this alcohol testing is a condition of employment. Subcontractors must meet the duty to accommodate these safety sensitive employees who test positive to a random alcohol test. Random alcohol testing for workers in a non-safety sensitive position is not acceptable. Unless the subcontractor has reasonable cause to believe the employee is unfit to conduct their job as a result of alcohol use, a subcontractor cannot demonstrate that it is reasonably necessary to administer breathalyzer tests to ensure effective job performance.

6.4 Reasonable Cause and Post Incident Drug and Alcohol Testing

Reasonable cause and post incident drug and alcohol testing may be permissible in a safety sensitive environment. Should an employee report for work and there are reasonable grounds to believe there is an underlying problem of substance abuse, or post incident, testing is reasonably necessary in risk sensitive environments, if this testing is part of a broader program of medical assessment, monitoring and support. This testing should be conducted as soon as reasonably practical, but not where there is evidence that the act or omission of the employee could not have been a contributing factor to the incident (e.g., structural or mechanical failure).

Reasonable cause and post incident drug and alcohol testing of employees in non-safety sensitive positions should be considered only if the employee's on the job behaviour provide reasonable grounds to believe he or she is impaired by drugs and alcohol. An employer would have to show that, in a particular employee's case, the circumstances were such that no other means were possible, short of undue hardship to the subcontractor, to ensure the accomplishment of a legitimate objective such as workplace safety.

T09 0008-7999 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

6.5 Follow up Testing

Following disclosure of a substance abuse or dependency problem, periodic or random testing is permissible as long as it is tailored to individual circumstances, and is part of a broader program of monitoring, rehabilitation and support. Usually the designated rehabilitation provider will determine whether follow up testing is necessary for a particular individual.

6.6 Mandatory Disclosure

Employees working in safety sensitive positions can be asked to disclose current substance abuse problems, as well as past problems with drugs or alcohol within the last 5 years. Automatic dismissal or refusal to employ an individual based on a disclosure of past or present dependency on drugs or alcohol is not in keeping with the Canadian Human Rights Act. The subcontractor must accommodate the individual to the point of undue hardship. Failure of an individual to disclose a substance abuse problem should also not be grounds for dismissal as denial is a symptom of addiction.

Generally, employees in non-safety sensitive positions need not disclose past dependency on alcohol or drugs unless an employer can show that, in a particular employee's case, the circumstances were such that no other means were possible, short of undue hardship to the subcontractor, to ensure the accomplishment of a legitimate objective such as workplace safety.

6.7 Accommodation

The subcontractor must temporarily remove an employee with an active or recently active substance abuse problem from a safety sensitive position and reassignment is not acceptable. In circumstance in which testing is justified, employees who test positive must be accommodated to the point of undue hardship. Accommodation should include the necessary support to permit the employee to undergo treatment or a rehabilitation program, and consideration of sanctions less severe than dismissal. The subcontractor will be relieved of the duty to accommodate the individual needs of the alcohol or drug dependent employee only if the employer can show that:

- The cost of accommodation would alter the nature or affect the viability of the subcontractor, or
- Notwithstanding the accommodation efforts, health or safety risks to workers or members of the public are so serious that they outweigh the benefits of providing individualized accommodation or consideration to a worker with an addiction or a dependency problem.

Once rehabilitation has been successfully completed, the employee should be returned to their position. Follow up testing may be a condition of continued employment where safety continues to be of fundamental importance. If follow up testing reveals continuing drug or alcohol use, further subcontractor action up to dismissal may be justified.

T09 0008-7999 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

If a subcontractor has reasonable cause to believe an employee is abusing drugs or alcohol or an employee tests positive and refuses treatment, this in itself does not constitute undue hardship or justify immediate dismissal of the employee. The subcontractor needs to demonstrate through progressive discipline that the employee has been warned and is unable to perform the essential requirements of his or her position.

6.8 Ensuring Compliance

In the limited circumstances where drug and alcohol testing may be considered a valid requirement of the job, the following elements should be considered:

- Does the subcontractor notify applicants of this requirement at the time that an offer of employment is made? The circumstances under which testing may be required should be made clear to employees and applicants.
- Are drug and alcohol samples collected by accredited individuals, and are the test results analyzed by a certified laboratory?
- Are procedures in place to ensure that a health care professional review the results with the employee or applicant concerned? All confirmed positive test results should be evaluated to determine if there is an explanation for the positive test result other than substance abuse. An affected individual or employee should have the right to submit a request to have their sample re-tested by an accredited laboratory should the original results be in dispute.
- Are procedures in place to ensure confidentiality of the results? Any records concerning drug and alcohol tests should be kept in a separate confidential file away from other employee records.

6.9 Positive Test Results

Any subcontractor employee or representative, whose drug screen results indicate a positive test for substance abuse, shall be immediately removed from the project site. The subcontractor has the full responsibility to remove that employee or representative in a prompt and orderly manner:

- An employee who has been removed from the site for a positive test will not be permitted to return to work until the subcontractor's authorized Employee Assistance Program (EAP) and/or its drug free workplace counseling service have released them, in writing.
- Vestas - CWT reserves the right to deny an employee's return to work on a case-by-case basis.

6.10 Financial Obligations

All costs connected with the development, implementation and administration of the subcontractor's drug and alcohol free workplace program, will be the sole responsibility of the subcontractor. These costs include, but are not limited to the following:

- Employee pay and benefits for the time to and from the collection site;
- Transportation to and from the collection site;

T09 0008-7999 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

- Collection of the sample and laboratory analysis; and
- Other services related to the subcontractor's drug and alcohol free workplace program.

6.11 Subcontractor Non-Compliance

In the event of subcontractor non-compliance with all the conditions outlined in Section 6.0 of the Exhibit "S", the subcontract/subcontractor may be cancelled, terminated, or suspended, in whole or in part. Subsequent to this action, Vestas - CWT may complete the work and invoice the cost to the subcontractor.

7. Training Requirements

7.1 New-Hire Safety Orientation

Subcontractor employees and representative entering the site for the first time must be attend the jobsite safety orientation before that employee or representative performs any work. Every new employee will complete a Vestas - CWT Project Safety Orientation Checklist or one meeting the intent of this requirement.

7.2 First Aid/CPR

The subcontractor will designate in writing the names of employees currently trained and certified in CPR/First Aid, through an approved program.

- Training will be conducted and certified through an accredited training provider which meets provincial requirements;
- Proof of current training will be provided to Vestas - CWT; and
- The number of trained personnel must meet applicable provincial requirements.

7.3 Workplace Hazardous Materials Information System (WHMIS)

Subcontractor employees and representatives must be properly trained in, and informed of, the identification and characteristics potential health risk and hazards, and the safe use and handling of all hazardous chemicals, materials and substances they will handle and work with, or possibly come in contact with on the jobsite.

- The subcontractor shall conduct follow-up training and provide undated information with the introduction of any new hazardous chemical, material or substance to the jobsite, or as otherwise indicated.
- Vestas - CWT will be provided with copies of the subcontract WHMIS training document.

7.4 Transportation of Dangerous Goods (TDG)

The subcontractor will ensure and provide proof of current Transportation of Dangerous Goods (TDG) training to Vestas - CWT for all personnel that will be transporting hazardous goods.

T09 0008-7999 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

7.5 Confined Space Entry

The subcontractor will ensure all personnel assigned duties related to confined space entry are adequately trained in the recognition of hazards associated with the confined space and the safe performance of the assigned duties. A record of this training must be provided to Vestas - CWT.

7.6 Equipment Training

The subcontractor will ensure that personnel are adequately trained in the safe operation of the equipment that the worker is required to operate. This training includes the selection of appropriate equipment, limitations of the equipment, an operator's pre-use inspection, the use of the equipment, the operators skills required by the manufacturers specifications for the equipment, the basic mechanical and maintenance requirements of the equipment, loading and unloading of the equipment if doing so is a job requirement, and the hazards specific to the operation of the equipment at the worksite.

7.7 Hazard Specific Training

Additional training may be required by the subcontractor for any activities that are specific in nature. This type of training might include fall protection and rescue, first aid transportation, respiratory protection, all terrain vehicle, snowmobile, fire fighting, rescue and defensive driving. This training will be specific to project location and the hazards associated with the project.

7.8 Foreman Training/Meetings

Depending on the subject requirements, schedule and scope of work, subcontractor foremen/supervisors may be required to attend a weekly foremen training and/or meeting administered by Vestas - CWT.

- Training sessions and meetings will be limited to a maximum of one (1) hour per week;
- Training and meetings will primarily focus on required environmental, health and safety training, injury free workplace issues, and planning for the upcoming phases of the project.

7.9 Subcontractor Assistance

Upon written request from the subcontractor, Vestas - CWT may assist the subcontractor in training of subcontractor's employees and representatives in specific areas of environmental, health and safety to enhance the injury free workplace process. Such training will be limited to those areas deemed by Vestas - CWT to be consistent with its responsibility as CM/EPC and mutually beneficial to the general workforce.

7.10 Training/Meeting Matrix

The Vestas - CWT Training and Meeting Matrix (Refer to Attachment S-2) is provided to outline the minimum training and meeting expectations for the project. The subcontractor shall review and integrate these training and meeting expectations into their environmental safety and health program. Should additional training and meeting requirements become necessary as the project develops, Vestas - CWT will advise the subcontractor.

T09 0008-7999 Ver 01 - Approved - Exported from DMS: 2010-03-08 by ASUER

8. Meeting Requirements

8.1 Vestas - CWT Weekly Safety Meeting

In keeping with its commitment to an injury free workplace, Vestas - CWT will conduct a weekly safety meeting, which will be attended by all subcontractor employees and representatives on the project.

- The meeting will be limited to twenty (20) minutes, and
- Meetings will be conducted every Monday morning at shift start, unless the Vestas - CWT construction manager directs otherwise.

8.2 Subcontractor Weekly Tailgate/Tool Box Safety Meeting

Subcontractors will administer a separate Weekly Tailgate/Toolbox Safety Meeting, to address environmental, health and safety issues specific to their trade, scope and phase of work. The subcontractor will submit weekly to Vestas - CWT, a copy of the safety meeting minutes and the names of those in attendance.

8.3 Training/Meeting Matrix

The Vestas - CWT Training and Meeting Matrix (Refer to Attachment S-2) is provided to outline the minimum training and meeting expectations for the project. The subcontractor shall review and integrate these training and meeting expectations into their environmental, health and safety program. Should additional training and meeting requirements become necessary as the project develops, Vestas - CWT will advise the subcontractor.

9. Documentation

Each subcontractor will be required to maintain the following documentation on the jobsite and provide Vestas - CWT with copies of such records as noted below.

9.1 Daily Injury and Illness Reporting

Subcontractors shall record all injuries and illnesses resulting form incidents on the job, regardless of severity and level of subsequent treatment.

9.2 First Aid Log

A first aid injury log shall be kept on file in the subcontractor's office.

9.3 Incident Report

A Supervisor's Incident Report (SIR) shall be filed with Vestas - CWT for all incidents resulting in injury, property damage, and near misses with serious potential for either. Verbal notification of the incident shall be made immediately after the occurrence of the incident, followed by a written report submitted to Vestas - CWT within twenty-four (24) hours.

9.4 Weekly Safety Meeting Minutes

Each subcontractor will provide Vestas - CWT with a copy of the subcontractor's weekly safety meeting minutes within twenty-four (24) hours of the safety meeting.

T09 0008-7999 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

9.5 Material Safety Data Sheets (MSDS)

Subcontractor employees and representatives will not bring, come in contact with, use, move, disturb, generate, store, transport or otherwise in any way deal with hazardous substances at the project site without the prior knowledge of the Vestas - CWT construction manager. Vestas - CWT will be provided with the MSDS for all hazardous substances before the subcontractor's employees and representatives bring, move, disturb, generate, store, transport or otherwise deal with any such substances at the project site. The subcontractor will keep an active file of all Material Safety Data Sheets (MSDS) used by that subcontractor.

9.6 Phased Safety Plan

Vestas - CWT requires a phased safety plan to be developed for the project by the subcontractor. The subcontractor must submit the safety plan to Vestas - CWT prior to starting work.

- **Job Hazard Analysis (JHA)**
  This process and format (refer to Attachment S-3) will be used to identify the steps of the job, inherent hazards and a description of how the work will be performed safely. The subcontractor will utilize the JHA to train all affected workers prior to commencing working. JHAs will be submitted to Vestas - CWT for review and approval.
- **Pre-Task Planning (PTP)**
  Using the JHA, pre-task planning shall be conducted daily by the supervisor and crew, to further identify the current task, working conditions and preventive measures to protect workers.

9.7 Daily Diaries

A Subcontractor Daily Job Diary (refer to Attachment S-4) shall be completed and submitted to Vestas - CWT on a daily basis by the supervisor/foreman of each crew working on the project. The report consists of total manpower, man-hours worked, limitations to performance of work, location of work and safety issues noted.

10. Incident, Injury and Emergency Procedures

10.1 Incidents and Injury Reporting

Subcontractors shall immediately report to Vestas - CWT, all incidents and injuries affecting their employees and representatives. Any first aid services will be recorded on the subcontractor's Daily First Aid Log.

10.2 Medical Treatment

The subcontractor is responsible to ensure an injured worker requiring medical treatment is provided with transportation to and from the medical facility. The subcontractor may use its medical provider of choice unless Vestas - CWT construction manager determines otherwise.

T09 0008-7999 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

10.3 Early Return to Work

The subcontractor will cooperate to the fullest extent possible with Vestas - CWT's modified work/light duty program. All subcontractors shall develop and maintain an Early Return to Work Program that meets or exceeds Vestas - CWT's Program.

10.4 Incident Investigation, Review and Report Out

Incidents will be investigated and reviewed by Vestas - CWT and the subcontractor. At minimum, the chronology of events, contributing factors, root cause, and corrective action plan will be outlined and reported. A final report will be submitted to Vestas - CWT within twenty-four (24) hours of the incident. If information is lacking, a preliminary report will be filed.

10.5 Injury Management

The subcontractor shall assist Vestas - CWT in all areas of injury management, with the greatest emphasis placed on incident prevention. A proactive approach and total acceptance of the injury free workplace philosophy and process is the key focus.

10.6 Emergency Response Plan

The subcontractor must have in place a written emergency response plan for responding to an emergency that may require rescue or evacuation. This emergency response plan must describe the emergency procedures to be followed until emergency services arrive at the worksite. This emergency response plan must be communicated to all workers and simulated exercises will be held appropriate for the types of emergencies reasonably likely to occur at the worksite.

11. Personal Protective Equipment

Vestas - CWT personal protection equipment (PPE) requirements apply to the subcontractor, and all its employees, lower tier contractors, vendors, suppliers, and visitors. (**Note:** The subcontractor is solely responsible for providing all its employees and representatives with the appropriate site required personal protective equipment. Vestas - CWT will not provide PPE to the subcontractor's employees and representatives.)

- **Clothing** - Full length, non-cuffed pants will be worn. No shirts with sleeve length less than "T" shirt length will be worn at all times.
- **Footwear** - Over the ankle, sturdy, work boots made of leather and/or other substantial synthetic materials, will be worn at all times. Should steel toes and/or other special safety features be required, Vestas - CWT will notify the subcontractor.
- **Eye Protection** - Eye protection (safety glasses) will be worn at all times. Safety glasses must meet CSA Standard Z94.3-2 requirements. Prescription lenses and frames will meet the same requirements. Job specific hazards may require additional protection to include, but not limited to, use of goggles when handling hazardous chemicals.

T09 0008-7999 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

- **Hearing Protection** - Hearing protection (ear plugs or ear muffs) will be worn by employees when working in high-noise areas and/or when operating high-noise emitting tools or equipment. On Vestas - CWT projects, high noise is defined as that which measures over 80 decibels. A noise management program is required if workers are noise exposed.
- **Head Protection** - All employees are required to wear head protection at all times, except in designated "safe areas". This includes contractors, lower tier contractors, vendors, suppliers, and visitors. Head protection must meet CSA Standard CAN/CSA-Z94.1-92.

12. Fall Protection

Vestas - CWT's Fall Protection Plan focuses on the elimination of the fall hazard as its first priority. The use of personal protective equipment (PPE) fall protection systems will be authorized only as a last resort. PPE will be utilized only after a thorough analysis of the fall hazard has been made and it is determined no other method to eliminate the hazard is feasible and/or possible.

100% Fall Protection: The subcontractor will provide 100% fall protection to its workers when they are exposed to a potential fall of over 3 metres (10 feet). There are no exceptions to this requirement.

Fall Protection Plan: When a fall potential of over 3 metres (10 feet) exists, the subcontractor will develop a fall protection plan which addresses how the worker will be protected from exposure.

Engineering and Administrative Controls: The subcontractor fall protection plan will first take into consideration preventive measures such as standard guarding, boom scissor lifts, scaffolding, and other methods of protection before resorting to PPE systems.

Personal Protective Equipment: When all other protection systems have been considered and found not to be feasible, the exposed workers will wear PPE. Whether in a restraint or fall arrest mode, an approved full body harness will be worn. Safety belts are not approved for use on Vestas - CWT projects.

- Fall "restraint" is the preferred method of fall protection when a harness is worn; the fall arrest method is the last resort in all fall protection plans.
- An approved lanyard will be secured to a rigged restraint line and/or anchor point.
- Lanyard hooks must be the double-lock type.

Training: The worker will be trained on fall protection issues, to include the proper care, wear and use of personal protective equipment, specifically the harness, lanyard and other equipment used for fall restraint and arrest applications.

- The worker shall be made aware of his/her obligation to wear and use a full body harness and associated equipment when the work task dictates;
- A worker observed not tying off at all times, will be subject to immediate removal from the site;
- The worker will acknowledge their understanding of this policy, and responsibility to work accordingly, by signing a statement to that effect.

T09 0008-7999 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

13. Housekeeping

Good housekeeping is essential to the success of Vestas - CWT's injury free workplace. A neat and clean jobsite prevents incidents that result in injury. The subcontractor in partnership with Vestas - CWT, is responsible for maintaining the worksite in a clean/safe condition.

Daily Requirement: The subcontractor will perform housekeeping on a continual basis and will ensure its work areas are kept free from construction debris in accordance with the project *housekeeping requirements.*

14. Additional Program Requirements

Overhead Work: Controlled access zones will be established where overhead work is underway, to ensure workers are not exposed to falling equipment or material. Substantial barricades will be installed and signs posted to prevent workers or general public from entering these controlled access zones inadvertently.
Electrical Safety: Temporary GFCI systems shall be utilized to eliminate electrical shock hazards.

- Electrical cords and equipment shall be grounded or bonded in accordance with the standards *outlined in federal and provincial legislation, and*

- Electrical equipment shall be visually inspected daily for external defects. Equipment found to be in need of repair shall be removed from service until repaired and tested.

Hazardous Chemicals and Materials: The subcontractor is responsible for the procurement, transport, storage, handling, use, and disposal of all hazardous chemicals and/or materials required to perform its scope of work. When possible, the subcontractor shall substitute and utilize a less hazardous chemical and/or material to minimize potential exposure to employees and the environment. Additionally, the subcontractor shall comply with the following guidelines:

- Notify Vestas - CWT prior to bringing a hazardous chemical and/or material on the project site;
- Provide Vestas - CWT with a corresponding and current Material Safety Data Sheet (MSDS);
- Identify the contents of all containers and label accordingly;
- Train employees in the safe use and handling of the hazardous chemical and/or material;
- Develop a spill containment and cleanup procedure. Train affected employees; and
- Store flammable liquids in quantities over 5 gallons in a designated storage area.

Hazardous and Non-Hazardous Waste Control: The subcontractor shall ensure proper handling and disposal of all hazardous and non-hazardous waste. Recycling of non-hazardous waste is *encouraged and where possible separation of metal, wood, cardboard, and other recyclable* material will be performed. Additionally, the subcontractor shall comply with the following guidelines:

- Remove all non-hazardous waste from the work area daily and dispose in designated containers;

T09 0008-7999 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

- Store and dispose of hazardous waste in accordance with federal and provincial legislation; and
- Collect and remove all hazardous and non-hazardous waste, and/or unused chemicals and materials, from the project site prior to completion of work and departure from the site.

Fire Prevention and Protection: The subcontractor shall provide adequate fire prevention and protection procedures and equipment to protect workers and property. Fire prevention methods, such as good housekeeping, will be the first line of defence against fire.

- The subcontractor will notify the Vestas - CWT construction coordinator of any fire in its area of operation immediately, even if it has been contained and extinguished;
- Fire extinguishers must be of the appropriate size and fire retardant to provide effective protection for the fire hazard present; and
- In addition to fire protection equipment, the subcontractor will provide a designated fire-watch for all related hot work activities.

T09 0008-7999 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

15. Attachments

- ☐ **Attachment S-1** - Subcontractor Checklist
- ☐ **Attachment S-2** - Training/Meeting Matrix
- ☐ **Attachment S-3** - *Job Hazard Analysis*
- ☐ **Attachment S-4** - Subcontractor Daily Job Diary
- ☐ **Attachment S-5** - Environmental, Health & Safety (EHS) Orientation Checklist
- ☐ **Attachment S-6** - Exhibit "S" Subcontractor Acknowledgement and Agreement

T09 0008-7999 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

Environmental, Health & Safety Practices and Procedures

15.1 Attachment S-1 - Subcontractor Checklist

- ❑ Airborne Contaminant Control
- ❑ Barricading and Safety Signage
- ❑ Confined Space Entry Code of Practice
- ❑ Cranes, Hoist and Rigging
- ❑ Operations
- ❑ Disciplinary Policy
- ❑ Drug and Alcohol Free Workplace
- ❑ Environmental Protection
- ❑ Ergonomics and Body Mechanics
- ❑ Equipment and Power Tool Safety
- ❑ Excavation and Trenching
- ❑ Fall Protection and Prevention
- ❑ First Aid and Medical Treatment
- ❑ Hearing Conservation
- ❑ Hazardous Energy Lockout/Tagout
- ❑ Working Alone
- ❑ Housekeeping
- ❑ Hot Work (Electrical)
- ❑ Hot Work (Non-Electrical)
- ❑ Incident Emergency Response
- ❑ Incident Reporting and Review
- ❑ Ladder/Scaffolding/Aerial Lifts
- ❑ Material Handling (Hazardous)
- ❑ Material Handling (Non-Hazardous)
- ❑ Personal Protective Equipment (PPE)
- ❑ Respiratory Protection Code of Practice
- ❑ Safety Audits and Inspections
- ❑ Vehicle and Equipment Traffic Control
- ❑ Waste Management (Hazardous)
- ❑ Waste Management (Non-Hazardous)
- ❑ Workplace Hazardous Materials Information Systems (WHMIS)

T09 0008-7999 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

Environmental, Health & Safety Practices and Procedures

15.2 Attachment S-2 - Training/Meeting Matrix

Training	Time Frame	Frequency	Personnel
Safety orientation	1 to 2 hours	Once	All employees
First aid/CPR training	8 hours	Once	All foremen, superintendents, safety reps and additional as required by legislation.
Workplace Hazardous Materials Information training - by subcontractor	1 hour	As necessary	Subcontractor employees and other personnel that may be exposed to hazardous materials
Transportation of Dangerous Goods (TDG)	8 Hours	Every 3 Years	Employees transporting dangerous goods
Confined space entry training	8 hours	Every 3 years	All personnel assigned duties related to confined space entry
Equipment training	Varies depending upon equipment	Varies depending upon equipment	All personnel operating equipment
Hazard/Task specific	2-8 hours	As necessary	All employees

Meetings	Time Frame	Frequency	Personnel
Foremen training/meetings	1 hour	Weekly	All foremen and superintendents
Pre-task planning	20 minutes	Daily	All field personnel
Safety walks audit	1 hour	Weekly	All foremen, superintendents, pm
Vestas - CWT weekly safety meeting	20 minutes	Weekly	All personnel
Subcontractors safety meeting	20 minutes	Weekly	All subcontractors field personnel
Schedule meeting	1 hour	Weekly	All superintendents, GF
Safety leadership team	2 hours	Monthly	Senior managers
Incident review	1 to 4 hours	For every incident and near miss	All foremen, superintendent, safety representative and personnel involved

T09 0008-7999 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

15.3 Attachment S-3 - Job Hazard Analysis

Project: _____ **Subcontractor:** _____

Phase/Job: _____ **Location:** _____

Start Date: _____ **Est. End Date:** _____

Operation/Task:	Hazard:	Action Required:

T09 0008-7999 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

15.4 Attachment S-4 - Subcontractor Daily Job Diary

Work Date:	**Day of Week:**
Company Name:	
Location of Work:	
Hindrance to Work Progress:	
Total Workers on Site:	**Total Man-hours:**
Incident(s):	
Description:	
Injury(ies):	
Reported By:	
Site Phone Number:	

T09 0008-7999 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

15.5 Attachment S-5 - Environmental, Health & Safety (EHS) Orientation Checklist

Employee: (Print) _____

Date: _____

Company: _____

Logistics

- ❑ Parking
- ❑ Lunch areas
- ❑ Restroom facilities
- ❑ Job phone numbers
- ❑ First aid stations
- ❑ Weather
- ❑ Working times
- ❑ Harassment
- ❑ Smoking/chewing
- ❑ Safe work zones

Injury Free Workplace

- ❑ Vestas-AWT Mission Statement
- ❑ Injury free philosophy
- ❑ *Pre-task planning (PTP)*
- ❑ Risk assessments (JHA)
- ❑ Incident review process
- ❑ Drug and alcohol free workplace
- ❑ Employee motivation/recognition
- ❑ Management involvement
- ❑ *Communication*
- ❑ Training requirements
- ❑ Discipline

Safety Meetings/Audits

- ❑ Daily safety audits
- ❑ Incident reviews
- ❑ Safety self assessment (SSA)
- ❑ Safety committee meeting (Monthly)
- ❑ Project safety leader team (SLT)
- ❑ Vestas - CWT safety leadership team
- ❑ Daily tailgate safety meetings
- ❑ Weekly safety meetings

Incident/Accident/Near Miss Reporting

- ❑ Correct and/or report all safety concerns and hazards immediately!!
- ❑ *Report near misses, accidents, incidents, and* all first aids
- ❑ Report all injuries to your supervisor
- ❑ Fire
- ❑ Emergency response plan
- ❑ Serious injuries - call 911
- ❑ *Site specific radio/phone procedures*
- ❑ Evacuation and assembly area
- ❑ Spills - leaking equipment/containers/environment

T09 0008-7999 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

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Canadian Subcontractor Requirements

Personal Protective Equipment (PPE)

- ❑ Head Protection (Hardhats)
- ❑ Eye Protection (Safety Glasses)
- ❑ Hand Protection (Appropriate Gloves)
- ❑ Foot Protection (Work Boots)
- ❑ Reflective Vests (as required) Sleeved Shirts
- ❑ Respiratory Protection

Workplace Hazardous Materials Information System

- ❑ Location of hazardous materials
- ❑ Physical and health hazards
- ❑ Recognizing overexposure or emergency
- ❑ Understanding MSDSs
- ❑ Personal protective equipment
- ❑ Location of MSDSs

Personal Fall Protection

- ❑ No exposure to a fall of 3 meters (10 feet) or greater
- ❑ Use of full body safety harness only - no body belts
- ❑ Ladder safety
- ❑ Failure to comply with Vestas - CWT fall protection requirements is subject to immediate termination/removal from jobsite

Specific Job Hazard Requirements

- ❑ First aid/CPR and blood-borne pathogens
- ❑ Housekeeping
- ❑ *Assured equipment grounding - GFCI*
- ❑ Lockout/tagout
- ❑ Operators of all mobile equipment must be trained, qualified, and carded. i.e., forklifts, articulating lifts, cranes
- ❑ Traffic
- ❑ Work zone safety caution tape/danger tape
- ❑ *Hot work/confined space*
- ❑ Material lifting

Employee Signature: _____ **Date:** _____

Supervisor Signature: _____ **Date:** _____

T09 0008-7999 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

15.6 Attachment S-6 - Exhibit "S" Subcontractor Acknowledgement and Agreement

Vestas - CWT Project Name_____ **Project #**_____

The subcontractor, _____, has a subcontract with Vestas - Canadian Wind Technology, Inc. to perform certain specific labour in this project. Said subcontractor is require to ensure all its employees, subcontractors, suppliers, agents and representatives performing labour in this project, comply with this Exhibit "S" (Subcontractor Environmental, Health & Safety Requirements) in its entirety.

The subcontractor has read and understands the conditions outlined herein. Further, the subcontractor agrees to be bound by, and comply with, all terms and provisions, and assumes the responsibility for all associated costs to implement these requirements.

The subcontractor agrees to inform its crew(s) actually performing the work, of the contents of Exhibit "S" and this agreement prior to reporting to work on the project.

Accepted and Agreed to this_____ Day of _____

Vestas - Canadian Wind Technology, Inc.	_____
Contractor	Subcontractor
By _____	By _____
Name of Vestas - CWT Representative	Name of Subcontractor Representative
_____	_____
Title	Title

T09 0008-7999 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

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T09 0008-7999 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

Contents

Introduction 3

1. Federal and State OSHA Compliance 4

2. Site Safety Representative 4

3. Program Policies, Practices and Procedures 5

4. EHS Discipline Policy 6

5. Drug Free Workplace Program 7

5.1 Subcontractor Drug Free Workplace Program Scope 7

5.2 Testing Frequency and Methods 7

5.3 Program Minimum Test Panel Standards 7

5.4 Drug Testing Cut-off Levels: 8

5.5 Pre-Construction Verification Requirements 8

5.6 Incidents and Reasonable Suspicion 8

5.7 Positive Test Results 9

5.8 Financial Obligations 9

5.9 Subcontractor Non-Compliance 9

6. Training Requirements 9

6.1 New-Hire Safety Orientation 9

6.2 Drug Free Workplace Testing 9

6.3 First Aid/CPR 10

6.4 Hazard Communication (Haz-Com) 10

6.5 Foreman Training/Meetings 10

6.6 Subcontractor Assistance 10

7. Meeting Requirements 10

7.1 Training/Meeting Matrix 10

7.2 Vestas-AWT Weekly Safety Meeting 12

7.3 Subcontractor Weekly Tailgate/Tool Box Safety Meeting 12

8. Documentation 12

9. OSHA- Form 300 Log 12

9.1 Incident Report 12

9.2 Weekly Safety Meeting Minutes 12

9.3 Assured Grounding Notice 12

9.4 Material Safety Data Sheets (MSDS) 12

9.5 Phased Safety Plan 13

9.6 Daily Diaries 13

10. Incident, Injury and Emergency Procedures 13

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T09 0008-6835 Ver 02 - Approved - Exported from DMS: 2010-07-09 by ASUER

10.1 Incidents and Injury Reporting: 13
10.2 Medical Treatment: 13
10.3 Early Return to Work: ..... **Error! Bookmark not defined.** 13
10.4 Incident Investigation Review and Report-Out 13
10.5 Injury Management 14

11. Personal Protective Equipment **14**
11.1 Clothing 14
11.2 Footwear 14
11.3 Eye Protection 14
11.4 Hearing Protection 14
11.5 Head Protection 14

12. Fall Protection **15**
12.2 Fall Protection Plan 15
12.3 Engineering and Administrative Controls 15
12.4 Personal Protective Equipment 15
12.5 Training 15

13. Housekeeping **15**
13.1 Daily Requirement 16

14. Additional Program Requirements **16**
14.1 Overhead Work 16
14.2 Electrical Safety 16
Temporary GFCI systems shall be utilized to eliminate electrical shock hazards 16
14.3 Hazardous Chemicals and Materials 16
14.4 Hazardous and Non-Hazardous Waste Control 16
14.5 Fire Prevention and Protection 17

15. History of this Document **25**

T09 0008-6835 Ver 02 - Approved - Exported from DMS: 2010-07-09 by ASUER

Introduction:

Health, Safety & Environmental (HSE) Goals and Expectations

Vestas - American Wind Technology, Inc. expects and requires that Subcontractors develop and implement EHS programs and management systems that accomplish the following:

- Encourage, promote and establish goals and expectations that the Subcontractor and its subcontractors, suppliers, and all their respective employees, agents and representatives will enter into this project with a desire to create and maintain an **Injury Free Workplace** and a working environment that recognizes the well-being of the people working at the project site and the need to protect the environment from activities at the project site.
- Establish and maintain management commitment, resources, training, site supervision, and personnel that not only provide quality work, but also place the safety and well-being of the people working at the project site and the protection of the environment from activities at the project site on an **uncompromisable standard.**
- The Subcontractor shall comply with the suggestions and requirements set forth in these Subcontractor Environmental, Health, and Safety Requirements (this document). The subcontractor is further obligated and responsible to ensure its employees and representatives that enter the project site embrace the above goals and expectations and comply with the requirements set forth in this document.
- Subcontractor non-compliance with the requirements set forth in this document may result in cancellation, termination, or suspension of the subcontract, in whole or in part, and allow Vestas – American Wind Technology, Inc. To complete the work at the Subcontractors cost.
- The Subcontractor shall include the provisions of this document in every subcontract with its subcontractor's, and its subcontractors shall extend this requirement to their subcontractors.
- At minimum, the Subcontractor Environmental, Health & Safety programs shall meet or exceed the requirement outlined in this document. Where conflicts occur, the most stringent provision shall apply.

T09 0008-6835 Ver 02 - Approved - Exported from DMS: 2010-07-09 by ASUER

1. Federal and State OSHA Compliance

The Subcontractor, and its employees and representatives, will comply with all applicable Federal and State Environmental, Health & Safety regulations as outlined in 29 CFR 1910 and 1926.

- **NOTE:** When the above standards are exceeded by Vestas-AWT in this document, and/or in other Vestas-AWT Environmental, Health & Safety practices and procedures, the Subcontractor, and its employees and representatives, will comply with those higher standards.

2. Site Safety Representative

2.1 Subcontractors with less than ten employees performing work at the project site will designate a Site Safety Representative.

- The assigned Subcontractor Safety Representative may be a Supervisor, foreman or working member of the crew. This Safety Representative is directly responsible for implementing and maintaining the project site specific Subcontractor Environmental Health & Safety Programs (see section 3: Program Policies, Practices and Procedures), which are designed to meet the goals and expectations of, and the suggestions and requirements set forth in, these Subcontractor Environmental Health & Safety Requirements.
- At minimum, Safety Representative is authorized to stop work when an imminent danger situation exists. Additionally, this person may be authorized to implement changes regarding the Subcontractor Environmental, Health & Safety Programs and their administration, quality of life issues, unsafe acts and conditions, employee non-compliance, disciplinary and last chance programs.

2.2 For subcontractors with ten or more employees on the project site, in addition to the requirements in section 2.1, a Subcontractor Safety Professional will be available to respond to project Safety and Health issues.

- This Safety Professional, which may be the Subcontractor's Safety Director, Manager or Safety Consultant, is not required to be on site full time.
- The Safety Professional's responsibility includes assisting the Subcontractor's Site Superintendent/General Foreman and Site Safety Representative in implementing and maintaining the site-specific Subcontractor Environmental Health and Safety process, designed to meet the goals, expectations, and requirements outlined in this document.
- Prior to Subcontractor's start-up of work, Vestas-AWT will provide the Safety Professional's point of contact information.

2.3 The Subcontractor Safety Representative shall provide quality safety training programs for subcontractor employees and representatives, and implement protective measures to prevent damage, injury, or loss to its employees and representatives performing work at the project site, as well as other impacted persons in the Subcontractor's area of responsibility.

T09 0008-6835 Ver 02 - Approved - Exported from DMS: 2010-07-09 by ASUER

2.4 If the project requires the staffing of a full-time Subcontractor Safety Representative, the qualifications of the selected individual will be submitted in writing to Vestas-AWT.

- If during the course of work on the project site, the Subcontractor's Safety Representative is not carrying out his/her obligations to ensure compliance with the Subcontractor's Environmental, Health & Safety Programs and/or the requirements set forth in this document, Vestas-AWT will report the matter to the Subcontractor. The Subcontractor shall than take immediate corrective action to ensure its Safety Representative carries out his/her duties and responsibilities as required by this document.

2.5 Should the unsatisfactory performance continue Vestas-AWT will direct the Subcontractor to replace its Safety Representative.

3. Program Policies, Practices and Procedures

3.1 The Subcontractor shall develop and enforce Environmental, Health & Safety requirements, policies, practices, and procedures for the Subcontractor's employees and representatives that encourage, promote, and establish an Injury Free Workplace. Such programs shall include the enhancement of worker quality of life issues and the protections and preservation of the environment form the construction process on the project site.

3.2 To attain this high level of performance, the subcontractor shall train and review its employees and representatives with the requirements of this document and the Subcontractor's Environmental Health and Safety practices and procedures. The Subcontractor Environmental Health and Safety Process will include those programs necessary to perform Injury Free Work and comply with Federal and State OSHA regulations. As a minimum requirement, the Subcontractor will provide procedures and training, and ensure compliance with the Environmental, Health and Safety Practices and Procedures noted and initialed on the Subcontractor Checklist. **(Refer to Subcontractor Checklist on page 18.)**

3.3 The Subcontractor shall review and integrate the required task specific programs as outlined in the Subcontractor Checklist, into their Site Environmental Health and Safety Process. All applicable programs shall comply with Federal and State rules and regulations, and Vestas-AWT Environmental, Health and Safety practices and procedures.

3.4 The Subcontractor shall provide employees with training in hazard recognition and identification and the authorization necessary for them to take immediate corrective action of noted unsafe practices and/or conditions.

T09 0008-6835 Ver 02 - Approved - Exported from DMS: 2010-07-09 by ASUER

4. EHS Discipline Policy

The Subcontractor and its employees and representatives are required to comply with all aspects of this document.

Failure of the Subcontractor or its employees or representatives to adhere to, and comply with, the requirements of this document, will subject such persons to the Environmental, Health & Safety (EHS) site discipline policy.

The EHS discipline policy will utilize a three step process for minor infractions.

- ***1st Step - Verbal Warning:*** The verbal warning shall be considered administered upon acknowledgement and signing of this contract. This warning shall be communicated by the Subcontractor to all its employees and representatives prior to commencing work on the project. The verbal warning will again be communicated, and acknowledgement documented, during the Subcontractor employee and representative site orientation.
- ***2nd Step - Written Warning:*** The second step in the process is the written warning by the Subcontractor to its employee and/or representative. A copy of the written warning will be submitted to the Vestas-AWT Construction Manager for review and appropriate action. Such action by Vestas-AWT Construction Manager, may result in, but not limited to, employee and/or representative re-orientation and/or retraining, removal from the project or other appropriate action as deemed necessary.
  - Re-orientation and retraining will be conducted by the Subcontractor and be attended by both the violator and his/her Supervisor or Foreman.
  - This re-orientation and retraining will provide the employee and/or representative with a review of the Environmental, Health & Safety practices and procedures to ensure and Injury Free Workplace.
- ***3rd Step - Immediate Removal:*** Repeat of minor or major infractions of Vestas-AWT and/or Subcontractor Environmental Health & Safety practices and/or procedures will result in the immediate removal of the violator from the project site.
  - Vestas-AWT reserves the right to demand the removal of a Subcontractor employee or representative for the violation of any Environmental Health & Safety standard that results in imminent danger to the employee and/or others.
  - Immediate removal from the project site may include transfer, suspension, or termination of the employee, depending on the severity of the violation.
  - Upon determination for immediate removal, it is the Subcontractor's responsibility to expeditiously remove the employee from the project site, with a minimum impact on the order and production of the project.
  - Any Supervisor, General Foreman, Superintendent, or Construction Manager who forces or directs any employee to violate an Environmental, Health & Safety practice and/or procedure, will be removed from the Project.

T09 0008-6835 Ver 02 - Approved - Exported from DMS: 2010-07-09 by ASUER

VESTAS PROPRIETARY NOTICE

5. Drug Free Workplace Program

Vestas-AWT participates in a Drug Free Workplace Program, which is currently administered by a third party. The Subcontractor is responsible to ensure it has its own program in place, prior to performing work with Vestas – AWT. It should be noted that the Subcontractor cannot take part in Vestas – AWT's Drug Free Workplace Program in lieu of their own program.

5.1 Subcontractor Drug Free Workplace Program Scope

Subcontractors will ensure all their employees and representatives performing work on the project site, are drug and alcohol free. To support the intent of Vestas – AWT's Drug Free Workplace, the Subcontractor will have an internal written, substance abuse program, which addresses, at minimum, the guidelines and requirements outlined in this document. Vestas-AWT's Drug Free Workplace Administrator will review, approve, and file the Subcontractor program prior to the commencement of any work on the project site.

- **NOTE:** The Subcontractor shall include the provisions of this Drug Free Workplace program requirement in every subcontract and require that his subcontractors include it in their contracts so that such provisions will be binding upon each subcontractor.

5.2 Testing Frequency and Methods

The Subcontractor Drug Free Workplace program will provide for one of the following drug screening frequency and methods.

- **Method One: Random Drug Screening:** Employees are selected at random for testing a minimum of twice during each calendar year.
- **Method Two: Scheduled Drug Screening:** Employees are tested at minimum once every six months during a twelve-month period.

5.3 Program Minimum Test Panel Standards

The Subcontractor Drug Free Workplace program must employ the urine drug panel procedure. This procedure tests for the controlled substances listed below.

T09 0008-6835 Ver 02 - Approved - Exported from DMS: 2010-07-09 by ASUER

5.4 Drug Testing Cut-off Levels:

Substance or Class	Initial Screening Cu-toff	Confirmation Cutoff
Amphetamines	1000 ng/mL	500 ng/mL [1]
Barbiturates	200 ng/mL	200 ng/mL [2]
Cocaine	300 ng/mL	150 ng/mL
Ethanol (alcohol)	0.02 g/L	0.02 g/L [3]
	0.02 g/210 L	0.02 g/210 L [4]
Marijuana (THC)	50 ng/mL	15 ng/mL [5]
Opiates	2000 ng/mL [6]	2000/10 ng/mL [7]

[1] If methamphetamine only exceeds 500 ng/mL, specimen must also contain amphetamine at a concentration greater than or equal to 200 ng/mL

[2] Confirmation metabolite: benzoylecgonine
[3] Cut-off for alcohol in urine
[4] Cut-off for alcohol in breath
[5] Confirmation metabolite: delta-9-tetrahydrocannabinol-9-carboxylic acid
[6] Gas chromatography/mass spectrometry cut-off for codeine/morphine
[7] Confirmation cut-offs for codeine/morphine and 6-acetylmorphine

These levels are subject to change without notice based on changes in the "Procedures for Transportation Workplace Drug and Alcohol Testing Programs," 49 CFR Part 40. Other drugs may be tested for under special circumstances.

The substances and screening thresholds (cut-off values), in the Subcontractor's Drug Free Workplace program, will be consistent with the above outlined minimum requirements.

5.5 Pre-Construction Verification Requirements

Verification will be made in writing to Vestas-AWT that each of the Subcontractor's employees and representatives has been identified as drug and alcohol free prior to the commencement of work by the Subcontractor's employees and representatives. This requirement may be met in one of the following two ways.

1. Distribute drug free certification cards to each employee and representative and provide Vestas AWT with copies of each card. The card must include Subcontractor and employee/representative names, and date of current test and/or expiration date of drug free card.
2. Submit on company letterhead, a complete list of the certified drug and alcohol free employees and representatives. The listed information will include the employee/representative names, and date of current test and/or expiration date of drug free status. Vestas-AWT reserves the right to obtain additional information to confirm Subcontractor compliance.
    - **Note:** No Subcontractor employee or representative will be authorized to perform work on the project site until proof of a current and valid (within six months or less) drug screen is provided.

5.6 Incidents and Reasonable Suspicion

T09 0008-6835 Ver 02 - Approved - Exported from DMS: 2010-07-09 by ASUER

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Adequate provisions will be included in the Subcontractor Drug Free Work Place program for employee testing for drugs and alcohol:

- If an employee is involved in an incident and/or where reasonable suspicion of impairment is indicated.
- When involved in an incident resulting in injury and treatment by a physician, an employee will be tested prior to being released to return to work.
- When behavior and fitness for duty concerns are observed, and employee will be removed from the site and tested for reasonable suspicion of impairment, prior to being released to return to work.

5.7 Positive Test Results

Any Subcontractor employee or representative whose drug screen results indicate a positive test for substance abuse shall be immediately removed from the project site. The Subcontractor has the full responsibility to remove that employee or representative in a prompt and orderly manner.

- An employee who has been removed from the site for a positive test will not be permitted to return to work until the Subcontractor's authorized Employee Assistance Program (EAP) and/or its Drug Free Workplace counseling service have released him, in writing.
- Vestas-AWT reserves the right to deny an employee's return to work on a case-by-case basis.

5.8 Financial Obligations

All costs connected with the development, implementation and administration of the Subcontractor's Drug Free Workplace program, will be the sole responsibility of the Subcontractor. These costs include, but are not limited to the following:

- Employee pay and benefits for the time to and from the collection site.
- Transportation to and from the collection site.
- Collection of the sample and laboratory analysis.
- Other services related to the Subcontractor Drug Free Workplace program.

5.9 Subcontractor Non-Compliance

In the event of Subcontractor non-compliance with all the conditions outlined in Section 5, the Subcontract/Subcontractor's contract may be canceled, terminated, or suspended, in whole or in part. Subsequent to this action, Vestas-AWT may complete the work and invoice the cost to the Subcontractor.

6. Training Requirements

6.1 New-Hire Safety Orientation

Subcontractor employees and representatives entering the site for the first time must attend the jobsite safety orientation before that employee or representative performs any work. Every new employee will complete a Vestas-AWT Project Safety Orientation Checklist or one meeting the intent of this requirement.

6.2 Drug Free Workplace Testing

VESTAS PROPRIETARY NOTICE

T09 0008-6835 Ver 02 - Approved - Exported from DMS: 2010-07-09 by ASUER

As outlined in Section 5 of this document, all Subcontractor employees and representatives will be certified drug and alcohol free prior to performing work on the jobsite.

6.3 First Aid/CPR

The Subcontractor will designate in writing the name of at least one employee (for every ten employees) currently trained and certified in CPR/First Aid, through an approved program.

- Training will be conducted and certified through EMP America, American Red Cross, or other recognized programs.
- Proof of current training will be provided to Vestas – AWT.
- For each additional ten employees another employee will be designated in writing.

6.4 Hazard Communication (Haz-Com)

Subcontractors' employees and representatives must be properly trained in, and informed of, the identification and characteristics of potential health risk and hazards, and the safe use and handling of all hazardous chemicals, materials, and substances they will handle and work with, or will possibly come in contact with on the jobsite.

- The Subcontractor shall conduct follow-up training and provide undated information with the introduction of any new hazardous chemical, material, or substance to the jobsite, or as otherwise indicated.
- Vestas-AWT will be provided with copies of the Subcontractor (Haz-Com) training documentation.

6.5 Foreman Training/Meetings

Depending on the subject requirements, schedule and scope of work, Subcontractor Foremen/Supervisors may be required to attend a weekly Foremen Training and/or Meeting administered by Vestas – AWT.

- Training sessions and meetings will be limited to a maximum of one (1) hour per week.
- Training and meetings will primarily focus on required Environmental, Health & Safety training, Injury Free Workplace issues, and planning for the upcoming phases of the project.

6.6 Subcontractor Assistance

Upon written request from the Subcontractor, Vestas-AWT may assist the Subcontractor in training of Subcontractor's employees and representatives in specific areas of Environmental, Health & Safety to enhance the Injury Free Workplace process. Such training will be limited to those areas deemed by Vestas-AWT to be consistent with its responsibility as CM/EPC and mutually beneficial to the general workforce.

7. Meeting Requirements

7.1 Training/Meeting Matrix

T09 0008-6835 Ver 02 - Approved - Exported from DMS: 2010-07-09 by ASUER

VESTAS PROPRIETARY NOTICE

The Vestas-AWT Training and Meeting Matrix **(refer to Section 14.5.3 of this document)** is provided to outline the minimum training and meeting expectations for the project. The Subcontractor shall review and integrate these training and meeting expectations into their Environmental Safety and Health Program. Should additional training and meeting requirements become necessary as the project develops, Vestas will advise the Subcontractor.

T09 0008-6835 Ver 02 - Approved - Exported from DMS: 2010-07-09 by ASUER

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VESTAS PROPRIETARY NOTICE

7.2 Vestas-AWT Weekly Safety Meeting

In keeping with its commitment to an Injury Free Workplace, Vestas-AWT will conduct a weekly safety meeting which will be attended by **all** Subcontractor employees and representatives on the project.

- The meeting will be limited to 20-minutes.
- Meetings will be conducted every Monday morning at shift start, unless the Vestas-AWT Construction Manager directs otherwise.

7.3 Subcontractor Weekly Tailgate/Tool Box Safety Meeting

Subcontractors will administer a separate Weekly Tailgate/Toolbox Safety Meeting, to address Environmental, Health & Safety issues specific to their trade, scope, and phase of work. The Subcontractor will submit a copy of the safety meeting minutes and the names of those in attendance to Vestas-AWT weekly.

8. Documentation

Each subcontractor will be required to maintain the following documentation on the jobsite and provide Vestas-AWT with copies of such records as noted below.

Daily Injury and Illness Reporting: Subcontractors shall record all injuries and illnesses resulting from incidents on the job, regardless of severity and level of subsequent treatment.

9. OSHA- Form 300 Log

OSHA Form 300 record able injury log shall be kept on file in the Subcontractor's office.

9.1 Incident Report

A Supervisors Incident Report (SIR) shall be filed with Vestas-AWT for all incidents resulting in injury, property damage, and near misses with serious potential for either. Verbal notification of the incident shall be made immediately after the occurrence of the incident, followed by a written report submitted to Vestas-AWT within 24 hours.

9.2 Weekly Safety Meeting Minutes

Each contractor will provide Vestas-AWT with a copy of the Subcontractor's weekly safety meeting minutes within twenty-four (24) hours of the safety meeting.

9.3 Assured Grounding Notice

Vestas-AWT will be provided with a notice from the Subcontractor indicating completion of the quarterly assured grounding testing of electrical equipment. The notice will be submitted within one week of completion of the testing. **(Refer to Section 14).**

9.4 Material Safety Data Sheets (MSDS)

VESTAS PROPRIETARY NOTICE

T09 0008-6835 Ver 02 - Approved - Exported from DMS: 2010-07-09 by ASUER

Subcontractor's employees and representatives will not bring, come in contact with, use, move, disturb, generate, store, transport or otherwise in any way deal with hazardous substances at the project site without the prior knowledge of the Vestas-AWT Construction Manager.

- Vestas-AWT will be provided with the MSDS for all hazardous substances before the Subcontractor's employees and representatives bring, move, disturb, generate, store, transport or otherwise deal with any such substances at the project site.
- The Subcontractor will keep an active file of all material safety data sheets (MSDS) used by that subcontractor.

9.5 Phased Safety Plan

Vestas-AWT requires a phased safety plan to be developed for the project by the subcontractor. The Subcontractor must submit the safety plan to Vestas-AWT Site Manager and HSE Department prior to starting work.

- **Job Safety Analysis (JSA):** This process and format **(refer to Section 14.5.4 of this document)** will be used to identify the steps of the job, inherent hazards and a description of how the work will be performed safely. The Subcontractor will utilize the JSA to train all affected workers prior to commencing work. JSA's will be submitted to Vestas-AWT for review and approval prior to starting work.
- **Pre Task Planning (PTP):** Using the JSA, pre-task planning will be conducted daily by the supervisor and crew, to further identify the current task, working conditions and preventive measures to be taken to protect workers.

9.6 Daily Diaries

A Subcontractor Daily Job Diary **(refer to Section 14.5.5 of this document)** shall be completed and submitted to Vestas-AWT on a daily basis by the supervisor/foreman of each crew working on the project. The report consists of total manpower, man-hours worked, and limitations to performance of work, location of work and safety issues noted.

10. Incident, Injury and Emergency Procedures

10.1 Incidents and Injury Reporting:

Subcontractors shall immediately report to Vestas-AWT all incidents and injuries affecting their employees and representatives. Any first-aid services will be recorded on the subcontractor's Daily First-Aid Log.

10.2 Medical Treatment:

The Subcontractor is responsible to ensure an injured worker requiring medical treatment is provided with transportation to and from the medical facility. The Subcontractor may use a medical provider of their choice unless Vestas-AWT Construction Manager determines otherwise.

10.3 Incident Investigation Review and Report-Out

T09 0008-6835 Ver 02 - Approved - Exported from DMS: 2010-07-09 by ASUER

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VESTAS PROPRIETARY NOTICE

Incidents will be investigated and reviewed by Vestas-AWT and the Subcontractor. At minimum, the chronology of events, contributing factors, root cause, and corrective action plan will be outlined and reported. A final report will be submitted to Vestas-AWT within 24 hours of the incident. If information is lacking, a preliminary report will be filed.

10.4 Injury Management

The Subcontractor shall assist Vestas-AWT in all areas of injury management, with the greatest emphasis placed on incident prevention. A proactive approach and total acceptance of the Injury Free Workplace philosophy and process is the key focus.

11. Personal Protective Equipment

Vestas-AWT personal protection equipment (PPE) requirements apply to the subcontractor and all its employees, lower tier contractors, vendors, suppliers, and visitors.

- **Note:** The Subcontractor is solely responsible for providing all its employees and representatives with the appropriate site required personal protective equipment.

Vestas will not provide PPE to the Subcontractor's employees, representatives or visitors.

11.1 Clothing

Full length, non-cuffed pants will be worn. No shirts with sleeve length less than "T" shirt length will be worn at any time.

11.2 Footwear

Over the ankle, sturdy, work boots made of leather and/or other substantial synthetic materials, will be worn at all times. Should steel toes and/or other special safety features be required, Vestas-AWT will notify the Subcontractor.

11.3 Eye Protection

Eye protection (safety glasses) will be worn at all times. Safety glasses must meet ANSI Z-87.1 requirements. Prescription lenses and frames must meet the same requirements. Job specific hazards may require additional protection to include, but not limited to, use of goggles when handling hazardous chemicals.

11.4 Hearing Protection

Hearing protection (ear plugs or ear muffs) will be worn by employees when working in high-noise areas and/or when operating high-noise emitting tools or equipment. On Vestas-AWT projects, high noise is defined as that which measures over 80-decibels.

11.5 Head Protection

All employees are required to wear head protection at all times except in designated "safe areas". This includes contractors, lower tier contractors, vendors, suppliers, and visitors. Head protection must meet ANSI Z89.1 Class "B" head protection guidelines.

T09 0008-6835 Ver 02 - Approved - Exported from DMS: 2010-07-09 by ASUER

12. Fall Protection

Vestas-AWT's Fall Protection Plan focuses on the elimination of the fall hazard as its first priority. The use of personal protective equipment (PPE) fall protection systems will be authorized only as a last resort. PPE will be utilized only after a thorough analysis of the fall hazard has been made and it is determined no other method to eliminate the hazard is feasible and/or possible.

12.1 100% Fall Protection

The Subcontractor will provide 100% fall protection to its workers when they are exposed to a potential fall of over 6-feet. **There are no exceptions to this requirement**.

12.2 Fall Protection Plan

When a fall potential of over 6-feet exists, the Subcontractor will develop a fall protection plan which addresses how the worker will be protected from falling.

12.3 Engineering and Administrative Controls

The Subcontractor fall protection plan will first take into consideration preventive measures such as standard guarding, boom scissor lifts, scaffolding, and other methods of protection before resorting to PPE systems.

12.4 Personal Protective Equipment

When all other protection systems have been considered and found unfeasible, the exposed workers must wear PPE. Whether in a restraint or fall arrest mode, an approved full body harness will be worn. ***Safety belts are not approved for use on Vestas-AWT projects.***

- **Fall "restraint"** is the preferred method of fall protection when a harness is worn; the **fall arrest** method is the last resort in all fall protection plans.
- An approved lanyard will be secured to a rigged restraint line and/or anchor point.
- Lanyard hooks must be the double-lock type.

12.5 Training

The worker will be trained on fall protection issues, to include the proper care, wear and use of personal protective equipment, specifically the harness, lanyard and other equipment used for fall restraint and arrest applications.

- The worker shall be made aware of his/her obligation to wear and use a full body harness and *associated equipment when the work task dictates.*
- A worker observed not tying off at all times, will be subject to **immediate removal from the site**.
- The worker will acknowledge his/her understanding of this policy, and responsibility to work accordingly, by signing a statement to that effect.

13. Housekeeping

Good housekeeping is essential to the success of Vestas-AWT's Injury Free Workplace policy. A neat and clean job-site prevents incidents that result in injury. The Subcontractor, in partnership with Vestas-AWT, is responsible for maintaining the work site in a clean/safe condition.

VESTAS PROPRIETARY NOTICE

T09 0008-6835 Ver 02 - Approved - Exported from DMS: 2010-07-09 by ASUER

13.1 Daily Requirement

The Subcontractor will perform housekeeping on a continual basis and will ensure its work areas are kept free from construction debris in accordance with the Project housekeeping requirements.

14. Additional Program Requirements

14.1 Overhead Work

Controlled access zones will be established where overhead work is underway to ensure workers are not exposed to falling equipment or material. Substantial barricades will be installed and signs posted to prevent workers or others from inadvertently entering these controlled access zones.

14.2 Electrical Safety

Temporary GFCI systems shall be utilized to eliminate electrical shock hazards.

- Electrical cords and equipment shall be tested in accordance with the Assured Grounding standards outlined in State and Federal OSHA regulations.
- A test for continuous circuitry shall be performed on all cord sets, receptacles not part of the permanent wiring of the facility or structure, and plug-connected equipment required to be grounded.
- Electrical equipment shall be visually inspected daily for external defects. Equipment found to be in need of repair shall be removed from service until repaired and tested.

14.3 Hazardous Chemicals and Materials

The Subcontractor is responsible for the procurement, transport, storage, handling, use, and disposal of all hazardous chemicals and/or materials required to perform its scope of work. When possible, the Subcontractor shall substitute and utilize a less hazardous chemical and/or material to minimize potential exposure to employees and the environment. Additionally, the Subcontractor shall comply with the following guidelines.

- Notify Vestas-AWT prior to bringing a hazardous chemical and/or material on the project site.
- Provide Vestas-AWT with a corresponding and current Material Safety Data Sheet (MSDS).
- Identify the contents of all containers and label accordingly.
- Train employees in the safe use and handling of the hazardous chemical and/or material.
- Develop a spill containment and cleanup procedure. Train affected employees.
- Store flammable liquids (quantities over 5-gallons) in a designated storage area.

14.4 Hazardous and Non-Hazardous Waste Control

The Subcontractor shall ensure proper handling and disposal of all hazardous and non-hazardous waste. Recycling of non-hazardous waste is encouraged and where possible separation of metal, wood, cardboard, and other recyclable material will be performed. Additionally, the Subcontractor shall comply with the following guidelines.

- Remove all non-hazardous waste from the work area daily and dispose in designated containers.

T09 0008-6835 Ver 02 - Approved - Exported from DMS: 2010-07-09 by ASUER

- Store and dispose of hazardous waste in accordance with State and DEQ and OSHA regulations.
- Collect and remove all hazardous and non-hazardous waste, and/or unused chemicals and materials, form the project site prior to completion of work and departure from the site.

14.5 Fire Prevention and Protection

The Subcontractor shall provide adequate fire prevention and protection procedures and equipment to protect workers and property. Fire prevention methods, such as good housekeeping, will be the first line of defense against fire.

- The Subcontractor will notify the Vestas-AWT Construction Coordinator of any fire in its area of operation immediately, even if it has been contained and extinguished.
- Fire extinguishers must be of the appropriate size and fire retardant to provide effective protection for the combustible or flammable fire hazard present.
- In addition to fire protection equipment, the Subcontractor will provide a designated fire-watch for all related hot-work activities.

T09 0008-6835 Ver 02 - Approved - Exported from DMS: 2010-07-09 by ASUER

14.5.1 Subcontractor Checklist

- ☐ Airborne Contaminant Control
- ☐ Barricading & Safety Signage
- ☐ Confined Space Entry
- ☐ Cranes, Hoist & Rigging
- ☐ Operations
- ☐ Disciplinary Policy
- ☐ Drug Free Workplace
- ☐ Environmental Protection
- ☐ Ergonomics & Body Mechanics
- ☐ Equipment & Power Tool Safety
- ☐ Excavation & Trenching
- ☐ Fall Protection & Prevention
- ☐ First Aid & Medical Treatment
- ☐ Hazard Communication
- ☐ Hazardous Energy LOCK/TAG OUT
- ☐ Housekeeping
- ☐ Hot Work (Electrical)
- ☐ Hot Work (Non-Electrical)
- ☐ Incident Emergency Response
- ☐ Incident Reporting & Review
- ☐ Ladder/Scaffolding/Aerial Lifts
- ☐ Material Handling (Hazardous)
- ☐ Material Handling (Non-Hazardous)
- ☐ Personal Protective Equipment (PPE)
- ☐ Respiratory Protection
- ☐ Safety Audits & Inspections
- ☐ Vehicle & Equipment Traffic Control
- ☐ Waste Management (Hazardous)
- ☐ Waste Management (Non-Hazardous
- ☐ Hearing Conservation

T09 0008-6835 Ver 02 - Approved - Exported from DMS: 2010-07-09 by ASUER

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VESTAS PROPRIETARY NOTICE

14.5.2 Orientation Checklist

Employee :(please print) _____

Date: _____

Company: _____

Logistics

- ☐ Parking
- ☐ Lunch areas
- ☐ Restroom facilities
- ☐ Job phones #'s
- ☐ First aid station
- ☐ Weather
- ☐ Working times
- ☐ Harassment
- ☐ Smoking/Chewing
- ☐ Safe Work Zones

Injury Free Workplace

- ☐ Vestas-AWT Mission Statement
- ☐ Injury Free Philosophy
- ☐ Pre-Task Planning (PTP)
- ☐ Risk Assessments (JSA)
- ☐ Incident Review Process
- ☐ Drug/Alcohol Free Workplace
- ☐ Employee Motivation/Recognition
- ☐ Management Involvement
- ☐ Communication
- ☐ Training Requirements
- ☐ Discipline
- ☐

Safety Meetings/Audits

- ☐ Daily Safety Audits
- ☐ Incident Reviews
- ☐ Safety Self Assessment (SSA)
- ☐ Safety Committee Meeting (Monthly)
- ☐ Project Safety Leader Team (SLT)
- ☐ Vestas-AWT Safety Leadership Team
- ☐ Daily-Tailgate Safety Meetings
- ☐ Weekly Safety Meetings

Incident/Accident/Near Miss Reporting

- ☐ Evacuation and assembly area
- ☐ Report near misses, accidents, and incidents, and all first aids
- ☐ Site Specific radio/phone procedures
- ☐ Report all injuries to your supervisor
- ☐ Fire
- ☐ Serious injuries – Call 911
- ☐ Correct and/or report all safety concerns/hazards immediately!
- ☐ Spills – leaking equipment/containers /environment
- ☐ Emergency Response Plan

T09 0008-6835 Ver 02 - Approved - Exported from DMS: 2010-07-09 by ASUER

VESTAS PROPRIETARY NOTICE

Personal Protective Equipment (PPE)

- ☐ Head Protection (Hardhats)
- ☐ Eye Protection (Safety Glasses)
- ☐ Hand Protection (Appropriate Gloves)
- ☐ Foot Protection (Work Boots)
- ☐ Reflective Vests (as Required) Sleeved Shirts
- ☐ Respiratory Protection

Hazard Communication (HazCom)

- ☐ Location of hazardous materials
- ☐ Physical and health hazards
- ☐ ☐ Recognizing overexposure or emergency
- ☐ Understanding MSDSs
- ☐ Personal Protective Equipment
- ☐ Location of MSDSs

Personal Fall Protection

- ☐ No exposure to a fall 6 feet or greater.
- ☐ Use of full body safety harness only – no body belts
- ☐ Ladder Safety
- ☐ Failure to comply with Vestas-AWT Fall Protection Requirements is subject to immediate termination/removal from job site.

Specific Job Hazard Requirements

- ☐ First Aid/CPR & Blood borne Pathogens
- ☐ Housekeeping
- ☐ Assured Equipment Grounding – GFCI
- ☐ Lock Out/Tag Out
- ☐ Operators of all mobile equipment must be trained, qualified, and carded i.e. Forklifts, Articulating lifts, Cranes
- ☐ Traffic
- ☐ Work Zone Safety Caution Tape/Danger Tape
- ☐ Hot Work/Confined Space
- ☐ Material Lifting

Employee Signature: _____ **Date:** _____

Supervisor Signature: _____ **Date:** _____

VESTAS PROPRIETARY NOTICE

T09 0008-6835 Ver 02 - Approved - Exported from DMS: 2010-07-09 by ASUER

14.5.3 Training/Meeting Matrix

Training	Time Frame	Frequency	Personnel
Safety Orientation	1 to 2 hours	Once	All Employees
D/A Testing	Up to 2 Hours	Once Every 6 Months	All Employees
Task Specific	2 Hours	As Necessary	All Employees
First Aid/CPR Training	8 Hours	Once	All Foreman, Superintendent, Safety Rep.
Hazardous Material Training - By Subcontractor	1 Hour	As Necessary	Subcontractor Employees and other Personnel that may be Exposed to Hazardous Materials
Foremen Training/Meetings	1 Hour	Weekly	All Foreman, Superintendent,

Meetings	Time Frame	Frequency	Personnel
Pre-task Planning	20 minutes	Daily	All Field Personnel
Safety Walks Audit	1 hour	Weekly	All Supt./ Foreman/PM
Vestas-AWT Weekly Safety Meeting	20 Minutes	Weekly	All Personnel
Subcontractors Safety Meeting	20 Minutes	Weekly	All Subcontractors Field Personnel
Schedule Meeting	1 Hour	Weekly	All Superintendents / GF
Safety Leadership Team	2 Hours	Monthly	Senior Managers
Incident Review	1 to 4 Hours	For Every Incident & Near Miss	All Foreman, Superintendent, Safety Rep. & Personnel Involved

VESTAS PROPRIETARY NOTICE

T09 0008-6835 Ver 02 - Approved - Exported from DMS: 2010-07-09 by ASUER

14.5.4 Job Hazard Analysis

Project: _____ **Subcontractor:** _____
Phase/Job: _____ **Location:** _____
Start Date: _____ **Est. End Date:** _____

Operation/ Task:	Hazard:	Action Required

T09 0008-6835 Ver 02 - Approved - Exported from DMS: 2010-07-09 by ASUER

VESTAS PROPRIETARY NOTICE

14.5.5 Subcontractor Daily Job Diary

Work Date:	**Day of Week:**
Company Name:	
Location of Work:	
Hindrance to Work Progress:	
Total Workers on Site:	**Total Man-hours**
Incident(s):	**DESCRIPTION:**
Injury(s)	
Report by:	
Site Phone #:	

T09 0008-6835 Ver 02 - Approved - Exported from DMS: 2010-07-09 by ASUER

14.5.6 Subcontractor Acknowledgement and Agreement

Project Name _____ ***Project #:*** _____

The Subcontractor _____ has a subcontract with Vestas – American Wind Technology, Inc. to perform certain specific labor on this Project. Said Subcontractor is required to ensure all its employees, subcontractors, suppliers, agents and representatives performing labor on this Project, comply with the Subcontractor Environmental, Health & Safety Requirements in its entirety.

The Subcontractor has read and understands the conditions outlined herein. Further, the Subcontractor agrees to be bound by, and comply with, all terms and provisions, and assumes the responsibility for all associated costs to implement these requirements.

The Subcontractor agrees to inform its crew(s) actually performing the work of the contents of the Subcontractor Environmental, Health & Safety Requirements and this agreement prior to reporting to work on the project.

Accepted and Agreed to this _____ Day of _____ Year_____

Vestas - American Wind Technology, Inc.
Contractor

By_____
Name of Vestas-AWT Representative

_____
Title

_____
Subcontractor

By_____
Name of Subcontractor Representative

_____
Title

VESTAS PROPRIETARY NOTICE

T09 0008-6835 Ver 02 - Approved - Exported from DMS: 2010-07-09 by ASUER

15. History of this Document

Rev. no.:	Date:	Description of changes
00	20-Nov-2003	First edition – Reformatted and Renumbered 21-May-07
01	01-Jan-2010	Template updated
02	09-July-2010	Title changed from "American Subcontractor Requirements" to "VAME Subcontractor Requirements". References to JHA replaced with references to JSA. References to sections of same document corrected. Former Section 10.3 – Early Return to Work deleted. Minor wording changes to Section 9.5.

T09 0008-6835 Ver 02 - Approved - Exported from DMS: 2010-07-09 by ASUER

VESTAS PROPRIETARY NOTICE

Vestas

HSE Contractor Qualifications

Vestas American Wind Technology, Inc. is specifically interested in the health, safety, and environmental performance of all contractors and their employees who work for our company. Your response to this questionnaire and self-assessment will help us assess your company's overall HSE program and performance.

Background Information

Name of Company: _____

Address: _____

Telephone: _____ FAX: _____

Questionnaire Completed By: _____ Date: _____

Title: _____ Email: _____

Secondary Contact: _____

Title: _____ Email: _____

Check the type(s) of service your company performs:

☐	Exterior Tower Work	☐	Inspections
☐	Construction	☐	Insulation
☐	Consulting	☐	Mechanical
☐	Crane Service	☐	Painting / Abrasive Blasting
☐	Electrical	☐	Labor , managed
☐	Engineering	☐	Trucking
☐	Equipment Rental	☐	Waste Disposal
☐	Fabrication	☐	Welding
☐	General Maintenance	☐	Janitorial
☐	Other: _____	☐	Other: _____

Has your company worked for any Vestas company in the past? ☐ Yes ☐ No

If yes, which one(s)? _____

T09 0008-8014 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

The following HSE Questionnaire represents the elements and sub-elements that should be present in a contractor's HSE Management System (MS) or Plan to satisfy the Vestas HSE Policy requirement.

Element 1: Leadership and Commitment

(i) Commitment to HSE Through Leadership

1. How are senior managers personally involved in HSE management?

   ———

2. Provide evidence of commitment at all levels of the organization:

   ———

3. How do you promote a positive culture towards HSE matters?

   ———

   Additional Comments:

   ———

Self Assessment - Commitment to HSE through leadership: Element 1(i) Questions 1 - 3			
Level A - (0 Points)	**Level B - (10 Points)**	**Level C - (20 Points)**	**Level D - (30 Points)**
No commitment from senior management	HSE disciplines delegated to line managers – no direct involvement by senior management	Evidence of active senior management involvement in HSE aspects	Evidence of a positive HSE culture in senior management and at all levels

Element 2: Policy and Strategic Objectives

(i) HSE Policy Documents

4. Does your company have an HSE policy document? If the answer is YES please attach a copy.

   ———

5. Who has overall and final responsibility for HSE in your organization?

   ———

6. Who is the most senior person in the organization responsible for this policy being carried out at the premises and on site where his employees are working? Provide name, title and experience.

   ———

(ii) Availability of Policy Statements to Employees

7. Itemize the methods by which you have drawn your policy statement to the attention of all your employees.

   ———

8. What are your arrangements for advising employee of changes in the policy?

   ———

T09 0008-8014 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

Additional Comments:

Self Assessment - HSE policy documents and availability: Element 2(i) and 2(ii) Questions 4 - 8			
Level A - (0 Points)	**Level B - (10 Points)**	**Level C - (20 Points)**	**Level D - (30 Points)**
No written HSE policy	A policy statement exists but not in a widely distributed document	HSE policy establishes responsibility for HSE, but not widely distributed	Policy with clearly established responsibility and accountability; is distributed to all employees; and is visible on notice boards

Element 3: Organization, Responsibilities, Resources, Standards & Documentation

(i) Organization, Commitment and Communication

9. How is management involved in HSE activities, objectives and monitoring?

10. How is your company structured to manage and communicate effectively?

Additional Comments:

11. What provision does your company make for HSE communication meetings?

Additional Comments:

Self Assessment - HSE Communication and Meeting Programs: Element 3(i) Questions 9 - 11			
Level A - (0 Points)	**Level B - (10 Points)**	**Level C - (20 Points)**	**Level D - (30 Points)**
None	Periodic HSE meetings for special operations only	HSE meetings performed on a regular basis at management and supervisor level	In addition to C, employees are assigned topics to discuss on a rotational basis

(ii) Competence and Training of Managers, Supervisors, Senior Staff and HSE Advisors

12. Have the managers and supervisors at all levels who will plan, monitor oversee and carry out the work received formal HSE training in their responsibilities with respect to conducting the work to HSE requirements? If the answer is yes, give details. Where the training is given (e.g. in-house, training consultant). Please describe the content and duration of courses.

Additional Comments:

Self Assessment - Staff HSE Training: Element 3(ii) Question 12			
Level A - (0 Points)	**Level B - (10 Points)**	**Level C - (20 Points)**	**Level D - (30 Points)**

T09 0008-8014 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

No specialized staff training	HSE training assigned to a specific person on location	HSE training applied to management but not comprehensively covered	HSE training given formally to all relevant staff on their respective responsibilities

Element 3 Continued

(iii) Competence and General HSE Training

13. What arrangements does your company have to ensure new employees have knowledge of basic industrial HSE, and to keep this knowledge up-to-date?

14. What arrangements does your company have to ensure new employees also have knowledge of your HSE policies and practices?

15. What arrangements does your company have to ensure new employees have been instructed and have received information on any specific hazards arising out of the nature of the activities? What training do you provide to ensure that all employees are aware of company requirements?

16. What arrangements does your company have to ensure existing staff HSE knowledge is up-to-date? If training is provided in-house please give the details of the content).

Additional Comments:

Self Assessment - Employee Orientation and Training Program: Element 3(iii) Questions 13 - 16			
Level A - (0 Points)	**Level B - (10 Points)**	**Level C - (20 Points)**	**Level D - (30 Points)**
No formal program	Verbal instructions on company procedures only; Orientation booklet provided for new employees but no on-the-job orientation by supervisor	Employee handbook provided and supervisor outlines, explains and demonstrates new employee's job	All under C together with: follow-up observation of the new employee's work is also included. Employee has explained to him safe practices and emergency duties

Element 3 Continued

(iv) Specialized Training

17. How have you identified areas of your company's operations where specialized training is required to deal with potential hazards? (Please itemize and provide details of training given).

18. If specialized work involves occupational health hazards (e.g. radioactive, asbestos, chemical, etc.), how are the hazards identified, assessed and controlled?

(v) HSE Qualified Staff – Additional Training

T09 0008-8014 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

19. Does your company employ any staff that possesses HSE qualifications that aim to provide training in more than basic requirements?

_____

Additional Comments:

_____

Self Assessment - Specialized Training: Element 3(iv) and (v) Questions 17 - 19			
Level A - (0 Points)	**Level B - (10 Points)**	**Level C - (20 Points)**	**Level D - (30 Points)**
No HSE training established	On-site basic training conducted occasionally	HSE training is given for specialized operations, but no routine training conducted	Formal HSE training programs have been developed in all areas and are conducted on a regular basis. Retraining periods are established

Element 3 Continued

(vi) **Assessment of Suitability of Sub-contractors or Other Companies**

20. How do you assess:

a) HSE competence of your sub-contractors?

_____

b) HSE record of the sub-contractors and companies with whom you place contracts?

_____

21. Where do you spell out the standards you require your contractors to meet?

_____

22. How do you ensure these standards are met and verified?

_____

Additional Comments:

_____

Self Assessment - Sub-Contractors: Element 3(vi) Questions 20 - 22			
Level A - (0 Points)	**Level B - (10 Points)**	**Level C - (20 Points)**	**Level D - (30 Points)**
No written arrangements	Written arrangements in place for basic HSE matters only	HSE arrangements incorporated in HSE manual but not in a format which is distributed to all employees	HSE arrangements exist in handbook form, distributed to all employees, subcontractors and their employees and enforced. Follow-up audits held with discussion / feedback to management/employees

Element 3 Continued

(vii) **Company HSE Standards**

T09 0008-8014 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

23. Where do you spell out the HSE performance standards you require to be met?

24. How do you ensure these are met and verified?

25. How do you identify new industry or regulatory standards that may be applicable to your activities?

26. Is there an overall structure for producing, updating and disseminating standards?

Additional Comments:

Self Assessment – Company HSE Standards: Element 3(vii) Questions 23 - 26			
Level A - (0 Points)	**Level B - (10 Points)**	**Level C - (20 Points)**	**Level D - (30 Points)**
No HSE standards available	Basic HSE standards exist	Contractor has written HSE standards to cover all hazardous operations	Contractor has a system of specifying, monitoring compliance and updating standards

Element 4: Hazards and Effects Management

(i) Hazards and Effects Assessment

27. What techniques are used within your company for the identification, assessment, control and mitigation of hazards and effects?

Additional Comments:

Self Assessment - Hazards and Effects Assessment: Element 4(i) Question 27			
Level A - (0 Points)	**Level B - (10 Points)**	**Level C - (20 Points)**	**Level D - (30 Points)**
Company's HSE system does not include hazards and effects assessment	Company's HSE system makes reference to the need to assess hazards and effects but has no comprehensive structure to carry this out	Company's HSE system includes methods for the assessment of major hazards and effects	Company's HSE system has a comprehensive set of methods for the assessment of all HSE hazards and effects and applies them to all of its contracts with documentation

(ii) Exposure of the Workforce

28. What systems are in place to monitor the exposure of your workforce to chemical or physical agents?

Additional Comments:

Self Assessment - Exposure of the workforce: Element 4(ii) Question 28			
Level A - (0 Points)	**Level B - (10 Points)**	**Level C - (20 Points)**	**Level D - (30 Points)**

T09 0008-8014 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

Company does not actively advise the workforce nor monitor exposure	Company advises the workforce of the major hazards that they are likely to be exposed to but only monitors exposure randomly	Company distributes information to individuals in the workforce at start of their involvement on-site	Company has a set of formal methods for monitoring exposure to all foreseeable hazards (linked to its hazards and effects management method) and applies them to all contracts

Element 4 Continued

(iii) Handling of Chemicals

29. How is your workforce advised on potential hazards (chemical, physical, biological hazards such as noise, r, temperature extremes, etc.) encountered in the course of their work?

Additional Comments:

Self Assessment - Potential Hazards: Element 4(iii) Question 29

Level A - (0 Points)	Level B - (10 Points)	Level C - (20 Points)	Level D - (30 Points)
Company makes no special provision for advising the workforce about properties of potential hazards	Company provides information to workforce in the workplace on properties of potential hazards but has no active follow-up	Company distributes information to individuals in the workforce at the start of their involvement on-site	Company maintains a database of the properties of all potential hazards encountered in its contracts and has formal methods of information distribution to all personnel and trains its workforce in handling, etc.

(iv) Personal Protective Equipment

30. What arrangements does your company have for provision and upkeep of protective equipment and clothing, both standard issue, and that required for specialized activities?

Additional Comments:

Self Assessment - Personal protective equipment: Element 4(iv) Question 30

Level A - (0 Points)	Level B - (10 Points)	Level C - (20 Points)	Level D - (30 Points)
Basic PPE provided to personnel but no corporate procedure for assessing individual needs	PPE requirements formally assessed but little effort made to ensure correct usage	PPE requirements formally addressed with spot checks on usage	Procedures in place to assess all PPE requirements monitor and enforce usage and replacement needs. Stock inventories monitored, kept above demand levels. Training in use provided where needed

Element 4 Continued

(v) Waste Management

31. What systems are in place for identification, classification, minimization and management of waste?

T09 0008-8014 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

Additional Comments:

Self Assessment - Waste management: Element 4(v) Question 31			
Level A - (0 Points)	**Level B - (10 Points)**	**Level C - (20 Points)**	**Level D - (30 Points)**
Company has no formal methods for the control of waste	Company has general procedures for waste disposal	Company has procedures for the disposal of each of the main categories of site wastes but makes no provision for minimizing environmental impact	Company has a formal system for waste management (including identification, minimization and classification), which actively seeks to minimize environmental impact

(vi) Drugs and Alcohol

32. Do you have a Substance Abuse Policy that prohibits the use, sale or possession of drugs and alcohol in your organization? If so, does it include pre-employment and random testing?

Additional Comments:

Self Assessment - Drugs and Alcohol (Substance Abuse): Element 4(vi) Question 32			
Level A - (0 Points)	**Level B - (10 Points)**	**Level C - (20 Points)**	**Level D - (30 Points)**
Company has no formal substance abuse program	Company has a basic drug and alcohol program that includes pre-employment testing	Company has a basic drug and alcohol program that includes pre-employment testing and post-accident testing	Company has a basic drug and alcohol program that includes pre-employment testing, post-accident testing, suspect of drug use testing and random testing.

Element 5: Planning and Procedures

(i) HSE or Operations Manuals

33. Do you have a company HSE Manual (or Operations Manual with relevant sections on HSE) that describes in detail your company approved HSE working practices relating to your work activities? If the answer is yes, please attach a copy of supporting documentation.

34. How do you ensure that the working practices and procedures used by your employees on-site are consistently in accordance with your HSE policy, objectives and arrangements?

Additional Comments:

Self Assessment - HSE or operations manuals: Element 5(i) Question 33 & 34			
Level A - (0 Points)	**Level B - (10 Points)**	**Level C - (20 Points)**	**Level D - (30 Points)**

T09 0008-8014 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

No HSE procedures available	Basic HSE procedures exist	Contractor has written HSE procedures to cover all hazardous operations	Contractor has procedures to cover all HSE precautions, typical contractor HSE Plan requirements with a system of updating and dissemination to employees

(ii) Equipment Control and Maintenance

35. How do you ensure that the equipment used within your premises, on-site or at other locations, by your employees are correctly registered and/or certified, controlled and maintained in a safe working condition?

Additional Comments:

Self Assessment - Equipment control and maintenance: Element 5(ii) Question 35

Level A - (0 Points)	Level B - (10 Points)	Level C - (20 Points)	Level D - (30 Points)
No defined program to identify or evaluate hazardous practices and equipment conditions	Plan relies on outside sources, i.e. company inspections. Supervisory inspection of equipment confined to work site personnel only	A written program outlining supervisory guidelines, responsibilities, frequency and follow-up is in effect	In addition to C, periodic inspections conducted by top management or by teams of specialists

Element 5 Continued

(iii) Road Safety Management

36. What arrangements/programs does your company have for eliminating road and vehicle incidents?

Additional Comments:

Self Assessment - Road Safety Management: Element 5(iii) Question 36

Level A - (0 Points)	Level B - (10 Points)	Level C - (20 Points)	Level D - (30 Points)
No special attention paid to road safety as an area of hazardous activities	Importance of road safety acknowledged but left to the core business managers / supervisors to enact individually	Company has a general management strategy with some procedures for its component issues	Company has a complete strategy and set of plans and procedures covering vehicles, drivers and operations management

Element 6: Implementation and Performance Monitoring

(i) Management and Performance Monitoring of Work Activities

37. What arrangements does your company have for supervision and monitoring of HSE performance?

T09 0008-8014 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

38. What type of HSE performance criteria is used in your company? Give examples.

_____

39. What arrangements does your company have for passing on results and findings of this supervision and monitoring to your:

a) Base Management?

_____

b) Site Employees?

_____

(ii) HSE Performance Achievement Awards

40. Has your company received any awards for HSE performance achievement?

_____

Additional Comments:

_____

Self Assessment - Management & Performance Monitoring of Work Activities: Element 6(i) & (ii) Questions 37 - 40			
Level A - (0 Points)	**Level B - (10 Points)**	**Level C - (20 Points)**	**Level D - (30 Points)**
No system for formally monitoring HSE performance	Performance monitoring in a few areas carried out	Company has a system for monitoring HSE performance in key areas	Company has a comprehensive system for monitoring performance in all areas with feedback to employers for improvement and has received awards for achievement

Element 6 Continued

(iii) Statutory notifiable incidents, dangerous occurrences

41. Has your company suffered any statutory notifiable incidents in the last 5 years (safety, occupational health or environmental? Answer with details including dates, country, most frequent types, causes and follow-up preventative measures taken.

_____

(iv) Improvement Requirement and Prohibition Notices

42. Has your company suffered any improvement requirement or prohibition notices by the relevant national body, regulatory body for HSE or other enforcing authority, or been prosecuted under any HSE legislation in the past 5 years? If your answer is yes, please give details.

_____

Additional Comments:

_____

T09 0008-8014 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

Self Assessment - Statutory notifiable incidents, dangerous occurences, improvement requirements and prohibition notices: Element 6(iii) and (iv) Questions 41 & 42			
More than one occurrence of major incident in the last five years	One occurrence of a major incident in the last five years	Occurrences relate to minor incident(s) only	No occurrences in the last five years

Element 6 Continued

(v) HSE Performance Records

43. Have you maintained records of your incidents and HSE performance for the last 5 years? Please submit.

44. How is health performance recorded?

45. How is environmental performance recorded?

46. How often is HSE performance reviewed? By whom?

Element 6 Continued

47. Please provide your HSE statistics in the appropriate spaces below:

ITEM	2007	2006	2005	2004	2003
Exposure Hours					
Number of Fatalities					
Permanent Total Disabilities (PTD)					
Lost Work Day Cases (LWC)					
Lost Time Injuries (LTI)					
Lost Time Injury Frequency (LTIF)					
Restricted Work Day Cases (RWC)					
Medical Treatment Cases (MTC)					
Total Reportable Cases (TRC)					
Total Reportable Case Frequency (TRCF)					
Total Reportable Occupational Illnesses (TROI)					
Total Reportable Occupational Illness Frequency (TROIF)					
Total Number of Environmental Occurrences					

Additional Comments:

Self Assessment - HSE Performance records: Element 6(v) Question 47 (Health)			
Level A - (0 Points)	**Level B - (20 Points)**	**Level C - (30 Points)**	**Level D - (40 Points)**
Contractor supplied insufficient information to establish frequency (rate or rate increases)	Frequency (rate) is not improving	Shows only minor frequency (rate) improvement	Frequency (rate) steadily improving by more than 25% Per year

T09 0008-8014 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

Self Assessment - HSE Performance records: Element 6(v) Question 47 Safety)			
Level A - (0 Points)	**Level B - (20 Points)**	**Level C - (30 Points)**	**Level D - (40 Points)**
Contractor supplied insufficient information to establish frequency (rate or rate increases)	Frequency (rate) is not improving	Shows only minor frequency (rate) improvement	Frequency (rate) steadily improving by more than 25% Per year

Self Assessment - HSE Performance records : Element 6(v) Question 47(Environmental)			
Level A - (0 Points)	**Level B - (20 Points)**	**Level C - (30 Points)**	**Level D - (40 Points)**
Contractor supplied insufficient information needed to determine improvement	Environmental performance is not improving	Shows only minor environmental performance improvement	Environmental performance is steadily improving by more than 25% Per year

Element 6 Continued

(vi) **Incident Investigation and Reporting**

48. Who conducts incident investigations?

49. How are the findings following an investigation, or a relevant incident occurring elsewhere, communicated to your employees?

50. Are Near Miss safety learnings reported?

Additional Comments:

Self Assessment - Incident Investigation and reporting: Element 6(vi) Questions 48 - 50			
Level A - (0 Points)	**Level B - (20 Points)**	**Level C - (30 Points)**	**Level D - (40 Points)**
Findings not generally communicated	Findings communicated to key personnel only via limited company internal memo or similar media	Findings communicated to all employees via specific company notice	As in C but with the addition of details of implication for improving HSE performance

Elements 7 & 8: Auditing and Review

(i) **Auditing**

51. Do you have a written policy on HSE auditing?

52. How does this policy specify the standards for auditing (including unsafe act auditing) and the qualifications for auditors?

T09 0008-8014 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

53. Do your company HSE plans include schedules for auditing and what range of auditing is covered?

54. How is the effectiveness of auditing verified and how does management report and follow up audits?

Additional Comments:

Self Assessment - Auditing: Element 7(i) Questions 51 - 54			
Level A - (0 Points)	**Level B - (10 Points)**	**Level C - (20 Points)**	**Level D - (30 Points)**
Audit process is cursory only – HSE documents are not explicit about auditing	Company HSE documents include reference to auditing but there are no specific details about scheduling and coverage	Company HSE documents include details of how auditing is to be implemented with schedules / coverage for the key areas	As in C but additionally specifies management's role in audit and follow-up on action items

T09 0008-8014 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

Definitions for Question 47:

Exposure hours - The total number of hours of employment including paid overtime and training but excluding leave, sickness and unpaid overtime hours. Exposure hours should be calculated separately for company and contractor personnel. Time off duty, even if this time is spent on company premises, is not included in the calculation of exposure hours, but incidents during this are included in statistics if they are the result of failure or absence of management controls. In many company sites the number of exposure hours can be calculated from computer controlled access or time keeping records. In the absence of more accurate methods exposure hours can also be calculated from a head count and nominal working hours per person.

Fatality - A death resulting from a work related injury or occupational illness, regardless of the time intervening between the incident causing the injury or exposure causing illness and the death.

Permanent Total Disability (PTD) - Any work related injury that permanently incapacitates an employee and results in termination of employment.

Lost Workday Case (LWC) - Any work related injury that renders the injured person temporarily unable to perform their normal work or restricted work on any day after the day on which the injury occurred. Any day includes rest day, scheduled holiday, public holiday or subsequent day after ceasing employment. Note for U.S. Based Companies: This definition is different from the OSHA definition, which considers restricted work as a lost workday case.

Lost Time Injuries (LTI) - The sum of injuries resulting in fatalities, permanent total disabilities and lost workday cases, but excluding restricted work cases and medical treatment cases.

Lost Time Injury Frequency (LTIF) - The number of lost time injuries per million exposure hours.

Restricted Workday Case (RWC) - Any work related injury, which renders the injured person temporarily unable to perform all, but still some, of their normal work on any day after the day on which the injury occurred.

Medical Treatment Cases (MTC) - Any work related injury that involves neither lost workdays or restricted workdays, but which requires treatment by a physician or other medical specialist. Medical treatment does not include first aid even if a physician or registered professional personnel provide this.

Total Reportable Cases (TRC) - The sum of injuries resulting in fatalities, permanent total disabilities, lost workday cases, restricted workday cases and medical treatment cases.

Total Reportable Case Frequency (TRCF) - The number of total reportable cases (see definitions above) per million exposure hours. This frequency is determined by the following formula:

$$\frac{\text{Number of Reportable Cases} \times 1{,}000{,}000 \text{ hours}^*}{\text{Number of Total Exposure Hours}}$$

(* OSHA formula uses 200,000 hours)

Total Reportable Occupational Illnesses (TROI) - The sum of all identified occupational illnesses. Cases involving no lost or restricted workdays and no medical treatment are included.

Total Reportable Occupational Illness Frequency (TROIF) - The number of occupational illnesses per million exposure hours.

T09 0008-8014 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

HSE MS Point Totals

Element	Total Possible Points	Actual Points Scored
1. Leadership and Commitment	30	
2. Policy and Strategic Objectives	30	
3. Organization, Responsibilities, Resources, Standards & Documentation	180	
4. Hazards and Effects Management	180	
5. Planning and Procedures	90	
6. Implementation and Performance Monitoring	230	
7. & 8. Auditing and Review	60	
9. Additional Features	30	
Total Points	**830**	

HSE MS Maturity Level Score			
Maturity Scoring Indicators	Level B	Level C	Level D
	201 - 400	401- 600	601-830
Stoplight Designation	YELLOW		GREEN

T09 0008-8014 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

ALL EMPLOYEES shall follow this CODE OF SAFE PRACTICES, render every possible aid to safe operations, and report all unsafe conditions or practices to the proper site management.

After you have read the listed practice and feel certain that you understand it, proceed to the next. If you DO NOT understand the practice, list the topic and practice number on the acknowledgement page, and discuss it/them with your supervisor.

1. General

1.1 Supervisors shall require employees to observe and adhere to every safe practice, regulation and policy as is necessary for the safe conduct of the work, and shall take action as necessary to ascertain a safe work environment.

1.2 A personnel record (which contains personal and emergency contact information) for each site employee shall be established and kept current. Any changes should be reported to your supervisor by the end of the business day of that given change.

1.3 NFPA class zero dress code: 100% cotton long sleeved shirts, 100% cotton trousers (no shorts) without holes, and suitable climate and weather-appropriate wear to combat heat or cold stress. Clothing made from polyester, nylon and acetate is prohibited. All personnel working in areas where electrical hazards are present shall use protective equipment that is designed and constructed for the specific part of the body to be protected and for the work to be performed.

Where installed personnel must adhere to the arc flash labels posted. If the Arc Flash Hazard Analysis (AFHA) is not complete and no labels are posted personnel are required to utilize the Vestas Arc Flash PPE Matrix or NFPA 70E table 130.7(C)(9).

1.4 All employees who drive to access or perform their work assignments must adhere to the VAME Vehicle Use Policy and Procedure (AME-POL-1.08.00), maintain a current and valid license to drive, as well as proof of insurance. Any change in license or insurance coverage status must be reported to a direct supervisor by the end of the business day of the given change.

1.5 IMMEDIATELY REPORT ALL INCIDENTS. All injuries, illnesses and/or chemical exposures, including vehicle incidents, environmental/spills or near miss events, must be reported to your immediate supervisor as soon as possible so that the reporting and investigation process can begin and corrective measures can be taken to prevent recurrence. Refer to the HSE homepage for further assistance. Post-incident substance screening may be required.

1.6 REPORT ALL UNSAFE CONDITIONS OR HAZARDS. All personnel must report any hazardous or unsafe conditions, anonymously if they prefer, to the immediate or site supervisor or to the Safety Department (VAME-Safety@vestas.com).

1.7 All employees shall be given frequent incident/hazard prevention instruction and reminders. Daily and weekly morning safety meetings for ALL site employees and subcontractors will be held on a regular basis. Attendance is mandatory.

1.8 Anyone known to be under the influence of intoxicating substances shall not be allowed on site while in that condition. Intoxication (or the use of intoxicating substances while on the job) is grounds for disciplinary action up to and including termination.

1.9 No person shall knowingly be permitted to work while his/her ability or alertness is so impaired by fatigue, illness, or other causes that it unnecessarily exposes him/her or others to injury.

Confidential & Proprietary to Vestas
DMS 0008-7897 R5 09-July-2010 Vestas Confidentia VAME HSE Manual
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T09 0008-7923 Ver 04 - Approved - Exported from DMS: 2010-10-05 by ASUER

1.10 *Violence/Harassment Free Workplace: No threatening or aggressive behavior toward other site* personnel or visitors will be tolerated. Horseplay, fighting, scuffling, throwing of objects and/or other unsafe acts that could potentially injure or adversely affect the safety of others are prohibited.

1.11 Work requirements may require field employees to climb vertically in excess of 250' and access restricted or confined work areas. Failure to do so or have the ability to do so may result in termination.

1.12 Only competent employees may access or operate machines or equipment and must be properly trained. Employers must provide training, or verify applicable current and valid records of training, before access to machinery or equipment is permitted. Employees shall not handle or tamper with any electrical equipment, machinery, or air or water lines in any manner not within the scope of their duties, unless they have received training and/or appropriate instruction from a competent person.

1.13 Prior to use or operation, all equipment shall be inspected to ensure safe operation, and appropriate documentation must be completed and filed.

1.14 Prior to working with tools or equipment, a Job Safety Analysis (JSA) or Pre-Task Plan (PTP) shall be well planned, documented and supervised to ensure quality and eliminate risk and / or prevent injury.

1.15 When lifting or moving heavy objects, always seek assistance from competent employees and utilize appropriate lifting tools where applicable. If the appropriate tools aren't readily available, the job must be stopped.

1.16 All employees, contractors and visitors should be aware of hazards (electrical, mechanical and hydraulic), guards and protective devices, their proper use and adjustments, and shall promptly report deficiencies to their supervisors or managers.

1.17 When there is the risk of injury from entanglement while working with or near machinery, combustibles, or toxic contaminants, all employees in these areas will tie back or otherwise confine their hair to eliminate the hazard. Employees must remove all metal jewelry prior to work in a turbine.

1.18 Employees shall be mindful of work positions in potentially hazardous work environments – nacelles, hubs, towers, roofs, E-Stops, locks, anchors, etc. – and review and be familiar with the turbine specific safety instructions prior to turbine access.

1.19 Never work aloft if you are afraid or nervous to do so, are subject to fainting or dizziness, or if you are ill.

1.20 Only one person at a time on any one ladder when climbing a tower or in a turbine.

1.21 Cover floor or platform openings with adequate barriers or covers.

1.22 Nothing may be thrown or dropped from a turbine, tower, ladder, scaffold, shelf or other elevated platform.

1.23 Any damage to scaffolds, false work, or other supporting structures must be reported promptly to a supervisor or manager and repaired prior to use.

1.24 No burning, welding, or other sources of ignition shall be applied to any enclosed tank or vessel, with or without openings, until it has been determined by the proper authority that no possibility of explosion exists.

T09 0008-7923 Ver 04 - Approved - Exported from DMS: 2010-10-05 by ASUER

1.25 Prior to handling an injurious, caustic, toxic, or unfamiliar substance, review the special instructions provided for that substance (MSDS) and follow the precautions. After handling, wash hands thoroughly.

1.26 Prior to use, review the MSDS (Material Safety Data Sheet) for routinely used and newly introduced substances. Review updates when issued.

1.27 NEVER use compressed air or other gases for blowing off or cleaning clothing or body parts.

1.28 Warning signs and tags are for the protection of you and your co-workers.

1.29 Never remove a warning sign, danger tag, lock out or tag out device from any apparatus, valve, switch, etc. unless you are the owner of that tag.

1.30 Be alert to conditions and work processes in surrounding areas so that you can foresee and avoid danger. Be aware of other employees and equipment. Always have an escape route.

1.31 When working around heavy equipment, be sure that the operator can always see you.

1.32 Work under a suspended load is strictly forbidden.

1.33 In the event of a natural disaster, follow your emergency response plan.

1.34 Facilities are to be free of rodents, insects, vermin or vector. Continuing and effective extermination or elimination programs shall be instituted where their presence is detected. The presence of wildlife at this site may pose potential hazards. Do not feed or otherwise encourage their presence. Do not attempt to capture or move them.

2. Housekeeping

2.1 All employees are expected to practice good housekeeping. A job is not complete until cleanup is done.

2.2 Keeping tools, materials and equipment safely stored and in their proper places will prevent damage and help you and others find them when needed.

2.3 To prevent fire or accident hazards, arrange for periodic removal of scrap materials and/or rubbish left to accumulate in your work area. Rags, packing materials, sawdust and other trash should be collected and placed in appropriately marked receptacles.

2.4 Wipe up spills immediately. Notify your supervisor or a manager if you notice unusual leaks or drips. Be sure to contain and dispose of absorbent materials appropriately.

2.5 Sharp objects (scrap metal, glass, bottles, cans, etc.) shall be placed in appropriate containers.

2.6 Nails or screws protruding from lumber or boards should be removed or bent into the wood to prevent punctures or tears.

2.7 Do not place debris or other obstacles in roadways, walkways, aisles, or otherwise obstruct travel routes.

2.8 Help keep common areas (change rooms, sanitary facilities, drinking fountains, etc.) clean. They are provided for your health and convenience.

T09 0008-7923 Ver 04 - Approved - Exported from DMS: 2010-10-05 by ASUER

3. Vehicles

3.1 All vehicles in use shall be checked at the beginning of the shift to assure that the following parts, equipment, and accessories are in safe operating condition and free of apparent damage which could cause failure while in use: service brakes, including trailer brake connections; parking system (hand or foot brake); emergency stopping system (brakes); tires; horn; steering mechanism; coupling devices; seat belts; operating controls (including lights, reflectors, windshield wipers, defrosters); and safety devices (including fire extinguishers). All defects shall be corrected before the vehicle is placed in service.

3.2 The driver is responsible for the safety of all passengers and for the stability of all materials in and on the vehicle.

3.3 All vehicle occupants shall use the safety belts provided.

3.4 Ask an observer to guide you when backing up or driving in congested or precarious areas, or when visibility is limited for any reason.

3.5 Whenever a vehicle is parked, the parking brake shall be set. As an additional precaution, vehicles parked on severe inclines shall have the parking brake set AND the wheels chocked.

3.6 Whenever possible, park so that the vehicle windshield is facing directly into the wind. Secure the doors when entering or leaving the vehicle to prevent wind damage to the vehicle and/or personal injury.

3.7 Park a safe and clear distance from other vehicles, turbines, transformers, or other structures. Do not park behind another vehicle or in such a way as to block any vehicle from moving. Park so that you have a clear escape route.

3.8 All passengers must be seated while the vehicle is in motion. No person shall ride outside of the vehicle, for instance in the truck bed.

3.9 As a general rule, the speed limit on all graded dirt site roads is 15 mph. Slower speeds are advised where visibility is restricted or impaired.

3.10 Vehicles should not have less than ¼ tank of fuel at any time.

3.11 Windshields should be kept clean to prevent glare or reduced visibility.

3.12 Off road parking or driving is prohibited.

3.13 Vehicles needing repair should be reported and attended to as soon as possible.

3.14 Oil and other fluid levels should be checked daily and added as needed. Belts, hoses, tires, etc. should be routinely inspected and replaced as necessary.

3.15 Each service vehicle should be equipped with a fire extinguisher and a first aid kit with incident reporting forms, and inspected/replenished as needed.

3.16 On remote sites, service vehicles should also be equipped with a shovel, at least a gallon of water, and a quart of oil.

4. Hand Tools

4.1 Every tool is designed for a specific purpose. Do not deliberately misuse any tool. For example:

- Do not use screwdrivers as chisels or punches.
- Do not use files to pry or punch.

T09 0008-7923 Ver 04 - Approved - Exported from DMS: 2010-10-05 by ASUER

4.2 Keep tools in proper working condition. Inspect before use; keep properly oiled, dressed, and adjusted.

4.3 Carry tools in their proper sheath, belt bag, or box – points down!

4.4 Hammer heads shall be properly secured to the shaft; hammer faces kept dressed and free of chips or unusual wear.

4.5 Hold cold chisels so as to protect the knuckles if the hammer misses the head. When available, use tongs or similar holding devices when using chisels.

4.6 Chisels shall be kept properly dressed, the cutting edge sharpened to the correct angle. Regular grinding will prevent the head of cold chisels from mushrooming.

4.7 Never hit hardened steel with another hardened steel implement, such as hitting a hatchet with a hammer.

4.8 Handle extensions or "cheaters", or similar alterations should not be used on wrenches unless they are designed for it.

4.9 Do not use pipe wrenches (i.e. Stilson wrenches) as a substitute for other wrenches.

4.10 Keep saw blades sharp. Sharpen or replace dull blades as necessary.

4.11 Keeps drill bits sharp. Sharpen or replace bits as necessary.

4.12 Use eye and ear protection.

5. Tools

5.1 Know the proper use and function of any tool you use BEFORE you use it.

5.2 All electric power tools must be grounded or "double insulated".

5.3 Inspect power tools prior to use for defects, loose parts, altered safety devices, worn or otherwise defective power supplies or cords. Do not use altered or defective tools. Report defects to your supervisor or manager immediately.

5.4 Unplug or disengage tools from power supply after use. Store in a safe place and protect from weather, dirt, and moisture. Tools are to be stored no higher than shoulder height.

5.5 The power supply must be properly attached to the tool and the source. Do not lift a power tool by its cord or power supply.

5.6 In certain situations, it may be necessary to hang a portable tool. Be certain to secure it from a stable object and using a rope, tool lanyard.

5.7 Do not allow tools or their respective power supplies or cords to be run over by vehicles, or where others might trip over them.

5.8 Check immediate surroundings before operating any tool. Warn those nearby.

5.9 Be prepared for a rotating tool to jam; be sure to have secure footing and good balance, and keep loose clothing and hair tied back.

5.10 All portable and stationary grinders should be equipped with guards. Do not alter, disengage, or otherwise remove any protective device.

5.11 Shut off and bleed down air hose before disconnecting air tools.

5.12 Always use ear and eye protection when using power tools.

T09 0008-7923 Ver 04 - Approved - Exported from DMS: 2010-10-05 by ASUER

6. Electrical

6.1 Electrical work is to be done by trained, authorized personnel ONLY, and ALWAYS with a partner present. Electricity must be respected and all safety precautions followed.

6.2 Prior to work on any circuit, it must be de-energized and secured by means of a personal lock-out device or tag. The de-energized condition MUST be verified by the use of appropriate test equipment and approved methods.

6.3 Do not remove protective shields until the shielded components are de-energized.

6.4 No circuits are to be energized without first informing a supervisor or manager, and then appropriate site personnel.

6.5 Prior to working on any circuit, that circuit must be grounded. The ground wire in any circuitry is for your protection – do not bypass or damage it.

6.6 All electrically operated equipment, portable or stationary, must be grounded.

6.7 Use gloves, hot stick, and other grounding equipment as needed.

6.8 Power supplies or extension cords must be inspected for wear or damage prior to use. Do not use if cords are defective or worn.

6.9 Keep cords out of water or mud, and above or out of foot or vehicle traffic.

6.10 Temporary lighting circuits are not to be used to power electrical tools.

6.11 Disconnect switches are labeled to show the equipment or service they supply. Check carefully before operating.

7. Personal Protective Equipment

7.1 PPE - APPROVED (ANSI and/or CSA) Personal Protective Equipment, specifically selected for use by HSE Department, shall be worn in all work areas and/or situations where there is inherent risk of receiving injury or harm. Failure to do so will result in disciplinary action up to and including immediate dismissal. Substitutions for personal protective equipment are forbidden unless approved by the HSE Department.

a. **Eye and Face** – HSE approved safety glasses with side shields, face shields, goggles, etc. must be worn at all times when in contact with or when being exposed to flying particles, hazardous substances (splash or spray), or light rays. Goggles (secured with a strap) must be worn when working with, on or near any pressurized (hydraulic) system or tool such as bolt torquing or tensioning, (Hytorc or ITH), compressed gases, blade hydraulics (rams), etc. Safety glasses are required upon exiting your vehicle on-site, while climbing and in the nacelle, hub or base. Eye protection must be worn at all times except in administrative areas.

b. **Hearing** – Hearing protection must be worn when exposed to high noise levels (prolonged exposure to 85db or greater) as outlined in the day's JSA.

c. **Head** – An HSE authorized hard hat is required upon exiting your vehicle on-site. Only an HSE approved hard hat is acceptable when working around suspended loads (no work is permitted directly under a suspended load), or where there is possibility of lateral impact to the head. A Vestas approved hard hat is required for climbing and in the nacelle, hub or base. Head protection must be worn at all times, except in administrative areas or while riding in vehicles.

T09 0008-7923 Ver 04 - Approved - Exported from DMS: 2010-10-05 by ASUER

d. **Respiratory** – Hazard specific respiratory protection (masks, respirators, self-contained breathing apparatus, personal air purifying respirators, etc.) must be worn where hazards identified in the JSA are determined to be harmful to health exist. Training, fit testing and medical clearance MUST be acquired for respirator use. Respirators – assigned to individuals – shall be kept clean and replacement cartridges shall be made available by site management.

e. **Hands and Arms** – Task suitable gloves and arm protection shall be worn at all times when hands will be exposed to rough or uneven surfaces, when gloves will improve grip, or when the possibility of handling hazardous materials or substances (concrete, epoxies, cleaning agents, greases, etc.) exists.

f. **Feet** – Safety footwear must be worn at all times by field and service personnel except in administrative areas. Safety footwear must adhere to the ANSI Z41 standard or be CSA Z195 approved. Overshoes shall be worn in snow, mud, or rain conditions to access work areas and protect safety footwear from excessive soiling, premature wear, and/or wetness. If work tasks require ladder climbing, warehouse, service and field personnel shall wear approved steel or composite toed safety footwear in good condition that provides ankle and instep support.

g. **Fall Protection** – HSE approved personal fall arrest equipment must be worn, including: fall arrest gear, cable grab or slider, head protection, gloves, safety glasses and safety footwear. Only HSE approved ladder safety cable systems or certified anchorages (usually painted yellow) will be used for fall protection, fall restraint or positioning. Failure to practice 100% tie-off fall protection (fall arrest, restraint or positioning) when exposed to falls is basis for disciplinary action up to and including immediate termination. Two personnel certified in fall protection and rescue is required during climb test for new employees, visitors and subcontractors prior to tower access.

An HSE approved personal fall arrest system (PFAS) - safety harness, lanyards, and cable ascent/descent device will be worn at all times by any employee working at heights (in turbines, on scaffolds, on suspended work platforms, etc.). They should be kept in good condition and stored in a clean, dry place when not in use. They should be visually inspected daily prior to use and formally inspected (documented) quarterly, and replaced when worn or damaged. Personal fall arrest shall only be attached to certified anchors

h. **Controlled Descent** – Every Vestas Americas employee and contractor entering a turbine must have successfully completed HSE-approved controlled descent training. An approved inspected controlled descent device must be present any time an employee is working in the nacelle.

For test climbing a turbine, there must be two competent people with approved Vestas Americas controlled descent training present at all times.

i. **Clothing** – It is each individual's responsibility to evaluate the hazard present and don the appropriate PPE required to protect them from that hazard.

All personnel working in areas where electrical hazards are present shall use protective equipment that is designed and constructed for the specific part of the body to be protected and for the work to be performed.

Where installed personnel must adhere to the arc flash labels posted. If the Arc Flash Hazard Analysis (AFHA) is not complete and no labels are posted personnel are required to utilize the Vestas Arc Flash PPE Matrix or NFPA 70E table 130.7(C)(9).

T09 0008-7923 Ver 04 - Approved - Exported from DMS: 2010-10-05 by ASUER

Cotton shirts and long cotton pants without holes shall be worn. Clothing made of acetate, rayon, nylon or polyester is prohibited. Weather protective clothing is issued to employees who work in areas with extreme climatic conditions.

8. Cranes (Mobile)

8.1 A copy of current certifications for all on-site operators shall be on hand at all times.

8.2 The crane operator is in charge and must be respected.

8.3 Place outriggers on solid footing.

8.4 Keep boom, lines, and loads a minimum of fifty (50) feet away from electric power lines. To perform work closer than this minimum, power lines must be de-energized. If crane work must be done within fifty feet, a regional manager must be contacted for approval.

8.5 Never swing loads over any personnel or equipment. Persons should stay out from under all suspended loads.

8.6 Use standardized OSHA approved signals and from ONLY ONE signal person at any one time. If more than one signal is given, immediately cease operation.

8.7 Use a spotter when moving the load, backing up, or whenever additional visibility is warranted.

8.8 Riding on a suspended load is strictly forbidden at any time. Failure to follow this policy is grounds for disciplinary action up to and including termination

9. Rigging

9.1 Before use, inspect the equipment for wear or defects. Do not use if the integrity of the equipment is questionable.

9.2 Know the load limitations of the rigging equipment you will use.

9.3 Keep hands and fingers clear of the load, chokers, and slings.

9.4 All hooks must have safety latches.

9.5 The use of carabineers for rigging purposes is strictly forbidden.

9.6 Use only one eye per hook. Use a shackle if two or more eyes are involved.

9.7 Use softeners for sharp edges, and for a secure grip.

9.8 Tag lines are mandatory for all loads being lifted.

10. Heavy Equipment: Forklifts

10.1 Heavy equipment must be inspected and documented prior to each use.

10.2 Do not attempt to operate any heavy equipment until you have been properly trained and certified, and then only if authorized by a supervisor or manager.

10.3 No riders will be allowed on any piece of heavy equipment. Forklifts must not be allowed to elevate employees unless cages or platforms with guardrails and fall arrest gear are used.

10.4 Check to see that direction of travel (including overhead) is clear before and while moving.

10.5 On banks, steep slopes, and deep fill edges, be aware of the possibility and danger of overturning.

T09 0008-7923 Ver 04 - Approved - Exported from DMS: 2010-10-05 by ASUER

10.6 Keep the forks spread as far apart as possible. Always check the stability of the load before moving it.

10.7 Back down grades when carrying a load.

10.8 Lower forks as far as safely possible before moving.

10.9 Lower forks completely before leaving the equipment.

11. Excavations (Trenches)

11.1 Place high visibility barricades and warning signs around excavation site. Use warning lights, flagmen, or watchman if necessary.

11.2 Do not permit vehicles or equipment to get too close to the edge.

11.3 Place excavation spoils as far away as is safely possible to avoid load strain on walls. Remove rocks that may fall in.

11.4 Stay within the shore area and be aware of changing ground conditions.

11.5 Slope or shore all sides to prevent cave-ins. Inspect carefully after rain and/or flooding, or other hazard-increasing occurrence. Sides must be shored if vertically deeper than five (5) feet.

11.6 Ensure that there is no one below when excavating near tops of cuts, banks, and cliffs.

11.7 Use hand railed bridges as walkways across excavations.

11.8 Before backfilling any excavation, be positive that there is no one in it.

12. Non-Electrical Hot Work

A non-Electrical Hot Work Permit is required when performing any operations involving open flames produces heat and/or sparks such as welding, cutting, brazing, grinding or use of propane heaters.

13. Portable Ladders

13.1 Prior to use, inspect ladders for split side rails, missing or defective rungs, or other signs of weakness. Defective ladders should be removed from service immediately. Wooden ladders are not allowed on Vestas' sites.

13.2 Appropriately select a ladder which will extend three (3) feet beyond the top landing.

13.3 Never attempt to splice two (2) ladders together.

13.4 When climbing or descending, face the ladder and always use both hands.

13.5 Do not ascend higher than the third rung from the top of a straight or extension ladder, or above the second step from the top of a stepladder.

13.6 A metal spreader or locking device, to hold the front and back sections open, shall be on all stepladders.

13.7 The base of the ladder should be set out at least one-fourth of the ladder height measured from the bottom to the point of bearing.

13.8 Tie off all straight ladders as a precaution.

T09 0008-7923 Ver 04 - Approved - Exported from DMS: 2010-10-05 by ASUER

13.9 Ladders must not be placed in blind spots without proper barricades, or warning signs, or watch person in place.

13.10 When using a portable ladder, three (3) points of contact while climbing and a support person at the bottom of the ladder.

13.11 Ladders shall be maintained free of oil, grease and other slipping hazards.

14. Personnel Platforms

14.1 Personnel platforms shall be inspected before use according to manufacturers' specifications, and shall be designed to support the task working load capacity.

14.2 Use only HSE approved platforms.

14.3 Planking shall be designated for use on scaffolds only and marked accordingly.

14.4 Prior to use, personnel must be trained and certified on personnel platforms.

14.5 Platforms must have handrails and toe boards. Handrails and toe boards must be secured.

15. Compressed Air/Gas Tanks/Accumulators

15.1 Compressed Air/Gas tanks must be separated between empty and full containers in an upright and secured position out of the way of moving traffic. Accumulators are the only exception to the storage restrictions. (Accumulators are to be stored laid on their side.)

15.2 Remove regulators, close valves tight and cap after use and during storage.

15.3 When tanks must be moved, keep upright; use proper blocks and ties to secure to the transporter.

15.4 Tanks must have regulators removed and caps installed before moving.

15.5 If a crane is used, a cradle or suitable platform shall be used to secure the tank.

16. Fire Protection and Prevention

16.1 Prior to beginning any work, assess your work environment, noting the possibility of a fire occurring, the proximity of firefighting equipment, and a safe escape route in the event of a fire.

16.2 All firefighting equipment shall be conspicuously located, shall be easily accessible, and will be inspected and maintained on a regularly scheduled basis.

16.3 Internal combustion engine powered equipment (e.g.: portable generators) shall be so situated that the exhausts are clear of any combustible materials.

16.4 Smoking is prohibited on site except in designated areas. Smoking is forbidden in any turbine.

16.5 Gasoline or other flammable liquids should never be used for cleaning. Use approved cleaning agents only.

16.6 Oily rags should be stored in an appropriate receptacle labeled for them. Do not discard oily rags in regular rubbish bins.

16.7 A fire extinguisher rated 2A or better shall be provided for each 3,000 square feet of protected building area or major fraction thereof.

T09 0008-7923 Ver 04 - Approved - Exported from DMS: 2010-10-05 by ASUER

16.8 Travel distance from any point of the building to the nearest fire extinguisher shall not exceed 50 feet.

16.9 Fire extinguishers are to be inspected monthly by a competent person and annually by a certified inspector.

16.10 Fire extinguishers are to be unobstructed and readily accessible.

16.11 A fire extinguisher, rated not less than 10B, shall be provided within 50 feet of wherever more than 5 gallons of flammable or combustible liquids or 5 pounds of flammable gas are being used on the site (this requirement does not apply to motor vehicle fuel tanks). Fire extinguishers are also required to be up tower when working.

17. Conclusion

Staying safe is your FIRST responsibility at Vestas Americas. Stay aware and prevent hazards from occurring. Be alert to sensibly react to potential danger.

By being safety conscious at all times, you'll enhance this workplace for yourself, your co-workers, and the environment.

T09 0008-7923 Ver 04 - Approved - Exported from DMS: 2010-10-05 by ASUER

Vestas®

Acknowledgement of Intent to Follow Code of Safe Practices

Vestas Americas expects all employees, subcontractors and visitors on site to know and follow the safety rules described in our Code of Safe Practices (DMS 0008-7923).

Additionally, other safety rules (e.g.: site or job specific) may be brought to your attention, and should be followed as well.

There are many other safety regulations, such as standards issued by the Occupational Safety and Health officials that may also apply.

This Code of Safe Practices is comprised of basic rules. It is your responsibility to abide by them and ensure a safe work place for yourself and others.

Directions:

As you review the Code of Safe Practices, list each Topic Letter /Item Number that you do not understand or wish to have further clarified on each line.

Example:

A 17 ☐

Once you have read through the Code, present this list to the trainer.
As they have been explained to you and you understand them, write your initials in the adjoining box:

_____ ☐ _____ ☐ _____ ☐

_____ ☐ _____ ☐ _____ ☐

I, (Print Full Name) _____, have received and reviewed a complete copy of the Vestas Americas Code of Safe Practices.

I understand and agree to abide by these and any supplementary safety rules.

_____ _____

Employee Signature Date (MM/DD/YR)

Name/Address of Employer if other than Vestas Americas:

Name: _____

Address: _____ City: _____ ST: _____

Phone: _____ FAX: _____

The Code of Safe Practices is readily available for review in the OHSMS Manual posted on SharePoint.

Attach this SIGNED Acknowledgement sheet to the Orientation Form and file with the Site Safety Records.
Copy to: Employee File
Copy to: Employer (if other than Vestas Americas)
Copy to: Signee Above

T09 0008-7939 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

Vestas®

Site Safety Rules
Field & Service Personnel

Site Name: _____ Site Location: _____

Name (Print Full Name): _____ Date: _____

Site Supervisor: _____ Site Safety Rep _____

PLEASE NOTE: ***The following rules are mandatory. Any person choosing to disregard them may be escorted from this site and prohibited from further work on this site.*** *A map of the site, Emergency Response Plan and Emergency Contact Lists are available to all site personnel.*

1) If you arrived for work alive, with ten fingers and ten toes, excellent vision and hearing, and free from illness, we expect you to return home the same way, and so does your family.
2) All employees who drive on this site must maintain a current and valid license to drive and proof of insurance. Any change in license or insurance coverage status must be reported to your supervisor within 5 workdays.
3) A personnel record (which contains personal and emergency contact information) for each site employee shall be established and kept current. Any changes should be reported to your supervisor within 5 workdays.
4) Dress code: Long sleeved shirt (no short-sleeved, sleeveless or "tank tops") and full length trousers (no shorts) without holes, and suitable climate or weather appropriate wear. Clothing made from polyester, nylon, acetate or rayon, unless it has been treated to be flame retardant, is prohibited.
5) Safety footwear (CSA or ANSI approved) must be worn at all times except in administrative areas or while riding in vehicles. Safety footwear will support the ankles, have steel or composite toes and have a supportive shank and good tread. "Cowboy" style boots, unless they meet all above requirements for safety footwear, are not allowed.
6) Hard hats or Petzl helmets must be worn at all times except in administrative areas or while riding in a vehicle. Only a hard hat is acceptable when working around suspended loads (no work is permitted directly under a suspended load), or where there is a possibility of lateral impact to the head.
7) Failure to practice 100% tie-off fall protection when working at heights of 6 feet or more is basis for disciplinary action up to and including immediate termination.
8) Eye protection must be worn at all times except in administrative areas. Safety goggles (secured with a strap) must be worn when working on or near any pressurized (hydraulic) system or with or near any pressurized (hydraulic) tool such as the Hytorc or ITH.
9) All personal jewelry (i.e. metal rings, earrings, watches, necklaces, etc.) should be removed before working on or around energized electrical or mechanical equipment or tools.
10) All climbing and lifting equipment must be inspected daily before use and defective equipment removed from service immediately.
11) Speed limits (unless otherwise posted): County Roads (paved) 55 mph – Township Roads 35 mph – Site Roads (graded) 15 mph are strictly enforced. Reduce speed to 5 mph on graded roads when workers are present or where visibility or road conditions are impaired in any way.
12) All site vehicles will provide Right-Of-Way to farm vehicles (harvesting machines) and school busses – DO NOT PASS.
13) Vehicles shall stay on established roads. Do not park any vehicle where the exhaust system could ignite dry vegetation.
14) Vehicles must be parked with the hood facing into the wind to prevent vehicle door damage or personal injury.
15) Seat belts must be worn by all occupants when traveling in vehicles.
16) Riding in or on any motorized vehicle or piece of equipment anywhere other than where designed for a passenger is prohibited.

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T09 0008-7944 Ver 03 - Approved - Exported from DMS: 2010-07-09 by ASUER

17) To ensure a safe and healthful workplace for all employees, site guests and visitors, use of tobacco products is prohibited inside any administrative building, in company vehicles, or in WTGs. Smoking is restricted to designated outdoor areas only. Spent tobacco materials (cigarette butts, matches, chew) must be securely contained (disposable ashtray or other enclosed containment device) until it can be properly disposed of.
18) No controlled substances, alcohol, weapons or firearms are permitted on this site. Report any physician prescribed medicines to your site supervisor before you begin work.
19) All site employees shall be aware of hunting season and the potential presence of hunters – bows and rifles.
20) Violence/Harassment Free Workplace: No threatening or aggressive behavior toward other site personnel will be tolerated. No roughhousing, horseplay or bravado will be tolerated.
21) Do not intentionally kill or harass wildlife. Do not feed, lure, trap or capture any creature. Exception: vermin control.
22) Dead or injured birds of prey must be reported to the Site Supervisor immediately. It may be necessary to secure the scene by putting up a security boundary until proper authorities (i.e. Dept. of Fish & Game) are able to respond.
23) All equipment operators must be properly trained. Employers must provide training, or verify current and valid records of training, before access to machinery or equipment is assigned.
24) Wind turbine tower doors must NEVER be locked from the inside or otherwise prevent emergency entry.
25) High visibility barriers and signage shall be posted around all open excavations and trenches and must be respected.
26) Where necessary, high visibility traffic control measures will be used when working on or adjacent to the site roads especially when using cranes and excavators, digging trenches or blocking part of the road for any reason.
27) Fire prevention measures must be followed, including completing a HOT WORK PERMIT prior to performing any hot work such as cutting and welding, or use of open flame torches.
28) All waste (plastic, cardboard, empty containers, etc.) shall be properly and securely contained until it can be disposed of. Bags of trash must be tied shut - dumpsters shall be kept covered - pallets stacked neatly – oil, solvent, or paint soaked rags must be stored in closed metal containers.
29) All incidents, including vehicle incidents or near miss events, must be reported to your supervisor as soon as possible so that the reporting and investigation process can begin and so that corrective measures can be taken to prevent recurrence. Post-incident drug tests may be required.
30) All personnel must attend regularly scheduled site safety meeting with their employers.
31) All personnel must report any hazardous or unsafe conditions, anonymously if they prefer, to the site supervisor or to the Safety Department (VAME-safety@vestas.com).
32) Know your Site Safety Representative and the correct procedures to follow in emergency situations.
33) Work requirements of this project may require employees to climb vertically in excess of 250' and access restricted or confined work areas. Failure to do so or have the ability to do so may result in termination.

REPORT ALL SAFETY HAZARDS OR INCIDENTS TO YOUR SUPERVISOR IMMEDIATELY

I acknowledge that I have read and fully understand these rules and agree to comply with them at all times while on this site. I also understand that disregard for these rules can result in disciplinary action up to and including immediate termination. If I do not understand these or any other rules, policies or procedures, it is my responsibility to ask.

Signature _____ Date _____

VESTAS PROPRIETARY NOTICE

T09 0008-7944 Ver 03 - Approved - Exported from DMS: 2010-07-09 by ASUER

New Employee Safety Training (Orientation)

Vestas

PLEASE PRINT:

NAME: _____

COMPLETE HOME ADDRESS: _____

HOME PHONE: _____

OTHER #: _____

EMERGENCY CONTACT NAME & PHONE #: _____

SITE/LOCATION: _____

PROJECT/SITE MANAGER: _____

SITE SAFETY OFFICER: _____

☐ NEW HIRE ☐ REHIRE ☐ TRANSFER - From: _____ ☐ OTHER: _____

DATE OF THIS SITE ASSIGNMENT: _____

ORIGINAL HIRE: _____

CHECK EACH ITEM AS IT IS EXPLAINED TO YOU:

I. PROJECT/SITE LOGISTICS

☐ Schedule: Shift, Start/End & Break Times	☐ Site Access/Speed	☐ Phones &/or Radios	☐ Work Uniform/Footwear
☐ Sanitary Facilities - Restrooms & Water	☐ Site Access/Parking	☐ Harassment Policy	☐ Emergency Response Supplies
☐ Eating Areas - Food Storage/Recycling	☐ Site Access/Security	☐ Smoking/Chew Policy	☐ Weather

II. INITIAL TRAINING ON THE HEALTH AND SAFETY PROGRAM, INCLUDING:

☐ Reporting safety concerns and the right to ask any question, or report any safety hazard, either directly OR ANONYMOUSLY without any fear of reprisal.

☐ Disciplinary procedures that may be used to ensure compliance with safe work practices.

☐ The location of departmental safety bulletins, safety postings and federal, state and local required postings.

☐ Access to the Vestas Safety Committee. Site Representative: _____

☐ Pre-Task Planning Forms (Pre-Lift, Tail Gate, JSAs, etc.)

☐ Reporting Occupational Incidents - Injuries, Illnesses, Vehicle or Equipment Damage and Near Miss events.

☐ Emergency Contact Phone Numbers. To summon Emergency Medical Response, Call: _____

☐ Safety Meetings - Site Schedule and Policy: _____

III. HAZARD COMMUNICATION TRAINING

☐ The potential occupational hazards in the work area and **safe work practices and/or personal protective equipment** required for my job title/assigned tasks:

○ Bloodborne Pathogens - **Universal Precautions**	○ Cranes & Forklifts - **Trained Operators**	○ Office Area Hazards - **Ergonomics**
○ Electrical Hazards - **LOTO, GFCI & Grounding**	○ Confined Space - **Permits & Attendants**	○ Poisoning/Spills - **Haz Com Training**
○ Fall From Heights - **Fall Protection Training/PPE**	○ Excavations - **Barricades & Bridges**	○ Site Hazards - **Semi Annual Audits**
○ Vehicle Accident - **Defensive Driver Training**	○ Slip/Trip/Fall - **Housekeeping**	○ Weather - **Emergency Response Plans**
○ _____	○ _____	

☐ The hazards of any chemicals to which I may be exposed, and my right to review the information contained on the Material Safety Data Sheets.

☐ The labeling and hazard warnings for containers of hazardous chemicals.

☐ The location and availability of Material Safety Data Sheets (MSDSs), the site Chemical Inventory List & the VWS Black List.

☐ The Person Responsible for maintaining the Material Safety Data Sheets (MSDSs) and the site Chemical Inventory List.

☐ The Business Processes and Work Instructions regarding EMS (Environmental Management Systems) compliance have been reviewed.
(These Business Processes are available on SharePoint.)

☐ The procedure for updating the site chemical inventory list.

☐ [illegible] have had the opportunity to review the material safety data sheets for the substances currently in use or stored at this site.

T09 0008-7947 Ver 02 - Approved - Exported from DMS: 2010-03-09 by ASUER

IV. OTHER SAFETY TRAINING / INFO:

☐ Site Safety Rules	☐ Fall Arrest System Inspection	☐ Climb Test	☐ Emergency Response Plan
☐ Code of Safe Practices	☐ PPE Issue & Training	☐ Safety Bulletin Review	☐ Controlled Substance Policy

V. EMPLOYEE CERTIFICATION/DATE *(COPY and ATTACH proof of Current/Valid Training and Certification below - Record Expiration Dates)*

☐ Fork Lift Operator: _____ ☐ First Aid/CPR: _____

☐ Crane Operator: _____ ☐ Other: _____

I fully understand the above items and agree to comply with safe work practices in my work area at all times.
I understand that my actions can affect the health and safety of others.
I understand that disciplinary action, up to and including termination, may result from failure to follow procedure.
I also understand that every individual is ultimately responsible for his/her own safety.

EMPLOYEE SIGNATURE: _____ DATE: _____

I, (Instructor's Name/Job Title) _____
hereby certify that this employee has been trained on the items checked on this form.

INSTRUCTOR SIGNATURE: _____ DATE: _____

**When complete, file report in Site Safety Records, or forward to the Vestas Americas HSE Dept.*
CA Sites - This completed form provides evidence of initial training required under the SB-198 - Injury & Illness Prevention Program.

Attach copy of Driver's License, Proof of Insurance, and any available certifications:

T09 0008-7947 Ver 02 - Approved - Exported from DMS: 2010-03-09 by ASUER

Contents

1. **Purpose** 2
2. **Scope** 2
3. **General Safety Requirements** 2
4. **Personal Protection** 3
5. **Ventilation** 3
6. **Fire Prevention** 3
7. **Compressed Air** 4
8. **Eye Injuries** 4
9. **Ear Injuries/Hearing Damage** 4
10. **Burns** 4
11. **Falls** 5
12. **Fumes** 5
13. **Asphyxiation** 5
14. **X-Rays** 5
15. **Welding** 5
    15.1 General Precautions 5
    15.2 Arc Radiation 6
    15.3 Fire Prevention 6
    15.4 Explosions 6
16. **Burning and Cutting** 7
    16.1 General Precautions 7
    16.2 Eye Protection 7
    16.3 Emergency Situations 8
17. **Compressed Gas Cylinders** 8
    17.1 General Requirements 8
    17.2 Cylinder Storage Requirements 9
18. **Hose and Hose Connections:** 9
19. **Torch Safety** 10
20. **Grinding** 11
21. **Non-Electrical Hot Work Permit** 11
    21.1 Non-Electrical Hot Work Permit Issuer: 12
22. **History of this Document** 13

T09 0008-8001 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

1. Purpose

The purpose of this program is to ensure that Vestas – American Wind Technology, Inc employees are properly protected when performing **HOT WORK** which includes, but is not limited to welding, burning, and grinding operations and have a clear understanding of the hazards involved and the proper way to control them. Control of welding, burning, and grinding hazards include avoiding eye injury, respiratory protection, ventilation of the work area, protective clothing and having safe equipment use. To establish the written requirements for the safe performance of **NON-ELECTRICAL HOT WORK** operations. These requirements also help to ensure compliance with Federal OSHA *General Industry Standard 29 CFR 1910 Subpart Q and Construction Standard 29 CFR 1926 Subpart* J.

2. Scope

This program applies to all Vestas – American Wind Technology, Inc. employees, Suppliers/ Contractors who may be performing non-electrical **HOT WORK**, welding, burning, and grinding operations at a Vestas job site. Improper welding, burning, and grinding can be dangerous, but can be performed safely by following simple common sense procedures. The following information includes a list of potential hazards associated with welding, burning, grinding and includes guidelines by which hazards of these operations can be controlled and/or eliminated.

NOTE: This information is intended for use on many different types of jobs and as such, very general in nature. Specific job rules-standards may dictate requirements that are more stringent.

3. General Safety Requirements

- Disposable butane pocket lighters are not allowed where any **HOT WORK** is being performed.
- Assure welding leads and burning hoses are clear of high traffic areas and are neatly arranged to prevent tripping hazards.
- Inspect all leads, ground clamps, welding machines, hoses, gauges, torches, and cylinders each day prior to use.
- Treat welding cylinders with care. Keep cylinders secured in an upright position. Replace the protective caps when cylinders are not in use.
- Be sure all fittings, couplings, and connections are wrench tight.
- Use flashback arrestors on manifold outlets.
- Return all empty cylinders to a designated cylinder rack.
- Provide adequate ventilation.
- Appropriate fire extinguishing equipment must be readily available (25-50 ft).
- Know where the nearest fire extinguisher is located. Use a fire watch when necessary.
- All combustible material below welding and burning operations must be removed to a safely location and/or covered with protective approved fire retardant material.
- Protect others from <u>your</u> welding, cutting or grinding operation. Use approved welding curtains or flash screen in and around active work areas.

T09 0008-8001 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

- A **HOT WORK PERMIT** is required for any temporary operation involving open flames or producing heat and/or sparks. This includes, but not limited to Brazing, Cutting, Grinding, Soldering, Thawing Pipe, Torch applied roofing and welding.

4. Personal Protection

- Long-sleeve leather gloves, high top shoes, hard hats, a leather jacket, and other protective clothing and equipment as required shall always be used. Ear protection shall always be used for protection form hot sparks and molten metal. Clothing shall be selected with consideration given to the flammability of the material.
- Use the proper disposable particle and vapor type respirators, (Refer to Vestas-AWT Respiratory Protection Program), and additional ventilation, as required, when welding, cutting, gouging or burning on coated materials, such as galvanized or heavily painted materials.
- Do not perform **HOT WORK** in such a manner that sparks, slag, hot metal or the other cut parts will fall on you, other personnel, or on flammable materials.
- Do not smoke when connecting or disconnecting regulators, torches or hoses.
- Do not start burning or heating operations until you have checked to see that sparks or heat will not cause damage or personal injury.
- Anytime an operator is heating, brazing or burning on material where the other side cannot be seen and/or the possibility of fire exists, a fire watch shall be used.
- Wear higher top boots to protect ankles.
- Wear the proper welding hood with shaded lens. Prior to welding, check hood for leaks.
- Wear long pants without cuffs.
- Don't wear excessively greasy or dirty clothing
- Button your collars and sleeves to prevent sparks from entering.

5. Ventilation

When performing **HOT WORK** in a confined or enclosed space, provide mechanical ventilation as needed.

When performing **HOT WORK** on galvanized metal, be especially careful to provide adequate ventilation, smoke eaters, and/or appropriate respirator. (Refer to Vestas-AWT Respiratory Protection Program).

6. Fire Prevention

- Check perimeter areas, floor and walls openings.
- Use fire watch when needed.
- Use fire retardant blankets where needed.
- Remove flammable and combustible materials.
- Recheck areas at quitting time.

T09 0008-8001 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

7. Compressed Air

- Inspect all hoses and couplings before using them.
- Never crimp, couple or uncouple pressurized hoses. Shut off the valve and slowly bleed the hose.
- Use hose that is designated for compressed air only
- Use guards whenever they can be used. If you must remove a guard for any reason, get authorization from your supervisor, and replace it as soon as possible.

8. Eye Injuries

Grinding or welding sparks or slag can cause eye injuries. Full-face shields and safety glasses should be worn at all times. (Specific job requirements may be more stringent.)

Use care in removing safety glasses, face shield and welding hoods so as not to cause residual dust particles to enter eyes.

9. Ear Injuries/Hearing Damage

Welding, cutting or grinding sparks can enter the ear and burn and possibly permanently damage the ear.

High noise levels from carbon-arc cutting or the plasma arc cutting processes can affect your hearing.

Always wear protective ear equipment as appropriate. Protection, which covers the entire ear, is recommended.

10. Burns

- Exposed skin is an invitation to burns. Be sure to wear long-sleeved shirts that are not open at the chest and always fasten the top button of you shirt or jacket. Use leather jackets when appropriate;
- Avoid polyester clothing since it melts easily and can result in serious burns;
- Falling slag, spatter or molten filler metal can cause burns to ankles and feet. Wear high top safety shoes. Avoid trousers with cuffs;
- Never carry flammable items such as matches and lighters in your pocket while involved with "hot work". Disposable butane pocket lighters are not allowed where any "hot work" is carried on;
- Always wear the appropriate type of leather gloves for welding or cutting process being employed;
- Be extremely cautious around weld joints that require high preheat temperatures, and the use of added heat sources for maintenance of the required preheat temperature; and
- Before leaving a work area, always mark "hot work" pieces (with soapstone, crayon, etc.) to alert others of this hazard.

T09 0008-8001 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

11. Falls

Welding cables, hoses and lines lying about the floor or deck are tripping hazards. Always keep cables, hoses, and lines off the decks and floors and on hangers and out of main walkways.

Electrode stubs lying on floors or decks are slipping hazards. Always use the appropriate stub end containers.

While welding, the welding hood prevents an individual from relating to the immediate surroundings. Be aware of the hazards around your area, and use safety belts when appropriate, or as required by job rules.

12. Fumes

Avoid breathing fumes and gases. Always try to keep your head out of the direct path of the fume plume.

Use the proper vapor type respirators, and additional ventilation, as required, when welding, cutting, gouging or burning on coated materials, such as galvanized or heavily painted materials.

Make sure adequate ventilation is available, and used, when welding or cutting in confined areas.

13. Asphyxiation

Inert gases, such as argon, helium, nitrogen and carbon dioxide displace air in a confined space as they build up. The flame of an oxy-fuel torch can form poisonous carbon monoxide.

Always be sure there is adequate ventilation when using these inert gases, especially in confined areas.

Never enter a confined space without proper authorization.

14. X-Rays

X-Rays are commonly used for weld inspection. Excessive exposure to X-Rays can pose a hazard to your health. Never cross radiation barriers.

15. Welding

15.1 General Precautions

- Electrode holders shall be in good repair and rated for the maximum capacity of equipment used.
- All cables and connectors shall be in good repair, tightly attached, fully insulated, and rated for the maximum capacity of the work.
- Welding lead shall have a safe current capacity equal to or greater than the specified maximum output of the arc welding or cutting unit, which it services. When a single work lead services more than on unit, its safe current carrying capacity shall equal or exceed the total specified maximum output capacities of all the units, which it services.
- All electrical equipment (welding machines) and work shall be properly grounded. The welding lead is not a ground lead. It is used only to complete the electrical circuit. A separate

T09 0008-8001 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

connection may be required to ground the work piece. Do not mistake the work lead for a ground.

- Pipelines containing gases and/or flammable liquids, or conduits containing electrical circuits shall not be used as a ground.
- When electrode holders are to be left unattended, the electrode shall be removed and the holders so placed or protected that they cannot make electrical contact with personnel or conducting objects. Always put stub ends in appropriate containers.
- Do not weld while standing in water or if clothing and gloves are wet.
- Inspect equipment for loose connections or bare and/or damaged wires. Do not use faulty equipment.
- Turn off your welding machine at the end of your shift and/or when machine is not in use for an extended period.

15.2 Arc Radiation

Infrared or ultraviolet radiation from the arc can burn the eyes or skin. Intense light can cause an irritation in the eyes known as "welder flash", arc-eye" or flash burn. Always view the arc when protected with a shield using protective altered lenses of the appropriate shade. The following are recommended shade numbers:

- SMAW 10 to 14
- GTAW 10 to 12
- GMAW 10 to 12
- FCAW 11 to 14
- Carbon Arc -14

A slightly lighter or darker shade may be required depending on individual needs.

Avoid light, thin Clothing.

15.3 Fire Prevention

- Acetone and alcohol are commonly used for cleaning parts to be welded. Be sure to keep these containers and rags a safe distance from **HOT WORK.**
- Sparks and/or splatter from welding and/or arc gouging may ignite burnable items in the area. Assure areas are free of trash and debris.
- Burnable materials shall either be removed from the area where welding or arc gouging is to take place or materials are protected with approved flame retardant materials.
- Sparks and spatter from arc gouging travel considerable distances. Whenever possible, orientate the spark stream to minimize concern for fire and/or damage resulting from the spark stream. Use approved fire retardant shielding and/or fire watch as appropriate.
- When welding on decks, walls, or overhead, assure that necessary precautions are taken to prevent fire and/or heat damage to adjacent areas.
- Assure that full knowledge of the locations and proper use of fire extinguishing equipment.

15.4 Explosions

T09 0008-8001 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

- Do not weld and/or use arc-gouging equipment in the presence of propane, acetylene or any other flammable materials.
- Do not perform any **HOT WORK** in or on any tank, vessel, or container unless it is properly vented.
- Do not perform **HOT WORK** in or on any vessel, tank, and/or container that carry or have carried flammable materials, liquids, gases until the container has be properly cleaned and tested for safe **HOT WORK** by a qualified person.
- Appropriate ventilation shall be used during **HOT WORK**.
- Never strike an arc on any cylinder.

16. Burning and Cutting

Improper use of any oxy-fuel equipment can be extremely dangerous and has the potential to cause personal injury and/or property damage. Oxy-fuel equipment is used extensively in our operations to aid us in performing our work. These operations can be performed safely by following simple precautions.

16.1 General Precautions

- Do not use leaking and/or defective equipment.
- In the event of a cylinder valve leak, immediately stop all **HOT WORK** and notify your supervisor.
- Manifold valves that are not operating properly shall be immediately reported to your supervisor.
- In the event torches and/or regulators leak, report to your supervisor. Repair shall be made by authorized personal only.
- Hose leaks and/or damaged shall be reported immediately.
- Compressed gas cylinders must always be stood upright and properly secured. Protective valve caps must be installed when cylinders are not in use.
- Cylinder and manifold valves must be closed when not in use. Do not over tighten. If cylinder valve becomes frozen, thaw it at room temperature or use warm water no greater than 125 degree F. Never use open flame or electric heating device of any kind.
- Keep Oil and grease away from oxygen regulators, hoses and fittings. Do not store wrenches, dies, cutters or other grease-covered tools in the same compartment with oxygen gauges and/or equipment.
- Wear only approved burning goggles.

16.2 Eye Protection

When burning/cutting operations are taking place, personnel shall be protected with the proper burning goggles having the shaded lens required for the type of work being performed.

- Light cutting, up to 1" No. 3 or No. 4
- Medium cutting 1" to 6" No. 4 or No. 5
- Heavy cutting, over 6" No. 5 or No. 6

T09 0008-8001 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

16.3 Emergency Situations

In case of a flashback and/or ruptured hose, the operator's first duty is to stop the flow of gases. This can be done either directly behind the damaged or burning area (if it can be done safely) or at the cylinder or manifold.

If it can be done safely, the torch and hose should be moved out of confined areas to an open space (preferably outside).

Any equipment that has been involved in a flashback, fire or explosion shall be completely inspected prior to being put back into service.

17. Compressed Gas Cylinders

Serious accidents may result from the misuse, abuse or mishandling of compressed gas cylinders. The two most commonly used compressed gas cylinders found on sites are oxygen and acetylene.

Employees whose work involves compressed gas cylinders are to be trained in the safe methods of handling, storage, and use.

17.1 General Requirements

- Cylinders shall be kept away from radiators and all other sources of heat. Do not place cylinders in any location where they could become heated to 125 degree F.
- Empty cylinders shall have closed valves.
- Storage of empty cylinders shall be separate from fully charged cylinders.
- Valve protection caps, where cylinder is designed to accept a cap, shall always be in place, hand tight except when cylinders are in use or connected for use.
- Protection from solar radiant heat shall be provided where cylinders are directly exposed to sunlight.
- Compressed gas cylinders shall be secured in an upright position at all times except for short periods while cylinders are actually being hoisted or carried.
- A fire extinguisher shall be no closer than 25 feet, but not farther than 50 feet from areas where fuel gases are stored.
- If a storage area is dock height, appropriate guard railing and safe access shall be provided.
- A Suitable cylinder truck, cradle, or suitable platform shall be used when moving cylinder. Slings, hooks, or electric magnets shall not be used. Valve protection caps must always be in place during transport.
- Cylinders must be kept far enough away form actual welding or cutting operations so sparks, hot slag or flame will not reach them.
- Cylinders, when not in use, shall be turned off and the hoses and regulators shall be bled off.
- Acetylene in cylinders is dissolved in liquid acetone. Never lay an acetylene cylinder on its side because the acetone liquid can get into the regulator and/or hoses, and cause flashbacks. Occasionally, liquid acetone may be drawn out of the cylinder along with the acetylene gas when a very large gas flow is required. Evidence of this will be erratic "spitting" of the flame. Installing a manifold to use two or more cylinders simultaneously will eliminate this problem.

T09 0008-8001 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

- Acetylene cylinder valves should be opened only ¾ to 1 ½ turns. This will permit adequate flow of gas and restrict flow rates, which could draw acetone out of the cylinders.
- All propane and oxygen cylinders should be opened all the way and seated at the full-open position to reduce the possibility of valve stem leakage.
- Cylinders handled by cranes shall be secured in a specially made rack or material skip box. Never use magnets or slings to handle compressed gas cylinders.
- Always refer to oxygen as **OXYGEN** and not as air. Oxygen shall not be used for ventilation purposes, comfort cooling, blowing dust from clothing, or for cleaning work area.
- Never set acetylene outlet pressure above 15 PSI as acetylene gas becomes unstable at pressure greater than 15 PSI and may explode.
- Isolate cylinders to prevent contact with welding or other electric lines. Do not let cylinders become part of an electrical circuit.

17.2 Cylinder Storage Requirements

- Oxygen cylinders in storage shall be separated from fuel or gas cylinders or combustible materials (especially oil or grease) a minimum of 20 feet or by a noncombustible barrier at least 5 feet high having a fire-resistant rating of at least one-half (1/2) hour.
- Inside of facilities and/or enclosures, cylinders shall be stored in a well-ventilated, well-protected dry location at least 20 feet from highly combustible materials such as oil or shavings. Cylinders shall be stored in designated locations away form stairs, hallways, etc. Designated spaces shall be located where cylinders are protected from being tipped over and/or damaged by passing or falling objects or subject to tampering by unauthorized persons. Cylinders shall not be stored in unventilated enclosures such as lockers and cupboards.
- Inside a building, cylinders except those in actual use or attached for use, shall be limited to a total gas capacity of 2, 000 cubic feet to 300 pounds of liquefied petroleum gas.
- Warning signs shall be conspicuously placed and shall read, 'Danger- No Smoking, Matches or Open Flames' or other equivalent wording.
- Acetylene cylinders shall be stored valve end up.
- A chain or other secure fastening shall be used to keep cylinders from being knocked over while in storage.
- Empty cylinders shall have their valves closed. Valve protection caps shall always be in place, except when cylinders are in use or connected for use.

18. Hose and Hose Connections:

- Oxygen hoses must be of a different color from hoses used for fuel gas lines (oxygen-green: fuel-red).
- Connections must be cared for so that the brass fitting will not leak and will be able to withstand twice the maximum delivery pressure of the regulators provided.
- Standard oxygen equipment has right hand threads; fuel gas equipment has left handed threads. Never force connections.
- Inspect hoses for leaks and other defects such as nicks, cuts, and abrasions.

T09 0008-8001 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

- Never use tape to correct a deficiency; get another piece of hose.
- Never stand in front of the gauges on the regulator when opening the discharge valve of the tank. Open discharge valve slowly. Sudden pressure may destroy the gauge and blow out glass and parts.
- *Keep caps and plugs on and in gas outlets to prevent foreign debris and liquid from entering* the system and/or damaging the threads.
- Frequently (at least daily) inspect all connections seats and fittings. If warped, scarred, or damaged in any way, do not use the part. Repair or replace.
- Always remove open-ended oxy-fuel hoses from confined spaces immediately or cap the ends of the hose with approved hose caps.
- Before installing regulators on cylinders or manifolds, open the cylinder or manifold valve slightly (standing to one side) and quickly close the valve. This activity know as "blowing out" the valve seat area, cleans the seating area of dust, dirt, and debris.

19. Torch Safety

- Do not handle torch roughly or use it as a hammer, hook or pry bar.
- To minimize leaks, fuel gas control valves on hand torches have soft nylon seats. These valves should be closed only to the point where the flow of gas is stopped. Forcing them beyond this point will cause damage and impair the proper operation of the equipment.
- Use only tips that have clear passages and clean seats free from bruises or scars. A bruised or dented tip makes a leaky seat and scores the torch head.
- Do not attempt to improve the performance of a tip by drilling, peening, bending or otherwise modifying the original design.
- Torch tip cleaning should only be done with special tip cleaners
- Always perform safety check on all torch equipment. Blow out the torch and hoses before you attempt to operate the equipment.
- When lighting a torch, light it quickly, keeping the torch flame away from you, others, gas equipment and combustibles. Remember not to let too large a volume of gas escape before igniting the torch.
- When lighting a torch, open the fuel gas valve on the torch before opening the oxygen valve.
- Light torches with striker lighters only. Always use approved spark lighter for igniting oxy-fuel torches. Never use matches or cigarette lighter. Do not try to re-ignite a torch on **HOT WORK** as accumulated gas may cause an explosion.
- Do not let the tip of the torch contact work when using an acetylene torch. Flashback or backfires will almost certainly occur. If the flame pops or goes out for any reason, turn off torch valves immediately and investigate the problem.
- Prior to lighting your touch, but after all hose and torch connections have been safely made, the regulators shall be opened for a short interval of time to permit complete filling of the hoses. The supply valve will than be closed and the pressure on the gauges watched for 60 seconds. Any drop in pressure indicates a leak. (Torch valves shall be closed). Do not turn on the

T09 0008-8001 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

supply valve again until the leak has been repaired. This activity is known as your "Torch Safety Check".

- After your "Torch Safety Check" has been performed, go back to the torch, and if it is not already in an open space (preferably outside), carry it to an open area where it will be safe to blow it out. Never blow out a torch or hose in a confined or enclosed space.
- Keep tips clean.
- Never attempt to relight a torch from **HOT WORK**, especially in a confined space.

20. Grinding

- Always use proper protective equipment.
- Use guards whenever they can be used. If you must remove a guard for any reason, get authorization from you supervisor, and replace it as soon as possible.
- Use flash screens or other nonflammable barrier to confine flying particles whenever anyone else could become exposed to flying particles.
- Inspect grinding wheels before using them. Use only wheels that are rated (RPM) for the machine you are using.
- On bench grinders, keep tongue guards no more than 1/4 inch and work rests no more than 1/8 inch away from the grinding wheel.
- Do not use or allow any oily or greasy substance to come in contact with compressed gas cylinders, manifold valves, regulators, hoses or torches. Oil or grease in the presence of oxygen may ignite with explosive violence.
- Keep the torch flame, sparks, molten metal, and hot slag away from hoses, regulators, and cylinders.

21. Non-Electrical Hot Work Permit

Before initiating Hot Work, always consider alternatives to avoid performing hot work. Is there a safer way?

The term **NON-ELECTRICAL HOT WORK** is defined as any operation that involves open flames or produces heat and/or sparks. Some examples of **NON-ELECTRICAL HOT WORK** are welding, cutting, brazing, soldering, grinding, and the use of propane heaters. All **NON-ELECTRICAL HOT WORK** must be permitted by use of a **NON-ELECTRICAL HOT WORK PERMIT**.

The **NON-ELECTRICAL HOT WORK PERMIT** must be prominently displayed in the work area where the **NON-ELECTRICAL HOT WORK** is being performed.

Requests for a **NON-ELECTRICAL HOT WORK PERMIT** should be made to Vestas Americas site management prior to starting any **NON-ELECTRICAL HOT WORK**. This individual will be different across the Americas.

Material Safety Data Sheets (MSDS) for the welding rods, gases, fluxes and other chemical materials used in performing **NON-ELECTRICAL HOT WORK** must have received approval from Vestas site management prior to items being brought on site.

T09 0008-8001 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

NON-ELECTRICAL HOT WORK will not be initiated and/or will be terminated if the requirements in this document are not followed.

21.1 Non-Electrical Hot Work Permit Issuer:

Complete and issue the **NON-ELECTRICAL HOT WORK PERMIT** only after the following requirements are met:

- Visually inspect the area where **NON-ELECTRICAL HOT WORK** is to be performed.
- Determine what special precautions are required, if any;
- Inform the personnel performing the **NON-ELECTRICAL HOT WORK** of any hazards or other special instructions necessary to do the work safely;
- Ensure the **NON-ELECTRICAL HOT WORK** equipment is in good repair;
- Ensure the required PPE is available, in good condition, the employee is properly trained and will be worn during the **NON-ELECTRICAL HOT WORK**;
- Ensure fire watch has been designated, if needed;
- Ensure fire extinguishers or any other safety equipment or supplies are available for use;
- Inspect the area periodically while the **NON-ELECTRICAL HOT WORK** is being performed.

Follow the **NON-ELECTRICAL HOT WORK PERMIT** process and security procedures.

Note: The Vestas Americas Environmental, Health & Safety Department has determined that all sites must meet or exceed the Vestas-Americas Hot Work Permit form requirement

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22. History of this Document

Rev. no.:	Date:	Description of changes
00	2003-11-20	First edition – Reformatted and renumbered 21-May-07
01	2010-01-01	Content and template updates

T09 0008-8001 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

Hot Work Permit

Vestas

SITE NAME: _____ LOCATION: _____

DATE: _____ TIME: _____

WORK TO BE PERFORMED IN / AT (Describe location / nearest structure):

PERMIT ISSUED TO (NAME): _____

PERMIT EXPIRATION (TIME): _____ DATE: _____

DESCRIBE WORK TO BE DONE:

REQUIRED EQUIPMENT: *(Inspected and operational; "X" all that apply to this permit)*

☐ Glasses/Goggles	☐ Body Protection	☐ Hard Hat	☐ Ventilation	☐ Air Monitoring (Tunnels only)
☐ Shield/Helmet	☐ Gloves	☐ Respirator	☐ Communication	☐ Special Protection/Tools

FIRE WATCH REQUIRED? *Fire Watch: a person stationed at the hot work area who monitors the area for the beginnings of any potential, unwanted fires. The Fire Watch may be assigned other duties while in the hot work area. A Fire Watch is required in the following situations: in a sprinklered building when the sprinkler system is impaired; when there are combustible materials within 35' of the hot work area; when large amounts of combustible materials are present, even if located 35'+ from the hot work area, but close enough to be ignited by a spark; any time there is a high risk that a fire could start.*

The Fire Watch must have readily available, appropriate fire extinguishing equipment, and be trained in its use and limitations. They shall also be familiar with the procedures for sounding an alarm in the event of a fire. The Fire Watch will watch for fires in all exposed areas and try to extinguish them ONLY when obviously within the capacity of the equipment available - otherwise they will sound the alarm immediately.

☐ NO ☐ YES - IF YES, NAME(s):

PRECAUTIONS CHECKLIST - *Complete prior to any hot work planned for an area not designed for hot work. "X" each box where the statement is true. If any statements are not true, then hot work shall not begin until that issue can be safely resolved.*

- ☐ Fire suppression sprinklers, fire hoses, and/or fire extinguishers are available and operable - employees are trained to use them.
- ☐ Flammable and ignitable materials & debris are moved at least 35' from hot work area OR covered & protected with fire resistant material OR Fire Watch arranged.
- ☐ Smoke/fire detectors/alarms in immediate area of hot work have been temporarily disabled.
- ☐ Building/site occupants have been protected/isolated from hot work area.
- ☐ All cracks or openings in walls, floors, ceilings (including duct work) are covered or plugged.
- ☐ Welders have been protected from electrical hazards. Metal equipment and materials have been adequately grounded.
- ☐ Hot work equipment is operable and in good repair - CGCs have been leak tested - welding machines have been inspected.
- ☐ Drums, barrels and tanks have been cleaned and purged of flammables and toxics - all tanks feeds are closed, and tank is vented.
- ☐ Workers and Fire Watch have been trained in use of equipment and how to sound the alarm.

TIME STARTED: _____ : _____

WHEN WORK IS COMPLETED: *At the completion of the hot work, inspect the work and surrounding areas for the possibility of smoldering or fire, ensure that all hot work equipment has been removed from the area and, if appropriate, re-activate the fire detection equipment. If appropriate, notify the building/facility manager or contact person that the work has been completed. Complete this section and close the permit by signing at the bottom.*

- ☐ Inspected hot work area and all potentially affected surrounding areas for fire, fire damage, or potential for fire.
- ☐ Reactivated smoke/fire detectors/alarms that were disabled to perform the hot work.

I verify that the precautions on this permit have been taken to prevent fire and that the work has been authorized. The creation or discovery of any work induced hazards or other unforeseen, actual, apparent or potential hazards will be assessed, and additional precautions taken, if necessary.

Signature: _____ *Date:* _____

TIME COMPLETED: _____ : _____

SITE MANAGER APPROVAL:

Signature: _____ *Date:* _____

***HOT WORK:** Cutting, welding, brazing, torch soldering, high speed metal grinding, or use of an open flame. Hot work is not permitted: within 50' of explosives, stored cylinders, or stored fuel; unless authorized by a supervisor; in the presence of a potentially explosive atmosphere.*

File completed forms in the Site Safety Records, Section 15.

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Vestas®

Guest Agreement & Release of Liability

DMS 0008-7954 R01
Date 2010-01-01
Page 1 of 1

I, (Print Full Name)_____

☐ Am a site guest of:_____ ☐ Am a site visitor.

In case of emergency, please call:

(Name)_____ Phone: (_____) _____-_____

In consideration of being permitted to use the facilities and equipment at this Vestas Americas site, I do hereby waive, release, and forever discharge Vestas and all of its employees and representatives from any and all responsibilities or liability for injuries or damages resulting from my participation or my use of equipment at the aforementioned facility. I do hereby release all of those mentioned and any others acting on their behalf from any responsibility or liability for any injury or damage to myself in any way arising out of or connected with my use of this facility.

Please initial here: _____

I understand and am aware of the presence of industrial equipment and that exposure to the equipment can be a potentially hazardous activity. I also understand that some activities may involve a risk of injury and even death and that I am voluntarily participating in these activities and utilizing equipment and machinery with the knowledge of the dangers involved. I hereby agree to expressly assume and accept any and all risks of injury or death.

Please initial here: _____

I do hereby further declare myself to be physically sound and suffering from no condition, impairment, disease, infirmity, or other illness that would impede or preclude my activities this facility.

Please initial here: _____

I acknowledge that I have either had a physician's approval for my activities or that I have decided to participate without the approval of a physician and do hereby assume all responsibility for my participation and activities and utilization of equipment and machinery in my activities.

Please initial here: _____

_____ _____
Signature Date

PROJECT MANAGER / SITE SUPERVISOR USE ONLY

Visit/Tour was pre-arranged and approved

☐ By Phone ☐ Written Request (attach) ☐ Other: _____

Site Mgmt. Rep. Name: _____

Site Escort Name(s): _____

Number of Guest(s)/Visitor(s) _____ (Attach Guests/Visitors Site Safety Rules if available)

Visit Start Time: _____ End Time: _____ VISITOR PPE: ☐ Issued ☐ Returned

☐ Attach signed sheet to Guest Agreement and Release of Liability form – file in Site Safety Records

☐ Copy to employer if other than Vestas Americas.

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Contents

1. Introduction 2
1.1 Purpose 2
1.2 Scope 2
1.3 Application 2

2. Responsibilities 2
2.1 Management 2
2.2 Site Management 2
2.3 HSE Department 3
2.4 Employees 3

3. Identifying and Reporting Hazards 3
3.1 Observations 3
3.2 Inspections 3
3.3 Reporting Hazards 4

4. Controlling Hazards and Exposure 4
4.1 Controlling Hazards 4
4.2 Controlling Exposure 4
4.3 Scheduling 4

5. Training Requirements 5
5.1 General Instruction 5
5.2 Job Safety Analysis Training 5

6. History of this Document 5

T09 0008-7993 Ver 05 - Approved - Exported from DMS: 2010-07-09 by ASUER

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1. Introduction

1.1 Purpose

The purpose of the Hazard Identification and Control Plan is to provide direction in identifying and controlling hazards.

1.2 Scope

This plan details the programs and procedures used to identify and control hazards.

1.3 Application

This plan applies to employees, contractors, visitors and others performing work on Vestas Americas premises.

2. Responsibilities

2.1 Management

2.1.1 Executives, Project Managers and Regional Service Managers shall:

a) ensure development and implementation of the plan
b) provide site management with adequate resources and support to carry out their responsibilities
c) require site management adherence to hazard identification and control procedures
d) recognize site management and employees for performance improvement

2.2 Site Management

2.2.1 Site management shall:

a) adhere to Hazard Identification and Control Plan procedures
b) ensure a safe work instruction or a Job Safety Analysis (JSA - DMS# 0008-7897) is available and reviewed prior to performing a hazardous task
c) carry out Hazard Identification and Control Plan responsibilities
d) ensure required instruction and training has been provided to employees, contractors, visitors and others
e) require employees, contractors, visitors and others to carry out their responsibility to identify and report hazards
f) ensure employees and others are protected from hazards presenting imminent-danger and that the hazards are corrected as soon as possible
g) respond promptly to hazard reports, safety concerns and suggestions
h) ensure hazard reports are properly documented and submitted to the HSE Department
i) ensure required preventive or corrective actions have been taken and monitor effectiveness
j) ensure the duration of employee exposure to hazards does not extend beyond safe limits

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2.3 HSE Department

2.3.1 The HSE Department shall:

a) develop and monitor implementation of this plan
b) provide efficient and effective hazard identification and control instruction and training
c) conduct regular worksite inspections and program audits
d) review hazard reports and evaluate preventive or corrective actions taken

2.4 Employees

2.4.1 Employees shall:

a) adhere to plan requirements
b) review safety precautions in work instructions prior to performing tasks
c) report inadequate safe work instructions and/or JSAs to site management
d) report any of the following as soon as possible to a supervisor:
   1. injuries or illnesses
   2. unsafe conditions and behaviors
   3. near miss (non-injury) incidents
   4. environmental incidents
e) conduct safety inspections and programs audits as required by site management
f) document completion of inspections and other program activities
g) warn co-workers of unsafe conditions or behaviors
h) refuse to perform hazardous tasks if:
   1. adequate protective equipment and other resources have not been provided, or
   2. adequate instruction and/or training on the task have not been provided

3. Identifying and Reporting Hazards

3.1 Observations

3.1.1 Site management shall frequently observe employees performing work tasks to reinforce safe work practices.

3.1.2 Site management shall frequently observe worksite conditions and take protective or corrective action when deficiencies are noted.

3.1.3 Employees shall continually observe behaviors and worksite conditions while performing work activities and take immediate corrective action if unsafe conditions or behaviors are observed. This includes alerting others of hazards.

3.2 Inspections

3.2.1 Site management shall conduct worksite inspections as often as the type of operation or character of the equipment requires and at least quarterly using the Site HSE Inspection Checklist (DMS# 0008-8003).

3.2.2 Defective equipment or unsafe conditions found during worksite inspections shall be removed from service, replaced, repaired, or remedied promptly.

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T09 0008-7993 Ver 05 - Approved - Exported from DMS: 2010-07-09 by ASUER

3.2.3 Inspection reports shall be signed, dated and filed in the Site Safety Records.

3.3 Reporting Hazards

3.3.1 Employees shall report workplace hazards to their immediate supervisor or other person in charge as soon as possible.

3.3.2 Unsafe conditions that can not be remedied promptly shall be reported to the HSE Department using the Unsafe Condition or Hazard Report (DMS# 0008-8002).

4. Controlling Hazards and Exposure

4.1 Controlling Hazards

4.1.1 Site management shall take protective or corrective action to eliminate or reduce hazards to an acceptable level of risk according to the following priority:

a) Elimination. Attempt to remove the hazard itself through design specifications and standards for tools, equipment, machinery, and facilities.

b) Substitution. This control method eliminates/reduces hazards by substituting or replacing existing equipment and materials with less hazardous equipment and materials.

c) Engineering controls. These include ventilation systems, machine guarding, noise abatement, or modification of existing tools, equipment, machinery, or facilities, etc.

d) Warnings. These increase awareness of potential and existing hazards (e.g., lights, signage, barriers, and beepers, etc.)

4.2 Controlling Exposure

4.2.1 To reduce exposure to hazards, site management shall use administrative controls such as modified work schedules, procedures, or work practices (e.g., job rotation, safe work instructions, restricted access, or required use of PPE.)

4.2.2 Employees shall review and follow task-specific work instructions for all hazardous tasks.

4.2.3 A Job Safety Analysis (JSA) using the Job Safety Analysis form (DMS# 0008-7897) shall be completed and referenced for hazardous tasks when any of the following conditions exists:

a) JSA does not exist for the hazardous task

b) adequate task-specific work instruction is not available

c) task-specific work instruction is available, but the procedures do not adequately identify HSE hazards and safety precautions

4.2.4 Site management shall review and approve each JSA for use as a temporary work instruction until an adequate approved task-specific work instruction is available.

4.2.5 Site management shall forward a copy of the JSA and draft work instruction for technical and HSE review.

4.2.6 For complex processes, site management may choose to conduct a Risk Assessment using the Risk Assessment Worksheet (DMS# 0008-8004).

4.3 Scheduling

4.3.1 Site management shall ensure work schedules do not extend the duration of employee exposure to hazards beyond safe limits.

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5. Training Requirements

5.1 General Instruction

5.1.1 Employees will receive hazard identification and control instruction and training as follows:

a) initially during basic HSE training at the Portland Training Center, or on-site during site-specific safety orientation

b) periodic on-site and web-based training

5.2 Job Safety Analysis Training

5.2.1 Employees required to perform JSAs should complete the online course - Conducting a Job Safety Analysis.

6. History of this Document

Rev. no.:	Date:	Description of changes
02	2002-10-15	Unknown – revision history was not maintained in original safety *manual*
03	2007-05-30	Completely rewritten and formatted
04	2010-01-01	Template and content updates
05	2010-07-09	Added links and DMS numbers to HSE Manual document references. Changed references to JHA to JSA. Minor wording changes.

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Unsafe Condition or Hazard Report

Vestas

I. UNSAFE CONDITION OR HAZARD (Attach additional pages as needed)

OBSERVED DATE(S): _____ **TIME:** _____

SITE NAME/LOCATION: _____

DESCRIBE UNSAFE CONDITION OR HAZARD:

RECOMMENDATIONS TO CORRECT THE UNSAFE CONDITION OR HAZARD:

II. OBSERVED BY (PRESENT TO PROJECT/SITE MANAGER OR HEALTH AND SAFETY REPRESENTATIVE):

NAME (Optional): _____ **Date:** _____

III. MANAGEMENT / H&S / SAFETY COMMITTEE INVESTIGATION

DATE RECEIVED: _____ **RECEIVED BY:** _____

SITE SUPERVISOR NAME **SIGNATURE** **DATE**

INVESTIGATOR(s _____

INVESTIGATION RESULTS:

IV. PROPOSED CORRECTIVE ACTION:

CORRECTIVE ACTION COMPLETION DATE (if more than 30 days, refer to Safety Committe

V. AFFECTED:

ARE OTHER SITES AFFECTED? IF YES, LIST NAMES OF SITES OR EQUIPMENT:

**When complete, send to Vestas Americas, 1881 SW Naito Parkway, Portland, OR 97201, Attn: Safety Office and / or present to Site Supervisor or Site Safety Rep.*

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Risk Assessment

(Use to assess complex processes)

Location:

Job/Task	Probability	Severity	Risk

Prepared By (Name / Title):	**Date**	**Prepared By (Name / Title):**	**Date**
Reviewed By (Name / Title):	**Date**	**Reviewed By (Name / Title):**	**Date**

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Instructions

1 Enter jobs to be assessed.

2 Rate the probability that, if exposed, an employee will be injured or become ill. Choose one of the drop-down ratings.

3 Rate the severity of the injury or illness if an accident occurs. Choose from one of the drop-down ratings.

4 Calculate the overall risk by multiplying each Probability Rating by each Severity Rating. Generally, the higher the Risk Score, the higher the priority for conducting a Job Hazard Analysis.

5 Enter the name(s) of the person(s) who prepared the Risk Assessment and the date it was performed.

6 Enter the name of the person reviewing the Risk Assessment. Usually, this will be a site manager or safety representative/coordinator.

How to increase row height when part of the text you entered does not show:

Click the cell that has hidden text.

Point the row from the left.

Slowly move the mouse down until the pointer changes to a little line with up and down arrows.

Hold down the right mouse button, then move the mouse down until all the text is visible.

How to add more rows:

Unprotect the sheet (Tools > Protection > Unprotect Sheet).

Select some rows. Be sure that the top row selected is a date entry row and the last row selected little row.

Right click and then click Copy (make sure the pointer is pointing at the selected rows).

Right Click and select Insert Copied Rows (make sure the pointer is pointing at the selected rows).

Protect the sheet (Tools > Protection > Protect Sheet). Do not enter a password; just click OK.

T09 0008-8004 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

Choose One
1 - Very Unlikely
2 - Unlikely
3 - Likely
4 - Very Likely
5 - Extremely Likely

Choose One
1 - Minor Injury/Illness
2 - Injury/illness < 3 days lost
3 - Injury/illness > 3 days lost
4 - Major injury/illness, >30 days lost
5 - Almost certain death

Choose One
1 - Never
2 - Rarely (exposed less than once a month)
3 - Occasional (one or more exposures during a workweek)
4 - Frequent (one or more exposures during the workday)
5 - Continuous exposure throughout the workday

T09 0008-8004 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

Manufacturer	Trade Name	Inventory PN or N/A	MSDS Date (mm/yr)	Container Size	Haz

THE FOLLOWING PRODUCTS HAVE BEEN ADDED TO THE SITE INVENTORY - POST AU

Manufacturer	Trade Name	Inventory PN or N/A	MSDS Date (mm/yr)	Container Size	Haz

New Material Review

Vestas

SITE: _____ LOCATION: _____

DATE: _____ SITE SUPERVISOR: _____

PLEASE REVIEW THE ATTACHED. ONCE REVIEWED, PLEASE SIGN AND DATE NEXT TO YOUR NAME ON THE ROSTER BELOW. WHEN SIGNATURES OF ALL AFFECTED SITE EMPLOYEES ARE COLLECTED, THIS MSDS WILL BE FILED, WITH THIS RECORD ATTACHED, IN THE SITE MSDS COLLECTION.

MATERIAL SAFETY DATA SHEET FOR:

PRODUCT TRADE NAME/NUMBER: _____

MANUFACTURER NAME: _____

CHECK AS APPLIES: ☐ NEW PRODUCT ☐ REFORMULATION OR UPDATE

SITE EMPLOYEE ROSTER - *List ALL employees who may be exposed to or affected by this product*:

NAME (PRINTED)	SIGNATURE	DATE REVIEWED
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		

HAZARDS - The Site Supervisor will review this MSDS prior to distribution and highlight or otherwise note or call attention to any particular hazards involved in the use, storage, handling and/or shipment of this substance. In addition, the Site Supervisor will also ensure that any PPE, spill containment or special emergency response product specifically noted on the MSDS shall be readily available prior to introducing the substance for use in the workplace.

QUESTIONS OR CONCERNS (Questions or Concerns about this or ANY site chemical substance or product) should be addressed by the Site Supervisor, or forwarded to The Safety Department for review.

When completed (all signatures collected), Original Signed Copy shall be filed with the MSDS in the site MSDS collection and the site Chemical Inventory List updated to include this new product.

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Contents

1. Introduction 2
2. Responsibilities 2
3. Worksite Hazard Assessment 3
4. Procurement 4
5. Issuing PPE 4
6. Inspection, Maintenance, & Storage 5
7. Program Evaluation and Corrective Action 6
8. Training Requirements 6
9. Associated Documentation 7
10. PPE Matrix 7
11. History of this Document 10

T09 0008-6837 Ver 06 - Approved - Exported from DMS: 2010-07-17 by ASUER

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1. Introduction

1.1 Purpose

The purpose of the Vestas PPE Program is to help protect all affected employees and others working or visiting Vestas worksites from injury or illness through the effective use of personal protective equipment.

1.2 Scope

This written plan details the policies, processes, procedures and practices required to implement and maintain an effective PPE program.

1.3 Application

This plan applies to all Vestas Americas employees, subcontractors, visitors and others who use and/or supervise the use of PPE while performing work procedures.

2. Responsibilities

2.1 Management

Executives, Project Managers and Regional Service Managers shall:

2.1.1 Ensure effective program development and implementation.

2.1.2 Provide Site Management with adequate resources and support to carry out program responsibilities and obligations.

2.1.3 Require adherence to all policies, procedures, practices and rules related to the use and care of PPE.

2.1.4 Oversee and evaluate site supervisor performance.

2.1.5 Recognize Site Management and employees for performance improvement.

2.2 Site Management

All Construction Managers and Service Site management shall:

2.2.1 Carry out all of their PPE Program responsibilities.

2.2.2 Ensure all technicians, visitors and contractors adhere to policies, procedures and rules related to the use, care and storage of PPE.

2.2.3 Ensure technicians, visitors and contractors have received training from a competent person and have adequate knowledge and skills to perform their duties using required PPE.

2.2.4 Require timely reporting of defective PPE or other PPE-related concerns.

2.2.5 Report concerns and PPE plan deficiencies to the HSE Department.

2.2.6 Conduct regular and random inspections of PPE to make sure all PPE is in good condition or replaced.

2.2.7 Ensure that employees properly wear, maintain, store and inspect PPE.

2.2.8 Verify that PPE is approved for the hazards presented and fully protects the user.

2.2.9 Make sure the use of PPE does not itself endanger the user.

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2.3 HSE Department

The HSE Department shall:

2.3.1 Develop and monitor implementation of the PPE Program.

2.3.2 Select and assist in procuring PPE.

2.3.3 Ensure efficient and effective PPE instruction and training are conducted.

2.3.4 Conduct program surveys, workplace inspections and audits.

2.3.5 Propose and implement improvements to the PPE Program.

2.4 Employees

All employees who perform tasks that require the use of PPE shall:

2.4.1 Comply with PPE-related rules in the Code of Safe Practices.

2.4.2 Properly use and maintain PPE as specified in this plan and in accordance with the manufacturer's instruction and training received.

2.4.3 Inspect PPE for defects before and after each use.

2.4.4 Document completion of the annual PPE Inspection Record (DMS# 0008-6840).

2.4.5 Report any defects or other conditions that might render PPE ineffective (use Equipment Defect Record - DMS# 0008-6839).

2.4.6 Replace PPE that is unable to perform the function for which it is designed.

2.4.7 Properly clean and store PPE.

2.4.8 Remind coworkers to properly use and wear PPE.

2.4.9 Report incidents of misuse, symptoms of overexposure, injury or illness while working with PPE.

2.4.10 Refuse to perform tasks if approved PPE is not provided.

2.4.11 Refuse to expose themselves to any hazard requiring PPE until they are properly instructed and trained on the proper use of PPE.

3. Worksite Hazard Assessment

3.1 Hazard Assessments

PPE hazard assessments to determine the PPE requirements are conducted during the following processes:

3.1.1 PPE Hazard Assessment (DMS# 0009-2995) - This form is to be completed for each task for each platform. VAME HSE will be responsible for maintaining the most current PPE Hazard Assessments, and certifying the appropriate PPE for the task. A PPE matrix will be created with these forms, and posted on the VAME HSE website, for utilization by the field.

- If respiratory and/or hearing protection is identified during the PPE Hazard Assessment process, the appropriate PPE will be qualified and quantified by a certified Industrial Hygiene Plan.

3.1.2 Risk Assessments (RA) (DMS# 0008-8004)

3.1.3 Job Safety Analyses (JSA) (DMS# 0008-7897)

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4. Procurement

4.1 Selection & Purchase

4.1.1 The HSE Department shall:

- Select and evaluate PPE and ensure that equipment is compliant with applicable national standards and that it conforms to consensus standards.
- Update the List of Approved Safety Supplies periodically to ensure that PPE listed provides necessary protection and meets the comfort and fit requirements of the user.

4.1.2 Site Management shall:

- Prepare and submit a Purchase Request for PPE to the Purchasing Department. Reference the List of Approved Safety Supplies when completing a Purchase Request.
- Notify the HSE Department if substitutes or other items not on the List of Approved Safety Supplies are needed.

4.2 PPE Reimbursement Policy

4.2.1 Employees shall be reimbursed $250 (USD) per year for approved safety footwear.

4.2.2 Employees shall be reimbursed $200 (USD) per biennium, or whenever prescriptions change, for approved safety eyewear meeting the specifications on the List of Approved Safety Supplies.

5. Issuing PPE

5.1 Initial Issue

Each new employee will be issued a gear bag containing a standard set of PPE items prior to the start of work. (Please refer to AME-BP.03.11.00 – Procurement of PPE Bags for New Hires.) Issue of PPE equipment shall be documented using the PPE Issue Record (DMS 0008-6841).

5.2 Personal Fall Arrest Systems (PFAS)

Issue and inspection of PFAS equipment shall be documented using the Personal Fall Arrest System Inspection Record (DMS 0008-6842). Site Management shall use the Personal Fall Arrest Equipment Register (DMS 0008-6843) to help keep track of the equipment in use at their site. Refer to the Fall Protection section of this manual for more information regarding PFAS Equipment.

5.3 Hearing Protection

Hearing protection shall be issued and inspected at initial issue and as required during the normal course of work. Refer to the Hearing Protection Program section of this manual for more information regarding hearing protection.

5.4 Respiratory Protection

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Respirators shall be issued and inspected initially and as required prior to and after use. Refer to the Respiratory Protection Program section of this manual for more information regarding respiratory protection.

6. Inspection, Maintenance, & Storage

6.1 Initial Inspection

Employees will inspect PPE during initial issue to ensure all items listed in the new employee PPE gear bag are present and verify PPE is in good condition. The inspection shall be documented using the PPE Inspection Form.

6.2 Daily Inspections

6.2.1 Employees required to use PPE will inspect the PPE issued to them to ensure proper fit, function, cleanliness and integrity, and to detect any defects or other unsuitable conditions at the following times:

- at the beginning of the shift prior to the start of work
- during the work shift as necessary
- at the end of each work shift prior to PPE storage

6.2.2 When employees detect or suspect any condition, including the condition of storage containers, that prevents PPE effectiveness, they shall report the condition to site management.

6.2.3 Site Management will take immediate action to repair and/or replace PPE or defective storage containers.

6.2.4 Employees will provide feedback in a timely manner to site management about the effectiveness of PPE.

6.3 Annual PPE Inspections

6.3.1 Site management, or a designate, shall inspect all PPE, including PPE not specifically issued to individuals (e.g., extra fall protection equipment used for visitors) annually and document the inspection using the PPE Inspection Record.

6.3.2 Site management may also schedule quarterly, monthly or random PPE inspections as deemed appropriate.

6.3.3 All PPE Inspection records shall be stored in the Site Safety Records binder.

6.4 Equipment Storage

6.4.1 Site Management will ensure PPE is stored appropriately.

6.4.2 Employees shall use only approved containers and areas for storing PPE.

6.4.3 Lockers, storage bags, and other containers used only by an individual employee shall have the employee's full name affixed to the container.

6.4.4 PPE storage containers shall not be used for other purposes.

6.5 Disposition of Equipment

6.5.1 All damaged PPE that is not repairable to an original state by an approved repair procedure must be immediately destroyed and disposed of to prevent the possibility of further use.

6.5.2 Dispose of all PPE that is beyond its useful life as if it were damaged.

DMS 0008-7897 R5 09-July-2010 Vestas Confidential VAME HSE Manual
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6.5.3 Document the disposition of defective fall protection and emergency descent equipment by completing an Equipment Defect Record (DMS 0008-6839). File the original in the Site Safety Records binder.

7. Program Evaluation and Corrective Action

7.1 Evaluation

The HSE Department shall conduct surveys, interviews, inspections, and process audits on a regular basis to monitor, measure, and record the performance of the PPE Program in accordance with OHSMS Program evaluation procedures detailed in the Continual Improvement Plan.

7.2 Improvement

The HSE Department shall develop and implement to PPE Program elements in accordance with the OHSMS Continual Improvement Plan.

8. Training Requirements

8.1 Initial Training

8.1.1 All employees whose job tasks or exposures require the use of PPE shall receive initial PPE training from a competent trainer prior to their first exposure to tasks requiring the use of PPE.

8.1.2 Site Management shall provide or arrange for hands-on training by a competent person on the specific PPE that is being issued. At a minimum, this training will include the following:

- why PPE is necessary
- when PPE is necessary
- what PPE is necessary
- how to properly don, doff, adjust, and wear PPE
- the limitations of the PPE
- the proper care, maintenance, storage, useful life and disposal of the PPE

8.1.3 The trainer will document completion of PPE training on the Safety Training Certification form.

8.2 Retraining

Site Management shall ensure retraining is conducted when the following situations occur:

- Changes in the worksite or types of PPE required render previous training obsolete
- Employee performance in the use, care, or storage of assigned PPE indicates that the employee has not retained the requisite understanding or skill

8.3 Ongoing instruction and training

Site safety meetings will periodically include instruction and training on the safe use, care and storage of PPE.

8.4 Trainer Qualifications

8.4.1 Site Management shall designate employees who meet the following criteria as competent safety trainers and authorize them to conduct PPE training:

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8.4.2 Employees designated as competent safety trainers shall have:

- been trained in PPE topics in Section 8.1.2, above
- experience in using the PPE
- demonstrated to Site Management adequate skill in PPE training

9. Associated Documentation

- Safety Training Certification
- Equipment Defect Record (DMS 0008-6839)
- PPE Issue Record (DMS 0008-6841)
- PPE Inspection Record (DMS 0008-6840)
- Fall Arrest System Inspection Record (DMS 0008-6842)
- Personal Fall Arrest Equipment Register (DMS 0008-6843)
- List of Approved Safety Supplies
- PPE Hazard Assessment Certification Form PPE Matrix (see Section 10 below)
- Descent Device Inspection (DMS# 0008-7903)

10. PPE Matrix

Areas (Service)	Long pants, long sleeved shirt	Long Pants, Short sleeved shirt	Safety Footwear	Safety Helmet	Safety Glasses	High Visibility Vest	Goggles with Strap	Hand PPE (Task Specific)	Fall Protection Gear	Lad Safe w/ Carabiner	Lock Out/ Tag Out Hardware
Parking lot, administrative areas											
Warehouse, shops and stock areas											
In a service truck on site (Includes Rental)											
At turbine pad											
Crane/Hoist work											
Ascending/ descending tower											
In the nacelle											
Working near pressurized hydraulics											
Electrical troubleshooting											
In a hub											
Crane/Hoist work in hub											
On top of the nacelle											

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- **Safety Helmets:** Safety Helmet requirements in shop and warehouse areas task specific, i.e. overhead hazards with forklift operation (25 ft. radius)

- **Safety Helmets in tower:** Required at all times. If a task requires hardhat to be removed, certain requirements must be met; unable to engineer this need out (i.e. different tools). Noted on the JSA, approved by site management, and area is inspected prior to work for overhead obstructions. Task in question must be in extremely tight areas where hardhat impedes access.

- **Hand PPE:** Task Specific (i.e. climbing, work with chemicals, sharp and rough edges)

- **Safety Footwear:** Required at all times, except for in Parking Lot/Admin Areas when arriving/leaving to/from work.

- **High Vis Vests:** Required when working around mobile equipment.

- **Safety Goggles:** Required whenever working around chemicals, fluids, corrosives in warehouse, in towers when working around pressurized systems or when breaking lines for the first time on newly de-pressurized systems.

- **Additional PPE:** Additional PPE may be required at times. Examples are High Voltage PPE and faceshields. This list of additional PPE is not all-inclusive.

- **LO/TO:** LO/TO may be required for these tasks, depending on the task being performed in the particular area. It will not be required in the parking lot, but may be required in admin area when working with electrical circuits.

- **Class Zero:** Long Sleeves - Employees standing or working in the base of the turbine or above the yaw bearing are required to wear the appropriate Class 0 PPE per NFPA 70E 2009.

    - The only exception to this requirement is when personnel are passing through the base of the turbine to access and climb the ladder or access the lift. Personnel waiting to access the ladder must remain outside the tower.

    - Long-sleeved shirts are required at the base of the tower due to the high arc flash potential. Long-sleeved shirts above the yaw bearing are required due to the potential for arc flash, working around high temperature equipment and work in close proximity to metal objects.

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Areas (Construction /Projects)	Long pants, long sleeved shirt	Long Pants, short sleeved shirt	Safety Footwear	Safety Helmet	Safety Glasses	High Visibility Vest	Goggles with Strap	Hand PPE (Task Specific)	Fall Protection Gear	Lad Safe w/ Carabiner	Lock Out/ Tag Out Hardware
Parking lot, administrative areas	X	X	X	X	X	X					X
Warehouse, shops and stock areas	X	X	X	X	X	X	X	X	X		X
In a service truck on site (Includes Rental)	X	X	X			X		X			
At turbine pad	X	X	X	X	X	X		X			X
Crane/Hoist work	X	X	X	X	X	X		X	X		X
Ascending/ descending tower	X	X	X	X	X	X		X	X	X	X
In the nacelle	X		X	X	X	X	X	X	X	X	X
Working near pressurized hydraulics	X		X	X	X	X	X	X	X	X	X
Electrical troubleshooting	X		X	X	X	X		X	X	X	X
In a hub	X		X	X	X	X	X	X	X	X	X
Crane/Hoist work in hub	X	X	X	X	X	X		X	X	X	X
On top of the nacelle	X	X	X	X	X	X		X	X	X	X

T09 0008-6837 Ver 06 - Approved - Exported from DMS: 2010-07-17 by ASUER

- **Safety Footwear:** Required at all times when on the jobsite.
- **Safety Helmet:** Required at all times except while riding in work trucks.
- **Safety Glasses:** Required at all times except while riding in work trucks.
- **Safety Goggles:** Required whenever working around chemicals, fluids, corrosives in warehouse, in towers when working around pressurized systems or when breaking lines for the first time on newly de-pressurized systems.
- **LO/TO:** LO/TO may be required for these tasks, depending on the task being performed in the particular area. It will not be required in the parking lot, but may be required in admin area when working with electrical circuits.
- **Hand PPE:** Task Specific (i.e. climbing, work with chemicals, sharp and rough edges)
- **High Vis Vests:** Required at all times.
- **Additional PPE:** Additional PPE may be required at times. Examples are High Voltage PPE and faceshields. This list of additional PPE is not all-inclusive.
- **Class Zero:** Long Sleeves - Employees standing or working in the base of the turbine or above the yaw bearing are required to wear the appropriate Class 0 PPE per NFPA 70E 2009.
    - The only exception to this requirement is when personnel are passing through the base of the turbine to access and climb the ladder or access the lift. Personnel waiting to access the ladder must remain outside the tower.
    - Long-sleeved shirts are required at the base of the tower due to the high arc flash potential. Long-sleeved shirts above the yaw bearing are required due to the potential for arc flash, working around high temperature equipment and work in close proximity to metal objects.

11. History of this Document

Rev. no.:	Date:	Description of changes
00	27-Nov-2006	First edition
01	19-Dec-2006	Minor revisions and re-numbering due to re-organization of the OHSMS manual – Fall Protection now has its own section.
02	24-Feb-2009	Added PPE Matrix to Section 10 (TBD). All other changes highlighted in grey.
03	01-Jan-2010	Content revalidated and template updated
04	15-Apr-2010	Section 4.2.1: Safety footwear reimbursement updated from $150 to $250.
05	09-July-2010	PPE Matrices added to Section 10. DMS numbers/links for HSE Manual documents added.
06	16-July-2010	PPE Matrices updated (updates to long-sleeved shirt requirements)

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VAME Respiratory Protection Program

Contents

1. Purpose **1**
2. Scope **1**
3. General Requirements **2**
4. Roles / Responsibilities **2**
4.1 Trainer 2
4.2 Construction Managers/Site HSE 2
4.3 Employees 2
4.4 Tools/Materials 3
5. Procedures **3**
5.1 Job Safety Analysis (JSA) 3
5.2 Selection of Respirators 3
5.3 Medical Surveillance 4
5.4 Fit-Testing 5
5.5 Respirator Use 6
5.6 Monitoring Respirator Effectiveness 6
5.7 Respirator Maintenance and Care 6
5.8 Identity of Filters, Cartridges and Canisters 7
5.9 Training 7
5.10Program Evaluation 8
5.11Recordkeeping 8

1. Purpose

The purpose of this program is to ensure that Vestas - American Wind Technology, Inc. employees are properly protected from airborne chemical hazards during their work activities. This is typically accomplished by using accepted engineering controls such as general and local exhaust ventilation. When engineering controls are not feasible, while they are being instituted, or in an emergency, only employees who have been medically evaluated, trained, fit-tested and certified in their use and limitations may use appropriate respirators.

2. Scope

This program applies to all employees who are required to wear respirators during their normal work activities and during emergencies. Any employee who asks to wear a respirator when one is not required (voluntary use) must comply with the medical evaluation, cleaning, maintenance, and storage requirements of this program. Any employee who asks to wear a filtering face piece (dust mask) is not subject to the medical evaluation, cleaning, maintenance, and storage requirements of this program.

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T09 0008-7994 Ver 06 - Approved - Exported from DMS: 2010-07-09 by ASUER

3. General Requirements

A physician or other licensed health care professional (PLHCP) will be assigned the responsibility of confirming each person is physically able to perform assigned work while using a respirator.

4. Roles / Responsibilities

4.1 Trainer

4.1.1 Provide commitment and leadership to adhere to the requirements of the Respiratory Protection Program by assuming the role of Program Administrator.

4.1.2 Assist the construction managers and the site HSE representative in identifying areas where respiratory protection may be required.

4.1.3 Conduct and/or arrange for air sampling to evaluate the need for respiratory protection.

4.1.4 Assist with the selection and procurement of respirators.

4.1.5 Conduct an annual review of the program to ensure its effectiveness.

4.2 Construction Managers/Site HSE

4.2.1 Identify persons who are working in areas where respiratory protection is required and initiate the request for respirator issue.

4.2.2 Ensure that employees are medically able to wear respirators before assigning them to tasks requiring the use of a respirator.

4.2.3 Ensure that employees are properly instructed in the use and maintenance of their respirator and fit-tested before using a respirator.

4.2.4 Ensure that any person assigned to use a respirator is fully informed of the nature of the hazard.

4.2.5 Ensure that employees maintain all required respiratory protection devices in good repair and in a clean and sanitary condition.

4.2.6 Conduct regular inspections and evaluations to determine the continued effectiveness of the program.

4.2.7 Schedule employees for annual training, medical exam and fit testing.

4.2.8 Approve any changes, additions, or deletions to the Respiratory Protection Program.

4.2.9 Attend the training.

4.3 Employees

4.3.1 Use assigned respirators in accordance with instructions and training received.

4.3.2 Inform construction manager or the site HSE representative of any personal health problems that could be aggravated by the use of respirators.

4.3.3 Maintain respirator in good repair and use fresh filters of the appropriate type.

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4.3.4 Report any damaged, defective or malfunctioning respirator to the construction Manager or the site HSE representative immediately.

4.3.5 If the respirator malfunctions while in use, go to a safe area and do not remain in a hazardous atmosphere.

4.3.6 Inspect the respirator and perform the applicable pressure fit tests each time before using the respirator.

4.3.7 Do not disassemble or alter a respirator other than to change cartridges or to clean it.

4.3.8 Do not share or give your respirator to another employee to use.

4.3.9 Remain clean-shaven so that a face piece-to-face seal can be obtained.

4.3.10 Attend the training.

4.4 Tools/Materials

4.4.1 Issue approved respirators ONLY to certified employees.

4.4.2 Be trained to understand the importance of respirator part compatibility and the problems associated with incorrect issuance.

4.4.3 *Maintain adequate supply of required respirators, in all sizes.*

4.4.4 Keep current selection guide on hand for yourself and for certified employees.

5. Procedures

5.1 Job Safety Analysis (JSA)

5.1.1 Each site (projects, service) department will identify and evaluate all workplace respiratory hazards by means of a JSA (DMS# 0008-7897).

5.1.2 The JSA will include a reasonable estimate of employee exposures to the hazards and the identity of each hazard's chemical state and physical form.

5.1.3 The information obtained from the JSA will be used to select and assign respirators to employees.

5.2 Selection of Respirators

5.2.1 The construction manager and site HSE representative, with the assistance of the Trainer, will select respirators by determining whether there is either a potential for employees to be exposed above a Permissible Exposure Limit (PEL) or there is a specific reason that an employee needs such protection.

5.2.2 If the exposure cannot be reduced below the PEL, the construction Manager and site HSE representative, with the assistance of the Trainer, will select a respirator based upon the *following: chemical toxicity, maximum expected concentration, oxygen deficiency, chemical* warning properties, sorbent limitations, face piece fit, mobility requirements, and type of use (routine, escape, or emergency entry).

5.2.3 The construction manager and site HSE representative, with the assistance of the Trainer, are responsible for selecting the appropriate respirator filters and/or cartridges based on a review of material safety data sheets (MSDSs) and/or other relevant air contaminant data.

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5.2.4 Only respirators approved by the National Institute for Occupational Safety and Health (NIOSH) shall be used.

5.2.5 Only filters and/or chemical cartridges matched to expected atmospheric contaminants known to be present at Vestas - American Wind Technology, Inc. facilities will be used.

5.2.6 Air-purifying respirators shall not be used in oxygen deficient atmospheres. Only atmosphere supplying respirators (SCBA, or air-supplied) are to be used under these conditions.

5.2.7 Respirators will not be assigned to individuals who cannot obtain a proper fit or when facial hair prevents obtaining a good face seal.

5.2.8 Consideration must be given to the limitations of the protective device and the work environment in which it will be used.

TABLE 1: RESPIRATOR SELECTION CRITERIA

Type of Exposure:	**Selection Procedure:**
Particulate exposure	Respirators will be selected on the basis of potential oil mist exposure (N, R or P), severity of the inhalation hazard (95%, 99% or 100% efficient), air particulate concentration, and the availability of 21% oxygen.
Vapor and gas exposure	Respirators will be selected on the basis of chemical composition, physical state (vapor or gas), air contaminant concentration, and the availability of 21% oxygen.
Atmospheric oxygen at or below 19.5% or air contaminants Immediately Dangerous to Life or Health (IDLH)	Supplied-air respirators will be selected. Only Grade D breathing air will be used for supplied-air respirators. Only oil-less breathing air compressor or oil-compressor systems provided with carbon monoxide (10 ppm) or high-temperature alarms periodically tested for the presence of carbon monoxide will be used.

5.2.9 The construction Manager and site HSE representative, with the assistance of the Trainer, will rely on the current NIOSH-assigned protection factors (APFs) when selecting respirators.

5.3 Medical Surveillance

5.3.1 *Every employee who is required to wear a respirator, or who requests an air-purifying* respirator, shall be medically evaluated before being fit-tested.

- The construction Manager or the site HSE will ensure each employee has a medical evaluation, using the OSHA respirator medical evaluation questionnaire. A physician or licensed health care professional will make this evaluation.
- Follow-up appointments may be required.

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5.3.2 The construction manager or the site HSE representative will provide physician or other licensed health care professional with the following information:

- The type and weight of the respirator each employee will use,
- The duration and frequency of use,
- The expected physical work effort,
- Any other protective clothing and equipment worn,
- Temperature and humidity extremes at the workplace, and
- Air contaminants and concentration levels that each employee may encounter.

5.3.3 The physician or other licensed health care professional clinic may discuss the results of the evaluation with the employee and provide a written determination to the Safety Manager. This determination will not contain confidential medical information, but will include:

- An opinion regarding the employee's ability to tolerate a respirator,
- Any limitations on respirator use,
- Any need for follow-up evaluations, and
- A statement that the employee has been informed of the determination.

5.3.4 If the physician or other licensed health care professional recommends alternative respiratory protection, such as a powered air-purifying respirator, the construction manager or the site HSE representative will comply with the recommendation.

5.3.5 Employees will receive follow-up medical evaluations under the following conditions:

- The employee reports medical signs or symptoms related to respirator use,
- A reevaluation is recommended by a site construction manager, the site HSE representative or the licensed health care provider,
- A fit-test or other program information indicates a need for reevaluation, or
- When changes in the workplace increase respiratory stress on an employee.

5.4 Fit-Testing

5.4.1 All employees using a tight-fitting face piece respirator must pass an appropriate qualitative fit-test (QLFT) or quantitative fit-test (QNFT).

- The Trainer will determine which test is appropriate for each type of respirator.
- Qualitative fit testing shall be performed with the use of irritant smoke or Bitrex and testing procedures shall conform to the protocols found in OSHA 1910.134, Appendix A.
- A qualitative fit-test will be used only to fit-test negative pressure air-purifying respirators that achieve a fit factor of 100 or less.

5.4.2 Employees must be fit-tested before they use a respirator for the first time, whenever they use a different respirator face piece, and after any changes in their physical condition that could affect respirator fit.

5.4.3 Fit-tests will be administered using the employee's assigned respirator or from a selection of respirators set up for fit-testing purposes (for an initial fit-test).

5.4.4 All employees must be fit-tested annually and the results of the tests must be documented.

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5.5 Respirator Use

5.5.1 Employees who have beards or other conditions that interfere with the face-to-face piece seal or valve function cannot wear tight-fitting respirator face pieces.

5.5.2 PPE or clothing that interferes with the face-to-face piece seal or valve function is not permitted.

5.5.3 Corrective lenses (contacts) with temple bars or straps that interfere with the face-to-face piece seal cannot be used with any respirator.

5.5.4 Employees shall be instructed on how to perform a positive pressure and negative pressure seal check whenever they don the device.

5.6 Monitoring Respirator Effectiveness

5.6.1 The construction manager or the site HSE representative and/or designated trained representative will monitor and reevaluate the effectiveness of the employees' respirators after any significant changes in work conditions or exposure levels.

5.6.2 Employees must leave the areas in which they wear respirators to wash their faces and their respirator face pieces:

- If they detect face piece leaks or changes in breathing resistance,
- To change respirators, filters, cartridges, or canister elements.

5.6.3 Respirators will not be used to enter IDLH atmospheres. If an IDLH atmosphere is known or suspected, employees will report the condition to their supervisor, but will not enter the area or confined space where the IDLH atmosphere exists.

5.7 Respirator Maintenance and Care

5.7.1 Respirators must be washed, cleaned, sanitized and inspected according to the manufacturer's instructions:

- Before any new respirator is used,
- After each use, and
- When respirators are used for fit testing.

Warm water with a mild detergent is used for cleaning air-purifying respirators. All parts should be allowed to dry thoroughly before reassembling.

5.7.2 Employees must inspect their respirators before they use them and after they clean them. Inspection includes:

- A check of respirator function,
- Tightness of connections,
- Condition of the elastomeric face piece,
- Head straps,
- Valves,
- Connecting tubes, and
- Cartridges, filters or canisters.

5.7.3 Only trained employees can replace worn or deteriorated respirator parts. All repair work, adjustments, and replaced parts must comply with the respirator manufacturer's instructions.

T09 0008-7994 Ver 06 - Approved - Exported from DMS: 2010-07-09 by ASUER

5.7.4 Air-purifying respirators are to be stored by the user in a bag or box in such a way that the device is kept clean and dry away from contamination and sunlight.

5.7.5 Replacement parts, such as filters, cartridges, and valve assemblies, shall be kept in a central location in each department.

5.7.6 Respirators used in emergency situations shall be inspected at least monthly, in accordance with the manufacturer's recommendations, and checked for proper function before and after each use.

5.8 Identity of Filters, Cartridges and Canisters

5.8.1 All filters, cartridges and canisters must be maintained as received from the manufacturer or supplier and be labeled and color-coded with the NIOSH approval label.

5.8.2 The label on a cartridge, filter or canister cannot be removed and must remain legible.

5.8.3 Defective filters, cartridges, and canisters cannot be used and must be removed from service.

5.9 Training

5.9.1 Before any employee wears a respirator for the first time, they must receive and understand training that covers:

- What the hazard is and why a respirator is necessary,
- How improper fit, use or maintenance can compromise the protective effects of the respirator,
- The respirator's capabilities and limitations,
- How to use the respirator in emergency situations, including situations in which the respirator malfunctions,
- How to inspect, put on, check the seals, and remove the respirator,
- Proper maintenance and storage procedures, and
- How to recognize medical signs and symptoms that may limit or prevent effective use of the respirator.

5.9.2 A person designated by the Trainer and/or designated representative will provide training, which will be fully documented, certifying that the employee understands the concepts presented and has demonstrated how to use and wear the respirator.

5.9.3 The training must give each user an opportunity to handle the respirator; to have it fitted properly; to test the face piece-to-face seal; to wear it in normal air for a trial period; and to wear it in a test atmosphere.

5.9.4 Retraining must be performed at least annually or as deemed necessary by the construction manager, site HSE representative, Trainer and/or designated representative.

5.9.5 Employees who ask to voluntarily use respirators and are permitted to wear them for this purpose must first read the information contained in OSHA 1910.134, Appendix D, Mandatory Information for Employees Using Respirators When Not Required Under the Standard:

T09 0008-7994 Ver 06 - Approved - Exported from DMS: 2010-07-09 by ASUER

Respirators are an effective method of protection against designated hazards when properly selected and worn. Respirator use is encouraged, even when exposures are below the exposure limit, to provide an additional level of comfort and protection for workers. However, if respirator is used improperly or not kept clean, the respirator itself can become a hazard to the worker. Sometimes, workers may wear respirators to avoid exposures to hazards, even if the amount of hazardous substances does not exceed the limits set by OSHA standards. If Vestas – AWT provides respirators for employee voluntary use, or if employees provide their own respirators, employees must take certain precautions to be sure that the respirator itself does not present a hazard.

Employees shall do the following:

- Read and heed all instructions provided by the manufacturer on use, maintenance, cleaning and care, and warnings regarding the respirators limitations.
- Choose respirators certified for use to protect against the contaminant of concern. NIOSH, the National Institute of Occupational Safety and Health of the U.S. Department of Health and Human Services certifies respirators. A label or statement of certification should appear on the respirator or respirator packaging. It will tell the employee what the respirator is designed for and how much it will protect them.
- Do not wear respirator into atmospheres containing contaminants which respirator is not designed to protect against. For example, a respirator designed to filter dust particles will not protect the employee against gases, vapors, or very small solid particles of fumes or smoke.
- Employees shall keep track of their respirators so that one employee doesn't mistakenly use another employee's respirator.

5.10 Program Evaluation

5.10.1 The construction manager, site HSE representative and/or designated trained representative will evaluate this program annually or as often as necessary to ensure that it remains effective.

5.10.2 The construction manager, site HSE representative and/or designated trained representative will consult employees about respirator fit, selection, proper use and maintenance, and will make periodic workplace observations to confirm that respirators are being used and maintained correctly.

5.11 Recordkeeping

The construction manager, site HSE representative, Trainer and/or their designated representatives will maintain records of non-confidential medical evaluation determinations, fit-testing (DMS 0008-7962), training documentation, and annual inspection audits and make them available to employees and OSHA.

T09 0008-7994 Ver 06 - Approved - Exported from DMS: 2010-07-09 by ASUER

Vestas®

Occupational Noise Exposure Program

Contents

1. Basis 2
2. General 2
3. Responsibility 2
4. Definitions 2
5. Regulatory References 3
6. Written Program 3
7. Audiometric Testing Program 4
8. Hearing Conservation Program 5
9. Training Program 9
10. Recordkeeping 10
11. Appendices 11
12. Document History 20

T09 0008-7995 Ver 03 - Approved - Exported from DMS: 2010-03-09 by ASUER

1. Basis

Approximately 16 million workers are exposed to excessive on-the-job noise levels on an annual basis. In addition to causing hearing loss by destroying the inner ear, noise can put stress on other parts of the body causing fatigue and unnecessary psychological stress. This preventable added burden to the body can result in increased injury rates. This poses a serious problem for exposed workers and their employer. The OSHA Occupational Noise Exposure Standard establishes uniform requirements to make sure that the noise hazards associated with all U.S. workplaces are evaluated, and that the hazards associated with high noise are transmitted to all affected workers so that mitigation measures can be instituted.

2. General

Vestas-American Wind Technology will ensure that the noise hazards within our facility are evaluated, and that information concerning the hazards is transmitted to all employees. This standard practice instruction is intended to address comprehensively the issues of: evaluating the potential hazards of noise, communicating information concerning these hazards, and establishing appropriate protective measures for all employees.

3. Responsibility

The Company Safety Manager and/or Safety Representative is responsible for all facets of this program and has full authority to make necessary decisions to ensure success of the program. The Safety Manager and/or Safety Representative will develop written detailed instructions covering each of the basic elements in this program, and is the sole person authorized to amend these instructions. Vestas-American Wind Technology has expressly authorized the Safety Manager and/or Safety Representative to halt any operation of the company where there is danger of serious personal injury. This policy includes respiratory hazards.

4. Definitions

Definitions commonly found in the OSHA Occupational Noise Exposure Standard or that relate to the contents of the standard practice instruction.

Word	Definition
Action level	An 8 hour time weighted average of 85 decibels measured on the A-scale, slow response, or equivalently, a dose of fifty percent.
Audiogram	A chart, graph, or table resulting from an audiometric test showing an individual's hearing threshold levels as a function of frequency.
Audiologist	A professional, specializing in the study and rehabilitation of hearing, which is certified by the American Speech-Language-Hearing Association or licensed by a state board of examiners.

T09 0008-7995 Ver 03 - Approved - Exported from DMS: 2010-03-09 by ASUER

Baseline audiogram	The audiogram against which future audiograms are compared.
Criterion sound level	A sound level of 90 decibels.
Decibel (dB)	Unit of measurement of sound level.
Hertz (Hz)	Unit of measurement of frequency, numerically equal to cycles per second.
Medical pathology	A disorder or disease. For purposes of this instruction, a condition or disease affecting the ear, which should be treated by a physician specialist.
Noise dose	The ratio, expressed as a percentage, of (1) the time integral, over a stated time or event, of the 0.6 power of the measured SLOW exponential time-averaged, squared A-weighted sound pressure and (2) the product of the criterion duration (8 hours) and the 0.6 power of the squared sound pressure corresponding to the criterion sound level (90 dB).
Noise dosimeter	An instrument that integrates a function of sound pressure over a period of time in such a manner that it directly indicates a noise dose.
Otolaryngologist	A physician specializing in diagnosis and treatment of disorders of the ear, nose, and throat.
Representative exposure	Measurements of an employee's noise dose or 8 hour time weighted average sound level that the employers deem to be representative of the exposures of other employees in the workplace.
Sound level	Ten times the common logarithm of the ratio of the square of the measured A-weighted sound pressure to the square of the standard reference pressure of 20 micropascals. Unit: decibels (dB). For use with this instruction, SLOW time response, in accordance with ANSI S1.4-1971 (R1976), is required.
Sound level meter	An instrument for the measurement of sound level.
Time weighted average sound level	That sound level, which if constant over an 8 hour exposure, would result in the same noise dose as is measured.

5. Regulatory References

OSHA - 29 CFR 1910.95

6. Written Program

Development and maintenance of a written noise exposure program. This standard practice instruction will be reviewed on annual basis and updated as changes in company occur, or as changes are noted to 29 CFR 1910.95 which require revision of this document. Effective implementation of this program requires support from all levels of management within

T09 0008-7995 Ver 03 - Approved - Exported from DMS: 2010-03-09 by ASUER

Vestas-American Wind Technology. This written program will be communicated to all personnel that are affected by it. It encompasses the total workplace, regardless of the number of workers employed or the number of work shifts. It is designed to establish clear goals, and objectives.

7. Audiometric Testing Program

Vestas-American Wind Technology will maintain an audiometric testing program in accordance with the following guidelines.

- Vestas-American Wind Technology will establish and maintain an audiometric testing program free of charge for employees whose exposures equal or exceed an 8-hour time-weighted average of 85 decibels.
- Audio metric tests will be performed by a licensed or certified audiologist, otolaryngologist, or other physician, or by a technician who is certified by the Council of Accreditation in Occupational Hearing Conservation. A technician who performs audiometric tests must be responsible to an audiologist, otolaryngologist or physician.
- All audiograms obtained pursuant to this standard practice instruction will meet the requirements of 29 CFR 1910.95, Appendix C: Audiometric Measuring Instruments.
- Vestas-American Wind Technology will provide protection against the effects of noise exposure when the sound levels within our facility exceed those shown in Table 2.1, when measured on the A scale of a standard sound level meter at slow response.

Table 7.1 - PERMISSIBLE NOISE EXPOSURES

Duration per day, hour's	Sound level dBA slow response
8	90
6	92
4	95
3	97
2	100
1 1/2	102
1	105
0 1/2	110
1/4 or less	115

- When noise levels are determined by octave band analysis, the equivalent A-weighted sound level will be determined by using the appropriate table from 29 CFR 1910.95, appendix 1, equivalent sound level contours. Octave band sound pressure levels may be converted to the equivalent A-weighted sound level by plotting them on the graph shown as Figure G-9, 29 CFR 1910.95 (included as an appendix to this instruction) and noting the A-weighted sound level corresponding to the point of highest penetration into the sound level contours. This equivalent A-weighted sound level, which may differ from

T09 0008-7995 Ver 03 - Approved - Exported from DMS: 2010-03-09 by ASUER

the actual A-weighted sound level of the noise, will be used to determine exposure limits from Table 1-1 of this instruction.

- When employees are subjected to sound exceeding those listed in Table 1-1, Vestas-American Wind Technology will administer or have administered by qualified personnel, audiometric examinations, obtain valid audiograms, and ensure proper controls are reviewed and implemented where feasible. If such controls fail to reduce sound levels within the levels of Table 1.1, personal protective equipment will be provided and used to reduce sound levels within the levels of the table.
- If the variations in noise level involve intervals of 1 second or less, it will be considered to be continuous. When the daily noise exposure is composed of two or more periods of noise exposure of different levels, their combined effect will be considered, rather than the individual effect of each.
- Exposure to impulsive or impact noise will not exceed 140 dB peak sound pressure level.

8. Hearing Conservation Program

Vestas-American Wind Technology is dedicated to providing a safe and healthful working environment. We believe that safety in all operations and activities is of primary importance. Ultimately however, it is the employee's responsibility to seek assistance when required, and to carry out the job in a safe manner. Vestas-American Wind Technology- will administer a continuing, effective hearing conservation program, as described in the following paragraphs, whenever employee noise exposures equal or exceed an 8 hour time weighted average sound level (TWA) of 85 decibels measured on the A scale (slow response) or, equivalently, a dose of fifty percent. For purposes of the hearing conservation program, employee noise exposures will be computed without regard to any attenuation provided by the use of personal protective equipment.

8.1 An 8-hour time weighted average of 85 decibels or a dose of fifty percent will also be referred to as the action level.

8.2 Monitoring. When information indicates that any employee's exposure may equal or exceed an 8-hour time weighted average of 85 decibels, Vestas-American Wind Technology will implement this monitoring program.

8.2.1 The company will conduct sampling on an "as-needed" basis and will be designed to identify employees for inclusion in the hearing conservation program and to enable the proper selection of hearing protectors.

8.2.2 Where circumstances such as high worker mobility, significant variations in sound level, or a significant component of impulse noise make area monitoring generally inappropriate, Vestas-American Wind Technology will use representative personal sampling to comply with the monitoring requirements of this instruction unless it can be shown that area sampling produces equivalent results.

8.2.3 All continuous, intermittent and impulsive sound levels from 80 decibels to 130 decibels will be integrated into the noise measurements.

T09 0008-7995 Ver 03 - Approved - Exported from DMS: 2010-03-09 by ASUER

- Instruments used to measure employee noise exposure will have been calibrated to ensure measurement accuracy.

8.2.4 Monitoring will be repeated whenever a change in production, process, equipment or controls increases noise exposures to the extent that:

- Additional employees may be exposed at or above the action level.
- The attenuation provided by hearing protectors being used by employees may be rendered inadequate to meet the requirements of paragraph (j) of 29 CFR 1910.95.

8.2.5 *Employee notification.* Vestas-American Wind Technology will notify each employee exposed at or above an 8-hour time weighted average of 85 decibels of the results of the monitoring.

8.2.6 Observation of monitoring. Vestas-American Wind Technology will provide affected employees or their representatives with an opportunity to observe any noise measurements conducted.

8.2.7 Baseline audiogram. Within 6 months of an employee's first exposure at or above the action level, Vestas-American Wind Technology will establish a valid baseline audiogram against which subsequent audiograms can be compared. The company will obtain a valid baseline audiogram within 1 year of an employee's first exposure at or above the action level. Where baseline audiograms are obtained more than 6 months after the employee's first exposure at or above the action level, employees will wear hearing protectors for any period exceeding six months after first exposure until the baseline audiogram is obtained.

- Testing to establish a baseline audiogram will be preceded by at least 14 hours without exposure to workplace noise. Hearing protectors may be used as a substitute for the requirement that baseline audiograms be preceded by 14 hours without exposure to workplace noise.
- Vestas-American Wind Technology will notify employees of the need to avoid high levels of non-occupational noise exposure during the 14-hour period immediately preceding the audiometric examination.

8.2.8 Annual audiogram. At least annually after obtaining the baseline audiogram, Vestas-American Wind Technology will obtain a new audiogram for each employee exposed at or above an 8-hour time weighted average of 85 decibels.

8.2.9 Evaluation of audiogram. Each employee's annual audiogram will be compared to that employee's baseline audiogram to determine if the audiogram is valid and if a standard threshold shift has occurred. An individual trained to technician level may do this comparison. If the annual audiogram shows that an employee has suffered a standard threshold shift, a retest will be accomplished within 30 days and the results considered as the annual audiogram.

T09 0008-7995 Ver 03 - Approved - Exported from DMS: 2010-03-09 by ASUER

8.2.10 Problem audiograms. Vestas-American Wind Technology will ensure that an audiologist, otolaryngologist, or physician review problem audiograms and determine whether there is a need for further evaluation. The reviewer will be provided the following information:

- The baseline audiogram and most recent audiogram of the employee to be evaluated.
- Measurements of background sound pressure levels in the audiometric test room, (if the testing was not conducted at the reviewers facility).
- Records of audiometer calibrations, (if the testing was not conducted at the reviewers facility).

8.2.11 Follow-up procedures. If a comparison of the annual audiogram to the baseline audiogram indicates a standard threshold shift has occurred, the employee will be informed of this fact in writing, within 21 days of the determination.

8.2.12 Standard threshold shift. A standard threshold shift is a change in hearing threshold relative to the baseline audiogram of an average of 10 dB or more at 2000, 3000, and 4000 Hz in either ear. In determining whether a standard threshold shift has occurred, allowance may be made for the contribution of aging (presbycusis) to the change in hearing level by correcting the annual audiogram according to the procedure described in Appendix F, 29 CFR 1910.95: Calculation and Application of Age Correction to Audiograms. Unless a physician determines that the standard threshold shift is not work related or aggravated by occupational noise exposure, Vestas-American Wind Technology will ensure that the following steps are taken when a standard threshold shift occurs:

- Employees exposed or potentially exposed to high noise will be fitted with hearing protectors, trained in their use and care, and required to use them. For known high noise job assignments employees will be fitted and trained prior to job assignment.
- Employees already using hearing protectors will be refitted and retrained in the use of hearing protectors and provided with hearing protectors offering greater attenuation if necessary.
- Employees will be referred for a clinical audiological evaluation or an ontological examination, as appropriate, if additional testing is necessary or if it is suspected that a medical pathology of the ear is caused or aggravated by the wearing of hearing protectors.
- Employees will be informed of the need for an ontological examination if a medical pathology of the ear that is unrelated to the use of hearing protectors is suspected.
- If subsequent audiometric testing of an employee whose exposure to noise is less than an 8 hour TWA of 90 decibels indicates that a standard threshold shift is not persistent, Vestas-American Wind Technology:
  - Will inform the employee of the new audiometric interpretation.

T09 0008-7995 Ver 03 - Approved - Exported from DMS: 2010-03-09 by ASUER

- May discontinue the required use of hearing protectors for that employee.

8.2.13 Revised baseline. An annual audiogram may be substituted for the baseline audiogram when, in the judgment of the audiologist, otolaryngologist or physician who is evaluating the audiogram determine that:

- The standard threshold shift revealed by the audiogram is persistent.
- The hearing threshold shown in the annual audiogram indicates significant improvement over the baseline audiogram.

8.2.14 Audiometric test requirements. Audiometric tests conducted on employees of Vestas-American Wind Technology will be pure tone, air conduction, hearing threshold examinations, with test frequencies including as a minimum 500, 1000, 2000, 3000, 4000, and 6000 Hz. Tests at each frequency will be taken separately for each ear.

- Audiometric tests will be conducted with audiometers (including microprocessor audiometers) that meet the specifications of, and are maintained and used in accordance with, American National Standard Specification for Audiometers, S3.6-1969.
- Pulsed-tone and self-recording audiometers, if used, will meet the requirements specified in Appendix C, 29 CFR 1910.95: Audiometric Measuring Instruments.
- Audiometric examinations will be administered in a room meeting the requirements listed in Appendix D, 29 CFR 1910.95: Audiometric Test Rooms.
- Audiometer calibration. The functional operation of the audiometer will be checked before each day's use by testing a person with known, stable hearing thresholds, and by listening to the audiometer's output to make sure that the output is free from distorted or unwanted sounds. Deviations of 10 decibels or greater require an acoustic calibration.
- Audiometer calibration will be checked acoustically at least annually in accordance with Appendix E: Acoustic Calibration of Audiometers. Test frequencies below 500 Hz and above 6000 Hz may be omitted from this check. Deviations of 15 decibels or greater require an exhaustive calibration.
- An exhaustive calibration will be performed at least every two years in accordance with sections 4.1.2; 4.1.3; 4.1.4.3; 4.2; 4.4.1; 4.4.2; 4.4.3; and 4.5 of the American National Standard Specification for Audiometers, S3.6-1969. Test frequencies below 500 Hz and above 6000 Hz may be omitted from this calibration.

8.3 Hearing protectors. Vestas-American Wind Technology will make hearing protectors available to all employees exposed to an 8-hour time weighted average of 85 decibels or greater at no cost to the employees. Hearing protectors will be replaced at no cost as necessary.

T09 0008-7995 Ver 03 - Approved - Exported from DMS: 2010-03-09 by ASUER

8.3.1 Vestas-American Wind Technology will ensure that hearing protectors are worn:

- By any employee who is required by previous testing to wear personal protective equipment.
- By any employee who is exposed to an 8-hour time weighted average of 85 decibels or greater, and who: has not yet had a baseline audiogram established, or has experienced a standard threshold shift.

8.3.2 Employees will be given the opportunity to select their hearing protectors from a variety of suitable hearing protectors provided.

8.3.3 Vestas-American Wind Technology will provide training in the use and care of all hearing protectors provided to employees.

8.3.4 Vestas-American Wind Technology will ensure proper initial fitting and supervise the correct use of all hearing protectors.

8.4 Hearing protector attenuation. Vestas-American Wind Technology will evaluate hearing protector attenuation for the specific noise environments in which the protector will be used. One of the evaluation methods described in Appendix B: Methods for Estimating the Adequacy of Hearing Protection Attenuation will be used.

8.4.1 Selected hearing protectors will attenuate employee exposure at least to an 8-hour time weighted average of 90 decibels.

8.4.2 For employees who have experienced a standard threshold shift, selected hearing protectors must attenuate their exposure to an 8-hour time weighted average of 85 decibels or below.

8.4.3 The adequacy of hearing protector attenuation will be re-evaluated whenever employee noise exposures increase to the extent that the hearing protectors provided may no longer provide adequate attenuation. More effective hearing protectors will be provided where necessary.

9. Training Program

Vestas-American Wind Technology will institute a training program for all employees who are exposed to noise at or above an 8-hour time weighted average of 85 decibels, and will ensure employee participation in such program.

9.1 The training program will be repeated annually for each employee included in the hearing conservation program. Information provided in the training program will be updated to be consistent with changes in protective equipment and work processes. Each employee will be informed of the following:

T09 0008-7995 Ver 03 - Approved - Exported from DMS: 2010-03-09 by ASUER

- The effects of noise on hearing.
- The purpose of hearing protectors, the advantages, disadvantages, and attenuation of various types, and instructions on selection, fitting, use, and care.
- The purpose of audiometric testing, and an explanation of the test procedures.

9.2 Access to information and training materials. Vestas-American Wind Technology will make available to affected employees or their representatives copies of this standard practice instruction and 29 CFR 1910.95, and will also post a copy in the workplace.

9.2.1 Vestas-American Wind Technology will provide to affected employees any informational materials pertaining to 29 CFR 1910.95 that are supplied by OSHA.

10. Recordkeeping

Exposure measurements. Vestas-American Wind Technology will maintain an accurate record of all employee exposure measurements.

10.1 Audiometric tests. Vestas-American Wind Technology will retain all employee audiometric test records. This record will include as a minimum:

- Name and job classification of the employee.
- Date of the audiogram.
- The examiner's name.
- Date of the last acoustic or exhaustive calibration of the audiometer.
- Employee's most recent noise exposure assessment.
- Vestas-American Wind Technology will maintain accurate records of the measurements of the background sound pressure levels in audiometric test rooms.

10.2 Record retention. Vestas-American Wind Technology will retain audiometric and related records for at least the following periods.

10.2.1 Noise exposure measurement records will be retained for two years.

10.2.2 Audiometric test records will be retained for the duration of the affected employee's employment.

10.3 Access to records. All records cited in this standard practice instruction will be provided upon request to employees, former employees, representatives designated by the individual employee, and representatives of OSHA. The provisions of 29 CFR 1910.20 apply to access to records under this section.

10.2 Transfer of records. If Vestas-American Wind Technology ceases to do business, the records will be transferred to the successor employer and maintained by the successor employer. Should the company cease to function entirely the records will be provided to the respective employees, or as required by current law.

T09 0008-7995 Ver 03 - Approved - Exported from DMS: 2010-03-09 by ASUER

11. Appendices

11.1 Appendix A, 29 CFR 1910.95 Noise Exposure Computation

Computation of Employee Noise Exposure

- When the sound level, L, is constant over the entire work shift, the noise dose, D, in percent, is given by: D = 100 C/T where C is the total length of the work day, in hours, and T is the reference duration corresponding to the measured sound level, L, as given in Table G-16a below or by the formula shown as a footnote to that table.
- When the work shift noise exposure is composed of two or more periods of noise at different levels, the total noise dose over the workday is given by:

$$D = 100\ (C1/T1+C2/T2 + \ldots + Cn/Tn),$$

- Where Cn indicates the total time of exposure at a specific noise level, and Tn indicates the reference duration for that level as given by Table G-16a. The eight hour time weighted average sound level (TWA), in decibels, may be computed from the dose, in percent, by means of the formula: TWA = 16.61 $\log_{10}$ (D/100)+90. For an eight-hour work shift with the noise level constant over the entire shift, the TWA is equal to the measured sound level.

T09 0008-7995 Ver 03 - Approved - Exported from DMS: 2010-03-09 by ASUER

Table G-16a

A-weighted sound level, L (decibel)	Reference duration, T (hour)	A-weighted sound level, L (decibel)	Reference duration, T (hour)
80	32.0	106	0.87
81	27.9	107	0.76
82	24.3	108	0.66
83	21.1	109	0.57
84	18.4	110	0.5
85	16.0	111	0.44
86	13.9	112	0.38
87	12.1	113	0.33
88	10.6	114	0.29
89	9.2	115	0.25
90	8.0	116	0.22
91	7.0	117	0.19
91	6.1	118	0.16
93	5.3	119	0.14
94	4.6	120	0.125
95	4.0	121	0.11
96	3.5	122	0.095
97	3.0	123	0.082
98	2.6	124	0.072
99	2.3	125	0.063
100	2.0	126	0.054
101	1.7	127	0.047
102	1.5	128	0.041
103	1.3	129	0.036
104	1.1	130	0.031
105	1.0		

In the above table, the reference duration, T, is computed by

$$T = \frac{8}{2^{(L-90)/5}}$$

where L is the measured A-weighted sound level.

T09 0008-7995 Ver 03 - Approved - Exported from DMS: 2010-03-09 by ASUER

Conversion Between "Dose" and "8-Hour Time-Weighted Average" Sound Level

- *Compliance will be determined by the amount of exposure to noise in the workplace.* The amount of such exposure will usually be measured with an audiodosimeter, which gives readout in terms of "dose." Dosimeter readings can be converted to an "8 hour time weighted average sound level." (TWA).
- In order to convert the reading of a dosimeter into TWA, see Table A-1, below. This table applies to dosimeters that are set by the manufacturer to calculate dose or percent exposure according to the relationships in Table G-16a. So, for example, a dose of 91 percent over an eight-hour day results in a TWA of 89.3 dB, and, a dose of 50 percent corresponds to a TWA of 85 dB.
- If the dose as read on the dosimeter is less than or greater than the values found in Table A-1, the TWA may be calculated by using the formula: TWA = 16.61 $\log_{10}$ (D/100)+90 where TWA = 8 hour time weighted average sound level and D = accumulated dose in percent exposure.

T09 0008-7995 Ver 03 - Approved - Exported from DMS: 2010-03-09 by ASUER

Table A-1

Conversion From "Percent Noise Exposure" or "Dose" to "8-Hour Time-Weighted Average Sound Level" (TWA)

Dose or percent noise exposure	11.2 TWA
10	73.4
15	76.3
20	78.4
25	80.0
30	81.3
35	82.4
40	83.4
45	84.2
50	85.0
55	85.7
60	86.3
65	86.9
70	87.4
75	87.9
80	88.4
81	88.5
82	88.6
83	88.7
84	88.7
85	88.8
86	88.9
87	89.0
88	89.1
89	89.2
90	89.2
91	89.3
92	89.4
93	89.5
94	89.6
95	89.6
96	89.7
97	89.8
98	89.9
99	89.9
100	90.0
101	90.1
102	90.1

Dose or percent noise exposure	11.2 TWA
103	90.2
104	90.3
105	90.4
106	90.4
107	90.5
108	90.6
109	90.6
110	90.7
111	90.8
112	90.8
113	90.9
114	90.9
115	91.1
116	91.1
117	91.1
118	91.2
119	91.3
120	91.3
125	91.6
130	91.9
135	92.2
140	92.4
145	92.7
150	92.9
155	93.2
160	93.4
165	93.6
170	93.8
175	94.0
180	94.2
185	94.4
190	94.6
195	94.8
200	95.0
210	95.4
220	95.7
230	96.0

T09 0008-7995 Ver 03 - Approved - Exported from DMS: 2010-03-09 by ASUER

Dose or percent noise exposure	11.2 TWA
240	96.3
250	96.6
260	96.9
270	97.2
280	97.4
290	97.7
300	97.9
310	98.2
320	98.4
330	98.6
340	98.8
350	99.0
360	99.2
370	99.4
380	99.6
390	99.8
400	100.0
410	100.2
420	100.4
430	100.4
440	100.7
450	100.8
460	101.0
470	101.2
480	101.3
490	101.5
500	101.6
510	101.8
520	101.9

Dose or percent noise exposure	11.2 TWA
530	102.0
540	102.2
550	102.3
560	102.4
570	102.6
580	102.7
590	102.8
600	102.9
610	103.0
620	103.2
630	103.3
640	103.4
650	103.5
660	103.6
670	103.7
680	103.8
690	103.9
700	104.0
710	104.1
720	104.2
730	104.3
740	104.4
750	104.5
760	104.6
770	104.7
780	104.8
790	104.9
800	105.0

11.2 Appendix B, 29 CFR 1910.95 Estimating the Adequacy of Hearing Protector Attenuation

T09 0008-7995 Ver 03 - Approved - Exported from DMS: 2010-03-09 by ASUER

For employees who have experienced a significant threshold shift, hearing protection provided would have an attenuation that is sufficient to reduce employee exposure to a TWA of 85 dB. The following method will be used to estimate the adequacy of hearing protector attenuation.

The Noise Reduction Rating (NRR) developed by the Environmental Protection Agency (EPA) will be used. Only approved hearing protection equipment showing employees of Vestas-American Wind Technology will use the NRR on the hearing protector package. The NRR will be related to an individual employee's noise environment in order to assess the adequacy of the attenuation of a given hearing protector. When using the NRR to assess hearing protector adequacy, one of the following methods will be used:

- **Dosimeter (C-weighted):**
  - Obtain the employee's C-weighted dose for the entire work shift, and convert to TWA.
  - Subtract the NRR from the C-weighted TWA to obtain the estimated A-weighted TWA under the ear protector.
- **Dosimeter (not capable of C-weighted measurements):**
  - Convert the A-weighted dose to TWA.
  - Subtract 7 dB from the NRR.
  - Subtract the remainder from the A-weighted TWA to obtain the estimated A-weighted TWA under the ear protector.
- **Sound level meter (set to the A-weighting network):**
  - Obtain the employee's A-weighted TWA.
  - Subtract 7 dB from the NRR, and subtract the remainder from the A-weighted TWA to obtain the estimated A-weighted TWA under the ear protector.
- **Sound level meter (set to the C-weighting network):**
  - Obtain a representative sample of the C-weighted sound levels in the employee's environment.
  - Subtract the NRR from the C-weighted average sound level to obtain the estimated A-weighted TWA under the ear protector.
- **When using area monitoring procedures and a sound level meter set to the A-weighing network:**
  - Obtain a representative sound level for the area in question.

T09 0008-7995 Ver 03 - Approved - Exported from DMS: 2010-03-09 by ASUER

- *Subtract 7 dB from the NRR and subtract the remainder from the A-weighted* sound level for that area.

- **When using area monitoring procedures and a sound level meter set to the C-weighting network:**
  - Obtain a representative sound level for the area in question.
  - Subtract the NRR from the C-weighted sound level for that area.
    - Age Correction Values in Decibels for Males and Females.

Table F-1

Age Correction Values in Decibels for Males
Audiometric test frequency (Hz)

Years	1000	2000	3000	4000	6000
20 or younger	5	3	4	5	8
21	5	3	4	5	8
22	5	3	4	5	8
23	5	3	4	6	9
24	5	3	5	6	9
25	5	3	5	7	10
26	5	4	5	7	10
27	5	4	6	7	11
28	6	4	6	8	11
29	6	4	6	8	12
30	6	4	6	9	12
31	6	4	7	9	13
32	6	5	7	10	14
33	6	5	7	10	14
34	6	5	8	11	15
35	7	5	8	11	15
36	7	5	9	12	16
37	7	6	9	12	17
38	7	6	9	13	17
39	7	6	10	14	18
40	7	6	10	14	19
41	7	6	10	14	20
42	8	7	11	16	20
43	8	7	12	16	21
44	8	7	12	17	22
45	8	7	13	18	23

T09 0008-7995 Ver 03 - Approved - Exported from DMS: 2010-03-09 by ASUER

46	8	8	13	19	24
47	8	8	14	19	24
48	9	8	14	20	25
49	9	9	15	21	26
50	9	9	16	22	27
51	9	9	16	23	28
52	9	10	17	24	29
53	9	10	18	25	30
54	10	10	18	26	31
55	10	11	19	27	32
56	10	11	20	28	34
57	10	11	21	29	35
58	10	12	22	31	36
59	11	12	22	32	37
60 or older	11	13	23	33	38

Table F-2

Age Correction Values in Decibels for Females
Audiometric test frequency (Hz)

Years	1000	2000	3000	4000	6000
20 or younger	7	4	3	3	6
21	7	4	4	3	6
22	7	4	4	4	6
23	7	5	4	4	7
24	7	5	4	4	7
25	8	5	4	4	7
26	8	5	5	4	8
27	8	5	5	5	8
28	8	5	5	5	8
29	8	5	5	5	9
30	8	6	5	5	9
31	8	6	6	5	9
32	9	6	6	6	10
33	9	6	6	6	10
34	9	6	6	6	10
35	9	6	7	7	11
36	9	7	7	7	11
37	9	7	7	7	12

T09 0008-7995 Ver 03 - Approved - Exported from DMS: 2010-03-09 by ASUER

38	10	7	7	7	12
39	10	7	8	8	12
40	10	7	8	8	13
41	10	8	8	8	13
42	10	8	9	9	13
43	11	8	9	9	14
44	11	8	9	9	14
45	11	8	10	10	15
46	11	9	10	10	15
47	11	9	10	11	16
48	12	9	11	11	16
49	12	9	11	11	16
50	12	10	11	12	17
51	12	10	12	12	17
52	12	10	12	13	18
53	13	10	13	13	18
54	13	11	13	14	19
55	13	11	14	14	19
56	13	11	14	15	20
57	13	11	15	15	20
58	14	12	15	16	21
59	14	12	16	16	21
60 or older	14	12	16	17	22

Example to determine Age Correction Values in Decibels for Males and Females:

Audiometric test frequency (Hz)

Employee's age	1000	2000	3000	4000	6000
Age 32	6	5	7	10	14
Age 27	5	4	6	7	11
Difference	1	1	1	3	3

The difference represents the amount of hearing loss that may be attributed to aging in the time period between the baseline audiogram and the most recent audiogram. In this example, the difference at 4000 Hz is 3 dB. This value is subtracted from the hearing level at 4000 Hz, which in the most recent audiogram is 25, yielding 22 after adjustments. Then the hearing threshold in the baseline audiogram at 4000 Hz (5) is subtracted from the adjusted annual audiogram-hearing threshold at 4000 Hz (22). Thus the age-corrected threshold shift would be 17 dB (as opposed to a threshold shift of 20 dB without age correction).

T09 0008-7995 Ver 03 - Approved - Exported from DMS: 2010-03-09 by ASUER

12. Document History

Rev. no.:	Date:	Description of changes
R0	unknown	New document (old AWT number: 31031 R2)
R1	*unknown*	*unknown*
R2	15-Oct-2002	unknown
R3	01-Jan-2010	Content and template updates

T09 0008-7995 Ver 03 - Approved - Exported from DMS: 2010-03-09 by ASUER

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Vestas®

Equipment Defect Record

This form can be used to report defects in any equipment, including Personal Fall Arrest System (PFAS) and emergency descent equipment.

Site: City, State/Prov.:

Inspector Name: Signature:

DATE OF THIS INSPECTION: Date of Next Inspection:

ITEM DESCRIPTION (Include Make/Model #s):

Serial # or Identifying Mark(s):

DEFECT FOUND: ☐ During Scheduled Inspection ☐ During Daily Pre Use Check ☐ *During Use

DESCRIBE DEFECT(s):

CAUSE OF DEFECT *(Probable Cause, or If Defect is the result of an Incident, reference incident report and date):*

REMEDIAL ACTION(s) *(Check any/all that apply):*

DEFECTIVE CONDITION:

☐ CAN BE REPAIRED

☐ Returned to MANUFACTURER for Repair on (date):

☐ Sent to:

for Repair on (date): Phone:

☐ **CANNOT** BE REPAIRED*

☐ Item *DESTROYED to prevent accidental misuse OR,

☐ Replacement Ordered (date): PO #:

From:

**** Some Safety Items, once subjected to impact forces, must be immediately removed from service and destroyed.***

Attach original to the appropriate inspection form and file in Site Safety Records for that equipment.
If item is removed from service, note and date on Site Safety Equipment Register.
PPE Issue Record form shall be used to register replacement equipment.

Vestas American Wind Technology 1881 SW Naito Pkwy Suite 100 Portland Oregon - www.vestas.com

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Vestas PPE Inspection Record

Name:

Dept/Title:

Date:

Site/Location:

- ☐ Initial Issue
- ☐ Quarterly
- ☐ Annual
- ☐ Random

☑	Equipment	Present Condition	Stored Properly	Actions Required	Site Supervisor	Date Corrected
	*Fall Arrest Harness (CSA)					
	*Cable Grab w/ Carabiner					
	*Lanyard – double elastic leg and large mouth snap hooks (CSA)					
	Lanyard – 2', for positioning or ladder work					
	Lanyard – Retractable, seatbelt style					
	Gear Bag					
	Gloves, Cotton					
	Gloves, Leather					
	Gloves, Mechanic					
	Gloves, Latex or Nitrile					
	Glove Set, High Voltage					
	Hard Hat, white (CSA)					
	Hard Hat/Chin Strap					
	Hard Hat Liner					
	Petzl Helmet					
	Ball cap liner / Bump cap					
	LOTO – Lock, Tags, Hasp set					
	Respirator, Half Face					
	Respirator Cartridge – Organic Vapor					
	Respirator Cartridge – Particulate					
	Safety Glasses (clear)					
	Safety Glasses (tinted)					
	Safety Glasses (over the lenses)					
	Safety Goggles (clear)					
	Safety Glasses tether					
	Safety Glasses Anti-Fog wipes					
	High Visibility Vest					
	First Aid Kit – personal size					
	Work Uniform					
	Coverall					
	Safety Footwear Policy - review					

CERTIFICATION:

I have conducted a thorough inspection of PPE on the date and location specified above. I have indicated the status of each PPE item required by the tasks at this location and actions necessary to ensure each item is clean, in good repair and suitable for use.

I have also interviewed the employee using the PPE and he/she has demonstrated adequate knowledge and skills in the use of the PPE. They have also expressed their continued commitment to comply with Section 11, Personal Protective Equipment/Personal Use, Code of Safe Practices.

A copy of this inspection will be forwarded to HSE for retention.

Please use this space to express concerns and to make comments and suggestions to improve this procedure.
Use back side of sheet if necessary.

Employee Signature Date

Supervisor (Print Name) Signature Date

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Personal Protective Equipment (PPE) Issue Record

Vestas®

Name: _____ ☐ New Employee / 1st Issue

Dept/Title: _____ ☐ Replace - Lost / Stolen

Date: _____ ☐ Replace - Defective

Site/Location: _____ ☐ Additional Equipment Needed

	Equipment	Qty	Size	Comments
	*Fall Arrest Harness (CSA)			
	*Cable Grab w/ Carabiner			
	*Lanyard - double elastic leg and large mouth snap hooks (CSA)			
	Lanyard - 2', for positioning or ladder work			
	Lanyard - Retractable, seatbelt style			
	Gear Bag			
	Gloves, Cotton, Leather, Mechanic			
	Gloves, Latex or Nitrile			
	Glove Set, High Voltage			
	Hard Hat, white (CSA)			
	Hard Hat/Chin Strap			
	Petzl Helmet			
	Hard Hat Liner			
	Ball cap liner / Bump cap			
	LOTO - Locks, Tags, Hasp set			
	Respirator, Half Face			
	Respirator Cartridge - Organic Vapor			
	Respirator Cartridge - Particulate			
	Safety Glasses (clear) (tinted) circle one			
	Safety Glasses (over the lenses)			
	Safety Goggles (clear)			
	Safety Glasses tether			
	Safety Glasses Anti-Fog wipes			
	High Visibility Vest			
	First Aid Kit - personal size			
	Work Uniform			
	Coverall			

I have been issued the personal protective equipment checked above. I understand that this equipment is the property of Vestas Americas. I understand that I am responsible for this equipment and must return it at the termination of my employment, or this site visit. I understand that failure to comply with these requirements may result in progressive discipline up to and including termination.

Signature _____ Date _____

For new employees:

* Attach FALL ARREST SYSTEM INSPECTION RECORD for equipment accountability (model #, serial #, etc.), file in the Site Safety Records - Employee Orientation.
* If issued after start date, file in Site Safety Records - Inspections - Fall Arrest Systems.
**If replacing defective equipment, file with the Equipment Defect Record and note RFS (removed from service) date on the Site Equipment Register.

T09 0008-6841 Ver 02 - Approved - Exported from DMS: 2010-03-09 by ASUER

Vestas®

Respirator Fit Test Record

Employee has had a medical review and has no limitations that would prevent the use of respiratory protection equipment:

Signature of employee tested _____ Date _____

A. Employee name (print): _____

Employee No: _____ Employee job title/description: _____

B. Employer name: _____

Location/address: _____

Telephone: _____ Fax: _____

C. Respirator selected:

Manufacturer: _____

Model: _____ NIOSH approval number: _____

D. Conditions: (which could affect respirator fit):

Clean shaven ☐ Facial scar ☐ PPE worn ☐

Comments/other: _____

E. Fit checks:

Negative pressure: ☐ Positive pressure: ☐

F. Fit testing:

Qualitative: Bitrex ☐ Irritant smoke ☐ Saccharine ☐

Quantitative: Fit factor _____ Passed ☐ Failed ☐

G. Employee acknowledgement of test results:

Employee signature: _____ Date: _____

Test conducted by: _____ Date: _____

DISCLAIMER: This respirator fit test(s) training was performed on and by the person listed. The results indicate the performance of the listed respiratory protective device under controlled conditions, as tested on the employee named. Fit testing, as performed, measures the ability of the respiratory protective device to provide protection to the individual tested. The manufacturer or test conductor express or imply no guarantee that this or any identical respiratory protective device will provide adequate protection under conditions other than were present when this test was performed. Improper use, maintenance, or application of this or any other respiratory protective device will reduce or eliminate protection.

Initials of person tested: _____

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Vestas®

Respirator Medical Evaluation

Health Care Professional Respirator Medical Evaluation Questionnaire

Note: Answers to questions in Section 1, and to question 9 in Section 2 of Part A, do not require a medical examination.

To the employee:

Can you read (circle one)? Yes / No

Your employer must allow you to answer this questionnaire during normal working hours, or at a time and place that is convenient to you. To maintain your confidentiality, your employer or supervisor must not look at or review your answers, and your employer must tell you how to deliver or send this questionnaire to the health care professional who will review it.

Part A. Section 1:

(Mandatory) The following information must be provided by every employee who has been selected to use any type of respirator (please print).

1. Today's date: _____
2. Your name: _____
3. *Your age (to nearest year):* _____
4. Sex (circle one): Male/Female
5. Your height: _____ ft. _____ In.
6. Your weight: _____ lbs.
7. Your job title: _____
8. A phone number where you can be reached by the health care professional who reviews this questionnaire (include the Area Code): _____
9. The best time to phone you at this number: _____
10. Has your employer told you how to contact the health care professional who will review this questionnaire (circle one): Yes / No
11. Check the type of respirator you will use (you can check more than one category):
    a) _____ N, R, or P disposable respirator (filter-mask, non- cartridge type only).
    b) _____ Other type (for example, half- or full-face piece type, powered-air purifying, supplied-air, self-contained breathing apparatus).
12. Have you worn a respirator (circle one): Yes / No –
    If "yes," what type(s):_____

T09 0008-7960 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

Part A. Section 2:

(Mandatory) Questions 1 through 9 below must be answered by every employee who has been selected to use any type of respirator (please circle "yes" or "no").

1. Do you currently smoke tobacco, or have you smoked tobacco in the last month: Yes / No
2. Have you ever had any of the following conditions?
   a) Seizures (fits): Yes / No
   b) Diabetes (sugar disease): Yes / No
   c) Allergic reactions that interfere with your breathing: Yes / No
   d) Claustrophobia (fear of closed-in places): Yes / No
   e) Trouble smelling odors: Yes / No
3. Have you ever had any of the following pulmonary or lung problems?
   a) Asbestosis: Yes / No
   b) Asthma: Yes / No
   c) Chronic bronchitis: Yes / No
   d) Emphysema: Yes / No
   e) Pneumonia: Yes / No
   f) Tuberculosis: Yes / No
   g) Silicosis: Yes / No
   h) Pneumothorax (collapsed lung): Yes / No
   i) Lung cancer: Yes / No
   j) Broken ribs: Yes / No
   k) Any chest injuries or surgeries: Yes / No
   l) Any other lung problem that you've been told about: Yes / No
4. Do you currently have any of the following symptoms of pulmonary or lung illness?
   a) Shortness of breath: Yes / No
   b) Shortness of breath when walking fast on level ground or walking up a slight hill or incline: Yes / No
   c) Shortness of breath when walking with other people at an ordinary pace on level ground: Yes / No
   d) Have to stop for breath when walking at your own pace on level ground: Yes / No
   e) Shortness of breath when washing or dressing yourself: Yes / No
   f) Shortness of breath that interferes with your job: Yes / No
   g) Coughing that produces phlegm (thick sputum): Yes / No
   h) Coughing that wakes you early in the morning: Yes / No

T09 0008-7960 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

i) Coughing that occurs mostly when you are lying down: Yes / No

j) Coughing up blood in the last month: Yes / No

k) Wheezing: Yes / No

l) Wheezing that interferes with your job: Yes / No

m) Chest pain when you breathe deeply: Yes / No

n) *Any other symptoms that you think may be related to lung problems: Yes / No*

5. Have you ever had any of the following cardiovascular or heart problems?

a) Heart attack: Yes / No

b) Stroke: Yes / No

c) Angina: Yes / No

d) Heart failure: Yes / No

e) Swelling in your legs or feet (not caused by walking): Yes / No

f) Heart arrhythmia (heart beating irregularly): Yes / No

g) High blood pressure: Yes / No

h) Any other heart problem that you've been told about: Yes / No

6. Have you ever had any of the following cardiovascular or heart symptoms?

a) Frequent pain or tightness in your chest: Yes / No

b) Pain or tightness in your chest during physical activity: Yes / No

c) Pain or tightness in your chest that interferes with your job: Yes / No

d) In the past two years, have you noticed your heart skipping or missing a beat: Yes / No

e) Heartburn or indigestion that is not related to eating: Yes/ No

f) Any other symptoms that you think may be related to heart or circulation problems: Yes / No

7. Do you currently take medication for any of the following problems?

a) Breathing or lung problems: Yes / No

b) Heart trouble: Yes / No

c) Blood pressure: Yes / No

d) Seizures (fits): Yes / No

8. If you've used a respirator, have you ever had any of the following problems? (If you've never used a respirator, check the following space and go to question 9:)

a) Eye irritation: Yes / No

b) Skin allergies or rashes: Yes / No

c) Anxiety: Yes / No

d) General weakness or fatigue: Yes / No

e) Any other problem that interferes with your use of a respirator: Yes / No

T09 0008-7960 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

9. Would you like to talk to the health care professional who will review this questionnaire about your answers to this questionnaire: Yes / No

Questions 10 to 15 below must be answered by every employee who has been selected to use either a full-face respirator or a self-contained breathing apparatus (SCBA). For employees who have been selected to use other types of respirators, answering these questions is voluntary.

10. Have you ever lost vision in either eye (temporarily or permanently): Yes / No
11. Do you currently have any of the following vision problems?
    a) Wear contact lenses: Yes / No
    b) Wear glasses: Yes / No
    c) Color blind: Yes / No
    d) Any other eye or vision problem: Yes / No
12. Have you ever had an injury to your ears, including a broken ear drum: Yes / No
13. Do you currently have any of the following hearing problems?
    a) Difficulty hearing: Yes / No
    b) Wear a hearing aid: Yes / No
    c) Any other hearing or ear problem: Yes / No
14. Have you ever had a back injury: Yes / No
15. Do you currently have any of the following musculoskeletal problems?
    a) Weakness in any of your arms, hands, legs, or feet: Yes / No
    b) Back pain: Yes / No
    c) Difficulty fully moving your arms and legs: Yes / No
    d) Pain or stiffness when you lean forward or backward at the waist: Yes / No
    e) Difficulty fully moving your head up or down: Yes / No
    f) Difficulty fully moving your head side to side: Yes / No
    g) Difficulty bending at your knees: Yes / No
    h) Difficulty squatting to the ground: Yes / No
    i) Climbing a flight of stairs or a ladder carrying more than 25 lbs: Yes / No
    j) Any other muscle or skeletal problem that interferes with using a respirator: Yes / No

T09 0008-7960 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

Vestas®

Respirator Medical Evaluation

Part B

Any of the following questions, and other questions not listed, may be added to the questionnaire at the discretion of the health care professional who will review the questionnaire.

16. In your present job, are you working at high altitudes (over 5,000 feet) or in a place that has lower than normal amounts of oxygen: Yes / No
    If "yes," do you have feelings of dizziness, shortness of breath, pounding in your chest, or other symptoms when you're working under these conditions: Yes / No

17. At work or at home, have you ever been exposed to hazardous solvents, hazardous airborne chemicals (e.g., gases, fumes, or dust), or have you come into skin contact with hazardous chemicals: Yes / No

    If "yes," name the chemicals if you know them: _____

    _____

18. Have you ever worked with any of the materials, or under any of the conditions, listed below:

    a) Asbestos: Yes / No

    b) Silica (e.g., in sandblasting): Yes / No

    c) Tungsten/cobalt (e.g., grinding or welding this material): Yes / No

    d) Beryllium: Yes / No

    e) Aluminum: Yes / No

    f) Coal (for example, mining): Yes / No

    g) Iron: Yes / No

    h) Tin: Yes / No

    i) Dusty environments: Yes / No

    j) Any other hazardous exposures: Yes / No

    If "yes," describe these exposures: _____

    _____

    _____

19. List any second jobs or side businesses you have:

    _____

20. List your previous occupations:

    _____

21. List your current and previous hobbies:

    _____

22. Have you been in the military services? Yes / No

    If "yes," were you exposed to biological or chemical agents (either in training or combat): Yes / No

T09 0008-7960 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

23. Have you ever worked on a HAZMAT team? Yes / No

24. Other than medications for breathing and lung problems, heart trouble, blood pressure, and seizures mentioned earlier in this questionnaire, are you taking any other medications for any reason (including over-the-counter medications): Yes / No

    If "yes," name the medications if you know them:

    _____

    _____

25. Will you be using any of the following items with your respirator(s)?

    a) HEPA Filters: Yes / No

    b) Canisters (for example, gas masks): Yes / No

    c) Cartridges: Yes / No

26. How often are you expected to use the respirator(s) (circle "yes" or "no" for all answers that apply to you)?:

    a) Escape only (no rescue): Yes / No

    b) Emergency rescue only: Yes / No

    c) Less than 5 hours per week: Yes / No

    d) Less than 2 hours per day: Yes / No

    e) 2 to 4 hours per day: Yes / No

    f) Over 4 hours per day: Yes / No

27. During the period you are using the respirator(s), is your work effort:

    a) Light (less than 200 kcal per hour): Yes / No

    If "yes," how long does this period last during the average shift:: _____ hrs. _____ mins.

    Examples of a light work effort are **sitting** while writing, typing, drafting, or performing light assembly work; or **standing** while operating a drill press (1-3 lbs.) or controlling machines.

    b) Moderate (200 to 350 kcal per hour): Yes / No

    If "yes," how long does this period last during the average shift:: _____ hrs. _____ mins.

    Examples of moderate work effort are **sitting** while nailing or filing; **driving** a truck or bus in urban traffic; **standing** while drilling, nailing, performing assembly work, or transferring a moderate load (about 35 lbs.) at trunk level; **walking** on a level surface about 2 mph or down a 5-degree grade about 3 mph; or **pushing** a wheelbarrow with a heavy load (about 100 lbs.) on a level surface.

    c) Heavy (above 350 kcal per hour): Yes / No

    If "yes," how long does this period last during the average shift: _____ hrs. _____ mins.

    Examples of heavy work are **lifting** a heavy load (about 50 lbs.) from the floor to your waist or shoulder; working on a loading dock; **shoveling**; **standing** while bricklaying or chipping castings; **walking** up an 8-degree grade about 2 mph; **climbing** stairs with a heavy load (about 50 lbs.).

T09 0008-7960 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

28. Will you be wearing protective clothing and/or equipment (other than the respirator) when you're using your respirator: Yes / No

    If "yes," describe this protective clothing and/or equipment:

    _____

29. Will you be working under hot conditions (temperature exceeding 77 deg. F): Yes / No

30. Will you be working under humid conditions: Yes / No

31. Describe the work you'll be doing while you're using your respirator(s):

    _____

    _____

32. Describe any special or hazardous conditions you might encounter when you're using your respirator(s) (for example, confined spaces, life-threatening gases):

    _____

    _____

33. Provide the following information, if you know it, for each toxic substance that you'll be exposed to when you're using your respirator(s):

    Name of the first toxic substance: _____

    Estimated maximum exposure level per shift: _____

    Duration of exposure per shift: _____

    Name of the second toxic substance: _____

    Estimated maximum exposure level per shift: _____

    Duration of exposure per shift: _____

    Name of the third toxic substance: _____

    Estimated maximum exposure level per shift: _____

    Duration of exposure per shift: _____

    The name of any other toxic substances that you'll be exposed to while using your respirator: __

    _____

34. Describe any special responsibilities you'll have while using your respirator(s) that may affect the safety and well-being of others (for example, rescue, security):

    _____

    _____

T09 0008-7960 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

Vestas®

PPE Hazard Assessment Certification Form

Name of workplace: _____ **Assessment conducted by:** _____
Workplace address: _____ **Date of assessment:** _____
Work area(s): _____ **PPE Selected By:** _____
Job/Task(s): _____ **Effective Date:** _____

EYES/FACE ☐ **Negligible Hazard** **Can hazard be eliminated without the use of PPE? Yes ☐ No ☐**		
Work-related exposure to: ☐ Airborne dust ☐ Flying particles ☐ Hazardous liquids/chemicals ☐ Intense light ☐ Blood splashes ☐ Other: ____	PPE required to manage hazard: ☐ Safety glasses ☐ Safety goggles ☐ Face Shield ☐ Shading/Filter (#____) ☐ Welding shield ☐ Other: ____	Comments:
HEAD ☐ **Negligible Hazard** **Can hazard be eliminated without the use of PPE? Yes ☐ No ☐**		
Work-related exposure to: ☐ Beams ☐ Pipes ☐ Falling objects ☐ Machine parts ☐ Other: ____	PPE required to manage hazard: ☐ Protective Helmet ☐ Type 1 (top protection) ☐ Type 2 (lateral protection) ☐ Other: ____	Comments:
HANDS/ARMS ☐ **Negligible Hazard** **Can hazard be eliminated without the use of PPE? Yes ☐ No ☐**		
Work-related exposure to: ☐ Hazardous liquids/chemicals ☐ Scrapes, bruise, or cut ☐ Injuries from tools ☐ Extreme heat/cold ☐ Blood (OPIM) ☐ Other: ____	PPE required to manage hazard: ☐ Gloves ☐ Chemical resistance ☐ Liquid/leak resistance ☐ Temperature resistance ☐ Cut resistance ☐ Gauntlet or long necked ☐ Work Gloves ☐ Chemical Protective sleeves ☐ Long sleeves ☐ Other: ____	Comments:
FEET/LEGS ☐ **Negligible Hazard** **Can hazard be eliminated without the use of PPE? Yes ☐ No ☐**		
Work-related exposure to: ☐ Hazardous liquids/chemicals ☐ Heavy falling/rolling objects ☐ Heavy equipment ☐ Exposed electrical wiring or components ☐ Slippery surfaces ☐ Explosive atmospheres ☐ Tools ☐ Other: ____	PPE required to manage hazard: ☐ Closed shoes (e.g. no opened toes or sandals) ☐ Long pants ☐ Safety shoes or boots ☐ Toe protection ☐ Metatarsal protection ☐ Electrical protection ☐ Heat/cold protection ☐ Anti-slip soles ☐ Chemical resistance ☐ Leggings or chaps ☐ Foot-Leg guards ☐ Other: ____	Comments:
BODY/SKIN ☐ **Negligible Hazard** **Can hazard be eliminated without the use of PPE? Yes ☐ No ☐**		
Work-related exposure to: ☐ Hazardous liquids/chemicals ☐ Sharp or rough edges ☐ Extreme heat/cold ☐ Other: ____	PPE required to manage hazard: ☐ Lab Coat ☐ Raingear ☐ Coveralls, Body suit ☐ Apron ☐ Welding leathers ☐ Abrasion/cut resistance ☐ Other: ____	Comments:
BODY/WHOLE ☐ **Negligible Hazard** **Can hazard be eliminated without the use of PPE? Yes ☐ No ☐**		
Work-related exposure to: ☐ Working from heights of 6 feet or more ☐ Working around electrical ☐ Other: ____	PPE required to manage hazard: ☐ Fall Arrest/Restraint: Type: ____ ☐ Arc Flash Fire Resistive clothing Class ____ ☐ Other: ____	Comments:
LUNGS/EARS ☐ **Negligible Hazard** **Can hazard be eliminated without the use of PPE? Yes ☐ No ☐**		
Work-related exposure to: ☐ Irritating dust or particulate ☐ Irritating or toxic gas/vapor ☐ Loud work environment ☐ Noisy machines/tools ☐ Other: ____	PPE required to manage hazard: ☐ Respirator (Cartridge type: ____) ☐ Particulate Mask ☐ Hearing Protection ☐ Other: ____	Comments:

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Hazard Assessment Certification for PPE

This tool is used to perform a hazard assessment for the purpose of identifying the type of PPE required within an area, for a task or for a group of tasks. It is to serve as written certification that a hazard assessment has been done as required by CFR1919.132(d)(2). Document your hazard assessment for PPE. Make sure that the blank fields at the beginning of the checklist are filled out.

Instructions:

1. Do a walk through survey of each work area and job/task. Read through the list of work activities in the first column, putting a check next to the activities performed in that work area or job.
2. Read through the list of hazards in the second column, putting a check next to the hazards to which employees may be exposed while performing the work activities or while present in the work area. (For e.g., work activity: climbing turbine ladders; work-related exposure: working from heights of 6 feet or more.)
3. Decide how you are going to control the hazards. Try considering engineering, workplace, and/or administrative controls to eliminate or reduce the hazards before resorting to using PPE. If the hazard cannot be eliminated without using PPE, indicate which type(s) of PPE will be required to protect your employee from the hazard.
4. Make sure that you complete the following fields on the form to certify that a hazard assessment was done:
    - Name of your workplace
    - Address of the workplace where you are doing the hazard assessment
    - Name of person certifying that a workplace hazard assessment was done
    - Date the hazard assessment was done
5. Route completed form to HSE office.
6. If assessor identifies PPE requirements in excess of associated Work Instructions, forward a copy to Tech Support for WI update.

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Personal Fall Arrest System Inspection Record

Vestas®

Site: _____ Location: _____

This PFAS assigned to (Print Name): _____

Signature: _____ Date of this Inspection: _____

INSPECTION CHECKLIST *(" ✓" if no defect, or reference item number/letter and describe defect on defect record):*

I.a. CABLE GRAB OR SLEEVE

☐ The manufacturer's information for this piece of equipment, including inspection guidelines, is available for review.

MAKE: _____ MODEL: _____ SERIAL #: _____

BODY:

- a. Free of paint, dirt, grease, etc. ☐
- b. Markings are clearly readable ☐
- c. Engraved arrows clearly visible ☐
- d. Articulating surfaces are clean ☐
- e. Safety pin sits firmly - is not bent ☐

HANDLE AND CABLE SHOE:

- f. No bends, cracks, or deformities ☐
- g. Operates freely and smoothly ☐
- h. Springs secure and able to pull handle down ☐

ROLLERS AND UPPER ROLLER EXTENSION:

- i. Rollers spin freely ☐
- j. Roller track does not chafe ☐
- k. Spring rotates upper roller extension to climbing position ☐
- l. Fasteners secure and tight ☐

LOCKING LEVER:

- m. Operates smoothly ☐
- n. Springs back into locked position when released ☐

SLEEVE BODY:

- o. Normal wear on cable slot surface ☐

I.b. AVANTI SLIDER

☐ The manufacturer's information for this piece of equipment, including inspection guidelines, is available for review.

MAKE: _____ MODEL: _____ SERIAL #: _____

SHOCK ABSORBER SERIAL NUMBER: _____ SHOCK ABSORBER EXPIRATION DATE: _____

SLIDER:

- a. Free of paint, dirt, grease, etc. ☐
- b. Markings are clearly readable ☐
- c. No cracks or deformities ☐
- d. Springs are intact and working ☐

SHOCK ABSORBER:

- e. Free of paint, dirt, grease, etc. ☐
- f. No tears, abrasions, mold, or burns ☐
- g. No chemical, heat, or UV damage ☐
- h. Energy absorber cover is secure, not torn or damaged ☐

II. HARNESS *(Full body harness, front, back, & side "D" rings - Expected Service Lifetime Per Mfr 2-3 years in service/use):*

☐ The manufacturer's information for this piece of equipment, including inspection guidelines, is available for review.

MAKE: _____ MODEL #: _____ SERIAL #: _____ MFR. DATE: _____

- a. Webbing free of cuts, frays, or broken fibers ☐
- b. No tears, abrasions, mold, or burns ☐
- c. No chemical, heat, or UV damage ☐
- d. No pulled or cut stitches *(May indicate impact loading)* ☐
- e. Hardware not cracked, corroded, damaged, or distorted ☐
- f. Buckles work freely ☐

III. ANCHORAGE CONNECTOR or CARABINER *(Steel, one-handed operation, self-locking/self-closing gates):*

Identifying Marks: _____ Steel or Aluminum (circle one)

- a. *No bends, cracks, dents, deformities* ☐
- b. *Rivets are not bent, loose or missing* ☐
- c. Gate closes & locks automatically after releasing ☐

IV. ENERGY ABSORBENT LANYARD(s) *(With self-locking snap hooks):*

☐ The manufacturer's information for this piece of equipment, including inspection guidelines, is available for review.

MAKE: _____ MODEL #: _____ SERIAL #: _____ MFR. DATE:

- a. Webbing free of cuts, frays, or broken fibers ☐
- b. No knots, excessive dirt or paint buildup ☐
- c. No tears, abrasions, mold, or burns ☐
- d. No chemical, heat, or UV damage ☐
- e. No pulled or cut stitches *(May indicate impact loading)* ☐
- f. Measured length is same (+/-6") as marked on label ☐
- g. Energy absorber cover is secure, not torn or damaged ☐
- h. Connecting hooks work properly ☐
- i. Snap hook gates move freely, lock upon closing ☐
- j. Adjusters (if present) work properly ☐

Additional Comments *(Use Safety Equipment Defect Record to promptly address any noted defects)* :

_____

_____

_____

Every PFAS should be thoroughly inspected during initial assignment and then quarterly thereafter. When complete, file in Site Safety Records. Use this form to complete and update the Site Safety Equipment Register and Inspection schedule.

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Personal Fall Arrest Equipment Register

Vestas®

Site Name/Location _____

Site Supervisor _____

Equipment Description	Manufacturer	Model #	Serial #	Year New	Assigned to:	Insp Date	RFS

Required - Verification (signature) that this list accurately reflects all of the personal fall arrest equipment for this site:

Print or Type Name _____ *Signature* _____ *Date* _____

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Vestas® Tower Climbing Practical Test

(Print Full Name) _____ Date of Test (MM-DD-YR) _____

☐ Prospective Employee ☐ Site Guest ☐ Other: _____

Site/Location: _____ Trainer/Sup'r Name: _____

Turbine Model and ID #: _____ ☐ I have reviewed the **Turbine Safety Instruction** for this wind turbine

The Practical Test for Climbing a Wind Turbine Generator is comprised of a series of stages:

- Stage 1: Review of the potential hazards involved in this test, and site Emergency Response Procedures;
- Stage 2: Review basics of personal protective gear, proper use, fit, and limitations;
- Stage 3: Review of the actual climbing procedure;
- Stage 4: Practical Test – Trainer demonstration followed by trainee duplication – Ascent and descent.

Check or Initial as Training Points are reviewed:

Stage 1: HAZARD AWARENESS	**Trained**	**Stage 2: PPE USE, FIT, LIMITATIONS**	**Trained**
Heights		Climbing Harness Fit	
Wind Speeds		Head Protection, Gloves, Glasses, Boots	
Fatigue		Cable Glider/Avanti Slider to Cable Operation	
Radio or Phone Contacts		Anchorage Device Operation	
Location of ER Equipment			
Stop/Start Turbine (General Awareness)			
PPE for Hazard Abatement			

Stage 3: REVIEW OF CLIMBING PROCEDURE	**Trained**
Cable Glider/Avanti Slider Operation	
Platforms, Transitions, Tie-Offs (signs or yellow)	

Stage 4: PRACTICAL TEST - TOWER ASCENT/DESCENT (Note: The trainer can elect to discontinue this test AT ANY TIME). After each step, trainer will decide if test should continue, or comment why test should terminate. Prior to any climb test, notify Site Operations.

Trainer Attaches Cable Glider or Avanti slider, Climbs 15 feet and Returns – Trainee Duplicates	
Trainer Climbs to First Platform, Transitions to Platform - Trainee Duplicates	
Trainer Climbs to Top Platform, Ties Off, Transitions to Platform, Detaches From Cable Glider – Trainee Duplicates	
Trainer Evaluates Trainee Condition – *Is Trainee Coherent, Fatigued, Dizzy, Anxious*	
Trainer Climbs Ladder to Nacelle – Trainee Duplicates	
Trainer ascends to nacelle roof and ties off at two locations – Trainee Duplicates. Trainer Points Out Nacelle Components Including Tie-Off Points.	
Trainer transitions to last anchor point and Observes, Trainee transition to first/second anchor point. Trainer enters Hub-Trainee Duplicates	
Trainer Reviews Descent Procedures - Trainee Ties Off, Transitions to Ladder, Attaches Cable Glider/Avanti Slider, Detaches From Tie-Off , Climbs to First Platform, Waits – Trainer Observes Then Follows	
Trainee Transitions Past Platform, Descends to Tower Base, Detaches From Cable - Trainer Observes Then Follows	
Trainer and Trainee Remove Climbing Harnesses, Notify Operations, and Re-Start Turbine	
After Return To Site Office Trainer Will Verify That All Equipment Issued For the Purpose of This Test has been Returned	

TRAINER EVALUATION OF TOWER CLIMBING TRAINING/PRACTICAL TEST: ☐ PASSED ☐ FAILED (See Comments)

☐ RETEST DATE: _____ _____
Trainer Signature

Comments: _____

I understand that the opportunity for employment with Vestas Americas at this site as a Wind Turbine Technician is dependent on the successful completion of this test.

_____ _____
Signature Date (MM-DD-YR)

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Vestas®

Daily Company Vehicle Inspection Form

DMS 0009-2996 R00
Date:2010-01-01
Page 1 of 1

Daily Vehicle Checklist

Week of:	Complete each item by initialing in box.					
Vehicle #:	Mon.	Tues.	Wed.	Thur.	Fri.	Sat/Sun
Engine Oil and Coolant Levels						
Windshield & Mirrors						
Doors and Windows						
Tires - Wear and Pressure (spare)						
Inspection and License Plate Stickers						
Insurance Card and Registration						
Steering Mechanism						
Check Ground under Vehicle for Fluid Leaks						
First Aid Kit						
Fire Extinguisher						
Warning Reflectors and Flares						
Jack, Lug-wrench and Spare Tire						
Communication Device						
Check for Cleanliness & Damages (Interior & exterior)						
Fuel Level, Gauges, and Dash Warning Lights						
Windshield & Mirrors						
Horn						
Head lights, Tail Lights, Turn Signals, Flashers, Warning Lights						
Defrosters, Heaters and Air Conditioner (when applicable)						
Seat Belts						

Notes:

Signature of Operator:

T09 0009-2996 Ver 00 - Approved - Exported from DMS: 2010-03-09 by ASUER

Vestas® **Crane Safety Program**

Contents

1. Purpose 2
2. Basis 2
3. Responsibility 2
4. References 2
5. Scope 2
6. Written Program 3
7. Initial Training 3
7.1 General 3
7.2 Crane trainers 3
7.3 Retraining 4
8. Safe Operating Practices for Crane Operators 4
9. Safe Operating Practices for Signalers 5
10. Leaving or Parking Hoists or Cranes 5
11. Handling Sling Loads 5
12. Estimating the Weight of Loads 6
13. Personal Protective Equipment 6
14. Crane Inspections 6
14.1 Crane inspectors 7
14.2 Inspection intervals 7
14.3 Inspection documentation 7
14.4 Damaged/Unserviceable cranes 7
15. Daily Checks 7
16. Monthly Checks 8
17. Periodic Checks 8
18. Periodic CMAA Inspection Recommendations 8
19. New, Idle, and Altered, Used Cranes 9
20. Preventive Maintenance 9
20.2 Preoperational Tests - General 9
20.3 Preoperational Tests - Hooks 10
20.4 Preoperational Tests - Rope 10
21. Lockout/Tagout Considerations 10
22. History of this Document 11

T09 0008-7996 Ver 03 - Approved - Exported from DMS: 2010-03-09 by ASUER

1. Purpose

Vestas-American Wind Technology will ensure that all cranes used within our facilities are evaluated. This standard practice instruction is intended to address comprehensively the issues of: evaluating the associated potential hazards, communicating information concerning these hazards, and establishing appropriate procedures and protective measures for employees.

Vestas-American Wind Technology will establish crane safety operational procedures through the use of this document.

2. Basis

Serious injury or death can be the result of improper use, or use of cranes having defective or poorly maintained components. The Occupational Safety and Health Administration (OSHA) estimates that most of these types of accidents can be prevented if proper safety precautions at job sites are initiated. This poses a serious problem for exposed workers and the employer. The OSHA Crane safety standards establish uniform requirements to ensure that the hazards associated with the use of cranes in U.S. workplaces are evaluated, safety procedures implemented, and that the proper hazard information is transmitted to all affected workers.

3. Responsibility

The Safety Manager and/or Safety Representative is the person authorized to amend these instructions. The Safety Manager and/or Safety Representative is authorized to halt any operation of the company where there is danger of serious personal injury.

4. References

- OSHA - 29 CFR 1910.179 - Overhead and Gantry Cranes
- OSHA - 29 CFR 1926.550 - Cranes and Derricks
- OSHA - 29 CFR 1903.1 (The General Duty Clause)
- CMAA - Spec. No. 70 and 74 Crane Operator's Manual
- ANSI - ANSI/ASME
    - B-30 series Cranes, Derricks, Hoists,
    - B- 30.2 Overhead And Gantry Cranes (Top Running Hoist)
    - B- 30.10 Hooks
    - B- 30.11 Monorail and Underhung Cranes
    - B- 30.16 Overhead Hoists (Underhung)
    - B- 30.17 Overhead & Gantry Cranes (Underhung Hoists)
    - B- 30.18 Stacker Cranes
    - B- 30.21 Manually Lever Operated Hoists

5. Scope

This standard practice instruction applies to cranes used in conjunction with other material handling equipment for the movement of material.

T09 0008-7996 Ver 03 - Approved - Exported from DMS: 2010-03-09 by ASUER

6. Written Program

Vestas-American Wind Technology will review and evaluate this standard practice instruction on an annual basis, or when changes occur to regulatory standards that prompt revision of this document, or when facility operational changes occur that require a revision of this document. Effective implementation of this program requires support from all levels of management within the company. This written program will be communicated to all personnel that are affected by it. It encompasses the total workplace, regardless of number of workers employed or the number of work shifts. It is designed to establish clear goals and objectives.

7. Initial Training

7.1 General

Training shall be conducted prior to job assignment. The employer shall provide training to ensure that the purpose, function, and proper use of cranes is understood by employees and that the knowledge and skills required for the safe application and usage is acquired by employees. This standard practice instruction shall be provided to, and read by, all employees receiving training. The training shall include, at a minimum, the following:

7.1.1 Preoperational inspection requirements of the crane to be used.

7.1.2 Specific operational requirements of the crane to be used.

7.1.3 Principles of crane operations.

7.1.4 Recognition of applicable hazards associated with the work to be completed.

7.1.5 Load determination and balancing requirements.

7.1.6 Procedures for removal of a crane from service.

7.1.7 All other employees whose work operations are or may be in an area where cranes may be utilized shall be instructed in an awareness level concerning hazards associated with cranes.

7.1.8 Physical and mental requirements of operators. Crane operators will be screened for physical and mental impairments that could result in an improper use. Operators will meet, at a minimum, the following requirements before being certified to operate cranes:

- Be drug and alcohol free during any lifting event.
- Be thoroughly trained in all facets of the required lift.
- Have a mature and safe attitude at all times.
- Have good depth perception (essential for load spotting).
- Have good hearing and vision (corrected or uncorrected).
- Have no history of unsafe acts in the workplace.
- Have the ability to react quickly in an emergency.
- Take no medication that will interfere with the operation.
- Understand the requirements for all phases of the lift.

7.2 Crane trainers

7.2.1 Please contact the HSE Department for a list of employees or position titles that will receive training and, as required, serve as crane trainers.

T09 0008-7996 Ver 03 - Approved - Exported from DMS: 2010-03-09 by ASUER

7.3 Retraining

7.3.1 Retraining shall be provided for all authorized and affected employees whenever (and prior to) there being a change in their job assignments, a change in the type of crane used, equipment being lifted, lifting procedures, or when a known hazard is added to the lifting environment.

7.3.2 Additional retraining shall also be conducted whenever a periodic inspection reveals, or whenever this employer has reason to believe, that there are deviations from or inadequacies in the employee's knowledge or use of crane procedures.

7.3.3 The retraining shall reestablish employee proficiency and introduce new or revised methods and procedures, as necessary.

8. Safe Operating Practices for Crane Operators

Whenever any crane is used, the following safe practices (at a minimum) shall be observed:

8.1.1 Always check warning devices and signals before use.

8.1.2 Always document and maintain inspection records.

8.1.3 Always ensure cranes shall not be loaded in excess of their rated capacities.

8.1.4 Always ensure the new location supports the weight.

8.1.5 Always keep employees clear of loads about to be lifted and suspended loads.

8.1.6 Always keep suspended loads clear of all obstructions.

8.1.7 Always lockout before maintenance or repairing cranes.

8.1.8 Always position the hook directly over the load before lifting.

8.1.9 Always test brakes by a short lift to ensure control.

8.1.10 Before being lifted, loads will be checked for proper balance.

8.1.11 Follow the manufacturer's recommendations.

8.1.12 Frequently inspect cranes exposed to adverse conditions.

8.1.13 Hands must not be placed between the suspension means and the load during lifting.

8.1.14 Know where you're going to set the load down!

8.1.15 Know your travel path in advance of the lift!

8.1.16 Loads will, in all cases, be properly balanced to prevent slippage.

8.1.17 Move loads only after being signaled by the designated, qualified signaler.

8.1.18 Never allow riders on loads or hooks.

8.1.19 Never allow unauthorized persons to operate cranes.

8.1.20 Never attempt to operate a crane or hoist that is suspected to be unsafe.

8.1.21 Never carry loads over workers.

8.1.22 Never carry loads past workers (they must yield right of way).

8.1.23 Never use cranes that are damaged or defective in any way.

T09 0008-7996 Ver 03 - Approved - Exported from DMS: 2010-03-09 by ASUER

8.1.24 Operators must watch the signalers.

8.1.25 Shock loading is prohibited.

8.1.26 Signalers must keep line-of-sight with the operator.

8.1.27 Signalers must watch the load.

8.1.28 Test all hoist controls and brakes at the beginning of each shift.

9. Safe Operating Practices for Signalers

Whenever any crane is used, the following safe practices (at a minimum) shall be observed:

9.1.1 Ensure that only one person is the designated signaler.

9.1.2 Ensure the operator acknowledges every signal.

9.1.3 Follow the manufacturer's recommendations.

9.1.4 Know the new location will support the weight.

9.1.5 Maintain line-of-sight with the operator.

9.1.6 Operators must watch the signalers.

9.1.7 Plan in advance where the load is going!

9.1.8 Stop the operation any time comprehension is lost.

10. Leaving or Parking Hoists or Cranes

Whenever leaving or parking hoists or cranes, the following safe practices (at a minimum) shall be observed:

10.1.1 Follow the manufacturer's recommendations.

10.1.2 Make a visual check for any dangerous condition.

10.1.3 Place all controls in the "off" position.

10.1.4 Place main power switch in the "off" position.

10.1.5 Raise all hooks to - but not through - limit switches.

10.1.6 Report all cranes that are not in operation immediately.

10.1.7 Report any defects immediately.

10.1.8 Tagout defective equipment immediately.

11. Handling Sling Loads

The following general safe practices (at a minimum) shall be observed when handling sling loads:

11.1.1 Always keep hands and fingers clear of intentioned loads.

11.1.2 Always keep suspended loads clear of all obstructions.

11.1.3 Always keep suspended loads clear of employees.

T09 0008-7996 Ver 03 - Approved - Exported from DMS: 2010-03-09 by ASUER

11.1.4 Always pad or protect slings from sharp edges of the load.

11.1.5 Always think before you affect a load.

11.1.6 Determine the history of the care and usage of the sling.

11.1.7 Determine the number of sling legs (if used) and load requirements.

11.1.8 Ensure you know rated capacity of the sling.

11.1.9 Ensure you know the angle the sling makes with the horizontal line.

11.1.10 Ensure you know the size, weight, and center of gravity of the load.

11.1.11 Follow the manufacturer's recommendations.

11.1.12 Never load in excess of the rated capacity.

11.1.13 Never pull a sling from a suspended load under tension.

11.1.14 Never shorten with knots, bolts or other makeshift devices.

11.1.15 Never use a sling that is damaged in any way.

12. Estimating the Weight of Loads

Lifting will not be conducted until load weights have been determined. When estimating load weights, operators will stay within 10% of the crane's rated capacity (or manufacturer recommendation). Never attempt a load lift based solely on a guess! The following methods may be used to estimate the weight of loads.

12.1.1 Check equipment nomenclature plates.

12.1.2 Check shipping papers.

12.1.3 Consult with the equipment manufacturer.

12.1.4 Estimate weight-using weights of similar loads.

12.1.5 Use a dynamometer.

12.1.6 Use industry standard tables or charts.

13. Personal Protective Equipment

Operators will use the required PPE in the conducting of lifting operations. Protective clothing and equipment considerations:

13.1.1 Ensure PPE is appropriate for the particular hazard(s).

13.1.2 Ensure PPE is kept clean, fully functional, and sanitary.

13.1.3 Maintain all PPE in good condition.

13.1.4 Properly store PPE when not in use.

14. Crane Inspections

Where not otherwise delineated, crane inspections will be conducted in accordance with this section.

T09 0008-7996 Ver 03 - Approved - Exported from DMS: 2010-03-09 by ASUER

14.1 Crane inspectors

Please contact the HSE Department for the following:

- List of employees or position titles that will receive training and, as required, serve as crane inspectors
- List of company qualified inspectors

14.2 Inspection intervals

14.2.1 Daily Inspections

Cranes will be inspected each day before being used; the crane will be inspected in accordance with OSHA, Consensus Standards, and Manufacturer recommendations.

14.2.2 Periodic Inspections

Supervisors will determine and schedule additional inspections periodically during crane use, where service conditions warrant. A thorough periodic inspection shall be made on a regular basis, to be determined on the basis of: frequency of crane use; severity of service conditions; nature of lifts being made; experience gained on the service life of cranes used in similar circumstances; and OSHA, Consensus Standards, and Manufacturer recommendations.

14.2.3 Scheduled Inspections

The Safety Manager and/or Safety Representative will coordinate inspection dates and times with all assigned crane inspectors. The inspections will be conducted on a Periodic basis. Such inspections shall in no event be at intervals greater than once every 12 months.

14.3 Inspection documentation

Crane inspections will be documented. Scheduled inspections will be documented as having been conducted.

14.3.1 Identify items that were inspected.

14.3.2 Show the status of the inspected items.

14.3.3 Provide the signature of the inspector.

14.3.4 Show the date.

14.3.5 File it and maintain it!

14.3.6 Review the manufacturer's specific inspection requirements!

14.4 Damaged/Unserviceable cranes

Cranes found to be damaged or unserviceable will be immediately removed from service.

15. Daily Checks

The following items (at a minimum) shall be checked prior to use of any crane:

15.1.1 Check for air or hydraulic fluid leakage.

15.1.2 Check for load capacity stenciling on both sides of unit.

15.1.3 Check for twisted, broken or kinked cables or chains.

T09 0008-7996 Ver 03 - Approved - Exported from DMS: 2010-03-09 by ASUER

15.1.4 Check the operation of the crane, controls, and movement.

15.1.5 Inspect for deformed, cracked, or stretched hooks.

15.1.6 Inspect for serviceable safety latches.

15.1.7 Observe correct drum spooling as the hook is raised.

15.1.8 Operate empty hook until it actuates the upper limit switch.

15.1.9 Operate hoist and trolley brakes; ensure no excessive coasting.

15.1.10 Visually inspect all units for integrity, leaks, etc.

15.1.11 Review the manufacturer's specific requirements!

16. Monthly Checks

The following items (at a minimum) shall be checked monthly:

16.1.1 Follow any additional recommendations of the manufacturer.

16.1.2 Inspect for twisted, broken or kinked cables or chains.

16.1.3 Inspect hooks for cracks, missing or broken parts.

16.1.4 Measure hooks for deformation or stretching.

16.1.5 Measure lifting chains for excessive stretch, twisting, etc.

16.1.6 Review the manufacturer's specific inspection requirements!

16.1.7 Visually inspect all critical items.

17. Periodic Checks

Review the manufacturer's specific inspection requirements! The following items (at a minimum) shall be checked at periodic inspections (1 to 12 month intervals):

- Interval dependent on the type of activity performed.
- Interval dependent on the severity of service.
- Interval dependent on the environmental conditions.

At a minimum, the inspection should cover:

Chain Or Cable	Reeving	Hook Condition
Electrification	Hoist Drives	Travel Drives
Brakes	Limit Switches	Couplings
Rails	Balance	Controls
Warning Devices	End Stops	Signage

18. Periodic CMAA Inspection Recommendations

Class	Description	Typical schedule

T09 0008-7996 Ver 03 - Approved - Exported from DMS: 2010-03-09 by ASUER

A	Standby or infrequent service	Annually
B	Light service - 2-5 lifts / hr.	Annually
C	Moderate service - 50% capacity, 5-10 lifts / hr.	Annually
D	Heavy service - 50% capacity, 10-20 lifts / hr.	Semiannually
E	Severe service - near capacity, 20+ lifts / hr.	Quarterly
F	Continuous severe service - near capacity and continuous service throughout day	Bi-monthly

Note: Different conditions may suggest different intervals.

19. New, Idle, and Altered, Used Cranes

The use status of cranes will drive specific requirements for periodic maintenance and servicing. The status of the crane will be determined based on manufacturer recommendations and consultation with specific regulatory standards. Prior to initial use or reintroduction into service, cranes will be tested and inspected completely using the criteria applicable to periodic inspections. A report will be generated and kept on file for future reference. The manufacturer's specific requirements will be reviewed!

20. Preventive Maintenance

Preventative maintenance procedures will be developed and used for specific cranes. Maintenance procedures will be determined on the basis of: frequency of crane use; severity of service conditions; nature of lifts being made; experience gained on the service life of cranes used in similar circumstances; and OSHA, Consensus Standards, and Manufacturer recommendations. Typical requirements include:

20.1.1 Adjusting the brakes.

20.1.2 Adjusting the operation of limit switches.

20.1.3 Checking and filling the gear cases to the proper levels.

20.1.4 Cleaning and lubricating the wire rope (cable) and load chain.

20.1.5 Cleaning or replacing pitted or burned electrical contacts.

20.1.6 Cleaning or replacing the air and fluid filters.

20.1.7 Inspecting the operation of all controls and warning systems.

20.1.8 Lubricating the bearings, gears, pinions, linkages, shafts, etc.

20.1.9 Replacing any contaminated oils.

20.2 Preoperational Tests - General

20.2.1 Check for obstructions in the travel path of the crane.

20.2.2 Check upper and lower limit switches.

20.2.3 Ensure all emergency disconnects are known before any test.

20.2.4 Ensure that the manufacturer's recommendations are followed.

T09 0008-7996 Ver 03 - Approved - Exported from DMS: 2010-03-09 by ASUER

20.2.5 If you have a checklist - follow it!

20.2.6 If you're not familiar with the crane's operation, get help.

20.2.7 Inspect all electrical controls for proper operation.

20.2.8 Never unwind the spool completely!

20.2.9 Observe for smooth operation of the components.

20.2.10 Test all controls to determine proper operation.

20.3 Preoperational Tests - Hooks

20.3.1 Replace if deformation or cracks are found.

20.3.2 Check for proper function of the safety latch.

20.3.3 Inspect for twists from the plane of the unbent hook.

20.3.4 Check for proper swivel.

20.3.5 Hook repair is generally not recommended.

20.3.6 Emergency hook repair must be performed only under competent supervision.

20.3.7 After any hook repairs, the hook must be load tested before being returned to normal service.

20.4 Preoperational Tests – Rope

Check for the following:

20.4.1 Broken or worn outside wires.

20.4.2 Corroded or broken wires at end of connections.

20.4.3 Corroded, cracked, bent, worn, or improperly applied end connections.

20.4.4 Reduction in rope diameter (replace if found).

20.4.5 Severe kinking, crushing, cutting or unstringing.

21. Lockout/Tagout Considerations

Lockout/Tagout will be conducted when maintenance or servicing is performed on any crane. Lockout requirements will be determined on the basis of OSHA, Consensus Standards, and Manufacturer recommendations. (Also refer to VAME LOTO Program (DMS 0008-7997).) Typical requirements include:

21.1.1 Review requirements for the individual crane.

21.1.2 Integrate lockout and maintenance requirements.

21.1.3 Ensure training is adequate for level of maintenance.

21.1.4 Ensure written programs are established and reviewed.

21.1.5 Carefully select lockout devices; ask the manufacturer for recommendations.

21.1.6 Do not necessarily assume devices are interchangeable between different types of cranes.

T09 0008-7996 Ver 03 - Approved - Exported from DMS: 2010-03-09 by ASUER

22. History of this Document

Rev. no.:	Date:	Description of changes
00	Unknown	New document
01	Unknown	Unknown
02	24-July-2003	Old AWT Number: 31026. Document number updated. Nature of other changes unknown.
03	01-Jan-2010	Template update.

T09 0008-7996 Ver 03 - Approved - Exported from DMS: 2010-03-09 by ASUER

Vestas

Crane Inspection Form

(To Be Used ONLY If Crane Owner Does Not Have An Inspection Form)

SITE: _____ LOCATION: _____ DATE: _____

EQUIPMENT MAKE/MODEL/ID #: _____

VESTAS INSPECTOR NAME: _____ SIGNATURE: _____

CRANE OWNER/INSPECTOR NAME: _____ SIGNATURE: _____

Mark each item "X" if inspected and NO DEFECTS found, or N/A if Not Applicable

	ITEM	DESCRIPTION / PURPOSE	
*	**OPERATOR**	Has current and valid crane operation certification.	
1	**MFR Operation & Maintenance Manuals**	Manufacturer's operating and maintenance manuals shall accompany all mobile hoisting equipment. These manuals set forth specific inspection, operation and maintenance criteria for each mobile crane and lifting capacity.	
2	**Guarding**	All exposed moving parts such as gears, chains, reciprocating or rotating parts are guarded or isolated.	
3	**Swing Clearance**	Materials for guarding rear swing area.	
4	**High-Voltage Warning**	HV warning signs displaying restrictions and requirements are installed at the operator's station & at strategic locations on the	
5	**Boom Stops**	Shock absorbing or hydraulic type boom stops are installed in a manner to resist boom overturning.	
6	**Jib Boom Stops**	Jib stops are restraints to resist overturning.	
7	**Boom Angle Indicator**	A boom angle indicator readable for the operator station is installed accurately to indicate boom angle.	
8	**Boom Hoist Disconnect, Automatic Boom Hoist Shutoff**	A boom hoist disconnect safety shutoff or hydraulic relief to auto stop the boom hoist when the boom reaches a predetermined high angle.	
9	**Two-Blocking Device**	Cranes with telescoping booms should be equipped with a two-blocking damage prevention feature that has been tested on-site in accordance with manufacturer's requirements. All cranes, hydraulic and fixed boom used to hoist personnel must be equipped with two-blocking devices on all hoistlines intended to be used in the operation. The anti-two blocking device has automatic capabilities for controlling functions that may cause a two-blocking condition.	
#	**Power Controlled Lowering**	Cranes for use to hoist personnel must be equipped for power controlled lowering operation on all hoistlines. Check clutch, chains, and sprockets for wear.	
#	**Leveling Indicating Device**	A device or procedure for leveling the crane must be provided.	
#	**Sheaves**	Almost every wire rope installation has one or more sheaves – ranging from traveling blocks with complicated reeving patterns to equalizing sheaves where only minimum rope movement is noticed. Sheave grooves shall be smooth and free from surface defects, cracks, or worn places that could cause rope damage. Flanges must not be broken, cracked, or chipped. The bottom of the sheave groove must form a close fitting saddle for the rope being used. Lower load blocks must be equipped with close fitting guards.	
#	**Main Hoist and Auxiliary Drums System**	Drum crushing is a rope condition sometimes observed which indicates deterioration of the rope. Spooling is that characteristic of a rope which affects how it wraps onto and off a drum. Spooling is affected by the care and skill with which the first layer of wraps is applied on the drum. **Inspect** (note where applicable, Manufacturer's criteria):	
		Minimum number of wraps to remain on the drum:	
		Condition of drum grooves:	
		Condition of flanges at the end of drum:	
		Rope end attachment:	
		Spooling characteristics of rope:	
		Rope condition:	
#	**Main Boom, Jib Boom, Boom Extension**	Boom jibs, or extensions, must not be cracked or corroded. Bolts and rivets must be tight. Certification that repaired boom members meet manufacturer's original design standard shall be documented. Non-certified repaired members shall not be used until recertified.	
#	**Load Hooks and Hook Blocks**	Hooks and blocks must be permanently labeled with rated capacity. Hooks and blocks are counterweighted to the weight of the overhaul line from highest hook position. Hooks must not have cracks or throat openings more than 15% of normal or twisted off center more than 10° from the longitudinal axis. All hooks used to hoist personnel must be equipped with effective positive safety catches, especially on hydraulic cranes.	
#	**Hydraulic Hoses, Fittings, and Tubing**	Flexible hoses must be sound and show no signs of leaking at the surface or the junction with the metal and couplings. Hoses must not show blistering or abnormal deformation to the outer covering and should have no leaks at threaded or clamped joints that cannot be eliminated by normal tightening or recommended procedures. There should be no evidence of excessive abrasion or scrubbing on the outer surfaces of hoses, rigid tubing, or hydraulic fittings.	
#	**Outriggers**	Outrigger number, locations, types and type of control are in accordance with manufacturer's specifications. Outriggers are designed and operated to relieve all weight from wheels or tracks within the boundaries of the outriggers. If not, the manufacturer's specifications and operating procedures must be clearly defined. Outriggers must be visible to the operator or a signal person during extension or setting.	
#	**Load Rating Chart**	A durable rating chart(s) with legible letters and figures must be attached to the crane in a location accessible to the operator while at the controls. The rating charts shall contain the following:	
		A full and complete range of manufacturer's crane loading ratings at all stated operating radii.	
		Optional equipment on the crane such as outriggers and extra counterweight which effect ratings.	
		A work area chart for which capacities are listed in the load rating chart, i.e. over side, over rear, over front.	
		Weights of auxiliary equipment, i.e. load block, jibs, boom extensions.	
		A clearly distinguishable list of ratings based on structural, hydraulic or other factors rather than stability.	
		A list of no-load work areas.	
		A description of hoistline reeving requirements on the chart or in operator's manual.	

T09 0008-7972 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

#			
#	**Wire Rope**	Main hoist and auxiliary wire rope inspection should include examining for broken wires, excess wear, external damage from crushing, kinking, cutting or corrosion.	
#	**Cab**	Contains all crane function controls in addition to mechanical boom angle indicators, electric wipers, dash lights, warning lights and buzzers, fire extinguishers, seat belts, horn, and clear unbroken glass.	
#	**Braking Systems**	Truck cranes and self-propelled cranes mounted on rubber-tired chassis or frames must be equipped with a service brake system, secondary stopping emergency brake system and a parking brake system, unless the owner/operator ***can show written evidence*** that such systems were not required by the standards or regulations in force at the date of manufacture and are not available from the manufacturer. The braking systems must have been inspected and tested and found to be in conformance with applicable requirements.	
		Crawler cranes are provided with brakes or other locking devices that effectively hold the machine stationary on level grade during the working cycle. The braking system must be capable of stopping and holding the machine on the maximum grade recommended for travel. The brakes or locks are arranged to engage or remain engaged in the event of loss of operating pressure or power.	
#	**Turntable/Crane Body**	Make sure that the rotation point of a crane's gears and rollers are free of damage and wear, are properly adjusted, and the components are securely locked and free of cracks or damage. The swing locking mechanism must be functional (pawl, pin) and operated in the cab.	
#	**Counterweight**	The counterweight must be approved and installed according to manufacturer's specifications with attachment points secured.	

INSPECTION COMMENTS (* Attach a EQUIPMENT DEFECT FORM to promptly address any noted defects):

When completed, file in Site Safety Records or forward to H&S Office.

T09 0008-7972 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

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Pre-Lift Job Briefing

Site		Location			
Date (D-MTH-YYYY)		Time		AM / PM (Circle one)	
Weather		Temp (F)			
Wind Speed (M/S)		Gusts From (M/S)		to	

Crane Inspection

Operator Name:		Spotter Name:	
☐ Cable	☐ Hydraulics	☐ Operator Certification Current / Available	Exp. Date:
☐ Boom Test	☐ Capacity and Chart	☐ Equipment Certification Current / Available	Exp. Date:
Designated Signal Person(s):			
☐ Signals by Hand	☐ Signals by Radio / Phone (2 back up radios / phones available)		☐ Signals Reviewed

Rigging

☐ Rigging and lifting devices inspected	☐ Hooks have safety latches
☐ Slings, Straps, Wire Rope Chokers, Spreader Bars, etc. inspected	☐ Load limits verified

Position

☐ Outriggers on Solid Footing	☐ Counterweight Swing Area Barricaded
☐ Escape Routes Identified / Discussed	☐ Pinch Points Identified / Discussed
☐ Boom, Lines & Loads minimum of 10 feet (3.1 meters) from Power lines or ☐ Power Lines De-energized	

Review of Planned Lift (If additional steps are planned – list on back of form - ☐ see back of form)

Task Steps	Assigned to / Affected
1. Conduct test lift with load	Lift Supervisor / Crane Operator
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	

Crew

☐ Crew members have been oriented to the site		☐ All required PPE is worn correctly	
☐ Crew members have received appropriate training		☐ Crew has reviewed lift plan	
Crew Member (Print)	**Crew Member Signature**	**Crew Member (Print)**	**Crew Member Signature**
1.		5.	
2.		6.	
3.		7.	
4.		8.	

De-brief the Lift (use the back of the form as necessary - ☐ see back of form)

What went well?	Changes / improvements for next time?

File completed form in the Site Safety Records.

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Vestas®

Critical Lift Checklist

DETAILS:

Date of Lift: _____ Time of Lift: _____

Supervisor: _____ Contract No.: _____

Superintendent: _____

Lift Description: _____

_____

Subcontractor: _____ Subcontractor Supervisor: _____

Location of Lift: _____

Major Hoisting Equipment to be Used: _____

_____

Describe Item to be Lifted: _____

_____

REASON FOR CRITICAL LIFT PERMIT (CHECK ALL THAT APPLY):

- ☐ - Load exceeds 80% of the equipment load chart.
- ☐ - Load exceeds 50% of load chart and failure could endanger existing facilities.
- ☐ - Personnel will be lifted in non-emergency situation.
- ☐ - Helicopter used to lift in an industrial setting.
- ☐ - Lift is within the limits of approach to electrical or high pressure gas lines.
- ☐ - Hazardous substances are involved.
- ☐ - Two booms or lifting arrangements required.
- ☐ - Special rigging required.
- ☐ - There is a load transfer required.
- ☐ - Load exceeds 4.5 tonne/5 tons.
- ☐ - Load exceeds 4.5 metres/15 feet from CG.
- ☐ - Wind speed exceeds 20 km/12 miles/hour (Eng'g may be required).
- ☐ - Temperatures are lower than -30° C/-22° F. (Eng'g may be required).
- ☐ - Owner or site supervisor identifies lift as a "Critical Lift".

TOTAL WEIGHT OF LIFT
(INCLUDE SPECIAL RIGGING, FRAMING, AND CONTAINERS, EVERYTHING BELOW THE HOOK):

a) Certified Scale Weight: _____ or

b) Calculated Weight: _____ or

c) Calculated by: _____

d) Weight from Original Equipment Vendor drawings: _____

e) Allowance for sludge, scale, internal or external attachments: _____

T09 0008-7982 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

Critical Lift Checklist

f) Total weight c + d = _____

g) Size of item to be lifted: _____

h) Distance CG, Centre of Gravity, to end: _____

LIFT RELATIONSHIP:

- Operating Radius: _____
- Boom Length (max. oper.): _____
- Ratio of lift: allowable load: _____ : _____ or _____ % _____
- Clearance between boom and elec./HP gas lines: _____
- Location of underground services: _____
- Clearance to existing structures/facilities: _____

CONDITION OF HOISTING EQUIPMENT AND RIGGING:

Yes ☐ No ☐ - Has equipment been inspected for this lift?
Yes ☐ No ☐ - Are there deficient items in the equipment log that will affect this lift?
Yes ☐ No ☐ - Has the rigging been inspected and approved for this lift?

GUY ANCHORS AND GUYS:

Yes ☐ No ☐ - Are guy lines required?
Yes ☐ No ☐ - Are the guys and anchors in good condition?
Yes ☐ No ☐ - Are there adequate guys and anchors?
Yes ☐ No ☐ - Do foot blocks need to be anchored?

STABILITY OF GROUND AREA:

Yes ☐ No ☐ - Is ground suitable for allowable load?
Yes ☐ No ☐ - Will require mats or additional blocking?
Yes ☐ No ☐ - Are there underground services to protect?

OPERATOR:

Yes ☐ No ☐ - Is evidence of operator competency to operate this equipment under the required conditions available for review?

POWER LINES AND GAS LINES:

Yes ☐ No ☐ - Is there potential risk from electrical or gas lines?
Yes ☐ No ☐ - Have alternative lift positions been considered?
Yes ☐ No ☐ - Can the lines be de-energized?
Yes ☐ No ☐ - Has protection or warnings been put in place?

USE OF PERSONNEL LIFT (SEE STANDARD OPERATING PROCEDURE FALL PREVENTION):

Yes ☐ No ☐ - Have alternative means of access been considered?

T09 0008-7982 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

Vestas®

Critical Lift Checklist

Yes ☐ No ☐ - Is this an approved personnel lifting device?
Yes ☐ No ☐ - Is the mechanical/engineering inspection current?
Yes ☐ No ☐ - Has the pre-job inspection been done?
Yes ☐ No ☐ - Are workers competent in the use of fall protection?
Yes ☐ No ☐ - Is wind speed considered acceptable for the lift?
Yes ☐ No ☐ - Is a tag line required?

COMMUNICATION:

Yes ☐ No ☐ - Have the radios been checked and are free of cross talk?
Yes ☐ No ☐ - Have hand signals been reviewed?
Yes ☐ No ☐ - Is it clear who will have overall control of lift?
Name _____

WEATHER CONDITIONS:

Wind speed: _____ Temperature: _____ Visibility: _____

HAZARDOUS SUBSTANCES:

Yes ☐ No ☐ - *Are hazardous substances involved in the lift?*
Describe: _____

_____

_____

Yes ☐ No ☐ - Are MSDS sheets attached to the checklist?

Checklist completed by: _____

Checklist reviewed by: _____

Date: _____ Time: _____

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Vestas

Powered Industrial Truck - Fork Lift Inspection

SITE: _____ LOCATION: _____ DATE: _____

INSPECTOR NAME: _____ SIGNATURE: _____

EQUIPMENT MAKE/MODEL/ID #: _____

HOUR METER READING: _____ DATE OF LAST SERVICE: _____

Put "X" in column as applies - select "OK", "RS" for "Requires Service", or "N/A" if Not Applicable. Comment if item needs attention.

	OK	RS	NA	COMMENTS:
Are all name plates, model number, type designation and load capacity markings on this truck clearly legible?				
1 **OVERHEAD GUARD:** Are there broken welds, missing bolts, or damaged areas?				
2 **HYDRAULIC CYLINDERS:** Is there leakage or damage on the lift, tilt, or cylinder attachment functions?				
3 **MAST ASSEMBLY:** Are there broken welds, cracked or bent areas, or worn or missing stops?				
4 **LIFT CHAINS AND ROLLERS:** Is there wear, damage, kinks, rust, or any other sign that lubrication is required?				
Is there squeaking?				
5 **FORKS:** Are they cracked or bent , worn, or mismatched?				
Is there excessive oil or water on the forks?				
6 **TIRES:** (Inspect for embedded particles, large cuts along the circumference, chunks of rubber missing, or bond separation) Are all tires in good repair?				
All lugs in place and secure?				
Is pneumatic tire pressure correct?				
7 **BATTERY:** Are the cell caps and terminal covers in place?				
Is the cable insulation intact?				
State of charge acceptable? (Per hydrometer reading)				
8 **HYDRAULIC FLUID:** Is level correct?				
Any noticeable leaks?				
9 **GAUGES:** Are they all properly working?				
Are readings all normal or acceptable?				
10 **STEERING:** Operates correctly? (No excessive free play)				
If power steering, is the pump working?				
11 **BRAKES:** (Brakes may require service if pedal goes all the way to the floor)				
Do brakes work in reverse?				
Does the deadman seat brake hold when operator rises from seat?				
Does the parking brake work? Truck remains stationary when the parking brake is engaged; holds against slight acceleration.				
12 **LIGHTS:** If equipped with lights, are they working properly?				
13 **HORN:** Horn, whistle, gong, or other device is audible over the normal workplace noise?				
14 **SAFETY SEAT (See BRAKES)**				
15 **LOAD HANDLING ATTACHMENTS:**				

Note: If the truck is equipped with other than factory installed front-end attachments, the truck shall be marked to identify the attachments and show the approximate weight of the truck and attachment combination at maximum elevation with load laterally centered.

Is there hesitation when hoisting or lowering the forks, when using the forward or backward tilt, or the lateral travel on the side shift?				

T09 0008-7985 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

Is there excessive oil on the cylinders?					
Is the tank guard bracket properly positioned and locked down?					
16 **FUEL:**					
Is hose frayed, pinched, kinked, bound or damaged in any way?					
Is the connector threaded on squarely and tightly?					
* Propane Odor - If you detect the presence of propane gas odor, turn off the tank valve and report the problem.					
17 **ENGINE OIL:**					
Is level correct?					
18 **ENGINE COOLANT:**					
Is level correct?					
Note: Never remove the radiator cap to check the coolant level when the engine is running or while the engine is hot. Stand to the side and turn your face away. Always use a glove or rag to protect your hand.					
19 **TRANSMISSION FLUID:**					
Is level correct?					
20 **WINDSHIELD WIPERS:**					
Do they work properly?					
21 **SEAT BELTS:**					
Are there any, and do they work?					
22 **SAFETY DOOR: (found on stand up rider models)**					
Is it in place?					
23 **SAFETY SWITCH: (found on stand up riding tow tractors)**					
Is it working?					
24 **HAND GUARDS:** (found on stand up riding tow tractors, walking pallet trucks, walking transtackers)					
Are they in place?					
25 **TOW HOOK:**					
Does it engage and release smoothly?					
Does the safety catch work properly?					
26 **CONTROL LEVER:**					
Does the lever operate properly?					

INSPECTION SUMMARY:

* Attach a SAFETY EQUIPMENT DEFECT FORM to promptly address any noted defects.

*All powered industrial trucks shall be visually inspected **daily before use**; user signature and hours recorded.*
After every 10 hours of use, a formal inspection is required, using this (or other comprehensive form).
At 120 hours, the truck must be professionally serviced.

When complete, file in Site Safety Records - Site Equipment Inspections.

T09 0008-7985 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

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POWERED INDUSTRIAL TRUCK RECORD

(Keep Record With Truck)

PRINT NAME	DATE (mm/dd/yr)	HOURS
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PRINT NAME	DATE (mm/dd/yr)	HOURS
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All powered industrial trucks shall be visually inspected ***daily before use,*** *user name and hours recorded. After every 10 hours of use, a formal inspection is required.*
At 120 hours, the truck must be professionally serviced.

T09 0008-7985 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

Accident Report - Cover Sheet

Vestas

INCIDENT DATE: _____ NOTIFICATION DATE: _____

NOTIFICATION TO (check all that apply - list names - and note method of notification):

VESTAS - Site Specific

- ☐ Site Supervisor: _____
- ☐ Regional Manager: _____
- ☐ Next of Kin: _____
- ☐ Other: _____

VESTAS - Corporate

- ☐ HR / Payroll: _____
- ☐ Service: _____
- ☐ Projects: _____
- ☐ Safety: _____
- ☐ Finance: _____
- ☐ Legal: _____
- ☐ Other: _____
- ☐ Other: _____

NON VESTAS

- ☐ Employer: _____
- ☐ Customer: _____
- ☐ *OHS, OSHA or DOL: _____

* Fatalities or Serious Injury reports to will be made by Safety Manager or Corporate Officer ONLY

- ☐ Worker's Comp or WCB: _____
- ☐ Other: _____

ATTACHMENTS (list any / all additional pages that will comprise this report):

- ☐ Additional pages
- ☐ Witness Statement(s)
- ☐ Post Incident Safety Meeting Attendance Sheet
- ☐ Physician Statement
- ☐ Substance Screening Results
- ☐ Photographs
- ☐ Police Reports
- ☐ Insurance Forms
- ☐ Other: _____

When completed, SCAN and EMAIL TO safety@vestas-awt.com, or FAX to (503) 8327-0249. Attach any additional sheets.
FILE ORIGINAL completed report in Site Safety Records.

T09 0008-7989 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

Vestas

Vehicle/Equipment Accident Report

Part One - Operator's Report

I. ACCIDENT INFORMATION - COMPLETE ALL FIELDS THAT APPLY:

DATE OF ACCIDENT: _____ TIME (Military): _____ ☐ ON SITE ☐ OFF SITE

TYPE OF ACCIDENT:

☐ FLEET VEHICLE UNIT NUMBER _____ ☐ RENTAL CO. _____

☐ EQUIPMENT DAMAGE

☐ PROPERTY DAMAGE AREA(S) DAMAGED _____

☐ INJURY - If personal injury resulted from this event, please ALSO complete the Personal Incident Report.

LOCATION OF ACCIDENT: INCLUDE STREET ADDRESS (IF POSSIBLE), CITY AND STATE

DESCRIPTION OF EVENT: (Include additional pages if necessary)

CONDITIONS (Check ALL that apply):

LIGHT CONDITIONS: ☐ DAWN ☐ DAY LIGHT ☐ DUSK ☐ DARK WEATHER: ☐ CLEAR ☐ SNOWING ☐ RAINING ☐ FOG ☐ HEAVY WINDS

ROAD SURFACE: ☐ DRY ☐ WET ☐ ICE ☐ SNOW HIGHWAY: ☐ DIVIDED ☐ UNDIVIDED ___ # OF LANES

SPEED AT TIME OF INCIDENT: _____ POSTED SPEED LIMIT: _____ NUMBER OF PERSONS INVOLVED: _____

REASON FOR DRIVING/OPERATING _____

II. VESTAS EMPLOYEE INFORMATION (Print FULL name): _____

HOME ADDRESS: _____ STATE _____ ZIP _____

DL or ID #: _____ DL STATE: _____ DL EXP. DATE: _____

PHONE NUMBER _____ DATE OF BIRTH _____

III. VEHICLE/EQUIPMENT (Year/Make/Model): _____

VIN/SERIAL #: _____

LICENSE PLATE NUMBER _____ LICENSING STATE/PROVINCE _____

IF RENTAL VEHICLE, LIST RENTAL LOCATION _____ PHONE NUMBER _____

IV. OTHER DRIVERS/VEHICLES/PARTIES INVOLVED

Print FULL NAME, Home Address, Phone Number. If additional parties involved, attach additional sheets as necessary.

DRIVER NAME: _____ OWNER (If different than driver):

ADDRESS: _____ NAME _____

_____ ADDRESS: _____

PHONE: _____ _____

DL ST & #: _____ PHONE: _____

INSURANCE AND VEHICLE INFORMATION

INSURANCE COMPANY _____ YR/MAKE/MODEL: _____

POLICY # _____ VIN# _____

T09 0008-7919 Ver 04 - Approved - Exported from DMS: 2010-03-09 by ASUER

V. POLICE INFORMATION INCIDENT REPORTED ☐ NO ☐ YES REPORT # _____

CITATION ISSUED? ☐ NO ☐ YES IF YES, STATE CHARGE OR ATTACH CITATION _____

OFFICER NAME: _____ BADGE #: _____

STATION ADDRESS: _____ CITY _____ STATE _____

VI. WITNESSES (Print FULL NAME, Home Address, Phone #. Attach additional sheets as necessary):

NAME: _____ NAME: _____

ADDRESS: _____ ADDRESS: _____

PHONE: _____ PHONE: _____

DL #: _____ ST: _____ DL #: _____ ST: _____

WITNESS STATEMENT COMPLETED/ATTACHED? ☐ No ☐ Yes WITNESS STATEMENT COMPLETED/ATTACHED? ☐ No ☐ Yes

VII. DIAGRAM (Provide hand drawn diagram of accident scene. Label vehicles, direction of travel, street names, traffic control elements, etc. Also, indicate NORTH with ARROW):

JOB TITLE: _____ COST CENTER _____ DEPT _____

Vestas Employee Signature Date Signed

Present COMPLETED report to Manager.

Attach pertinent documentation, including photos, police reports, repair estimates, equipment or vehicle records.

T09 0008-7919 Ver 04 - Approved - Exported from DMS: 2010-03-09 by ASUER

Vehicle/Equipment Accident Report

Part Two - Supervisor's Report

I. POST-ACCIDENT INFORMATION

DATE OF SUBSTANCE SCREEN: TIME OF TEST: RESULT:

DATE OF HIRE WITH COMPANY: LEVEL OF EXPERIENCE PERFORMING TASK:

EMPLOYER'S PREMISES? Y N ON THE JOB SITE?: Y N OTHER:

DID AN EMPLOYEE GET INJURED? NO YES - IF YES, COMPLETE AN INCIDENT REPORT

ANY EYE WITNESSES TO THIS EVENT? NO YES - IF YES, COLLECT AND ATTACH WITNESS STATEMENTS FROM EACH

NATURE/EXTENT OF INJURY/ILLNESS (Be specific - use additional pages if necessary):

DESCRIBE HOW INCIDENT OCCURRED? (List all objects and substances involved - use additional pages if necessary):

ANY KNOWN PRIOR DEFECTS? NO YES - IF YES, LIST:

II. ROOT CAUSE ANALYSIS (Check all that apply):

UNSAFE ACTIONS - (UNSAFE ACTIONS REQUIRE RE-TRAINING AND/OR A WRITTEN WARNING *BEFORE EMPLOYEE RETURNS TO WORK):

IMPROPER TECHNIQUE (SHORT CUT)	OPERATING WITHOUT AUTHORITY	HORSEPLAY
SAFETY RULE VIOLATION	FAILURE TO WARNING DEVICE	PHYSICAL OR MENTAL INPAIRMENT
IMPROPER PPE OR PPE NOT USED	BY PASSING SAFETY DEVICE	FAILURE TO USE PROPER EQUIPMENT
FAILURE TO USE A SPOTTER	WEATHER	OTHER:

EXPLANATION OF ROOT CAUSE ANALYSIS: (Use additional pages if needed)

III. SUPERVISOR'S CORRECTIVE ACTION(S):

DATE	CORRECTIVE ACTION	COMPLETED BY (NAME):
	Mandatory - Post Incident Safety Meeting to review incident	

IV. SITE CODE DESIGNATION:

COST CENTER OPERATIONS SERVICE OTHER

CONSTRUCTION MGR / SITE MGR. NAME SIGNATURE DATE:

When completed, SCAN and EMAIL signed COPY TO:
Fleet Planner at japfl@vestas.com AND Safety Department at safety@vestas-awt.com.
Attach any additional sheets and attach any pictures of the incident to the email.
FILE ORIGINAL completed report in Site Safety Records.

T09 0008-7919 Ver 04 - Approved - Exported from DMS: 2010-03-09 by ASUER

Vestas

Vestas Americas Transportation Security Plan

Contents

1. Purpose: 2
2. Scope: 2
3. Definitions: 2
4. References: 2
4.1 Title 49 of the Code of Federal Regulations (United States) 2
5. General Requirements: 2
5.1 Personnel Security: 2
5.2 Unauthorized Access: 3
5.3 En Route Security: 3
6. History of this Document 4

T09 0008-8011 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

1. Purpose:

Vestas is committed to the safety and security of our employees, the customers we serve and the general public. We all are aware of the reasons that we must remain vigilant to prevent or inhibit the use of our equipment, terminals, or the products we transport by terrorists. We urge all employees to help us implement this plan and to continuously improve our security efforts. Regulations of the United States Department of Transportation require that any employee of this company (including independent contractors) who is a designated "hazmat employee" be trained and familiar with our company's security plan.

2. Scope:

Vestas Americas – All locations

3. Definitions:

Word	Definition
Hazmat Employee	Any person who performs a task or function covered by the regulations of the United States Department of Transportation.

4. References:

Title 49 of the Code of Federal Regulations (United States)

5. General Requirements:

5.1 Personnel Security:

Vestas will implement the following provisions with regard to the employment of the contractors which transport Vestas goods and services. Additionally, the company may (at its discretion) implement some or all of these provisions relevant to the employment of non-driver employees who perform functions regulated by the U.S. Department of Transportation's "Hazardous Materials Regulations" within Title 49 of the Code of Federal Regulations.

5.1.1 Perform detailed background checks on all applicants for any driver or leased operator position.

5.1.2 To the extent possible, check for criminal convictions.

5.1.3 Contact previous employers and references.

5.1.4 Investigate gaps in employment.

5.1.5 To the extent possible, have at least 10 years consecutive employment/education records.

5.1.6 Maintain employee information in a confidential and secure manner, and in compliance with all relevant Federal and state regulations and statutes regarding confidentiality and individual privacy.

5.1.7 Verify that drivers are US citizens or that non-citizens have documentation appropriate to their immigration status.

T09 0008-8011 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

5.1.8 Ensure drivers have current CDL with appropriate endorsements and another form of identification (i.e. company issued credential; current medical certificate).

5.1.9 Collect company identification card and any security materials when a driver/employee leaves the company. Update websites and lists. Cancel passwords to prohibit computer access by former employees.

5.2 Unauthorized Access:

5.2.1 Vestas management will designate who is in charge of security for the company and at each facility.

5.2.2 Vestas management will conduct security awareness training for all employees, including how to report suspicious incidents or events.

5.2.3 Vestas Site Managers will require all visitors and outside vendors to a terminal to sign in and be identified by a visitor's badge. Designated parking areas for visitor vehicles should be established.

5.2.4 Designated Vestas personnel will perform daily yard checks and equipment reconciliations.

5.2.5 Designated Vestas personnel will remove keys from vehicles not in use and have secure key storage.

5.2.6 All employees should control access to computers, especially those with product or routing information in keeping with Vestas confidentiality rules.

5.2.7 Vestas may develop specific actions for each security level alert that might be set by the Department of Homeland Security, (e.g. no preloading during condition Red)

5.2.8 Vestas may consider use of seals (for manways, product loading and unloading lines, etc.) for certain products or routes.

5.2.9 Vestas will distribute information related to changes in the nation's threat level.

5.2.10 Vestas Management will inspect facility grounds, maintenance areas, and buildings to identify points of possible unauthorized entry to the property. This will be an important consideration, particularly at facilities having more than one point for access and egress.

5.2.11 Periodically, Vestas will test emergency response communications equipment and procedures.

5.3 En Route Security:

5.3.1 Contractors working of behalf of Vestas should not accept business from an unknown party before verifying company legitimacy.

5.3.2 Contractors working of behalf of Vestas should lock vehicles and facility doors at all times and take keys anytime driver is not with vehicle. Ensure windows are closed.

5.3.3 Contractors working of behalf of Vestas should perform "walk around" inspection of vehicle after every stop, including deliveries and breaks. Be sure to look under the trailer and in hose tubes where a device could be attached.

5.3.4 To the extent possible, reduce preloading. Contractors working on behalf of Vestas should designate an area for pre- loaded trailers. Put glad- hand locks or kingpin locks on spotted loaded trailers. Regularly check that area.

5.3.5 Contractors working on behalf of Vestas should develop "parking instructions" for any locations away from Vestas facilities. Look for lighted and fenced areas, visibility, and security.

T09 0008-8011 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

5.3.6 Contractors working on behalf of Vestas should include security considerations in route selection and times for pick up and delivery. When possible, avoid bridges, tunnels and dense population areas.

5.3.7 Contractors working on behalf of Vestas should minimize driver "down-time" while en route.

5.3.8 Schedule and dispatch with as few required stops as possible.

5.3.9 Contractors working on behalf of Vestas will establish procedures to communicate emergency messages to all facilities and to drivers on the road. Options may include satellite communications systems, cell phones, two-way radios, or scheduled call-in times. Management will include communications procedures for drivers to report an unexpected occurrence with equipment, load, or route.

5.3.10 Contractors working on behalf of Vestas (and other knowledgeable employees) should not discuss any details about their load or pick- up points and destinations with unauthorized personnel, such as over the CB radio or at truck stops.

5.3.11 Contractors working on behalf of Vestas should not pick up hitchhikers or allow any unauthorized personnel in the truck cab.

5.3.12 Contractors working on behalf of Vestas should not stop to help disabled vehicles or motorists. Call local authorities and notify them of anyone needing assistance. Be suspicious of motorists trying to get the driver to pull over for an "alleged" traffic accident. Be especially suspicious of vehicles with three or more people in them.

5.3.13 Contractors working on behalf of Vestas should develop procedure for detecting "late loads." Investigate any late load more than an hour late for a delivery.

5.3.14 Contractors working on behalf of Vestas should not change delivery destination unless authorized by dispatch.

5.3.15 Contractors working on behalf of Vestas should develop a procedure for drivers when being asked to pull over by law enforcement or an unmarked vehicle.

5.3.16 Contractors working on behalf of Vestas may arrange with shippers to schedule teams for long trips with high hazard materials

5.3.17 Contractors working on behalf of Vestas should consult with shippers to ensure security of consignee delivery areas. Request well- lighted and marked delivery area and that customer personnel be available to answer safety or security questions.

5.3.18 All Vestas employees are to report any suspicious events to their supervisors and possibly to local law enforcement based on their observations.

6. History of this Document

Rev. no.:	Date:	Description of changes
00	28-August-08	First Edition
01	01-Jan-2010	Content and template updates

T09 0008-8011 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

Vestas Americas
Control of Hazardous Energy Program

Contents

1. **Definitions** 2
2. **Scope and Purpose** 3
2.1 Scope 3
2.2 Purpose 4
3. **CONTROL OF HAZARDOUS ENERGY Program** 4
3.1 Compliance 4
3.2 Basic Lockout Rules 5
3.3 Verification of Deenergization 6
3.4 Lockout Point Requirements 6
3.5 Locks 6
3.6 Lockout Boundary 7
3.7 Lockout Methods 7
3.8 Tagout 11
3.9 Interlock Bypass 12
3.10 Extended Shutdown 12
3.11 Subcontractors 13
3.12 Customers 13
3.13 Non-Owner Lock Removal 13
3.14 *Roles and Responsibilities* 14
3.15 Training 15
3.16 Energy Control Coordinator 16
3.17 *Periodic Assessments* 17
4. **Appendix A: Hazardous Energy Control Checklist** 18
5. **Appendix B: LOTO Form** 19
6. **Appendix C: Non-Owner Lock Removal Form** 21
7. **Appendix D: Interlock Bypass Form** 22
8. **Appendix E: CONTROL OF HAZARDOUS ENERGY** 23
9. **History of this Document** 24

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T09 0008-7997 Ver 08 - Approved - Exported from DMS: 2010-10-05 by ASUER

1. Definitions

Affected Employee: An employee whose job requires operation or use of a machine or equipment on which service or maintenance is performed under lockout/tagout or whose job requires him/her to work in an area in which servicing or maintenance is performed.

Authorized Person: A trained person who can perform lockout in accordance with this program. An Authorized Person can hang his/her personal locks on equipment that has already been locked out by the Person In Charge/Qualified Person.

CONTROL OF HAZARDOUS ENERGY Procedure: The CONTROL OF HAZARDOUS ENERGY Procedure consists of the LOTO Form (Appendix B or DMS# 0013-8299) and a written instruction that describes the safe shutdown, lockout, verification, unlocking, and startup of the equipment.

Control Lock: A non-conductive red lock applied by the Person In Charge to the lockout device. The control lock is the first lock applied and the last lock removed. The purpose of the control lock is to signal to the authorized person that the equipment was locked out by a Person in Charge in accordance with this CONTROL OF HAZARDOUS ENERGY Program.

Danger Zone: The immediate vicinity of a piece of equipment or machinery in which a person could be in danger if said equipment or machinery was to become energized.

Energized: The state of being connected to an energy source or containing residual or stored energy.

Energy Control Coordinator: A LOTO Specialist who has been designated by the Site Manager / Construction Manager to be the person responsible for the administration of the CONTROL OF HAZARDOUS ENERGY Program at the site location.

Energy-Isolating Device: A mechanical device that physically prevents the transmission or release of energy. These include manually operated circuit breakers, disconnect switches, blind flanges, blocks, valves, chains, and similar devices used to block or isolate energy.

Escorted Visitor – Unqualified worker. Must receive a site visitor orientation, cannot perform electrical work and cannot enter into the arc flash or shock boundaries.

Lockout: The placement of a Lockout Device, Lock and associated tag on an Energy-Isolating Device, in accordance with energy control procedures, ensuring that the Energy-Isolating Device and equipment being controlled cannot be operated until the Lockout Device is removed.

Lockout, Group: Requires a written procedure that lists all lockout points. Use of Red control locks for equipment and keys to the control locks are secured within the lock box. All workers must place their personal blue lock on the lockbox prior to performing work.

Lockout Boundary: The safe limits of a given Lockout/Tagout as determined by the lockout points for the equipment and systems to be worked on. All the equipment within the Lockout Boundary is safe to work on.

Lockout Device: A locking mechanism that provides a positive means for rendering an Energy-Isolating Device inoperable. The device may be a padlock alone, or a padlock in combination with a

T09 0008-7997 Ver 08 - Approved - Exported from DMS: 2010-10-05 by ASUER

restraining bar, chain, hasp, or any device that positively prevents the Energy-Isolating Device from being actuated.

Lockout, Individual (Exclusive): Individual/Exclusive Control is only allowed for plug-in equipment with power cords. A lockout is not required as long as the plug is within arm's reach of the individual performing work on the equipment. Where the plug is not within arm's reach of the individual performing work, the plug will be locked out with a suitable device.

Individual/Exclusive Control is allowed on breakers with door-mounted handles, when opening the door defeats the lockout applied to the door handle. When working under this isolation inside of this cabinet, a lockout is not required. If work location moves outside of the cabinet or if it is necessary to leave the location for any reason prior to the work being completed, the door must be closed and the lockout applied.

LOTO: Lockout – Tagout

LOTO Form: The LOTO Form (DMS# 0013-8299) catalogs all lockout points, tagout points and is where the Person In Charge signs off that the lockout is completed. It is found in Appendix B.

LOTO Specialist: A Qualified Person who has received special training in this program, and who is qualified to determine the appropriate Lockout methods and Lockout Boundaries for tasks performed on Vestas wind turbines.

Person In Charge: A Qualified Person designated to be in charge of a particular lockout.

Qualified Person: An Individual who has been trained in the construction, operation and recognition and avoidance of hazards for the equipment to be locked out.

Tagout: The placement of only a tag on an Energy-Isolating Device, where it is not physically possible to place a lock. Restrictions apply.

Vestas Senior Manager: The Site Manager or Construction Manager. Their permission is required for certain activities.

Zero Energy State: The state in which all possible energy sources have been disconnected and/or otherwise rendered inoperable, including stored energy within the piece of equipment or machinery. This requires following the Test-Verify-Test procedure to ensure zero energy. For electrical systems, this is an Electrically Safe Work Condition.

2. Scope and Purpose

2.1 Scope

This program outlines the methods, responsibilities and required employee training for the Lockout/Tagout energy control program for VESTAS AMERICAS (VAME), hereinafter called the CONTROL OF HAZARDOUS ENERGY Program.

T09 0008-7997 Ver 08 - Approved - Exported from DMS: 2010-10-05 by ASUER

2.2 Purpose

The purpose of the CONTROL OF HAZARDOUS ENERGY Program is to ensure that all persons performing work on Vestas wind turbines are fully protected from unexpected energization, startup or the uncontrolled release of energy, which could cause injury to those persons and/or damage to equipment.

WARNING: The procedures covered by this publication must be carried out only by persons who are knowledgeable in the operation and maintenance of wind turbines and in the practice of CONTROL OF HAZARDOUS ENERGY procedures and who have been trained by Vestas as a Person in Charge and/or LOTO Specialist. These instructions are intended only for such persons. They are NOT intended to be a substitute for adequate training and experience in safety procedures for this type of equipment. Failure to obtain the proper training and certification and to observe the precautions described in this CONTROL OF HAZARDOUS ENERGY Program may result in serious injury or death.

2.2.1 This CONTROL OF HAZARDOUS ENERGY Program has been established to prevent the unexpected release of potentially hazardous energy (e.g. mechanical, electrical, hydraulic, thermal, chemical, pneumatic, etc.) during the construction, service, and repair of Vestas wind turbines.

2.2.2 This CONTROL OF HAZARDOUS ENERGY Program is written to meet or exceed the requirements in the following standards:

a) OSHA 29 CFR 1910.147, Control of Hazardous Energy
b) OSHA 29 CFR 1910.333, Selection and Use of Electrical Work Practices
c) OSHA 29 CFR 1910.269 Electric Power Generation, Transmission, and Distribution
d) NFPA 70E, Electrical Safety in the Workplace
e) CSA Z460, Control of Hazardous Energy – Lockout and Other Methods
f) CSA Z462, Workplace Electrical Safety

3. CONTROL OF HAZARDOUS ENERGY Program

3.1 Compliance

3.1.1 ANY PERSON WHO OPERATES A VALVE, SWITCH OR OTHER ENERGY ISOLATING DEVICE TO WHICH A LOCK OR "DO NOT OPERATE" TAG IS ATTACHED WILL BE SUBJECT TO DISCIPLINARY ACTION UP TO AND INCLUDING IMMEDIATE TERMINATION, AND MAY BE SUBJECT TO CRIMINAL PROSECUTION.

3.1.2 The CONTROL OF HAZARDOUS ENERGY Program applies to all personnel, including employees, customers, contractors, inspectors and visitors.

3.1.3 Personnel working where the unexpected energization, start-up, or release of stored energy could occur and cause injury are required to comply with the restrictions and limitations imposed on them during the use of this lockout/tagout procedure. Energy sources include, but are not limited to, electrical, mechanical, pneumatic, and hydraulic.

T09 0008-7997 Ver 08 - Approved - Exported from DMS: 2010-10-05 by ASUER

3.2 Basic Lockout Rules

3.2.1 Do not attempt to operate any switch, valve, or other energy-isolating device when it is locked out other than during the initial check for a zero energy condition.

3.2.2 Prior to performing work, the employee must determine all sources of energy that potentially supply the equipment to be worked on. All sources of energy must be isolated and locked out.

a) **Exception:** Certain work procedures will require the equipment to remain energized in whole or in part. In this case, specific written work instructions must include formal job safety analyses that address the increased risk.

b) **Exception:** Troubleshooting energized systems requires a complete Pre-Task Plan (DMS# 0008-7900). Additional safety measures shall be identified and implemented.

3.2.3 Anyone working on the equipment must work under his or her personal lock and tag. Under no condition is anyone ever authorized to apply another person's lock and tag.

3.2.4 Personnel who are not touching the locked out equipment, but are required to enter into a danger zone to perform an inspection or walk-through, shall add their locks to the equipment lockout as if they were performing work on the equipment.

3.2.5 It is not permissible to rely on communications only (verbal, visual, written or radio) to perform a lockout. All persons must apply their own lock prior to work. In cases where accessibility is hampered, a portable lockbox system may be prepared so that all personnel may apply their lock.

3.2.6 All lockout locks will be applied to a lockout hasp, which is applied to the locking device. Never put your lock through the last hole in the lockout hasp. Instead, insert another hasp and put your lock through the new hasp. It is acceptable to daisy chain lockout hasps.

T09 0008-7997 Ver 08 - Approved - Exported from DMS: 2010-10-05 by ASUER

3.3 Verification of Deenergization

3.3.1 All equipment that is locked out must be start-tested where possible. The employee performing the lockout must operate the controls to verify that the equipment cannot be restarted.

3.3.2 Accumulated or stored energy sources that could supply a system that is locked out must be identified and dissipated by an appropriate means.

3.3.3 If there is a possibility of the equipment accumulating energy over time after the application of the lockout, then the lockout must:

a) Include an energy-dissipating device capable of continuously dissipating the energy without the buildup of hazardous conditions. Examples: open vent valve, temporary personal protective grounds.

-OR-

b) Be capable of completely isolating the source of energy in all cases where work is performed. Examples: double block and bleed (pressurized hydraulics), substantial blocking mechanism (rotor lock) with maximum wind speed.

3.3.4 All energy sources that are locked out must be verified completely deenergized by an appropriate means.

a) Electrical systems will be tested using approved methods outlined in the Electrical Safety Program (DMS 0008-7990), in the section for Electrical LOTO.

3.4 Lockout Point Requirements

3.4.1 All lockout points must consist of positive energy isolation devices such as disconnect switches, circuit breakers, block valves, and blocking pins.

3.4.2 All isolating devices used as lockout points must be capable of accepting an approved lockout device that physically prevents the actuation of the isolating device.

3.4.3 There can be no interlocks, contactors, diodes, check valves, or automatically controlled devices between the isolation device and the test point.

3.4.4 All lockout points susceptible to electrical shock shall be locked out with approved non-conductive lockout devices.

3.4.5 Refer to the VAME Electrical Safety Program (DMS 0008-7990), Section 6, for additional electrical requirements for proper lockout points.

3.5 Locks

3.5.1 All lockout locks will be issued by the employer to the Authorized Person(s) who may be required to work on machinery or equipment.

3.5.2 Personal lockout locks will all be keyed differently, and the keys will be kept by the employee who owns the locks. Personal locks for VAME employees shall be blue in color.

3.5.3 Control locks will all be keyed differently, and the keys will be kept either by the Person In Charge or locked in a lockbox. Control locks shall be non-conductive and red in color.

3.5.4 Locks shall be substantial enough to prevent removal without the use of excessive force or unusual techniques, such as with the use of bolt cutters or other metal cutting tools.

T09 0008-7997 Ver 08 - Approved - Exported from DMS: 2010-10-05 by ASUER

3.5.5 *Each personal lock shall be keyed different from all other locks. No one other than the lock owner* shall have a key.

3.5.6 Each individual lock will be identifiable as a lockout lock as follows:

a) Personal locks shall always be accompanied with a tag stating "DANGER – DO NOT OPERATE". The tag shall include the company name, first and last name identifying the worker and a contact phone number permanently printed on the tag.

b) VAME employees' tags shall have the first and last name of the employee, a color picture of the employee, and a contact phone number permanently printed on the tag.

c) Control locks shall always be tagged with "DANGER – DO NOT OPERATE" and shall include the permanent marking "VESTAS CONTROL LOCK".

3.5.7 **Visitors, vendors, and contractors:**

a) Shall supply their own locks and tags.

b) Each lock must have a key that is unique to the worker using the locks.

c) Markings shall include the word "DANGER", their name, their company name, and a phone number.

d) Vestas sites shall maintain a small supply of uniquely keyed locks for visitors who forget to bring a set of their own. Visitor locks shall be managed by the site's Energy Control Coordinator.

3.6 Lockout Boundary

3.6.1 The Lockout Boundary encloses the entire zone where it is safe to work. It is defined by the lockout points selected for the lockout procedure.

3.6.2 In all cases, the Lockout Boundary shall include the area where work is required.

3.6.3 Determining the proper Lockout Boundary requires a careful examination of the tasks to be performed and the surrounding equipment. Some tasks introduce greater risk and therefore must have a more expansive Lockout Boundary.

3.6.4 A Lockout Boundary can be made to include several work areas in one lockout procedure.

3.6.5 When the work area expands to an area outside the Lockout Boundary, the work must stop until a *new lockout is established that includes the new work area.*

3.6.6 All personnel performing work under a lockout must clearly understand the extent of the particular Lockout Boundary.

3.6.7 The Hazardous Energy Control Checklist (HECC) in Appendix A shall be used to initially establish all lockout procedures. The HECC helps define all sources of energy and establish a sufficiently large Lockout Boundary.

3.6.8 The Lockout Boundary shall be specifically identified on all written lockout procedures.

3.6.9 A Lockout Boundary may not rely on any process interlock, contactor, diode, or emergency stop.

3.6.10 A Lockout Boundary may not rely on any check valve, automatic control valve, or pressure relief valve.

3.7 Lockout Methods

T09 0008-7997 Ver 08 - Approved - Exported from DMS: 2010-10-05 by ASUER

3.7.1 **All lockout procedures will follow one of the established methods in this section:**

a) Individual (Exclusive) control

b) Single point lockout

c) Complex lockout

d) Group lockout (Lockbox)

3.7.2 ***Individual (Exclusive) Control***

a) Individual Control is only allowed for plug-in equipment with power cords.

b) In this case, a lockout is not required as long as the plug is within arm's reach of the individual performing work on the equipment.

c) Examples include a laptop computer power supply, a vacuum cleaner, or a drop light.

3.7.3 **Single Point Lockout**

a) An individual need not document the required procedure for a particular machine or equipment **when all of the following elements exist**:

a) the machine or equipment has no potential for stored or residual energy or reaccumulation of stored energy after shut down which could endanger employees;

b) the machine or equipment has a single energy source which can be readily identified and isolated;

c) the isolation and locking out of that energy source will completely deenergize and deactivate the machine or equipment;

d) the machine or equipment is isolated from that energy source and locked out during servicing or maintenance;

e) a single lockout device will achieve a lock-out condition;

f) the lockout device is under the exclusive control of the Qualified Person performing the servicing or maintenance;

g) the servicing or maintenance does not create hazards for other individuals; and

h) the employer, in utilizing this exception, has had no accidents involving the unexpected activation or re-energizing of the machine or equipment during servicing or maintenance.

3.7.4 **Complex Lockout**

a) This method shall be used as the default lockout method, whenever the individual control or single point lockout methods cannot be applied.

b) In all cases, a Complex Lockout will require a written lockout instruction that identifies every isolation point.

c) The lockout instruction shall be approved by a Lockout Specialist.

d) *The lockout instruction consists of a lockout form and a written instruction. The written instruction* shall include the sequence for the safe shutdown, lockout, verification, clearing of lockout, and startup of the system. The written instruction shall follow the latest work instruction format.

e) *The Person In Charge shall establish the lockout in accordance with the lockout instruction, using* control locks. The Person In Charge keeps possession of the control lock keys.

T09 0008-7997 Ver 08 - Approved - Exported from DMS: 2010-10-05 by ASUER

f) After the lockout is established, the completed lockout form is handed to any Authorized Person who wishes to lockout according to the form. The Authorized Person then hangs locks at every isolation point in accordance with the lockout form. If the Person In Charge is also working on the equipment, then his personal lock must be applied in addition to the control locks.

g) Certain frequently used lockout instructions may be kept in electronic format and printed for use as required.

h) Lockout instructions that have been prepared by someone offsite shall be reviewed by the Energy Control Coordinator before use at the site. The Energy Control Coordinator shall verify that the lockout instruction is completely sufficient for the equipment as installed at the site.

i) A complex lockout can be converted to a group lockout at any time. The Person In Charge is responsible for guiding all personnel through the transition.

j) After the complex Lockout has been broken down, the LOTO Form shall be returned to the ECC for record-keeping.

3.7.5 Group Lockout (Lockbox)

a) The Group Lockout or Lockbox method shall apply whenever the Individual Control or Single Point lockout method cannot be used. A Group Lockout requires the use of control locks and a lockbox.

b) In all cases, a Group Lockout will require a written LOTO Procedure that identifies every isolation point.

c) The LOTO Procedure shall be approved by a LOTO Specialist.

d) The LOTO Procedure consists of a LOTO Form and a written instruction.

e) The LOTO Form shall be initially developed using the Hazardous Energy Control Checklist (HECC) form in Appendix A. The LOTO Form will follow the format found in Appendix B (also refer to DMS# 0013-8299).

f) In addition to the LOTO Form, the LOTO Procedure shall include a written instruction that details the sequence for the safe shutdown, lockout, clearing of lockout, and startup of a system. The written instruction shall follow the latest work instruction format.

g) Certain frequently used LOTO Procedures may be kept in electronic format and printed for use as required.

h) LOTO Procedures that have been prepared by someone offsite shall be reviewed by the Energy Control Coordinator before use at the site. The Energy Control Coordinator shall verify that the LOTO Procedure is completely sufficient for the turbine models and mark versions at the site.

i) All lockboxes will be substantial in construction to prevent tampering and to withstand the rigors of transport without breaking.

j) The completed LOTO Form shall be securely attached to the lockbox in a weatherproof, clear plastic jacket, so that all personnel locking on the lockbox may clearly read the LOTO Form.

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k) Establishing a Group Lockout:

Step	Action
1.	The Energy Control Coordinator appoints a Person In Charge for the coordination of the Group Lockout.
2.	The equipment is locked out by the Person In Charge using the control locks.
3.	The Person In Charge completes the LOTO Form, then inserts the LOTO Form into the clear plastic jacket and attached to the lockbox.
4.	The Person In Charge puts the keys to the control locks into the lockbox.
5.	The Person In Charge then locks the lockbox latch with his/her personal lock (no hasp is used).
6.	All employees performing work under the Group Lockout will review the LOTO Form and apply their personal lockout lock to the lockbox, using a hasp.

l) Breaking down a Group Lockout:

Step	Action
1.	All employees who performed work under the Group Lockout remove their personal locks.
2.	The Person In Charge verifies that work is complete, that the turbine or circuit is ready for re-energization, and that the Group Lockout can be broken down.
3.	The Person In Charge removes his/her personal lock from the lockbox and retrieves the keys to the control locks and the LOTO Procedure.
4.	The Person In Charge removes all Group Lockout control locks, and restores the equipment to service following the written instruction in the LOTO Procedure.

m) It is permissible to nest a group lockout within another group lockout.

n) Any person (employee, vendor, or contractor) can request to put his or her personal lock-out locks on each of the lockout points of the Group Lockout, instead of just one lock on the lockbox, provided their lock conforms to section 3.4.4 of this manual.

- The person shall be given an additional copy of the Group Lockout procedure.

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- The Person In Charge will assist the person in locating all of the lockout points.
- The person must lockout every lockout point identified in the LOTO Form.

o) After the Group Lockout has been broken down, the LOTO Form shall be returned to the Energy Control Coordinator for record-keeping.

3.8 Tagout

WARNING: TAGS ARE NEVER TO BE REMOVED BY ANYONE EXCEPT THE AUTHORIZED PERSON THAT INITIATED THE LOCKOUT/TAGOUT PROCEDURE.

3.8.1 Where possible, a lockout shall be used instead of a tagout.

3.8.2 A tagout is acceptable as a substitute for a lockout if all of the following conditions apply:

a) There is no physical means of attaching a lock to the isolating device.

-AND-

b) The equipment cannot be properly isolated with a lock at some other upstream isolating device.

-AND-

c) The use of a tagout is specifically approved by the Vestas Senior Manager.

3.8.3 When the tagout method is used, it shall be supplemented by at least one additional safety measure that will provide a level of safety equivalent to that of a lockout program. The particular measure that is used must be documented in the work instruction.

3.8.4 All tagout points will be recorded as line items in the LOTO Form. In addition, the line item will be marked with "TAGOUT".

3.8.5 **Examples of additional required safety measures include:**

a) Removing an isolating circuit element.

b) Application of grounding devices.

c) Blocking a controlling switch.

d) Opening an extra disconnecting device.

e) Closing an additional in-line valve.

f) Removal of a valve handle after closing valve.

3.8.6 Tags, including their means of attachment, shall be substantial enough to prevent inadvertent or accidental removal.

3.8.7 Tag attachment means shall be of a non-reusable type, attachable by hand, self-locking, and non-releasable (like a nylon cable tie).

3.8.8 Tags shall be capable of withstanding the environment to which they are exposed for the maximum period of time that exposure is expected.

3.8.9 Tags shall include first and last name of the employee, a color picture of the employee (if available), and a contact phone number.

3.8.10 Tags shall be attached on or as close to the device to be unquestionably apparent that that device is not to be activated.

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T09 0008-7997 Ver 08 - Approved - Exported from DMS: 2010-10-05 by ASUER

3.8.11 Where used without a lockbox, every person working on the equipment shall attach a personal tagout tag to the isolation device, just as they would attach their personal lockout lock.

3.8.12 Where possible, the tag attachment means shall impede the activation of the device.

3.9 Interlock Bypass

3.9.1 No interlock shall be bypassed without written authorization from the Energy Control Coordinator and the Site/Construction Manager.

3.9.2 No interlock shall be bypassed without establishing a method to provide equal or greater protection. This method can consist of prohibiting access, prohibiting operation, or allowing such access or operation while following a special procedure written for the tasks required. The written procedure will establish safe boundaries and constraints such that the level of protection provided is equivalent to that provided by the interlock

3.9.3 Interlock bypass authorization shall use the form in Appendix E. The form shall require the following entries:

a) Reason the interlock bypass is required.

b) A list and description of all disabled devices, their purpose, the impact of disabling the interlock to equipment, and the impact of disabling the interlock to personal safety.

c) Method used to provide equal or greater protection while the interlock is bypassed.

3.9.4 While an interlock is bypassed, the interlock bypass form shall be posted in a conspicuous location.

3.10 Extended Shutdown

3.10.1 A Group Lockout is the Standard method lockout for extended shutdown situations.

3.10.2 In circumstances where equipment is taken out of service for extended time periods (more than one shift change), the equipment shall remain locked out with the control locks. The Person-In-Charge shall maintain their personal lock attached to the lockbox. This requirement applies in any of the following circumstances:

a) The equipment is left in a state where it should not be operated or started.

b) Starting the equipment could present a danger to persons nearby.

c) Starting the equipment could cause damage to the environment (e.g. oil spill).

d) Starting the equipment could cause equipment damage.

3.10.3 When personnel are not working on the system, any established lockout procedure and lockbox shall be left at the turbine control panel down-tower. The lockbox may be brought back to the office to facilitate turnover to a new Person In Charge, or in case of a tower evacuation.

3.10.4 When a Person In Charge needs to turn over responsibility of a lockbox, the new Person In Charge must place their lock directly on the lockbox without a hasp before the old Person In Charge removes their lock.

3.10.5 At the beginning of each shift, prior to starting work, the Person In Charge on the oncoming shift shall confirm that the isolation of the equipment is still effective by physically examining each control lock and lockout device. Verification of deenergization is not required unless a lockout device has been compromised.

T09 0008-7997 Ver 08 - Approved - Exported from DMS: 2010-10-05 by ASUER

3.10.6 All personnel performing work on the equipment shall first report to the Person In Charge of the lockout each day on each shift. Upon request, the Person In Charge shall provide a new copy of the lockout procedure to the workers.

3.11 Subcontractors

3.11.1 Whenever outside servicing personnel are to be engaged in activities covered by the scope and application of this procedure, the on-site employer and the outside employer shall inform each other of their respective lockout and/or tagout procedures.

3.11.2 VAME Sustainability/HSE must review and approve all subcontractor lockout and/or tagout procedures.

3.11.3 The Energy Control Coordinator shall have ultimate authority for the CONTROL OF HAZARDOUS ENERGY Program used on site.

3.11.4 Whenever Subcontractor's personnel are engaged in activities covered by this procedure, both the Subcontractor, and Energy Control Coordinator, shall ensure that his/her employees understand and comply with the restrictions and prohibitions of this CONTROL OF HAZARDOUS ENERGY Program.

3.12 Customers

3.12.1 The Energy Control Coordinator shall establish a proper understanding with the customer to ensure that there is consistent administration between the VAME CONTROL OF HAZARDOUS ENERGY Program and the Customer's CONTROL OF HAZARDOUS ENERGY Program. A written Memorandum of Understanding shall document this agreement and shall be kept on file as a site-specific addendum to this CONTROL OF HAZARDOUS ENERGY Program.

3.12.2 Where the Customer's CONTROL OF HAZARDOUS ENERGY Program does not require a lock to be applied, but instead relies solely on a utility-style tagout system, VAME CONTROL OF HAZARDOUS ENERGY Program requirements for locks shall prevail for all personnel (customer personnel included) performing work under a Vestas LOTO Procedure. Additionally:

a) When locks are required at the substation, the Energy Control Coordinator shall minimize substation access requirements by setting up a Group Lockout.

b) Only Vestas approved Energy Control Procedures will be used within the turbine.

3.13 Non-Owner Lock Removal

3.13.1 In the event that an Authorized Person is not available to remove their lockout/tagout device, the Energy Control Coordinator may remove (by following this procedure) the lockout/tagout device for them.

3.13.2 If the Energy Control Coordinator is not available, the Site Manager/Construction Manager shall designate a senior technician qualified as LOTO Specialist to perform this function.

3.13.3 Permission must be obtained from the Vestas Senior Manger.

3.13.4 Permission must also be obtained from the customer, in accordance with the customer's CONTROL OF HAZARDOUS ENERGY Program.

3.13.5 When possible, it is preferable to cut the lockout hasp rather than the lock.

3.13.6 **Use this procedure for non-owner lock removal (a check list is found in APPENDIX D):**

T09 0008-7997 Ver 08 - Approved - Exported from DMS: 2010-10-05 by ASUER

Step	Action
1.	Verify that the Authorized Person who applied the locking device is not present at the facility.
2.	Make all reasonable efforts to contact the Authorized Person and inform them that their lockout or tagout device is being removed.
3.	Make all reasonable efforts to contact the Authorized Person's supervisor and inform them that their employee's lockout or tagout device is being removed.
4.	Contact the Vestas Senior Manager and obtain permission prior to removing Authorized Person lockout or tagout device.
5.	Contact the Customer's Site Manager or other designated representative and obtain permission prior to removing Authorized Person lockout or tagout device.
6.	Ensure the Authorized Person is informed, before resuming work at the facility, that the lockout or tagout device has been removed.

3.14 Roles and Responsibilities

3.14.1 The VAME HSE Director is ultimately responsible for the administration of the CONTROL OF HAZARDOUS ENERGY Program.

3.14.2 VAME HSE shall maintain this program and keep it up to date.

3.14.3 Vestas Business Academy (VBA) shall be responsible for establishing a training curriculum that teaches all levels of CONTROL OF HAZARDOUS ENERGY program:

a) Escorted Visitor – Unqualified Worker (Level 0)

b) Authorized Person (Level 1)

c) Qualified Person in Charge (Level 2)

d) LOTO Specialist (Level 3)

e) Energy Control Coordinator

3.14.4 In addition, VBA shall provide a curriculum for annual refresher training.

3.14.5 The Site Supervisor/Construction Manager shall be responsible for the correct execution of the CONTROL OF HAZARDOUS ENERGY Program at their site.

a) The Site Supervisor/Construction Manager shall appoint one or more LOTO Specialist(s) to be the Energy Control Coordinator at the site.

b) The Site Supervisor/Construction Manager shall initiate a near-miss safety investigation whenever a discrepancy in a lockout has been discovered after work has commenced.

3.14.6 The Energy Control Coordinator shall perform the following CONTROL OF HAZARDOUS ENERGY duties:

T09 0008-7997 Ver 08 - Approved - Exported from DMS: 2010-10-05 by ASUER

a) Maintain the sets of lockboxes and control locks for use at the site.

b) Perform a monthly audit of lockout practices, and maintain a record of these audits.

c) Assist Qualified Persons in establishing the correct lockout procedures as necessary.

d) Ensure that all Qualified Persons at their site undergo annual LOTO refresher training.

e) Ensure that all newly trained Qualified persons performs a LOTO procedure practical evaluation.

3.14.7 The Qualified Person shall perform the following CONTROL OF HAZARDOUS ENERGY duties:

a) Perform the safe shutdown of equipment in accordance with work instructions.

3.14.8 The Person In Charge is a Qualified Person that is in charge of a particular lockout.

a) A Person In Charge shall be designated for every complex or group lockout.

b) The Person In Charge shall perform the lockout and verification of deenergization.

c) At each lockout point, the Person In Charge will hang a control lock (or tag).

d) The Person In Charge will brief all personnel locking out on the lockout boundary.

e) When work progresses to a point outside the LOTO boundary, the Person In Charge shall be contacted.

f) At the conclusion of the work, the Person In Charge will verify that all locks have been removed. If any locks remain, the Person In Charge will contact those employees and determine the status of the work. When all work is complete and all personnel have removed their locks, the Person In Charge shall walk down the equipment to verify that the equipment is ready for reenergization. Then the Person In Charge shall remove the control locks, restore the equipment, and make it ready for operation.

3.14.9 The Authorized Person shall perform the following CONTROL OF HAZARDOUS ENERGY duties:

a) Request that equipment be locked out by a Person In Charge when needed. In no case shall any Authorized Person attempt to establish the lockout by themselves.

b) Review all LOTO procedures prior to hanging locks, and ensure (to the best of their ability) that the task to be performed can be done safely within the Lockout Boundary established by the LOTO procedure.

c) Question the Person In Charge about any perceived discrepancy or technical feature of the task or lockout.

d) Follow approved LOTO procedures and put personal locks on isolation devices that have already been locked out and verified deenergized by a Person In Charge.

e) Remove all personal locks when work is complete or at end of shift.

f) Inform the Person In Charge after removing personal locks.

g) Inform the Person In Charge if the equipment is left out of service.

3.14.10 The Escorted Visitor shall:

a) Apply his or her lock at locations as instructed by the escorting Qualified Person.

3.15 Training

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3.15.1 **Escorted Visitor Unqualified Worker CONTROL OF HAZARDOUS ENERGY Training**

a) Escorted Visitor Unqualified Worker shall be trained on CONTROL OF HAZARDOUS ENERGY requirements as part of general site orientation.

3.15.2 **Authorized Person CONTROL OF HAZARDOUS ENERGY Training**

a) Authorized Person training shall be provided to all personnel who are required to perform work on equipment that has been locked out in a Vestas wind turbine.

b) Vestas Business Academy (VBA) will cover Authorized Person CONTROL OF HAZARDOUS ENERGY training as part of the Basic Safety course.

c) The Energy Control Coordinator will provide Authorized Person CONTROL OF HAZARDOUS ENERGY training at the site.

3.15.3 **Qualified Person CONTROL OF HAZARDOUS ENERGY Training**

a) Qualified Person training shall be provided to all Vestas Technicians.

b) As a prerequisite, all Qualified Persons must be Vestas Technicians qualified to the Level 2 Qualification.

c) VBA will provide Qualified Person training as part of its standard curriculum. The Energy Control Coordinator will provide Qualified Person CONTROL OF HAZARDOUS ENERGY training at the site. Contractors who can provide documentation and who can demonstrate competencies commensurate with this program can be considered a Qualified Person. HSE will ensure review documentation.

3.15.4 **LOTO Specialist Training**

a) LOTO Specialist training shall be provided to senior Vestas Technicians.

b) As a prerequisite, all LOTO Specialists must be Vestas Technicians certified to the Level 3 Electrical Qualification.

c) VBA will cover LOTO Specialist training as part of the Turbine Theory course.

3.15.5 Energy Control Coordinator Training

a) Energy Control Coordinator training shall be provided to selected senior Vestas Technicians.

b) As a prerequisite, Energy Control Coordinators must be Vestas Technicians certified to LOTO Specialist.

c) VBA will train all Energy Control Coordinators.

3.16 Energy Control Coordinator

3.16.1 Each site shall have at least one person designated and trained as Energy Control Coordinator.

3.16.2 The Energy Control Coordinator must be selected for his or her attention to detail and superior knowledge of the turbine platform(s) at his or her site and ability to train others.

3.16.3 The Energy Control Coordinator must be a Vestas Technician certified to Level 3 Electrical Qualification and LOTO Specialist.

3.16.4 The Energy Control Coordinator shall ensure that ESP/CONTROL OF HAZARDOUS ENERGY training is provided to all individuals so they understand the purpose and function of the energy control program, and that the knowledge and skills required for the safe application, usage and removal of the energy controls are acquired by all individuals.

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T09 0008-7997 Ver 08 - Approved - Exported from DMS: 2010-10-05 by ASUER

3.16.5 The Energy Control Coordinator shall certify that all ESP/CONTROL OF HAZARDOUS ENERGY training has been accomplished and is being kept up to date. The certification shall contain the topic of the training, each employee's name, and the dates of training.

3.16.6 Refresher training shall be provided annually to ensure the effectiveness of this program.

3.17 Periodic Assessments

3.17.1 The Energy Control Coordinator shall coordinate periodic assessments for each lockout method. The assessment shall be performed by a Qualified Person other than the employee who performed the lockout.

3.17.2 The periodic assessment shall be recorded using the CONTROL OF HAZARDOUS ENERGY Periodic Assessment Form in Appendix F.

3.17.3 The periodic assessments shall be performed at least monthly. A record of these monthly assessments shall be kept on file at the site for periodic safety audits.

3.17.4 An assessment shall be made for each Authorized Person to verify the employee's knowledge and correct any deviations or inadequacies identified.

3.17.5 The periodic assessment shall include a review between the assessor and each Authorized Person of the employee's responsibilities under the energy control procedure being evaluated.

T09 0008-7997 Ver 08 - Approved - Exported from DMS: 2010-10-05 by ASUER

4. Appendix A: Hazardous Energy Control Checklist

Date: _____ WTG ID#: _____ Completed by (name and position): _____

1. Identify the task to be performed:

_____

_____

2. Identify all sources of energy:

Source	Description	Isolation Point(s)
☐ Grid		
☐ Generator		
☐ UPS		
☐ Battery		
☐ Electrical Backfeed		
☐ Wind		
☐ Mechanical Backfeed		
☐ Hydraulic Pressure		
☐ Other		

3. Identify all sources of potentially stored energy:

Source	Description	Relief Method
☐ Capacitors		
☐ Magnetically Induced Charge		
☐ Hydraulic Accumulators		
☐ Sprung Force		
☐ Weight/Gravity		
☐ Inertial Movement		
☐ Mechanical Binding		
☐ Hot/Cold Surfaces		
☐ Hot/Cold Liquids		
☐ Other		

4. What is the safe boundary established by these isolations?

_____

Is this boundary enough to perform the task safely? Yes ☐ No ☐

5. Did you review the applicable one-line schematics to look for all sources of energy? Yes ☐ No ☐

6. Is there a particular shutdown and isolation sequence required? Yes ☐ No ☐

Detailed Description:

_____

_____

7. List all isolation points on the LOTO Form (Appendix B).

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5. Appendix B: LOTO Form

NOTE: Refer to DMS #0013-8299 for a functional electronic version of this form.

Vestas Loto Procedure **Site:** [redacted]
Turbine Model: [redacted] **MK Version:** [redacted] **WTG ID:** [redacted]

Description of task being performed:

This LOTO Procedure establishes a complete lockout boundary around the following system and/or components:

I have verified that this LOTO Procedure is accurate and sufficient to provide a safe boundary for work on the task above:
Printed Name: Signature: Title: [redacted]

LOTO Established by:
PIC Signature:
PIC Name:
LOTO Established:

ISO SEQ	Lock box and device #	Isolation ID and Location	Energy Hazard (mag, class)	Method to verify deenergization or dissipate energy	Location to verify deenergization	Lock out Pos	Test-Verify-Test initials

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Vestas

Vestas Americas Control of Hazardous Energy Program

LOTO Transferred to
PIC Signature
PIC Name:

LOTO Cleared:
LOTO Transferred from
PIC Signature
PIC Name:
LOTO Cleared:

RES SEQ	Lock box and device #	Isolation ID and Location	Energy Hazard (mag, class)	Restore Position	Work Comp Insp Initials (Tools and Mat removed)	Lock Removed Initials

LOTO Cleared by PIC Signature
PIC Name:
LOTO Cleared:

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6. Appendix C: Non-Owner Lock Removal Form

Date: _____ **WTG ID#:** _____

Owner of Lock(s): _____ **Number of locks to be removed:** _____

Owner's Company: _____

Owner's phone number (must be a personal number): _____

Reason for removing lock(s): _____

_____

Reason why owner did not remove locks before leaving the site:

_____

The lock owner was called and:

- ☐ Left a voicemail
- ☐ Talked with the owner
- ☐ Permission granted to remove locks

The Customer's Manager was contacted and:

- ☐ Permission granted to remove locks
- ☐ Permission not granted
- ☐ Permission granted, Customer will remove lock

The lock owner's supervisor was called and:

- ☐ Left a voicemail
- ☐ Talked with the supervisor
- ☐ Permission granted to remove locks

The Vestas Senior Manager was contacted and

- ☐ Permission granted to remove locks
- ☐ Permission not granted
- ☐ Permission granted, Customer will remove lock

The owner's lock(s) may not be removed without contacting either the owner or the owner's supervisor in a live conversation, and gaining verbal permission from the owner or the owner's supervisor.

Where possible, cut the lockout hasp(s) instead of the locks.

Vestas Site/Construction Manager: _____ Date: _____

Print name and title: _____ Time: _____

Lock(s) removed by: _____ Date: _____

Print name and title: _____ Time: _____

Contact the owner at the beginning of the next shift prior to beginning work. Return the locks to the owner and explain to them why their locks were removed. Inform the owner that their locks must be removed each time they finish work or leave the site.

Lock owner: _____ Date: _____

Print name and title: _____ Time: _____

T09 0008-7997 Ver 08 - Approved - Exported from DMS: 2010-10-05 by ASUER

7. Appendix D: Interlock Bypass Form

Date: _____ **WTG ID#:** _____

Detailed description of interlock to be bypassed:

_____

_____

What is the purpose of the interlock?

_____

_____

What is the impact of bypassing this interlock on equipment operation?

_____

_____

What is the impact of bypassing this interlock on personnel safety?

_____

_____

How will the interlock be bypassed?

_____

_____

What method will be established that will provide equal or greater protection?

_____

_____

Reason for bypassing interlock:

_____

_____

The interlock may not be bypassed without the authorization of both the Energy Control Coordinator and the Vestas Senior Manager.

Energy Control Coordinator:

_____

Date/Time:

_____

Vestas Senior Manager:

_____

Date/Time:

_____

Interlock Bypass Established by:

Person In Charge:

_____

Date/Time:

_____

Interlock Bypass Removed by:

Person In Charge:

_____

Date/Time:

_____

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8. Appendix E: CONTROL OF HAZARDOUS ENERGY

Periodic Assessment Form

Date: _____ **WTG ID#:** _____

Assessor: _____ **Person in Charge of lockout procedure:** _____

Evaluate the adequacy of the LOTO Procedure	YES	NO
1. Is the Hazardous Energy Control Checklist properly completed?		
2. Are all energy sources locked out?		
3. Were all sources of stored energy properly dissipated?		
4. Is the lockout boundary sufficient for the task being performed?		
5. If tagouts are used, was an additional method clearly identified and implemented?		
6. Is the LOTO method appropriate for the situation?		
Evaluate the correct application of the LOTO Procedure		
1. Is the LOTO Procedure properly completed?		
2. Do the lockout devices prevent the operation of the isolation devices?		
3. Are all locks properly identified?		
4. If a tagout is used, did all employees working under the lockout apply their personal tagout?		
5. Is the LOTO Procedure securely attached to the lockbox?		
6. Are all employees working under the lockout personally locked out?		
Evaluate the understanding of the employees working under the LOTO Procedure		
1. Are the employees performing the task as described on the LOTO Procedure?		
2. Do the employees understand the lockout boundary?		
Comments		

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9. History of this Document

Rev. no.:	Date:	Description of changes
00	--	New document (Old AWT Number: 31030)
01	--	Record of changes not available (Old AWT Number: 31030 R2)
02	15-Oct-2002	Change to new document numbering convention; record of additional changes not available
03	22-Oct-2009	Complete LOTO Program revamp (for reference use only)
04	22-Dec-2009	Initial release of revamped 2009 document
05	07-May-2010	Addition of Warning to Section 2.1.
06	08-Sept-2010	Complete process revamp.
07	10-Sept-2010	Error correction (section 3.7.5 (c)).
08	10-Oct-2010	Error correction (section 3.7.5 (e)).

T09 0008-7997 Ver 08 - Approved - Exported from DMS: 2010-10-05 by ASUER

Vestas®

Trenching and Excavation Safety

Contents

1. Purpose 2
2. Basis 2
3. Responsibility 2
4. Definitions 2
5. References 5
6. General Requirements 5
7. Written Program 5
8. Surface Encumbrances and Underground Installations - Safety Guidelines 5
9. Protection from Hazards Associated with Water Accumulation 6
10. Protection from Superimposed Loads 6
11. Accesses and Egress from Excavations 6
11.1 Structural ramps 6
11.2 Means of egress from trench excavations (less than 20 ft deep) 7
11.3 Means of egress from trench excavations (20 ft or greater in depth) 7
12. Trench Safety 7
13. Exposure to Vehicular Traffic 7
14. Exposure to Falling Loads 8
15. Warning Systems for Mobile Equipment 8
16. Hazardous Atmospheres 8
16.1 Testing and controls 8
16.2 Emergency rescue equipment 8
16.3 Personal Protective Equipment (PPE) 9
17. Material Handling Equipment 9
18. Stability of Adjacent Structures 9
19. Protection of Employees from Loose Rock or Soil 10
20. Site Inspections 10
21. Fall Protection 10
22. Training Requirements 11
22.1 Initial training 11
22.2 Refresher training 11
23. Protection of Employees in Excavations 11
23.1 General 11
23.2 Design of Sloping and Benching Systems 12
24. Design of Support Systems, Shield Systems, and other Protective Systems 12
25. Materials and Equipment used for Protective Systems 14
26. Installations and Removal of Support Systems 14
26.1 General requirements 14
26.2 Additional requirements for support systems for trench excavations 14

T09 0008-7998 Ver 03 - Approved - Exported from DMS: 2010-03-09 by ASUER

27.Sloping and Benching Systems **15**
28.Shield Systems **15**
29.History of Document **15**

1. Purpose

Vestas-American Wind Technology will establish procedures for "trenching and excavation" undertaken by its employees through the use of this document. Preventing future work-place injuries in our company is the principal purpose of this document. This document will provide a basis for ensuring that all procedures implemented, revised or modified meet our requirements for safety. This document will help identify hazards in our workplace and enable us to determine the best course of action to take to reduce or eliminate known hazards.

2. Basis

OSHA requires all employers to maintain a written program. The primary hazard to which employees may be exposed during excavation work is a cave-in, which occurs when the soil forming the side of the excavation can no longer resist the forces applied to it. This results from a reduction in the frictional and cohesive capacities of the soil to resist forces. Changing environmental conditions, such as freezing and thawing, or the addition or removal of water from the pores of the soil, can reduce the ability of a soil to resist forces. The addition of superimposed loads from spoil piles, or the placement of equipment or materials near the edge of the excavation, also creates forces that can exceed the ability of the soil to resist.

3. Responsibility

The Safety Manager and/or Safety Representative is responsible for all facets of this program and has full authority to make necessary decisions to ensure success of the program. The Safety Manager and/or Safety Representative is authorized to amend these instructions and is authorized to halt any operation in the area where there is danger of serious personal injury.

4. Definitions

Word:	Definition
Accepted Engineering Practices	Those requirements which are compatible with standards of practice required by a registered professional engineer.
Aluminum Hydraulic Shoring	A pre-engineered shoring system comprised of aluminum hydraulic cylinders (cross braces) used in conjunction with vertical rails (uprights) or horizontal rails (wales). Such system is designed specifically to support the sidewalls of an excavation and prevent cave-ins.
Bell-Bottom Pier Hole	A type of shaft or footing excavation, the bottom of which is made larger than the cross section above to form a bell shape.

T09 0008-7998 Ver 03 - Approved - Exported from DMS: 2010-03-09 by ASUER

Benching (Benching System)	A method of protecting employees from cave-ins by excavating the sides of an excavation to form one or a series of horizontal levels or steps, usually with vertical or near-vertical surfaces between levels.
Cave-In	The separation of a mass of soil or rock material from the side of an excavation, or the loss of soil from under a trench shield or support system, and its sudden movement into the excavation, either by falling or sliding, in sufficient quantity so that it could entrap, bury, or otherwise injure and immobilize a person.
Competent Person	For the purposes of this document, one who is capable of identifying existing and predictable hazards in their surroundings, or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.
Cross Braces	The horizontal members of a shoring system installed perpendicular to the sides of the excavation, the ends of which bare against either uprights or wales.
Excavation	Any man-made cut, cavity, trench, or depression in an earth surface, formed by earth removal.
Faces or Sides	The vertical or inclined earth surfaces formed as a result of excavation work.
Failure	The breakage, displacement, or permanent deformation of a structural member or connection so as to reduce its structural integrity and its supportive capabilities.
Hazardous Atmosphere	An atmosphere which, by reason of being explosive, flammable, poisonous, corrosive, oxidizing, irritating, oxygen deficient, toxic, or otherwise harmful, may cause, death, illness, or injury.
Kick Out	The accidental release or failure of a cross brace.
Protective System	A method of protecting employees from cave-ins, from material that could fall or roll from an excavation face or into an excavation, or from the collapse of adjacent structures. Protective systems include support systems, sloping and benching systems, shield systems, and other systems that provide the necessary protection.
Ramp	An inclined walking or working surface that is used to gain access to one point from another, and is constructed from earth or from structural materials such as steel or wood.
Registered Professional Engineer	A person who is registered as a professional engineer in the state where the work is to be performed. However, a professional engineer registered in any state is deemed to be a "registered professional engineer" within the meaning of this standard when approving designs for "manufactured protective systems" or "tabulated data" to be used in interstate commerce.

T09 0008-7998 Ver 03 - Approved - Exported from DMS: 2010-03-09 by ASUER

Sheeting	The members of a shoring system that retain the earth in position and in turn are supported by other members of the shoring system.
Shield (Shield System)	A structure that is able to withstand the forces imposed on it by a cave-in and thereby protect employees within the structure. Shields can be permanent structures or can be designed to be portable and moved along as work progresses. Additionally, shields can be either premanufactured or job-built in accordance with 1926.652. Shields used in trenches are usually referred to as "trench boxes" or "trench shields".
Shoring (Shoring System)	A structure such as a metal hydraulic, mechanical or timber shoring system that supports the sides of an excavation and which is designed to prevent cave-ins.
Sides	See "Faces."
Sloping (Sloping System)	A method of protecting employees from cave-ins by excavating to form sides of an excavation that are inclined away from the excavation so as to prevent cave-ins. The angle of incline required to prevent a cave-in varies with differences in such factors as the soil type, environmental conditions of exposure, and application of surcharge loads.
Stable Rock	Natural solid mineral material that can be excavated with vertical sides and will remain intact while exposed. Unstable rock is considered to be stable when the rock material on the side or sides of the excavation is secured against caving-in or movement by rock bolts or by another protective system that has been designed by a registered professional engineer.
Structural Ramp	A ramp built of steel or wood, usually used for vehicle access. Ramps made of soil or rock are not considered structural ramps.
Support System	A structure such as underpinning, bracing, or shoring which provides support to an adjacent structure, underground installation, or the sides of an excavation.
Tabulated Data	Tables and charts approved by a registered professional engineer and used to design and construct a protective system.
Trench (Trench Excavation)	A narrow excavation (in relation to its length) made below the surface of the ground. In general, the depth is greater than the width, but the width of a trench (measured at the bottom) is not greater than 15 feet (4.6 m) or less (measured at the bottom of the excavation), the excavation is also considered to be a trench.
Trench Box	See "Shield."
Trench Shield	See "Shield."

T09 0008-7998 Ver 03 - Approved - Exported from DMS: 2010-03-09 by ASUER

Uprights	The vertical members of a trench shoring system placed in contact with the earth and usually positioned so that individual members do not contact each other. Uprights placed so that individual members are closely spaced, in contact with or interconnected to each other, are often called "sheeting."
Wales	Horizontal members of a shoring system placed parallel to the excavation face whose sides bear against the vertical members of the shoring system or earth.

5. References

29 CFR 1926.650 - 653

6. General Requirements

Vestas-American Wind Technology will ensure that whenever an excavation operation is being undertaken, work practices and proper conditions are met prior to beginning, during and at the conclusion of such excavation operations. It should not be assumed that every acceptable safety precaution is contained herein or that unusual circumstances may not require further or additional procedures, equipment and practices. Employees will cease operations if there is a question regarding a hazard or if such is suspected or discovered.

7. Written Program

Vestas- American Wind Technology will review and evaluate this standard practice instruction:

- On an annual basis
- When regulatory changes occur that prompt revision of this document
- When facility operational changes occur that require a revision of this document
- When there is an accident or close-call that relates to this topic

Effective implementation of this program requires support from all levels of management within this company. This written program will be communicated to all personnel that are affected by it. It encompasses the total workplace, regardless of the number of workers employed or the number of work shifts. It is designed to establish clear goals and objectives.

8. Surface Encumbrances and Underground Installations - Safety Guidelines

8.1.1 All surface encumbrances that are located so as to create a hazard to employees will be removed or supported, as necessary, to safeguard employees. The estimated location of utility installations, such as sewer, telephone, fuel, electric, water lines, or any other underground installations that reasonably may be expected to be encountered during excavation work, will be determined prior to opening an excavation. The following procedures are designed to provide employees of this company with a system for protection and safe conditions while working in a trenching or excavation environment. Employees at all levels within the work force design these guidelines for use.

T09 0008-7998 Ver 03 - Approved - Exported from DMS: 2010-03-09 by ASUER

8.1.2 Establish the locations of all underground and overhead utilities and services before beginning trenching or excavation operations.

- Contact utility and service companies to include municipally owned underground and overhead utilities and services, and advise them prior to the start of all actual excavation. No exceptions.
- When excavation operations approach the estimated location of underground installations, the exact location of the installations will be determined by safe and acceptable means (modern techniques and customary types of equipment). Where this determination is unclear, the owning utility will be contacted for assistance.
- While any excavation is open, underground installations will be protected, supported or removed as necessary to safeguard employees.

9. Protection from Hazards Associated with Water Accumulation

9.1.1 Employees will not work in excavations in which there is accumulated water, or in excavations in which water is accumulating, unless adequate precautions have been taken to protect employees against the hazards posed by water accumulation. The precautions necessary to protect employees adequately vary with each situation, but could include special support or shield systems to protect from cave-ins, water removal to control the level of accumulating water, or use of a safety harness and lifeline systems.

9.1.2 Inspect all excavations after any rainfall or other hazard-producing occurrence to determine if any change to the soil's capacity to resist the force has occurred. A person that has the competence to do so will perform this assessment.

- Water should not be allowed to accumulate within the excavation.

9.1.3 Water will be controlled or prevented from accumulating by the use of water removal equipment; a competent person who can ensure proper operation will monitor the water removal equipment and operations.

9.1.4 If excavation work interrupts the natural drainage of surface water (such as streams), diversion ditches or dikes, suitable means will be used to prevent surface water from entering the excavation and to provide adequate drainage of the area adjacent to the excavation. A competent person will inspect excavations subject to runoff from heavy rains.

10. Protection from Superimposed Loads

Superimposed loads (crane, backhoe and other such equipment working close to the excavation edges) require extra sheet piling, shoring or other bracing be used to assure the ability of the soil to resist. The use of mobile equipment near the excavation requires proper vehicle barricades and/or stop blocks.

11. Accesses and Egress from Excavations

11.1 Structural ramps

A competent person will design structural ramps that are used solely by employees as a means of access or egress from excavations. Structural ramps used for access or egress of

T09 0008-7998 Ver 03 - Approved - Exported from DMS: 2010-03-09 by ASUER

equipment will be designed by a competent person qualified in structural design, and will be constructed in accordance with the design.

11.2 Means of egress from trench excavations (less than 20 ft deep)

A stairway, ladder, ramp or other safe means of egress will be located in trench excavations that are 4 feet (1.22 m) or more in depth so as to require no more than 25 feet (7.62 m) of lateral travel for employees.

11.3 Means of egress from trench excavations (20 ft or greater in depth)

Ladders will be equipped with ladder platforms at 20-foot intervals.

12. Trench Safety

12.1.1 Trenches more than five feet deep require shoring or will be laid back to its angle of repose (stabilized slope).

12.1.2 In hazardous soil conditions (loosely compacted or rocky), trenches under five feet need protection.

12.1.3 At any excavation site, there shall be a competently trained person who is capable of identifying existing and predictable hazards, and who shall have the authority to take prompt corrective action to eliminate them on the site. This individual shall be able to identify soil classifications and protective systems (shoring, bracing and piling) to be used in accordance with OSHA Trenching Standards found in 29 CFR 1926.652.

12.1.4 Trenches more than five (5) feet deep require shoring or will be laid back to a stable slope. In hazardous soil, trenches under five (5) feet will also be protected.

12.1.5 Portable trench boxes or sliding trench boxes used in place of shoring and sloping shall be designed, constructed and maintained to provide protection at least equal to the required sheeting and shoring. Shields shall be designed by a registered professional engineer and will meet the standards found in 29 CFR 1926.652.

12.1.6 Shields shall be installed so as to restrict lateral or other hazardous movement. Trench boxes and shields shall extend to the bottom of the trench and no less than eighteen (18) inches above the vertical top of the trench or excavation face. Exceptions are found in 29 CFR 1926.652. Excavation to a level not greater that 2 feet (.61 m) below the bottom of a shield shall be permitted, but only if the shield is designed to resist the forces calculated for the full depth of the trench and there are no indications while the trench is open of a possible loss of soil from behind or below the bottom of the shield. No employee shall be allowed within the shield or trench box during the installation, removal or relocation. If trench boxes are stacked at any time, means shall be provided to prevent separation.

13. Exposure to Vehicular Traffic

Employees exposed to public vehicular traffic will be provided with, and will wear, warning vests or other suitable garments marked with or made of reflector like or high-visibility material.

T09 0008-7998 Ver 03 - Approved - Exported from DMS: 2010-03-09 by ASUER

14. Exposure to Falling Loads

14.1.1 No employee will be permitted underneath loads handled by lifting or digging equipment.

14.1.2 Employees will be required to stand away from any vehicle being loaded or unloaded to avoid being struck by any spillage or falling materials.

14.1.3 Operators may remain in the cabs of vehicles being loaded or unloaded when the vehicles are equipped, in accordance with §1926.601, to provide adequate protection for the operator during loading and unloading operations.

15. Warning Systems for Mobile Equipment

When mobile equipment is operated adjacent to an excavation, or when such equipment is required to approach the edge of an excavation, and the operator does not have a clear and direct view of the edge of the excavation, a warning system will be utilized, such as barricades, hand or mechanical signals, or stop logs. If possible, the grade should be away from the excavation.

16. Hazardous Atmospheres

16.1 Testing and controls

Confined space entry procedures will be adhered to in accordance with Vestas-American Wind Technology Confined Space Entry Program. (See Confined Spaces (DMS 0008-8012) and Confined Spaces Canada (DMS 0008-8017.) To prevent exposure to harmful levels of atmospheric contaminants and to assure acceptable atmospheric conditions, the following requirements apply:

16.1.1 Oxygen deficiency

Where oxygen deficiency (atmospheres containing less than 19.5 percent oxygen) or a hazardous atmosphere exists or could reasonably be expected to exist, such as in excavations in landfill areas or excavations in areas where hazardous substances are stored nearby, the atmospheres in the excavation will be tested before employees enter excavations greater than 4 feet (1.22 m) in depth.

16.1.2 Flammable atmospheres

Adequate precautions will be taken, such as providing ventilation, to prevent employee exposure to an atmosphere containing a concentration of a flammable gas in excess of 20 percent of the lower flammable limit of the gas.

16.1.3 Testing

When controls are used that are intended to reduce the level of atmospheric contaminants to acceptable levels, testing will be conducted as often as necessary to ensure that the atmosphere remains safe.

16.2 Emergency rescue equipment

16.2.1 Availability

Emergency rescue equipment, such as breathing apparatus, a safety harness and line, or a basket stretcher, will be readily available where hazardous atmospheric conditions exist

T09 0008-7998 Ver 03 - Approved - Exported from DMS: 2010-03-09 by ASUER

or may reasonably be expected to develop during work in an excavation. The equipment will be attended when in use.

16.2.2 Lifelines

Employees entering bell-bottom pier holes, or other similar deep and confined footing excavations, will wear a harness with a lifeline securely attached to it. The lifeline will be separate from any line used to handle materials, and will be individually attended at all times while the employee wearing the lifeline is in the excavation.

16.3 Personal Protective Equipment (PPE)

The following procedures are designed to provide employees of this company with a checklist system or procedure to follow for the selection of proper PPE for operations under this program.

16.3.1 Checklist

- ☐ Hard hat
- ☐ Long sleeve garment
- ☐ Trouser
- ☐ Safety-toed work boot
- ☐ Proper eye and face protection
- ☐ Work gloves - rubber or neoprene when working with or in chemicals
- ☐ NIOSH-approved respirator where or when the job hazard may require
- ☐ Hearing protection
- ☐ Rubber or neoprene boots when exposed to waste-water products (a sanitary washing facility will be provided for cleanup)

Note: The first line supervisor or senior supervisor on the site will be responsible for compliance for proper utilization of PPE.

17. Material Handling Equipment

All material handling equipment will be operated in accordance with established Vestas-American Wind Technology's written policies, manufactures procedures and applicable OSHA standards.

18. Stability of Adjacent Structures

18.1.1 Where the stability of adjoining buildings, walls, or other structures is endangered by excavation operations, support systems such as shoring, bracing, or underpinning will be provided to ensure the stability of such structures for the protection of employees.

18.1.2 Excavation below the level of the base or footing of any foundation or retaining wall that could be reasonably expected to pose a hazard to employees will not be permitted except when:

- A support system, such as underpinning, is provided to ensure the safety of employees and the stability of the structure; or
- The excavation is in stable rock; or

T09 0008-7998 Ver 03 - Approved - Exported from DMS: 2010-03-09 by ASUER

- A registered professional engineer has approved the determination that the structure is sufficiently removed from the excavation so as to be unaffected by the excavation activity; or
- A registered professional engineer has approved the determination that such excavation work will not pose a hazard to employees.

18.1.3 Sidewalks, pavements and appurtenant structures will not be undermined unless a support system or another method of protection is provided to protect employees from the possible collapse of such structures.

19. Protection of Employees from Loose Rock or Soil

19.1.1 Adequate protection will be provided to protect employees from loose rock or soil that could pose a hazard by falling or rolling from an excavation face. Such protection will consist of scaling to remove loose material, installation of protective barricades at intervals as necessary on the face to stop and contain falling material, or other means that provide equivalent protection.

19.1.2 Employees will be protected from excavated or other materials or equipment that could pose a hazard by falling or rolling into excavations. Protection will be provided by placing and keeping such materials or equipment at least 2 feet (.61 m) from the edge of excavations, or by the use of retaining devices that are sufficient to prevent materials or equipment from falling or rolling into excavations, or by a combination of both if necessary.

20. Site Inspections

Daily inspections of excavations, the adjacent areas, and protective systems will be made by a competent person for evidence of a situation that could result in possible cave-ins, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions. These inspections are only required when employee exposure can be reasonably anticipated. An inspection will be:

- Conducted by the competent person prior to the start of work and as needed throughout the shift.
- Inspections will also be made after every rainstorm or other hazard-increasing occurrence.
- Where the competent person finds evidence of a situation that could result in a possible cave-in, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions, exposed employees will be removed from the hazardous area until the necessary precautions have been taken to ensure their safety.

21. Fall Protection

21.1.1 Where employees or equipment are required or permitted to cross over excavations, walkways or bridges with standard guardrails will be provided.

21.1.2 Adequate barrier physical protection will be provided at all remotely located excavations. All wells, pits, shafts, etc., will be barricaded or covered. Upon completion of exploration and other similar operations, temporary wells, pits, shafts, etc., will be backfilled.

T09 0008-7998 Ver 03 - Approved - Exported from DMS: 2010-03-09 by ASUER

22. Training Requirements

22.1 Initial training

Vestas-AWT shall provide training to ensure the purpose and function of the trenching and excavation program is understood by employees and the knowledge and skills required for safe trenching and excavation operations is acquired by all affected employees. The training shall include as a minimum, the following:

22.1.1 Training in the recognition of applicable hazards associated with trenching and excavation operations.

22.1.2 Each affected employee shall be instructed in the purpose and use of this standard practice instruction.

22.1.3 All other employees whose work operations are or may be in an area where trenching and excavation operation are conducted shall be instructed to an awareness level about the procedures and prohibitions relating to work in such areas.

22.2 Refresher training

22.2.1 Retraining shall be provided for all authorized and affected employees whenever there is a change in their job assignments, a change in equipment or processes that present a new hazard, or when there is a change in these procedures. Note: Retraining (to include a procedural review) will also be provided whenever there is a "close-call" or these procedures fail.

22.2.2 Additional retraining shall also be conducted whenever a periodic inspection reveals, or whenever the Company has reason to believe, that there are deviations from or inadequacies in the employee's knowledge or use of these procedures.

22.2.3 The retraining shall reestablish employee proficiency and introduce new or revised operational methods and procedures, as necessary.

22.2.4 Certification

The Company shall certify that employee training has been accomplished and is being kept up to date. The certification shall contain each employee's name and dates of training.

23. Protection of Employees in Excavations

23.1 General

23.1.1 Each employee in an excavation will be protected from cave-ins by an adequately designed protective system except when:

- Excavations are made entirely in stable rock; or
- Excavations are less than 5 feet (1.52 m) in depth and examination of the ground by a competent person provides no indication of a potential cave-in.

23.1.2 Protective systems will have the capacity to resist without failure all loads that are intended, or could reasonably be expected to be applied or transmitted to the system.

T09 0008-7998 Ver 03 - Approved - Exported from DMS: 2010-03-09 by ASUER

23.2 Design of Sloping and Benching Systems

The slopes and configurations of sloping and benching systems will be properly selected and constructed as follows:

- **Option 1 –**

  Allowable configurations and slopes. Excavations will be sloped at an angle not steeper than one and one-half horizontal to one vertical (34 degrees measured from the horizontal), unless the employer uses one of the other options listed below.

- **Option 2 -**

  Determination of slopes and configurations is made using 29CFR §1926.652, Appendices A and B: Maximum Allowable Slopes, and allowable configurations for sloping and benching systems.

- **Option 3 –**

  - Designs using other tabulated data. Designs of sloping or benching systems will be selected from and in accordance with tabulated data, such as approved tables and charts. The tabulated data will be in written form and will include:
    - Identification of the parameters that affect the selection of a sloping or benching system drawn from such data;
    - Identification of the limits of use of the data, to include the magnitude and configuration of slopes determined to be safe;
    - Explanatory information as may be necessary to aid the user in making a correct selection of a protective system from the data.

  Note: At least one copy of the tabulated data, which identifies the registered professional engineer who approved the data, will be maintained at the jobsite during construction of the protective system. After that time, the data may be stored off the jobsite, but a copy of the data will be made available to OSHA upon request.

- **Option 4 –**

  Design by a registered professional engineer. Sloping and benching systems not utilizing Option (1) or Option (2) or Option (3) will be approved by a registered professional engineer. Designs will be in written form and will include at least the following:

  - The magnitude of the slopes that were determined safe for the particular project;
  - The configurations that were determined to be safe for the particular project;
  - The identity of the registered professional engineer approving the design.

  Note: At least one copy of the design will be maintained at the jobsite while the slope is being constructed. After that time, the design need not be at the jobsite, but a copy will be made available to OSHA upon request.

24. Design of Support Systems, Shield Systems, and other Protective Systems

Designs of support systems, shield systems, and other protective systems will be selected and constructed in accordance with the following options:

- **Option 1 -**

T09 0008-7998 Ver 03 - Approved - Exported from DMS: 2010-03-09 by ASUER

Designs using Appendices A, C and D of 29CFR §1926.652. Designs for timber shoring in trenches will be determined in accordance with the conditions and requirements set forth in appendices A and C. Designs for aluminum hydraulic shoring will be in accordance with appendix D of 29CFR §1926.652, but if manufacturer's tabulated data cannot be utilized, designs will be in accordance with appendix D.

- **Option 2 -**

  Designs using Manufacturer's Tabulated Data. Design of support systems, shield systems, or other protective systems that are drawn from manufacturer's tabulated data will be in accordance with all specifications, recommendations, and limitations issued or made by the manufacturer.

  - Deviation from the specifications, recommendations, and limitations issued or made by the manufacturer will only be allowed after the manufacturer issues specific written approval.
  - Manufacturer's specifications, recommendations, and limitations, and manufacturer's approval to deviate from the specifications, recommendations, and limitations will be in written form at the jobsite during construction of the protective system. After that time, this data may be stored off the jobsite, but a copy will be made available to OSHA upon request.

- **Option 3 -**

  Designs using other Tabulated Data. Designs of support systems, shield systems, or other protective systems will be selected from and be in accordance with tabulated data, such as tables and charts. The tabulated data will be in written form and include all of the following:

  - Identification of the parameters that affect the selection of a protective system drawn from such data;
  - Identification of the limits of use of the data;
  - Explanatory information as may be necessary to aid the user in making a correct selection of a protective system from the data.

  Note: At least one copy of the tabulated data which identifies the registered professional engineer who approved the data will be maintained at the jobsite during construction of the protective system. After that time, the data may be stored off the jobsite, but a copy of the data will be made available to OSHA upon request.

- **Option 4 -**

  Design by a registered professional engineer. A registered professional engineer will approve support systems, shield systems, and other protective systems not utilizing Option 1, Option 2 or Option 3 above. Designs will be in written form and will include the following:

  - A plan indicating the sizes, types, and configurations of the materials to be used in the protective system; and
  - Identification of the registered professional engineer approving the design.

T09 0008-7998 Ver 03 - Approved - Exported from DMS: 2010-03-09 by ASUER

25. Materials and Equipment used for Protective Systems

25.1.1 Materials and equipment used for protective systems will be free from damage or defects that might impair their proper function.

25.1.2 Manufactured materials and equipment used for protective systems will be used and maintained in a manner that is consistent with the recommendations of the manufacturer, and in a manner that will prevent employee exposure to hazards.

25.1.3 When material or equipment that is used for protective systems is damaged, a competent person will examine the material or equipment and evaluate its suitability for continued use. If the competent person cannot assure the material or equipment is able to support the intended loads or is otherwise suitable for safe use, then the material or equipment will be removed from service, and will be evaluated and approved by a registered professional engineer before being returned to service.

26. Installations and Removal of Support Systems

26.1 General requirements

26.1.1 Members of support systems will be securely connected together to prevent sliding, falling, kick outs, or other predictable failure.

26.1.2 Support systems will be installed and removed in a manner that protects employees from cave-ins, structural collapses, or from being struck by members of the support system.

26.1.3 Individual members of support systems will not be subjected to loads exceeding those which those members were designed to withstand.

26.1.4 Before temporary removal of individual members begins, additional precautions will be taken to ensure the safety of employees, such as installing other structural members to carry the loads imposed on the support system.

26.1.5 Removal will begin at, and progress from, the bottom of the excavation. Members will be released slowly so as to note any indication of possible failure of the remaining members of the structure or possible cave-in of the sides of the excavation.

26.1.6 Backfilling will progress together with the removal of support systems from excavations.

26.2 Additional requirements for support systems for trench excavations

26.2.1 Excavation of material to a level no greater than 2 feet (.61 m) below the bottom of the members of a support system will be permitted, but only if the system is designed to resist the forces calculated for the full depth of the trench, and there are no indications while the trench is open of a possible loss of soil from behind or below the bottom of the support system.

26.2.2 Installation of a support system will be closely coordinated with the excavation of trenches.

T09 0008-7998 Ver 03 - Approved - Exported from DMS: 2010-03-09 by ASUER

27. Sloping and Benching Systems

Employees will not be permitted to work on the faces of sloped or benched excavations at levels above other employees except when employees at the lower levels are adequately protected from the hazard of falling, rolling, or sliding material or equipment.

28. Shield Systems

28.1.1 Shield systems will not be subjected to loads exceeding those which the system was designed to withstand.

28.1.2 Shields will be installed in a manner to restrict lateral or other hazardous movement of the shield in the event of the application of sudden lateral loads.

28.1.3 Employees will be protected from the hazard of cave-ins when entering or exiting the areas protected by shields.

28.1.4 Employees will not be allowed in shields when shields are being installed, removed, or moved vertically.

28.1.5 Excavations of earth material to a level not greater than 2 feet (.61 m) below the bottom of a shield will be permitted, but only if the shield is designed to resist the forces calculated for the full depth of the trench, and there are no indications while the trench is open of a possible loss of soil from behind or below the bottom of the shield.

29. History of Document

Rev. no.:	Date:	Description of changes
00	Unknown	New document
01	Unknown	Unknown
02	15-Oct-2002	Old AWT Number: 31033. Document number updated. Nature of other changes unknown.
03	01-Jan-2010	Template update.

T09 0008-7998 Ver 03 - Approved - Exported from DMS: 2010-03-09 by ASUER

Vestas®

Confined Space Policy and Program

Contents

1. Purpose: **1**
2. Definitions: **2**
3. General Requirements: **4**
4. Personnel Requirements: **4**
5. Rescue and Emergency Services **5**
6. Position Responsibilities **5**
6.1 Attendant 5
6.2 Entrant(s) Authorized 6
6.3 Entry Supervisors 6
7. Training **7**
8. Non-Permit Confined Space Entry **7**
9. Permit-Required Confined Space Classification **7**
10. Permit-Required Confined Space Entry Permit **8**
10.1 Permit 8
10.2 Duration of Permit 8
11. Preparation for a permit required Confined Space Entry Permit **8**
12. Testing Confined Space Atmospheres **9**
13. Entry to a Permit Required Confined Space **9**
14. Completion of Work and Restoration of Confined Space **10**
15. Confined Space Permit **10**
16. History of this Document **10**

1. Purpose:

This procedure covers the rules specific to entering a confined space. It also describes controls associated with the protection of Vestas Americas personnel and sub-contractors from the potential hazards of accessing into confined spaces. This program is intended to:

- Prevent unauthorized and unintentional personnel entry into a confined space.
- Confirm safe entry into, and work within, "confined spaces" by authorized, properly trained and equipped personnel and emergency rescue services.
- Comply with the minimum requirements for work inside a Confined Space as specified in OSHA 29 CFR 1910.146.

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2. Definitions:

Word:	Definition:
Confined Space	A space that has all three of the following criteria: • Large enough and so configured that an employee can physically enter and perform assigned work. • Limited or restricted means for entry or exit. • Not designed for continuous employee occupancy. Examples of confined spaces are tanks, vessels, silos, storage bins, hoppers, vaults, and pits. It can be any enclosed or partially enclosed space where there is a risk of death or serious injury due to the presence of hazardous substances or dangerous conditions (i.e. lack of oxygen, toxic or combustible gases).
Confined Space / Non-Permit Required	An enclosed space that meets the criteria of a confined space; however, does not contain or, with respect to atmospheric hazards, have the potential to contain, any hazard capable of causing death or serious physical harm.
Confined Space / Permit Required	An enclosed space that meets the criteria of a confined space and also has insufficient ventilation or contains hazards that could be harmful to health or safety. Characteristics of a permit-required confined space may contain one or more of the following: • Contains or has a known potential to contain a hazardous atmosphere; • Contains a material with the potential to engulf an entrant; • Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls, or a floor which slopes downward and tapers to a smaller cross-section; and/or • Contains any recognized serious safety or health hazard. Examples of permit-required confined spaces include, but are not limited to: storage tanks (i.e. black ink tanks, diesel tanks), vessels, pits, sewers, vaults, pipelines, and valve pits. A permit-required Confined Space may be reclassified as a non-permit required confined space if all hazards within the space are eliminated and documented. Control of atmospheric hazards through forced air ventilation alone does not constitute elimination of the hazard.
Entry	The action by which a person passes through an opening into a confined space. Entry is considered to have occurred as soon as any part of the entrant's body breaks the plane of an opening into the space. Entry can occur both during work and during preparation for work.
Attendant/Stand by Person	An individual stationed outside the confined space that is trained in accordance with this program and who monitors the entrants inside the permit required confined space.

T09 0008-8012 Ver 03 - Approved - Exported from DMS: 2010-03-09 by ASUER

Entrant	Any personnel who are trained in accordance with this program and are authorized to enter a permit-required confined space. The entrant must be able to demonstrate an understanding of the identified training requirements and proper use of personal protective equipment indicated on the entry permit.
Entry Supervisor	The person responsible for determining if acceptable entry conditions are present at a permit-required confined space where entry is planned, for authorizing entry, for overseeing entry operations, and for terminating entry as required by this program. The entry supervisor shall be named in writing on the entry permit.
Employee in Charge	The onsite manager, lead technician, or designated qualified employee who has working knowledge of all work activities being performed by all groups/personnel working on location.
Rescue Team	The rescue team consists of no less than 2 people that are available and trained to perform rescue from a confined space in case of an emergency.
Entry Permit	The written or printed document that defines the conditions of confined space entry, the anticipated hazards associated with space entry, the reasons for entering the confined space, and which provides a listing of authorized attendants and entrants, the date of entry into the confined space, and the expiration time of the entry permit.
Entry Log	The written or printed document on which any atmospheric conditions are recorded prior to entry into a "Permit-Required Space with only Atmospheric Hazards," and which provides a listing of authorized attendants and entrants, and the date of entry into the confined space.
Job Safety Analysis (JSA)	A process to be used daily for each major task being completed by technicians to ensure a proactive assessment and mitigation of risks.
Permit Issuing Authority	The Site Manager, lead technician or other trained/authorized employee who is assigned by the Corporate HS&E Group for issuing permits consistent with all associated practice and permit requirements. The Permit Issuing Authority is the lead Vestas representative in the day-to-day management of the permit-to-work process within their area of responsibility. The Permit Issuing Authority is directly responsible for confirming that all necessary and required precautions and/or procedures are followed prior to approving the permit. They are responsible for: • Issuing permits consistent with all associated practice and permit requirements. • Insuring that ALL of the workers fully understand the work and understand the project/work specific emergency action plan. • Insuring that there are no simultaneous operations that may endanger this or other work groups assigned to the same location.

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Hazardous Atmosphere An atmosphere that may expose employees to the risk of death, incapacitation, impairment of ability to self-rescue, injury or acute illness from one or more of the following causes:

- A flammable gas, vapor or mist in excess of 0% of its lower explosive limit.
- An airborne combustible dust at a concentration that meets or exceeds its lower explosive limit.
- An atmospheric oxygen concentration below 19.5% or above 23.5%.
- Atmospheric concentrations containing a toxic substance above the OSHA or ACGIH recommended exposure levels (whichever is more stringent).
- Any other atmospheric condition that is Immediately Dangerous to Life or Health (IDLH).

3. General Requirements:

The work area shall be surveyed by the Site Manager/Lead Technician or a designate to identify any confined spaces and/or other hazards associated with the work. This survey must identify the classification of confined spaces and rationale for the classification.

All affected personnel shall be informed of the existence and hazards of confined spaces by the posting of warning signs or by other equally effective means (i.e. Confined Space Inventory).

Confined Spaces that can be casually or inadvertently entered shall be guarded to prevent unauthorized entry.

Permit Required Confined Spaces shall only be entered when all provisions of the Confined Space Entry Program are satisfied.

Only properly trained and equipped personnel shall be allowed to participate in work involving entry into Permit Required Confined Spaces.

No entry shall be made until a rescue plan is developed, communicated to all affected personnel, and implemented by training the persons involved in possible evacuation/rescue processes.

4. Personnel Requirements:

The Entry Supervisor and Site Manager/Permit Issuing Authority shall be responsible for implementing and enforcing the requirements of the Confined Space Entry program. After the conditions for Confined Space Entry have been verified, the Site Manager must approve the Permit before the any work begins.

An Entry Supervisor also may serve as an Attendant or as an Authorized Entrant, as long as that person is trained and equipped, as required by this program, for each role they fill.

The duties of Entry Supervisor may be passed from one individual to another during the course of an entry operation. However, the person to whom the responsibilities are passed must have participated in the Job Safety Analysis and be identified on the permits.

T09 0008-8012 Ver 03 - Approved - Exported from DMS: 2010-03-09 by ASUER

5. Rescue and Emergency Services

The following requirements apply to ALL Vestas Americas locations where personnel enter permit required confined spaces to perform rescue and emergency services:

- Each member of the team shall be provided with and trained to properly use the PPE and rescue equipment necessary for making rescues from confined spaces.
- Each member of the team shall be trained to perform their assigned rescue duties, and each member shall also receive the training required of authorized entrants.
- Each member of the team shall practice making Confined Space rescues using dummies, mannequins, or actual persons in representative spaces that simulate the types of confined spaces from which rescue is to be performed, with respect to configuration, opening size, and accessibility. This training must be completed at least once every 12 months and repeated annually.
- All members of the team shall hold current certification in first aid and CPR.
- To facilitate non-entry rescue, retrieval systems or methods shall be used, unless the retrieval equipment would increase the overall risk of entry or would not contribute to the rescue of the entrant. Retrieval systems shall meet the following requirements:
  - Each Authorized Entrant shall use a chest or full body harness with a retrieval line attached at the center of the entrant's back, near shoulder level, or above the entrant's head.

NOTE- OSHA Statistics
The work activity that most frequently results in fatalities is rescue. For every entrant who dies in a confined space, approximately 1.6 people attempting a rescue die. In most cases, the people who die are untrained and improperly equipped for rescue.

6. Position Responsibilities

6.1 Attendant

- Know the hazards that may be faced during entry, including information on how exposure may occur, signs and symptoms of exposure, and consequences of an exposure.
- Be aware of possible behavioral effects of hazard exposure to worker/entrants.
- Constantly maintain an accurate count of personnel in the permit required confined space.
- Remain outside the permit-required Confined Space and monitor the Authorized Entrants until relieved by another Attendant.
- Communicate with Authorized Entrants as necessary to monitor entrant status and to alert them of the need to evacuate the space.
- Monitor activities inside and outside the space to determine if it is safe to remain in the space.
- Summon rescue and other emergency services as soon as the Attendant determines that Authorized Entrants may need assistance to escape from permit-required Confined Space hazards.
- Warn all unauthorized persons to stay away from the permit-required confined space.
- Perform non-entry rescues as specified by the location's rescue procedure.

T09 0008-8012 Ver 03 - Approved - Exported from DMS: 2010-03-09 by ASUER

- Perform no other duties that might interfere with the Attendant's primary duty to monitor and protect the entrants.

6.2 Entrant(s) Authorized

- Know the hazards that may be faced during entry, including information on how exposure might occur, signs and symptoms of exposure, and consequences of exposure.
- Be properly trained in the tasks and procedures they are required to perform.
- Use equipment properly and in accordance with the manufacturer's specifications.
- Communicate with the attendant as necessary to monitor status of the space and alert them of the need to evacuate the space.
- Alert the attendant whenever an entrant recognizes any warning sign or symptom of distress.
- Verify that all persons involved in permit required exposure to a dangerous situation or detects a prohibited condition.
- Exit from the Confined Space as quickly as possible whenever any of the following occur:
  - An order is given to evacuate by the Attendant or the Entry Supervisor.
  - The entrant recognizes any warning sign of a dangerous situation or symptom of exposure.
  - The entrant detects a prohibited condition.
  - An evacuation alarm is activated.

6.3 Entry Supervisors

- Know the hazards that may be encountered during entry, including information on how exposure might occur, signs and symptoms of exposure, and consequences of exposure.
- Verify that all tests specified by the permit have been conducted and that all procedures and equipment specified by the permit are in place before endorsing the permit and allowing entry to begin.
- Ensure that confined space entrants are properly trained and competent in their assigned duties.
- Verify that rescue services/equipment is/are available and that the means for activating a rescue has been tested and are available.
- Terminate the entry and cancel the permit when the entry operations specified by the permit have been completed or when a condition not allowed under the entry permit arises in or near the confined space.

6.4 Rescue Team Member

- Know the hazards that may be encountered during entry, including information on how exposure might occur, signs and symptoms of exposure, and consequences of exposure.
- Be aware of possible behavioral effects of hazard exposure to worker/entrants.
- Be properly trained in the duties they are required to perform.
- Be available in case of an emergency situation
- Perform non-entry rescues as specified by the location's rescue procedure.

T09 0008-8012 Ver 03 - Approved - Exported from DMS: 2010-03-09 by ASUER

7. Training

Personnel shall be trained in the relevant aspects of their assigned duties regarding confined spaces when:

- First assigned a Confined Space Entry role.
- There is a change in the assigned Confined Space Entry role.
- There is a change in permit-required Confined Space operations that presents a hazard about which an employee has not previously been trained.
- The Site Manager or the Entry Supervisor identifies deviations from acceptable entry conditions or that a worker demonstrates a lack of training in the Confined Space Entry procedures.
- Training shall include, at a minimum:
  - Proficiency in the specific duties assigned.
  - The type of Confined Space to be entered.
  - Chemical or physical hazards involved.
  - Work practices and techniques.
  - Atmospheric testing procedures.
  - Personal Protective Equipment (PPE) required.
  - Rescue procedures.

All training shall be documented and training records should be maintained in LMS.

8. Non-Permit Confined Space Entry

Work in an enclosed space that meets the criteria of a confined space, however, does not contain or, with respect to atmospheric hazards, have the potential to contain, any hazard capable of causing death or serious physical harm.

Vestas has classified the following as non-permit required confined spaces:

- Tower Sump/Cellar
- Tower
- Nacelle
- Hub

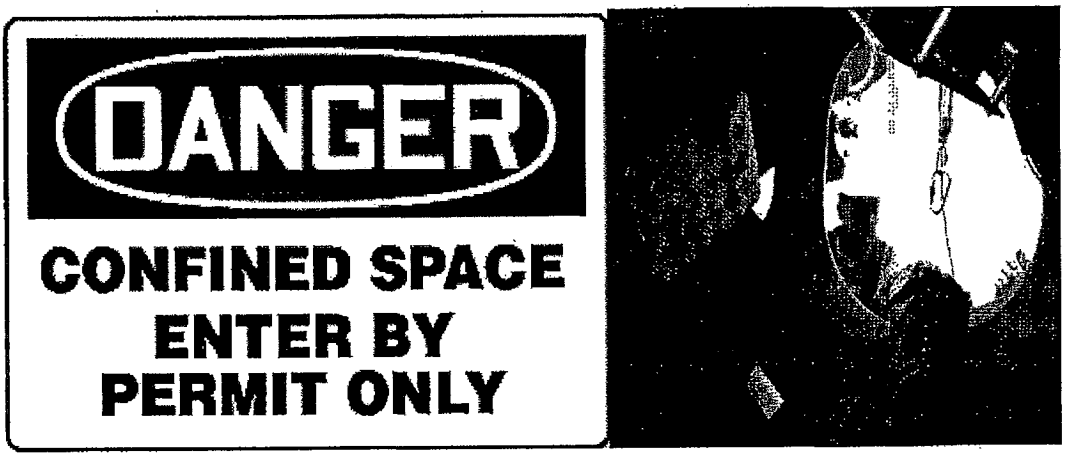
All applicable safety regulations shall be followed along with a work specific Job Hazard Analysis prior to work beginning.

9. Permit-Required Confined Space Classification

Vestas Americas has determined that accessing the space within a blade is consistent with that of a Permit Required Confined Space. When crossing into the threshold of the blade root the potential exists for engulfment and entrapment and the blades have a single point of entry therefore meeting the characteristics of a permit required confined space according to OSHA 1910.146.

- Blades

T09 0008-8012 Ver 03 - Approved - Exported from DMS: 2010-03-09 by ASUER



10. Permit-Required Confined Space Entry Permit

Work in the confined space identified above or any other permit-required confined space shall not be allowed until a Confined Space Entry permit and a JSA have been completed. The completed permit must be posted at or adjacent to the entrance of the permit-required Confined Space for the duration of the work.

Each completed entry permit shall be retained at the facility for at least one year to facilitate review of the permit-required Confined Space Entry program. Any problems encountered during an entry operation should be noted on the permit.

10.1 Permit

All of the following personnel must sign the permit:

- Site Manager/Lead Technician or authorized trained designee.
- Authorized Entrants
- Attendant/Standby person(s)

10.2 Duration of Permit

The permit duration is 12 hours or end of job, whichever occurs first, unless one of the following occurs which invalidates the permit

- Change of any permitted personnel.
- Conditions change in a manner not anticipated by the Confined Space Entry permit.
- Emergency conditions that cancel the permit.

11. Preparation for a permit required Confined Space Entry Permit

The Site Manager is responsible for confirming that a JSA has been completed and includes:

- Identification of communication protocols for all personnel named on the permit.
- Following all established electrical lockout/tag procedures for equipment isolation. Ensuring lockout and tag out of all necessary energy sources to confirm complete isolation of the confined space.

T09 0008-8012 Ver 03 - Approved - Exported from DMS: 2010-03-09 by ASUER

- Communicating rescue procedures to all personnel named on the permit.
- Identifying potential emergency conditions that may cancel the permit.
- Evaluating lighting conditions, temperature, the need for climbing, tie-off points, or other known hazards when preparing a Confined Space for entry.
- Providing, maintaining, and properly using appropriate PPE, such as coveralls, earplugs, goggles, gloves, and respirators, as required.
- Maintaining a first-aid kit outside the entry.
- Making available any fire extinguishers and other fire fighting equipment where needed
- Establishing a communication system (visual, hand signals, radio, voice, etc.) between workers and standby personnel.

Entrants and standby person(s) may only perform as rescuers if properly trained and equipped; however, the person must not enter the Confined Space during an emergency without first confirming that another trained standby person is present at the rotor hub.

Verify that a list of the rescue and other services that may be called/used in case of an emergency (and the means of communication with those services) has been attached to the permit.

12. Testing Confined Space Atmospheres

Permit required confined space atmospheres (blades) must be tested before entry is allowed. Tests shall be conducted in the following sequence and test results must be in accordance with the data below:

- The acceptable oxygen concentration range is from 19.5% – 23.5%. The normal oxygen level of 20.9% is desired. All other levels must be investigated and the contributing issue(s) addressed. Entry into a Confined Space with oxygen concentrations below 19.5% may be performed with additional personal protective equipment that requires entrants to wear a Self Contained Breathing Apparatus. **No one may ever enter a Confined Space with oxygen concentrations in excess of 23.5%.**
- The acceptable flammable gases or vapors concentration is 0% Lower Explosive Limit (LEL). **No one shall ever enter a Confined Space with flammable gas or vapor concentrations above 10% LEL.**

The Corporate HS&E Group should be contacted for guidance on how to achieve 0% LEL.

13. Entry to a Permit Required Confined Space

Personnel may only enter into a Permit Required Confined Space after preparation requirements are met and a permit is signed and issued. If at any time anyone (entrant, attendant, Entry Supervisor, or any other person) determines that the Confined Space Entry is unsafe or unanticipated hazards are present, the Permit Required Confined Space shall be immediately evacuated and safe conditions established prior to reentry.

T09 0008-8012 Ver 03 - Approved - Exported from DMS: 2010-03-09 by ASUER

Attendant on left and entrant on right

The designated standby person shall not leave the Confined Space hub access with any entrant inside unless they have been relieved by another trained standby person.

Unauthorized personnel shall not be allowed entry, and, if the confined space is left unattended, the entrance shall be barricaded. Access to the turbine is controlled by locks and therefore there is no need to post signage indicating that the blade is a permit required confined space.

14. Completion of Work and Restoration of Confined Space

When all work is complete and Permit Required Confined Space is ready to be returned to service, an entry supervisor will conduct a post-entry review. A site-specific checklist will be used for proper restoration. In addition to items listed on the permit, the following should be verified:

- Are all personnel out of the Permit Required Confined Space?
- Are all equipment and tools removed?
- Are all Lock Out/Tag Out equipment removed/disengaged?

After cancellation or expiration of the permit, an entry completion meeting (post-meeting) with everyone involved shall be held and documented. The canceled permit shall be reviewed to confirm that any hazards found or created have been documented to confirm that personnel participating in future entry operations are protected from previously unidentified hazards.

15. Confined Space Permit

A completed Confined Space Entry Permit (DMS 0008-8016) is required to enter a confined space. The permit must remain on-site for one year after the completion of the work to facilitate review.

16. History of this Document

Rev. no.:	Date:	Description of changes
00	18-Nov-2008	New Document
01	04-Mar-2009	Added reference to Confined Space Permit (HSE098

T09 0008-8012 Ver 03 - Approved - Exported from DMS: 2010-03-09 by ASUER

		[DMS 0008-8016]) to Section 18.17.
02	08-May-2009	Added new definitions.
	20-May-2009	Revisions to 18.11
	08-June-2009	Revisions to 18.5, 18.10, 18.11

T09 0008-8012 Ver 03 - Approved - Exported from DMS: 2010-03-09 by ASUER

Vestas®

Confined Space Policy and Program - Canadian Provinces

Contents

1. Purpose 2
2. Definitions 2
3. General Requirements 5
4. Personnel Requirements 5
5. Rescue and Emergency Services 5
6. Position Responsibilities 6
6.1 Attendant 6
6.2 Entrant(s) Authorized 6
6.3 Entry Supervisors 7
6.4 Rescue Team Member 7
7. Training 7
8. Non-Permit Confined Space Entry 8
9. Permit-Required Confined Space Classification 8
10. Permit-Required Confined Space Entry Permit 8
10.1 Permit 9
10.2 Duration of Permit 9
11. Preparation for a Permit Required Confined Space Entry Permit 9
12. Testing Confined Space Atmospheres 10
13. Entry to a Permit Required Confined Space 10
14. Completion of Work and Restoration of Confined Space 11
15. Confined Space Permit 11
16. Rescue Plan 11
16.1 Confined Space Entry Safe Work Procedure – Tower Basement 11
16.2 Confined Space Entry Safe Work Procedure - Hub 13
16.3 Confined Space Entry Safe Work Procedure - Nacelle 15
16.4 Confined Space Entry Safe Work Procedure - Tower 16
16.5 Confined Space Entry Safe Work Procedure – Blades & Hub 18
ATMOSPHERIC HAZARDS 18
17. References 22
18. History of this Document 23

T09 0008-8017 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

1. Purpose

This procedure covers the rules specific to entering a confined space. It also describes controls associated with the protection of Vestas Canadian Wind Technology personnel and sub-contractors from the potential hazards of accessing into confined spaces. This program is intended to:

- Prevent unauthorized and unintentional personnel entry into a confined space.
- Confirm safe entry into, and work within, "confined spaces" by authorized, properly trained and equipped personnel and emergency rescue services.
- Comply with the minimum requirements for work inside a Confined Space as specified in Canada Occupational Health and Safety Regulations (SOR/86-304)

2. Definitions

Word:	Definition:
Attendant/Stand by Person	An individual stationed outside the confined space that is trained in accordance with this program and who monitors the entrants inside the permit required confined space.
Confined Space	Except as otherwise determined by the Board, means an area, other than an underground working, that • is enclosed or partially enclosed, • is not designed or intended for continuous human occupancy, • has limited or restricted means for entry or exit that may complicate the provision of first aid, evacuation, rescue or other emergency response service, and • is large enough and so configured that a worker could enter to perform assigned work; • Examples of confined spaces are tanks, vessels, silos, storage bins, hoppers, vaults, and pits. It can be any enclosed or partially enclosed space where there is a risk of death or serious injury due to the presence of hazardous substances or dangerous conditions (i.e. lack of oxygen, toxic or combustible gases).
Confined Space / Non-Permit Required	An enclosed space that meets the criteria of a confined space; however, does not contain or, with respect to atmospheric hazards, have the potential to contain, any hazard capable of causing death or serious physical harm.

T09 0008-8017 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

Confined Space / Permit Required

An enclosed space that meets the criteria of a confined space and also has insufficient ventilation or contains hazards that could be harmful to health or safety. Characteristics of a permit-required confined space may contain one or more of the following:

- Contains or has a known potential to contain a hazardous atmosphere;
- Contains a material with the potential to engulf an entrant;
- Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls, or a floor which slopes downward and tapers to a smaller cross-section; and/or
- Contains any recognized serious safety or health hazard.

Examples of permit-required confined spaces include, but are not limited to: storage tanks (i.e. black ink tanks, diesel tanks), vessels, pits, sewers, vaults, pipelines, and valve pits.

A permit-required Confined Space may be reclassified as a non-permit required confined space if all hazards within the space are eliminated and documented. Control of atmospheric hazards through forced air ventilation alone does not constitute elimination of the hazard.

Employee in Charge

The onsite manager, lead technician, or designated qualified employee who has working knowledge of all work activities being performed by all groups/personnel working on location.

Entrant

Any personnel who are trained in accordance with this program and are authorized to enter a permit-required confined space. The entrant must be able to demonstrate an understanding of the identified training requirements and proper use of personal protective equipment indicated on the entry permit.

Entry

The action by which a person passes through an opening into a confined space. Entry is considered to have occurred as soon as any part of the entrant's body breaks the plane of an opening into the space. Entry can occur both during work and during preparation for work.

Entry Permit

The written or printed document that defines the conditions of confined space entry, the anticipated hazards associated with space entry, the reasons for entering the confined space, and which provides a listing of authorized attendants and entrants, the date of entry into the confined space, and the expiration time of the entry permit. The permit also contains an entry log, on which any atmospheric conditions are recorded prior to entry into a "Permit-Required Space with only Atmospheric Hazards," and which provides a listing of authorized attendants and entrants, and the date of entry into the confined space.

T09 0008-8017 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

Entry Supervisor	The person responsible for determining if acceptable entry conditions are present at a permit-required confined space where entry is planned, for authorizing entry, for overseeing entry operations, and for terminating entry as required by this program. The entry supervisor shall be named in writing on the entry permit.
Hazardous Atmosphere	An atmosphere that may expose employees to the risk of death, incapacitation, impairment of ability to self-rescue, injury or acute illness from one or more of the following causes: • A flammable gas, vapor or mist in excess of 0% of its lower explosive limit. • An airborne combustible dust at a concentration that meets or exceeds its lower explosive limit. • An atmospheric oxygen concentration below 19.5% or above 23.5%. • Atmospheric concentrations containing a toxic substance above the ACGIH recommended exposure levels • Any other atmospheric condition that is Immediately Dangerous to Life or Health (IDLH).
IDLH	An atmosphere that poses an immediate threat to life, would cause irreversible adverse health effects, or would impair an individual's ability to escape from a dangerous atmosphere.
Job Safety Analysis (JSA)	A process to be used daily for each major task being completed by technicians to ensure a proactive assessment and mitigation of risks.
Permit Issuing Authority	The Site Manager, lead technician or other trained/authorized employee who is assigned by the Corporate HS&E Group for issuing permits consistent with all associated practice and permit requirements. The Permit Issuing Authority is the lead Vestas representative in the day-to-day management of the permit-to-work process within their area of responsibility. The Permit Issuing Authority is directly responsible for confirming that all necessary and required precautions and/or procedures are followed prior to approving the permit. They are responsible for: • Issuing permits consistent with all associated practice and permit requirements. • Insuring that ALL of the workers fully understand the work and understand the project/work specific emergency action plan. • Insuring that there are no simultaneous operations that may endanger this or other work groups assigned to the same location.
Rescue Team	The rescue team consists of no less than 2 people that are available and trained to perform rescue from a confined space in case of an emergency.
SCBA	Self-contained breathing apparatus

T09 0008-8017 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

3. General Requirements

The work area shall be surveyed by the Site Manager/Lead Technician or a designate to identify any confined spaces and/or other hazards associated with the work. This survey must identify the classification of confined spaces and rationale for the classification.

All affected personnel shall be informed of the existence and hazards of confined spaces by the posting of warning signs or by other equally effective means (i.e. Confined Space Inventory).

Confined Spaces that can be casually or inadvertently entered shall be guarded to prevent unauthorized entry.

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Only properly trained and equipped personnel shall be allowed to participate in work involving entry into Permit Required Confined Spaces.

No entry shall be made until a rescue plan is developed, communicated to all affected personnel, and implemented by training the persons involved in possible evacuation/rescue processes.

4. Personnel Requirements

The Entry Supervisor and Site Manager/Permit Issuing Authority shall be responsible for implementing and enforcing the requirements of the Confined Space Entry program. After the conditions for Confined Space Entry have been verified, the Site Manager must approve the Permit before the any work begins.

An Entry Supervisor also may serve as an Attendant or as an Authorized Entrant, as long as that person is trained and equipped, as required by this program, for each role they fill.

The duties of Entry Supervisor may be passed from one individual to another during the course of an entry operation. However, the person to whom the responsibilities are passed must have participated in the Job Safety Analysis and be identified on the permits.

5. Rescue and Emergency Services

The following requirements apply to ALL Vestas Canadian Wind Technology locations where personnel enter permit required confined spaces to perform rescue and emergency services:

- Each member of the team shall be provided with and trained to properly use the PPE and rescue equipment necessary for making rescues from confined spaces.
- Each member of the team shall be trained to perform their assigned rescue duties, and each member shall also receive the training required of authorized entrants.
- Each member of the team shall practice making Confined Space rescues using dummies, mannequins, or actual persons in representative spaces that simulate the types of confined spaces from which rescue is to be performed, with respect to configuration, opening size, and accessibility. This training must be completed at least once every 12 months and repeated annually.
- All members of the team shall hold current certification in first aid and CPR.
- To facilitate non-entry rescue, retrieval systems or methods shall be used, unless the retrieval equipment would increase the overall risk of entry or would not contribute to the rescue of the entrant. Retrieval systems shall meet the following requirements:

T09 0008-8017 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

- Each Authorized Entrant shall use a chest or full body harness with a retrieval line attached at the center of the entrant's back, near shoulder level, or above the entrant's head.

NOTE: Statistics

The work activity that most frequently results in fatalities is rescue. For every entrant who dies in a confined space, approximately 1.6 people attempting a rescue die. In most cases, the people who die are untrained and improperly equipped for rescue.

6. Position Responsibilities

6.1 Attendant

- Know the hazards that may be faced during entry, including information on how exposure may occur, signs and symptoms of exposure, and consequences of an exposure.
- Be aware of possible behavioral effects of hazard exposure to worker/entrants.
- Constantly maintain an accurate count of personnel in the permit required confined space.
- Remain outside the permit-required Confined Space and monitor the Authorized Entrants until relieved by another Attendant.
- Communicate with Authorized Entrants as necessary to monitor entrant status and to alert them of the need to evacuate the space.
- Monitor activities inside and outside the space to determine if it is safe to remain in the space.
- Summon rescue and other emergency services as soon as the Attendant determines that Authorized Entrants may need assistance to escape from permit-required Confined Space hazards.
- Warn all unauthorized persons to stay away from the permit-required confined space.
- Perform non-entry rescues as specified by the location's rescue procedure.
- Perform no other duties that might interfere with the Attendant's primary duty to monitor and protect the entrants.

6.2 Entrant(s) Authorized

- Know the hazards that may be faced during entry, including information on how exposure might occur, signs and symptoms of exposure, and consequences of exposure.
- Be properly trained in the tasks and procedures they are required to perform.
- Use equipment properly and in accordance with the manufacturer's specifications.
- Communicate with the attendant as necessary to monitor status of the space and alert them of the need to evacuate the space.
- Alert the attendant whenever an entrant recognizes any warning sign or symptom of distress.
- Verify that all persons involved in permit required exposure to a dangerous situation or detects a prohibited condition.
- Exit from the Confined Space as quickly as possible whenever any of the following occur:

T09 0008-8017 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

- An order is given to evacuate by the Attendant or the Entry Supervisor.
- The entrant recognizes any warning sign of a dangerous situation or symptom of exposure.
- The entrant detects a prohibited condition.
- An evacuation alarm is activated.

6.3 Entry Supervisors

- Know the hazards that may be encountered during entry, including information on how exposure might occur, signs and symptoms of exposure, and consequences of exposure.
- Verify that all tests specified by the permit have been conducted and that all procedures and equipment specified by the permit are in place before endorsing the permit and allowing entry to begin.
- Ensure that confined space entrants are properly trained and competent in their assigned duties.
- Verify that rescue services/equipment is/are available and that the means for activating a rescue has been tested and are available.
- Terminate the entry and cancel the permit when the entry operations specified by the permit have been completed or when a condition not allowed under the entry permit arises in or near the confined space.

6.4 Rescue Team Member

- Know the hazards that may be encountered during entry, including information on how exposure might occur, signs and symptoms of exposure, and consequences of exposure.
- Be aware of possible behavioral effects of hazard exposure to worker/entrants.
- Be properly trained in the duties they are required to perform.
- Be available in case of an emergency situation
- Perform non-entry rescues as specified by the location's rescue procedure.

7. Training

Personnel shall be trained annually in the relevant aspects of their assigned duties regarding confined spaces when:

- First assigned a Confined Space Entry role.
- There is a change in the assigned Confined Space Entry role.
- There is a change in permit-required Confined Space operations that presents a hazard about which an employee has not previously been trained.
- The Site Manager or the Entry Supervisor identifies deviations from acceptable entry conditions or that a worker demonstrates a lack of training in the Confined Space Entry procedures.
- Training shall include, at a minimum:
  1. Proficiency in the specific duties assigned.
  2. The type of Confined Space to be entered.
  3. Chemical or physical hazards involved.
  4. Work practices and techniques.

T09 0008-8017 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

5. Atmospheric testing procedures.
6. Personal Protective Equipment (PPE) required.
7. Rescue procedures.

8. Non-Permit Confined Space Entry

Work in an enclosed space that meets the criteria of a confined space, however, does not contain or, with respect to atmospheric hazards, have the potential to contain, any hazard capable of causing death or serious physical harm.

Vestas has classified the following as non-permit required confined spaces:

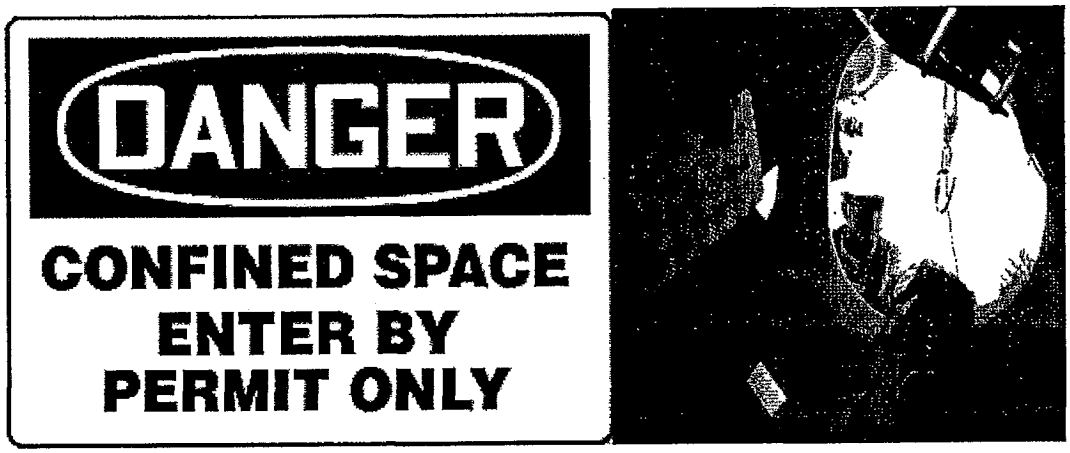
- Tower Sump/Cellar
- Tower
- Nacelle

All applicable safety regulations shall be followed along with a work specific Job Safety Analysis prior to work beginning.

9. Permit-Required Confined Space Classification

Vestas Canadian Wind Technology has determined that accessing the space within a blade & hub is consistent with that of a Permit Required Confined Space. When crossing into the threshold of the blade root the potential exists for engulfment and entrapment and the blades have a single point of entry. The hub has limited or restricted means for entry or exit that may complicate the provision of first aid, evacuation, rescue or other emergency response service - therefore they both meet the characteristics of a permit required confined space according to Canada Occupational Health and Safety Regulations (SOR/86-304)

- Blades & Hub



10. Permit-Required Confined Space Entry Permit

Work in the confined space identified above or any other permit-required confined space shall not be allowed until a Confined Space Entry permit and a JSA have been completed. The

T09 0008-8017 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

completed permit must be posted at or adjacent to the entrance of the permit-required Confined Space for the duration of the work.

Each completed entry permit shall be retained at the facility for at least one year to facilitate review of the permit-required Confined Space Entry program. Any problems encountered during an entry operation should be noted on the permit.

10.1 Permit

All of the following personnel must sign the permit:

- Site Manager/Lead Technician or authorized trained designee.
- Authorized Entrants
- Attendant/Standby person(s)

10.2 Duration of Permit

The permit duration is 12 hours or end of job, whichever occurs first, unless one of the following occurs which invalidates the permit:

- Change of any permitted personnel.
- Conditions change in a manner not anticipated by the Confined Space Entry permit.
- Emergency conditions that cancel the permit.

11. Preparation for a Permit Required Confined Space Entry Permit

The Site Manager is responsible for confirming that a JSA has been completed and includes:

- Identification of communication protocols for all personnel named on the permit.
- Following all established electrical lockout/tag procedures for equipment isolation. Ensuring lockout and tag out of all necessary energy sources to confirm complete isolation of the confined space.
- Communicating rescue procedures to all personnel named on the permit.
- Identifying potential emergency conditions that may cancel the permit.
- Evaluating lighting conditions, temperature, the need for climbing, tie-off points, or other known hazards when preparing a Confined Space for entry.
- Providing, maintaining, and properly using appropriate PPE, such as coveralls, earplugs, goggles, gloves, and respirators, as required.
- Maintaining a first-aid kit outside the entry.
- Making available any fire extinguishers and other fire fighting equipment where needed
- Establishing a communication system (visual, hand signals, radio, voice, etc.) between workers and standby personnel.

Entrants and standby person(s) may only perform as rescuers if properly trained and equipped; however, the person must not enter the Confined Space during an emergency without first confirming that another trained standby person is present at the rotor hub.

T09 0008-8017 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

Verify that a list of the rescue and other services that may be called/used in case of an emergency (and the means of communication with those services) has been attached to the permit.

12. Testing Confined Space Atmospheres

Permit required confined space atmospheres (blades) must be tested before entry is allowed. Tests shall be conducted in the following sequence and test results must be in accordance with the data below:

- The acceptable oxygen concentration range is from 19.5% — 23.5%. The normal oxygen level of 20.9% is desired. All other levels must be investigated and the contributing issue(s) addressed. Entry into a Confined Space with oxygen concentrations below 19.5% may be performed with additional personal protective equipment that requires entrants to wear a Self Contained Breathing Apparatus. **No one may ever enter a Confined Space with oxygen concentrations in excess of 23.5%.**
- The acceptable flammable gases or vapors concentration is 0% Lower Explosive Limit (LEL). No one shall ever enter a Confined Space with flammable gas or vapor concentrations above 10% LEL.

The Corporate HS&E Group should be contacted for guidance on how to achieve 0% LEL.

13. Entry to a Permit Required Confined Space

Personnel may only enter into a Permit Required Confined Space after preparation requirements are met and a permit is signed and issued. If at any time anyone (entrant, attendant, Entry Supervisor, or any other person) determines that the Confined Space Entry is unsafe or unanticipated hazards are present, the Permit Required Confined Space shall be immediately evacuated and safe conditions established prior to reentry.

Attendant on left and entrant on right

The designated standby person shall not leave the Confined Space hub access with any entrant inside unless they have been relieved by another trained standby person.

T09 0008-8017 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

Unauthorized personnel shall not be allowed entry, and, if the confined space is left unattended, the entrance shall be barricaded. Access to the turbine is controlled by locks and therefore there is no need to post signage indicating that the blade is a permit required confined space.

14. Completion of Work and Restoration of Confined Space

When all work is complete and Permit Required Confined Space is ready to be returned to service, an entry supervisor will conduct a post-entry review. A site-specific checklist will be used for proper restoration. In addition to items listed on the permit, the following should be verified:

- Are all personnel out of the Permit Required Confined Space?
- Are all equipment and tools removed?
- Is all Lock Out/Tag Out equipment removed/disengaged?

After cancellation or expiration of the permit, an entry completion meeting (post-meeting) with everyone involved shall be held and documented. The canceled permit shall be reviewed to confirm that any hazards found or created have been documented to confirm that personnel participating in future entry operations are protected from previously unidentified hazards.

15. Confined Space Permit

A completed Confined Space Entry Permit (DMS 0008-8016) is required to enter a confined space. The permit must remain on-site for one year after the completion of the work to facilitate review.

16. Rescue Plan

16.1 Confined Space Entry Safe Work Procedure – Tower Basement

This procedure reflects the requirements and the safe procedure to enter and work in a Wind Turbine Tower Basement Confined Space. Every worker involved in basement work has to follow the exact procedure as described in the **Vestas Canadian Wind Technology Confined Space Entry Program.**

PRE-ENTRY CONSIDERATIONS

- Ensure that all the personnel involved in the work have the proper training as required by the **Vestas Americas Confined Space Entry Program, Lock-out/Tag-out procedures, and climbing procedures.**
- For "Lockout-Tag out" purposes follow the **Equipment Lockout Procedure.**
- Complete the **Job Safety Analysis**
- Determine and establish an emergency **rescue plan**.
- Establish the work zone physically, close all openings, hatches.

DURING ENTRY AND RE-ENTRY

T09 0008-8017 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

- Follow the Confined Space Entry Procedure as described in the Vestas Americas Confined Space Entry Program.
- Have readily available and wear proper PPE to protect against identified and potential hazards.
- Safety harness must be worn at all times the entrance hatches are open. Once all hatches are closed the safety harness may be removed due to the increased hazard of catching it on protrusions. If any hatches are open workers must be tied off at all times with either the cable grab or shock absorbing lanyards.
- Radio or telephone available for emergency, 911 calls.
- Entry Permit completed by all workers involved in the work.
- Simple emergency plan involving attendant (Self or Entry rescue).
- One attendant in nacelle, competent worker
- Ensure safe work practices are followed.
- Stop work and exit the space if hazardous conditions arise, re-evaluate.
- Reissue permit after absence from area or if conditions change.
- Confirm that all persons & equipment are accounted for.

EMERGENCY AND RESCUE PROCEDURE

If an emergency requires the rescue of employees from the confined space, the following procedures must be followed:

ALWAYS CALL EMERGENCY SERVICES FIRST IN CASE OF AN INJURED WORKER.

a) If an emergency requires the rescue of employees from the confined space, the following procedures must be followed:
b) Determine if the worker is conscious.
c) Test the atmosphere before entering the confined space. If hazardous, an SCBA must be used by trained personnel only.
d) Perform first aid or CPR as necessary to stabilize victims and allow for their evacuation to the ground as quickly as possible.
e) Set up Tower Rescue Device
f) Raise worker to the waiting rescue workers on the main deck.
g) Secure the confined space for inspection and investigation.
h) Advise the Customer Power Plant Manager and the immediate Supervisor of the incident.
i) Record the details of the emergency as soon as possible after the emergency has ended. Be precise and detailed about the events before, during and after the emergency.
j) Accident reporting procedure:
   (i) Employees must report all minor or serious injuries without delay to their immediate Supervisors.
   (ii) Plant Manager in conjunction with the Vestas Site Supervisor must investigate all accidents; and members of the health and safety committee investigate all critical accidents.

T09 0008-8017 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASJER

(iii) Plant Manager must complete the accident/incident form.

AFTER EXIT

- Ensure safe work procedures are followed.
- Review operation- Comment on any unsatisfactory aspects.
- Acceptance of completed job.
- Sign off the Safe Work Permit.
- Perform the restoration as per the work instructions.
- Secure entry point of confined space; close the hatches on the way down.
- Sign off the Entry Permit
- Upon cancellation or completion of each Entry Permit, the Permit Issuer will return the completed documents to the Entry Supervisor.
- Retain all the original copies concerning the confined space entry in a station file for one year + current.

16.2 Confined Space Entry Safe Work Procedure - Hub

This procedure reflects the requirements and the safe procedure to enter and work in a Wind Turbine Hub Confined Space. Every worker involved in hub work has to follow the exact procedure as described in the **Vestas Canadian Wind Technology Confined Space Entry Program.**

PRE-ENTRY CONSIDERATIONS

- Ensure that all the personnel involved in the work have the proper training as required by the **Vestas Americas Confined Space Entry Program, Lock-out/Tag-out procedures, and climbing procedures.**
- For "Lockout-Tag out" purposes follow the **Equipment Lockout Procedure.**
- Complete the **Job Safety Analysis**
- Determine and establish an emergency **rescue plan**.
- Establish the work zone physically, close all openings, hatches.

DURING ENTRY AND RE-ENTRY

- Follow the Confined Space Entry Procedure as described in the Vestas Americas Confined Space Entry Program.
- Have readily available and wear proper PPE to protect against identified and potential hazards.
- Safety harness must be worn at all times the entrance hatches are open. Once all hatches are closed the safety harness may be removed due to the increased hazard of catching it on protrusions. If any hatches are open workers must be tied off at all times with either the cable grab or shock absorbing lanyards.
- Radio or telephone available for emergency, 911 calls.

T09 0008-8017 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

- Entry Permit completed by all workers involved in the work.
- Simple emergency plan involving attendant (Self or Entry rescue).
- One attendant in nacelle, competent worker
- Ensure safe work practices are followed.
- Stop work and exit the space if hazardous conditions arise, re-evaluate.
- Reissue permit after absence from area or if conditions change.
- Confirm that all persons & equipment are accounted for.

EMERGENCY AND RESCUE PROCEDURE

If an emergency requires the rescue of employees from the confined space, the following procedures must be followed:

ALWAYS CALL EMERGENCY SERVICES FIRST IN CASE OF AN INJURED WORKER.

a) If an emergency requires the rescue of employees from the confined space, the following procedures must be followed:
b) Determine if the worker is conscious.
c) Test the atmosphere before entering the confined space. If hazardous, an SCBA must be used.
d) Perform first aid or CPR as necessary to stabilize victims and allow for their evacuation to the ground as quickly as possible.
e) Set up Tower Rescue Device
f) Lower worker to the waiting rescue workers on the ground
g) Secure the confined space for inspection and investigation.
h) Advise the Customer Power Plant Manager and the immediate Supervisor of the incident.
i) Record the details of the emergency as soon as possible after the emergency has ended. Be precise and detailed about the events before, during and after the emergency.
j) Accident reporting procedure:
   (iv) Employees must report all minor or serious injuries without delay to their immediate Supervisors.
   (v) Plant Manager in conjunction with the Vestas Site Supervisor must investigate all accidents; and members of the health and safety committee investigate all critical accidents.
   (vi) Plant Manager must complete the accident/incident form.

AFTER EXIT

- Ensure safe work procedures are followed.
- Review operation- Comment on any unsatisfactory aspects.
- Acceptance of completed job.
- Sign off the Safe Work Permit.
- Perform the restoration as per the work instructions
- Secure entry point of confined space; close the hatches on the way down.
- Sign off the Entry Permit

T09 0008-8017 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

- Upon cancellation or completion of each Entry Permit, the Permit Issuer will return the completed documents to the Entry Supervisor.
- Retain all the original copies concerning the confined space entry in a station file for one year + current.

16.3 Confined Space Entry Safe Work Procedure - Nacelle

This procedure reflects the requirements and the safe procedure to enter and work in a Wind Turbine Nacelle Confined Space. Every worker involved in nacelle work has to follow the exact procedure as described in the **Vestas Canadian Wind Division Confined Space Entry Program.**

PRE-ENTRY CONSIDERATIONS

- Ensure that all the personnel involved in the work have the proper training as required by the **Vestas Americas Confined Space Entry Program, Lock-out/Tag-out procedures, and climbing procedures.**
- For "Lockout-Tag out" purposes follow the **Equipment Lockout Procedure.**
- Complete the **Job Safety Analysis**
- Determine and establish an emergency **rescue plan.**
- Establish the work zone physically, close all openings, hatches.

DURING ENTRY AND RE-ENTRY

- Follow the Confined Space Entry Procedure as described in the Vestas Americas Confined Space Entry Program.
- Have readily available and wear proper PPE to protect against identified and potential hazards.
- Safety harness must be worn at all times the entrance hatches are open. Once all hatches are closed the safety harness may be removed due to the increased hazard of catching it on protrusions. If any hatches are open workers must be tied off at all times with either the cable grab or shock absorbing lanyards.
- Radio or telephone available for emergency, 911 calls.
- Entry Permit completed by all workers involved in the work.
- Simple emergency plan (Self or Entry rescue).
- Ensure safe work practices are followed.
- Stop work and exit the space if hazardous conditions arise, re-evaluate.
- Reissue permit after absence from area or if conditions change.
- Confirm that all persons & equipment are accounted for.

EMERGENCY AND RESCUE PROCEDURE

If an emergency requires the rescue of employees from the confined space, the following procedures must be followed:

T09 0008-8017 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

ALWAYS CALL EMERGENCY SERVICES FIRST IN CASE OF AN INJURED WORKER.

a) If an emergency requires the rescue of employees from the confined space, the following procedures must be followed:
b) Determine if the worker is conscious.
c) Test the atmosphere before entering the confined space. If hazardous, an SCBA must be used.
d) Perform first aid or CPR as necessary to stabilize victims and allow for their evacuation to the ground as quickly as possible.
e) Set up Tower Rescue Device
f) Lower worker to the waiting rescue workers on the ground
g) Secure the confined space for inspection and investigation.
h) Advise the Customer Power Plant Manager and the immediate Supervisor of the incident.
i) Record the details of the emergency as soon as possible after the emergency has ended. Be precise and detailed about the events before, during and after the emergency.
j) Accident reporting procedure:
   (vii) Employees must report all minor or serious injuries without delay to their immediate Supervisors.
   (viii) Plant Manager in conjunction with the Vestas Site Supervisor must investigate all accidents; and members of the health and safety committee investigate all critical accidents.
   (ix) Plant Manager must complete the accident/incident form.

AFTER EXIT

- Ensure safe work procedures are followed.
- Review operation- Comment on any unsatisfactory aspects.
- Acceptance of completed job.
- Sign off the Safe Work Permit.
- Perform the restoration as per the WORK INSTRUCTIONS.
- Secure entry point of confined space; close the hatches on the way down.
- Sign off the Entry Permit
- Upon cancellation or completion of each Entry Permit, the Permit Issuer will return the completed documents to the Entry Supervisor.
- Retain all the original copies concerning the confined space entry in a station file for one year + current.

16.4 Confined Space Entry Safe Work Procedure - Tower

This procedure reflects the requirements and the safe procedure to enter and work in a Wind Turbine Tower Confined Space. The tower base section is not considered part of the Tower Confined Space. Once past the first hatch, confined spaces procedures are in effect. Every worker involved in tower work has to follow the exact procedure as described in the **Vestas Canadian Wind Technology Confined Space Entry Program.**

T09 0008-8017 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

PRE-ENTRY CONSIDERATIONS

- Ensure that all the personnel involved in the work have the proper training as required by the **Vestas Canadian Wind Technology Confined Space Entry Program, Lock-out/Tag-out procedures, and climbing procedures.**
- For "Lockout-Tag out" purposes follow the **Equipment Lockout Procedure.**
- Complete the **Job Safety Analysis**
- Determine and establish an emergency **rescue plan.**
- Establish the work zone physically, close all openings, hatches.

DURING ENTRY AND RE-ENTRY

- Follow the Confined Space Entry Procedure as described in the Vestas Americas Confined Space Entry Program.
- Have readily available and wear proper PPE to protect against identified and potential hazards.
- Safety harness must be worn at all times. If any hatches are open workers must be tied off at all times with either the cable grab or shock absorbing lanyards.
- Radio or telephone available for emergency, 911 calls.
- Entry Permit completed by all workers involved in the work.
- Simple emergency plan (Self or Entry rescue).
- Ensure safe work practices are followed.
- Stop work and exit the space if hazardous conditions arise, re-evaluate.
- Reissue permit after absence from area or if conditions change.
- Confirm that all persons & equipment are accounted for.

EMERGENCY AND RESCUE PROCEDURE

If an emergency requires the rescue of employees from the confined space, the following procedures must be followed:

ALWAYS CALL EMERGENCY SERVICES FIRST IN CASE OF AN INJURED WORKER.

a) If an emergency requires the rescue of employees from the confined space, the following procedures must be followed:
b) Determine if the worker is conscious.
c) Test the atmosphere before entering the confined space. If hazardous, an SCBA must be used.
d) Perform first aid or CPR as necessary to stabilize victims and allow for their evacuation to the ground as quickly as possible.
e) Set up Tower Rescue Device
f) Lower worker to the waiting rescue workers on the ground

T09 0008-8017 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

g) Secure the confined space for inspection and investigation.
h) Advise the Customer Power Plant Manager and the immediate Supervisor of the incident.
i) Record the details of the emergency as soon as possible after the emergency has ended. Be precise and detailed about the events before, during and after the emergency.
j) Accident reporting procedure:
   (x) Employees must report all minor or serious injuries without delay to their immediate Supervisors.
   (xi) Plant Manager in conjunction with the Vestas Site Supervisor must investigate all accidents; and members of the health and safety committee investigate all critical accidents.
   (xii) Plant Manager must complete the accident/incident form.

AFTER EXIT

- Ensure safe work procedures are followed.
- Review operation- Comment on any unsatisfactory aspects.
- Acceptance of completed job.
- Sign off the Safe Work Permit.
- Perform the restoration as per the WORK INSTRUCTIONS.
- Secure entry point of confined space; close the hatches on the way down.
- Sign off the Entry Permit
- Upon cancellation or completion of each Entry Permit, the Permit Issuer will return the completed documents to the Entry Supervisor.
- Retain all the original copies concerning the confined space entry in a station file for one year + current.

16.5 Confined Space Entry Safe Work Procedure – Blades & Hub

ATMOSPHERIC HAZARDS

This procedure reflects the requirements and the safe way to enter Blade Confined Space. Every worker involved in this work has to follow the exact procedure as described in the **Vestas Canadian Wind Technology Confined Space Entry Program**

Due to the possibility of one of the following conditions occurring entry into the blades must be considered hazardous, with appropriate safeguards taken:

- **Toxic chemicals**
- **Toxic gasses and vapours**
- **Explosive vapours**
- **Toxic particulate in the air**
- **Oxygen deficient**

DEFINITIONS:

- **Acceptable atmospheric levels:** An acceptable atmospheric level is one at which the atmospheric concentration of any explosive or flammable gas or vapour is less than 10 % of its lower explosive limit, for any work.

T09 0008-8017 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

- **Atmospheric hazard:** Any of the following situations qualifies as an atmospheric hazard:
  (a) The accumulation of flammable, combustible or explosive agents is over 10% of the LEL.
  (b) Oxygen content in the atmosphere that is less than 19.5 % or more than 23% by volume.
  (c) The accumulation of atmospheric contaminants, including gasses, vapours, fumes, or dust, that could:
    - result in acute health effects that poses an immediate threat to life, or
    - interfere with a person's ability to escape unaided from a confined space.

- **Bump Test:** A bump test is a method of testing an instrument's sensors with a concentration of gas high enough to make the instrument go into alarm. If the instrument fails to alarm or its reading does not coincide with the measure of gas as indicated on the test cylinder, a full calibration must then be performed to adjust the instrument's reading.

DO NOT ENTER A BLADE or HUB CONFINED SPACE UNLESS YOU:

1) **Use forced air ventilation to provide fresh air into the confined space.**
2) **Monitor the atmosphere with a previously bump tested air monitor.**
3) **Reach the normal atmosphere and eliminate or control the atmospheric hazard deficiency, then you can proceed with the pre-entry procedure. The space will remain hazardous which means that all the precautions must be taken to ensure the safety of the workers in the confined space. The emergency rescue plan will include 2 rescuers trained in the use of self contained breathing apparatus.**

Specific safety precautions for work in a potential hazardous environment: To be carried out by trained specialists only where self contained breathing apparatus or air supplied respirator is required. This is only permitted for rescue purposes by trained rescuers or for inspection purposes by trained and experienced workers.

PRE-ENTRY CONSIDERATIONS

- Ensure that all the personnel involved in the work have the proper training as required by the **Vestas Canadian Wind Technology Confined Space Entry Program, Lock-out/Tag-out procedures, and climbing procedures.**
- For "Lockout-Tag out" purposes follow the **Equipment Lockout Procedure.**
- Complete the **Job Safety Analysis**
- Complete the **Confined Space Entry Plan**
- Determine the emergency **rescue plan.**
- Establish the work zone physically, protect all openings, hatches.

NOTE: Removal of unconscious persons from confined spaces is difficult. The use of the tower rescue device should be considered and, where appropriate, be in the hub before entry to the

T09 0008-8017 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

confined space is permitted. **No persons are to enter the space to carry out retrieval of an unconscious person unless they have been trained as rescuer and in the use of SCBA or air adduction equipment, have it available and are wearing it.**

In an emergency, the spontaneous reaction to immediately enter and attempt rescue of an unconscious person, from a confined space may lead to the deaths or serious injury of those attempting the rescue.

The person working in the confined space to enable him/her to quickly exit the area may wear a self-rescue system. **It is not to be used to rescue one person by another.**

DURING ENTRY AND RE-ENTRY

- Follow the Confined Space Entry Procedure as described in the Vestas Americas Confined Space Entry Program.
- Have readily available and wear proper PPE (see DMS 0008-6837 – PPE Plan) to protect against identified and potential hazards.
- Gas monitoring is mandatory before and during entry in a continuous mode.
- Periodic measurements must be recorded on the entry permits
- Ventilation mandatory.
- Safety harness with a retrieval line connected and in use is mandatory unless it may cause a greater hazard.
- Two attendants in nacelle, both competent rescuers.
- Establish a path of communication between entrant(s) and attendant.
- Radio or telephone available for emergency, 911 call.
- Entry Permit completed by all workers involved in the work.
- Emergency plan with two trained rescuers. (Entry and non-entry rescue).
- Two workers trained as a rescuer and in the use of SCBA, mandatory.
- Ensure safe work practices are followed.
- Stop work and exit the space if hazardous conditions arise, re-evaluate.
- Reissue permit after absence from area or if conditions change.
- Confirm that all persons & equipment are accounted for.

IF AN OXYGEN-DEFICIENT OR TOXIC ATMOSPHERE IS DISCOVERED

If a toxic atmosphere contains gas, vapour or dust in a concentration higher than that indicated on he Confined Space Entry Permit, or if an oxygen-deficient or an excess-oxygen atmosphere exists the following procedures must be implemented:

- Evacuate the confined space immediately.
- Bump test the air monitor and resample to ensure the accuracy of the data indicating that there is an oxygen deficiency, excess oxygen or toxic atmosphere.
- Notify the supervisor that an oxygen-deficient, excess-oxygen or toxic atmosphere has been discovered, and provide as many details as possible, including the exact location.
- If it's safe to do so, ventilate the confined space with a blower unit to elimi-

T09 0008-8017 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

nate toxic pollutants.

IF AN EXPLOSIVE ATMOSPHERE IS DISCOVERED

Where gas or vapour in a confined space is, or may be, explosive or flammable, workers may enter the confined space for emergency purposes; if the concentration of the gas or vapour does not, or is not likely to, exceed 10% of its lower explosive limit (LEL) and that the oxygen concentration level is under 23%. Where gas or vapour in a confined space is, or may be, explosive or flammable, workers may enter the confined space only if:

If an explosive atmosphere is discovered (vapours, gases, dust), and its readings are over 10% the lower explosive limits, the following procedures must be implemented;

a) Evacuate the confined space and the surrounding area immediately.
b) Turn off all sources of ignition and ensure no smoking takes place in the area.
c) Bump test the air monitor to ensure accuracy of the readings.
d) Notify the supervisor immediately that an explosive condition has been discovered and provide as many details as possible, including the exact location.
e) If it's safe to do so, ventilate the confined space with a CSA-approved (explosion- proof) extractor to eliminate the explosion hazard.
f) Purge with an inert gas, if applicable.
g) Also purge with air.

NOTE: No one is to enter a confined space where an explosive atmosphere has been detected. A safe level for an explosive atmosphere is under "10% lower flammability limit."

EMERGENCY AND RESCUE PROCEDURES

If an emergency requires the retrieval of employees from the confined space, the following procedures must be followed (also refer to the Vestas Canadian Wind Technology Confined Space Entry Program).

ALWAYS CALL EMERGENCY SERVICE FIRST IN CASE OF AN INJURED WORKER.

If an emergency requires the retrieval of employees from the confined space, the following procedures must be followed:

a) If an emergency requires the rescue of employees from the confined space, the following procedures must be followed:
b) Determine if the worker is conscious.
c) Test the atmosphere before entering the confined space. If hazardous, an SCBA must be used.
d) Perform first aid or CPR as necessary to stabilize victims and allow for their evacuation to the ground as quickly as possible.
e) Set up Tower Rescue Device
f) Lower worker to the waiting rescue workers on the ground
g) Secure the confined space for inspection and investigation.

T09 0008-8017 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

h) Advise the Customer Power Plant Manager and the immediate Supervisor of the incident.

i) Record the details of the emergency as soon as possible after the emergency has ended. Be precise and detailed about the events before, during and after the emergency.

AFTER EXIT

- Ensure safe work procedures are followed.
- Review operation- Comment on any unsatisfactory aspects.
- Acceptance of completed job.
- Sign off the Confined Space Entry Permit (DMS 0008-8016).
- Perform the restoration as per the work instructions
- Secure entry point of confined space; close the hatches on the way down.
- Sign off the Entry Permit
- Upon cancellation or completion of each Entry Permit, the Permit Issuer will return the completed documents to the Entry Supervisor.
- Retain all the original copies concerning the confined space entry in a station file for one year + current.

17. References

Confined Spaces has a set of national regulations. However, individual provinces and territories may have introduced minor changes while integrating Confined Spaces with their occupational health and safety regulatory regime. Here are provincial Regulations for any special Confined Spaces requirements:

- **British Columbia**
  British Columbia Occupational Health & Safety Regulation, 296/97, Part 9.8

  http://www2.worksafebc.com/Topics/ConfinedSpaces/RegulationAndGuidelines.asp

- **Alberta**
  Alberta Occupational Health & Safety Code 2006, Part 5 46(1)

  http://www.employment.alberta.ca/documents/WHS/WHS-LEG_ohsc_2009.pdf

- **Saskatchewan**
  Saskatchewan Occupational Health and Safety Regulations, Part XVIII 272(3)

  http://www.qp.gov.sk.ca/documents/English/Regulations/Regulations/O1-1R1.pdf

- **Manitoba**
  Manitoba Workplace Safety and Health Regulation 217/2006, Part 15

  http://safemanitoba.com/uploads/regulations/part1.pdf

- **Ontario**

  Ontario Regulation 632/05 Section 8 & 9

  http://www.e-laws.gov.on.ca/html/regs/english/elaws_regs_050632_e.htm

T09 0008-8017 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

- **Québec**
  Québec OH&S Regulation, LRQ, c.S-2.1, Section XXI

http://www2.publicationsduquebec.gouv.qc.ca/dynamicSearch/telecharge.php?type=2&file=//S_2_1/S2_1R6.htm

- **New Brunswick**
  New Brunswick Regulation 91-191 Part 17 263(6)

  http://www.gnb.ca/0062/regs/91-191.htm

- **Nova Scotia**
  Nova Scotia Regulation 4/2004 Part 12 130 3(b) & 5(a)

  http://www.gov.ns.ca/just/regulations/regs/ohsgensf.htm

- **Newfoundland and Labrador**
  Newfoundland & Labrador Consolidated Regulation 1165/96 25(10)

  http://www.assembly.nl.ca/Legislation/sr/Regulations/rc961165.htm

- **Prince Edward Island**
  Prince Edward Island OH&S Act Regulations Part 13

  http://www.gov.pe.ca/photos/original/wcb_ohs_regs.pdf

- **Nation-wide (Canada)**
  Canada Occupational Health and Safety Regulations (SOR/86-304) Section 11.11

  http://laws.justice.gc.ca/en/showdoc/cr/SOR-86-304/20070524

18. History of this Document

Rev. no.:	Date:	Description of changes
00	11-August-2009	New document
01	01-Jan-2010	Template updated

T09 0008-8017 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

Vestas®

Confined Space Entry Permit

GENERAL INFORMATION

Wind Facility:	
WTG:	
Work to be done:	
Date and time:	

PERMIT SPACE HAZARDS

(Fill in fields if necessary/applicable)			
ATMOSPHERIC	**YES**	**NO**	**POTENTIAL**
Oxygen Deficiency	☐	☐	☐
Oxygen Enrichment	☐	☐	☐
Explosive (Gas/Vapor)	☐	☐	☐
Hydrogen Sulfide	☐	☐	☐
Explosive Dust	☐	☐	☐
Other toxic gases/vapors	☐	☐	☐
CONFIGURATION (entrapment)	☐	☐	☐
MECHANICAL	☐	☐	☐
ELECTRICAL	☐	☐	☐
SUBSTANCE HAZARD TO SKIN/EYES	☐	☐	☐
HEAT STRESS	☐	☐	☐
COLD STRESS	☐	☐	☐
HYDRAULIC	☐	☐	☐
PNEUMATIC	☐	☐	☐
WEATHER (electrical storms)	☐	☐	☐
OTHER POTENTIAL HAZARDS (Describe hazard -e.g. radiation, noise, phobias, mental or physical condition of entrant, vibration, cold, hot, humid etc.)			

PERSONNEL

Company Name	
Entrant(s) (Refer to Log)	**NAME & SIGNATURE**
Attendant(s) (Hub & Blades)	
Entry Supervisor	

EQUIPMENT VERIFICATION

Equipment on-site and verified in good order by :

COMMUNICATION PROCEDURES USED BY ENTRANT(S) & ATTENDANT(S) – *CHECK ALL THAT APPLY*

Visual	☐	**Rope**	☐
Voice	☐	**Radio**	☐
Other (specify)			

CONTROLS/ EQUIPMENT – *CHECK ALL THAT APPLY*

ISOLATION ☐	
Lockout/Tagout	☐
Service Key	☐
Remote Stop	☐
CONTINUOUS ATMOSPHERIC TESTING ☐	
VENTILATION ☐	
Natural	☐
Continuous Forced Air	☐
Local Exhaust	☐
ENTRY EQUIPMENT ☐	
Ladders	☐
First Aid Kit	☐
Other (specify type)	
PERSONAL PROTECTIVE EQUIPMENT (PPE) ☐	
Respirator	☐
SCBA/ESCBA	☐
SAR	☐
Air Purifying	☐
Protective Clothing (specify – i.e. gloves, coveralls etc.)	☐
Eye and Face Protection	☐
Hearing Protection	☐
RESCUE & RETRIEVAL EQUIPMENT ☐	
Full Body Harness	☐
Cable Grab	☐
Lanyards	☐
Tower Rescue Kit	☐
INTRINSICALLY SAFE ELECTRICAL EQUIPMENT & GFCI ☐	
EXPLOSION PROOF FLUORESCENT LIGHTS ☐	
COMMUNICATION EQUIPMENT ☐	
Radio	☐
Phone	☐
Other (specify type)	
FIRE EXTINGUISHERS ☐	

MSDS REVIEW ☐

Hazards Identified ☐
New Materials Reviewed ☐

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Confined Space Entry Permit

ATMOSPHERIC TESTING RECORD

CONDITION	ACCEPTABLE LEVEL	PRE-ENTRY READINGS				Time Interval Readings			
		Reading	Time	Reading	Time	30 min.	1 hr.	1.5 hrs.	2 hrs.
Oxygen	19.5% - 23.5%								
Explosive (Gas/Vapor)	<10% LEL								
Explosive Dust	<LEL (5 ft. visibility)								
Carbon Monoxide	25 ppm								
Hydrogen Sulfide	10 ppm								
Other Hazards (e.g. Heat Stress – specify type)									
Other Hazards (e.g. Heat Stress – specify type)									
Name(s) or Initials of Tester:									
Testing Equipment Used:		Serial #:			Type:				

Last Factory Calibration Date:	
Last Instance of Cal Gas Used:	

T09 0008-8016 Ver 02 - Approved - Exported from DMS: 2010-07-09 by ASUER

VESTAS PROPRIETARY NOTICE

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Confined Space Entry Permit

ENTRY AUTHORIZATION

CONFINED SPACE LOCATION:	
Nature of work to be done:	
Permit applies from **to**	
Entry authorized by (example - PM or CM):	
Date/Time:	
Signature:	

POST ENTRY PERMIT AT ENTRANCE TO PERMIT SPACE.
(NOTE: IF CONDITIONS CHANGE, THIS PERMIT IS VOID.)
ATTACH THE CATEGORY ENTRY PROCEDURE TO THE PERMIT.

ENTRY CANCELLATION

ENTRY CANCELLED BY:	
Date/Time:	
Signature:	
REASON FOR CANCELLATION:	
Entry Operation Completed	☐
Prohibited Condition Arose (describe)	

T09 0008-8016 Ver 02 - Approved - Exported from DMS: 2010-07-09 by ASUER

VESTAS PROPRIETARY NOTICE

Vestas®

Confined Space Entry Permit

CONFINED SPACE CATEGORY RISK ASSESSMENT

The purpose of this risk assessment is to identify the hazards (potential and existing), and to determine the category of confined space that is to be entered. Each potential hazard below has a category (1 or 2) allocated to it. This cannot be changed. Add a checkmark to the clear box if the hazard is present, or leave it empty if the hazard is not present. Document additional hazards and categorize the space. This will then identify the safety precautions that must be taken.

Site:

Date:

HAZARD – Mark check box if hazard is present; leave blank if hazard is not present	1	2
1. No other hazards than being a confined space	☐	
2. Electrical shock	☐	
3. Temperature extreme	☐	
4. Risk of falling objects	☐	
5. Risk of falling while working	☐	
6. Slippery/wet surfaces when climbing	☐	
7. Rescue plan-include self or assisted rescue technique	☐	
8. Limited egress from the space	☐	
9. Burning liquid potential	☐	
10. Limited ventilation	☐	
11. Flammable/ explosive potential	☐	
12. Toxic gases & vapors potential	☐	
13. Rescue plan-include self or entry rescue techniques	☐	
14. Extremely limited egress	☐	
15. Rescue plan-include non-entry or entry rescue techniques	☐	
16. Atmospheric deficiency at pre-entry air sample		☐
17. Entry & egress extremely difficult		☐
18. Falling hazard into a constricted space		☐
19. Rescue plan-include non-entry or entry rescue techniques		☐
20. Other considerations (specify):	☐	☐

Also consider :

- Nature of the confined space
- The work to be done
- The range of methods by which the work can be safely done
- The actual method selected and rescue plan proposed
- Emergency and rescue procedure (self rescue, non-entry rescue, entry rescue)

Comments:

Nature of the work to be done (describe):
Work Instruction Reference #:

VESTAS PROPRIETARY NOTICE

T09 0008-8016 Ver 02 - Approved - Exported from DMS: 2010-07-09 by ASUER

Contents

1. Introduction 2
2. Process Description 2
3. How Universal Wastes Are Regulated 3
3.1 Air Emissions 3
3.2 Stormwater Discharges 3
3.3 Wastewater Discharges 3
3.4 Hazardous Wastes 3
4. Required Operating Practices 4
4.1 Waste Collection Requirements 4
4.2 Special Transfer and Storage Arrangements 5
4.3 Stormwater 5
4.4 Inspections 6
4.5 Visually Inspect or Verify Monthly 6
4.6 Reporting Requirements 6
4.7 Recordkeeping Requirements 6
5. History of this Document 8

T09 0008-8005 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

1. Introduction

This document provides an overview of ongoing operation and maintenance (O&M) requirements that are mandated by federal and state environmental regulations for the class of waste products known as **UNIVERSAL WASTES** that are produced by Vestas operations. Universal wastes include:

- **Batteries** such as nickel-cadmium (Ni-Cd) and small sealed lead-acid batteries, which are found in many common items including electronic equipment, mobile telephones, portable computers, and emergency backup lighting.

Note: Automotive lead-acid batteries are NOT considered universal wastes[1]

- **Agricultural pesticides** that have been recalled or banned from use, are obsolete, have become damaged, or are no longer needed.
  They often have been stored for long periods of time in sheds, cabinets, etc.
  These types of chemicals should not be encountered at Vestas service site locations.
- **Thermostats**, which can contain as much as 3 grams of liquid mercury and can be found in almost any building.
- **Lamps**, which typically contain mercury and sometimes lead.
  Examples of common types of lamps include fluorescent, high intensity discharge (HID), neon, mercury vapor, high-pressure sodium, and metal halide lamps..

The target users of this document are all Vestas service site personnel that have occasion to use or manage the types of products noted above.

This document specifically addresses how these products, when they become wastes, are to be managed and disposed of or recycled.

2. Process Description

The term **UNIVERSAL WASTE** depicts the fact that businesses, government, communities, and households "universally" produce these types of wastes. Vestas produces **UNIVERSAL WASTES** at virtually all its locations, ranging from used fluorescent light tubes from office lighting at the Vestas Americas corporate offices, to spent nickel-cadmium batteries from a flashlight in a service truck at a wind park service site.

Historically, **UNIVERSAL WASTES** were disposed into the trash and ultimately ended up in municipal waste landfills, even though the properties of these wastes, or chemicals contained in the waste, would typically be considered a hazardous waste. For example, the sulfuric acid electrolyte in a small lead-acid battery in an uninterruptible power supply (UPS) for a desktop computer has a pH less than 2.0 (which would make it a corrosive hazardous waste). Many fluorescent light tubes contain enough mercury to be considered a toxic hazardous waste.

In the mid-1990's the federal government adopted rules intended to (a) reduce the amount of these wastes that end up in our municipal landfills, and (b) encourage recycling and proper disposal of these universally produced hazardous wastes.

[1] Normal fleet supply vendor channels should be followed for returning and recycling used automotive lead-acid batteries. That is, it is expected that Vestas will only do business with vendors that will take-away/swap used automotive-type batteries for new batteries when they are purchased or delivered.

T09 0008-8005 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

3. How Universal Wastes Are Regulated

This section summarizes key environmental requirements that apply to the handling and management of universal wastes at Vestas. These requirements are primarily imposed by federal regulations that have been adopted by the various states where we operate. Typically, the state environmental agency administers and enforces the state regulations.

3.1 Air Emissions

While some very minor air emissions could result from the improper management of universal wastes (e.g., crushing fluorescent light tubes that contain trace amounts of mercury), these wastes are not specifically controlled by air regulations.

3.2 Stormwater Discharges

State and local environmental agencies issue stormwater discharge permits based on the type of industrial activity conducted at a site-specific location. If the industrial activity is covered, a permit is required unless a demonstration is made that the potential for hazardous materials to come into contact with stormwater will not occur.

For facilities that have a stormwater NPDES permit, a written Stormwater Pollution Prevention Plan (SWPPP) is required to be prepared. The plan must describe physical and procedural steps that the permit holder has implemented to reduce or mitigate the chances of contaminating stormwater runoff. At least twice per year, permitted facilities are required to collect and analyze samples from various storm drain inlets for various pollutants to gauge the effectiveness of its pollution prevention practices. These results must be reported to the State each year.

At this time, no Vestas site operation has a stormwater NPDES permit.

As with any chemical product, extreme care must be exercised when handling all universal wastes to prevent the waste (or chemicals contained in the waste) from coming into contact with the ground or stormwater (such as draining the electrolyte from small lead-acid batteries, crushing light bulbs, or a leaking pesticide container).

3.3 Wastewater Discharges

Placing (e.g., draining) any universal waste (or chemicals contained in the waste) into the sanitary sewer (e.g., draining electrolyte or any pesticide into a sink) or septic tank system is not permissible.

3.4 Hazardous Wastes

As described in Section 4, the universal waste regulations require six (6) simple management steps:

- Do NOT throw universal wastes into the trash;
- Collect and store universal wastes in appropriate, non-leaking containers;
- Label or mark the container to identify what type of universal waste is inside in the container;
- Do NOT store accumulated universal wastes onsite for more than 1 year;
- Provide basic training to Vestas employees that produce, handle, or manage universal wastes; and
- Assure that universal wastes are shipped to and received by an authorized universal waste collection site or destination facility (e.g., a recycling facility for fluorescent light tubes).

T09 0008-8005 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

Despite the fact that the Universal Waste rules impose certain requirements, these rules are significantly more relaxed when compared to the 'regular' hazardous waste regulations. Therefore it is imperative that we properly identify, accumulate, store, and transfer universal wastes from our operations to companies that will properly manage these materials.

4. Required Operating Practices

This section provides an overview of the environmental regulatory requirements that pertain to managing universal wastes including:

- Collection and storage requirements
- Inspections
- Training
- Reporting and recordkeeping

Vestas service personnel that produce universal wastes are responsible for assuring that all requirements identified in this document are fulfilled. Any deviation from, or exception to, these requirements must be reported to Vestas' Environmental Manager.

4.1 Waste Collection Requirements

This section provides an overview of the minimum requirements that Vestas personnel must follow for the collection of universal wastes prior to disposal or recycling. This includes universal wastes that are produced during field/mobile activities.

4.1.1 All Vestas Operations

- ► Universal wastes must NOT be disposed of by throwing into the trash, or discarded in any other way.
- ► Do NOT crush or break fluorescent light tubes. They must be accumulated, stored, and shipped intact in order to qualify for the universal waste program.
- ► Do NOT drain the electrolyte from any wet cell batteries unless specifically directed by the Vestas Environmental Department.

4.1.2 Mobile Operations

- ► Return all universal wastes to your base service site garage.
- ► Give the universal wastes to the person responsible for stores or to the Site HazMat Coordinator.

4.1.3 Service Centers and Other Fixed Facilities

- ► Universal wastes must be placed into non-leaking containers that are appropriate for the universal waste;
- ► Do NOT place different types of universal wastes into the same container (e.g., don't place an unwanted container of RoundUp herbicide in the same container as used Ni-Cad batteries);
- ► Make sure the accumulation container(s) is clearly labeled with the words "Universal Waste," the type of universal waste (e.g., pesticide, fluorescent light tube, etc.), and the date the container is initially used for accumulating universal wastes. (See Figure 1.)
- ► The accumulation container(s) must be kept closed, except when emptying or filling, to minimize the potential for spillage;

T09 0008-8005 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

- Store the container(s) in an area with good ventilation. Harmful vapors can be released when opening a container to add or remove waste.
- The law allows a maximum of ONE YEAR onsite accumulation time for Universal Waste. It is Vestas' policy to remove these wastes in a timely manner, and more frequently than once per year if necessary to maintain small inventories at the service centers and other locations.
- Notify the Site Hazardous Material Coordinator or Vestas' Corporate Environmental Manager during APRIL and SEPTEMBER of each year with a Universal Waste inventory so that the company can make necessary arrangements for proper offsite management of these wastes.

4.2 Special Transfer and Storage Arrangements

As a general rule, a waste produced at a particular location must be handled and stored locally until such time as the company makes arrangements to ship the waste to an appropriate third-party vendor to dispose, recycle, or treat the material in accordance with the regulations. This holds true for Universal Wastes. That is, each location that produces Universal Wastes is expected to provide for the proper onsite storage and management of the waste until the waste is shipped offsite to the selected vendor.

Most Vestas locations produce very small quantities of Universal Waste that primarily consist of batteries and fluorescent light tubes. The regulations allow some flexibility for companies that operate at multiple locations to consolidate accumulated Universal Waste at one or more 'central' locations. Centralized collection facilitates a company's overall efforts to properly manage these materials by reducing the storage burden at its satellite locations and providing a more convenient pick-up option for vendors who ultimately manage these wastes.

The primary requirements that must be satisfied before Universal Wastes can be transferred from one location to another include:

- The shipping location must assure that all Universal Wastes are packaged and labeled in accordance with U.S. DOT shipping regulations;
- The shipping location must prepare an accurate inventory of Universal Wastes being transferred to the central location;
- The receiving location must accept the shipment;
- The total quantity of Universal Wastes stored at the receiving location cannot exceed 2,200 lbs after the shipment[2];

Unless specifically authorized by the Vestas Environmental Department, DO NOT transfer any quantity of Universal Wastes from your location to another Vestas facility. The Corporate Environmental Manager will work with you to either furnish proper storage containers and labels or assist you in making arrangements to transfer the waste materials to another Vestas location.

4.3 Stormwater

All Vestas service personnel are expected to make a conscious effort to assure that drips, leaks, and minor spillage of any chemical product or waste are immediately cleaned up with absorbent materials. (Absorbent materials must be collected and placed into a drum or other suitable container until the site HazMat Coordinator or Corporate Environmental Manager can determine if the material needs to be tested.)

[2] If more than 2,200 lbs of Universal Wastes is ever accumulated at the receiving location, Vestas must notify the state environmental agency. We will manage our operations to NOT exceed this threshold.

T09 0008-8005 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

- All Universal Waste storage is to be conducted under cover or indoors.

4.4 Inspections

The containers used for accumulating Universal Wastes are required to be under an inspection program to assure that appropriate preventative maintenance is occurring and that no releases to the environment occur.

Written records for daily visual inspections are recommended, but not required, unless a spill or release is discovered. Written records for weekly and monthly inspections are required.

4.4.1 Visually Inspect or Verify Daily

It is *recommended* that Facility personnel check areas were Universal Waste containers are stored every day to make certain the containers are in good condition and no releases are occurring.

4.4.2 Visually Inspect or Verify Weekly

- That container(s) used for accumulating Universal Wastes are kept closed (i.e., lid or cover is secured);
- That container(s) are stored in a secure area and properly maintained so that they do not leak, rupture, or tip over when being opened, handled, or stored;
- That each storage container is marked with the words **Universal Waste** and the category of waste (e.g., pesticide, light tubes, etc.); and

4.5 Visually Inspect or Verify Monthly

- That no container(s) of Universal Waste have accumulated onsite for longer than **9 MONTHS** without notifying Vestas' Corporate Environmental Manager.
- Check to assure that an adequate inventory of spill response supplies is available at or near the area where the containers are located; and
- Emergency notification telephone numbers are posted at or near the waste storage area.

4.6 Reporting Requirements

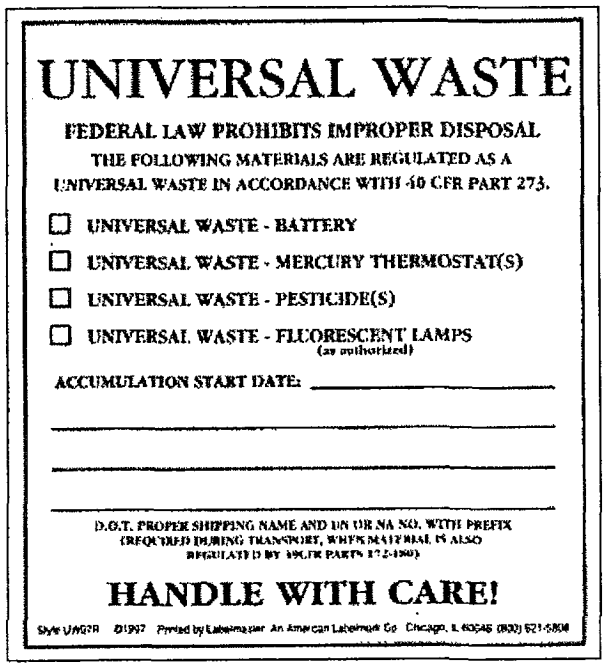
- At a minimum, inspection records MUST include the date and time of the inspection, the name of the individual making the observations, a notation of the observations made, and the date and nature of any repairs or other remedial actions; and
- All spills must be immediately reported (within 15 minutes of discovery) to the site HazMat Coordinator or Corporate Environmental Manager.

4.7 Recordkeeping Requirements

The Site HazMat Coordinator, or designee, must maintain the following records and documents:

- An emergency response Contingency Plan, Spill Prevention Control and Countermeasures Plan, (SPCC) or other plan. (If you are uncertain-contact the Corporate Environmental Manager);
- Inspection logs kept for at least 3 years; and
- Training documents, including copies of training materials and personnel attendance log sheets.

T09 0008-8005 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER


UNIVERSAL WASTE

FEDERAL LAW PROHIBITS IMPROPER DISPOSAL

THE FOLLOWING MATERIALS ARE REGULATED AS A UNIVERSAL WASTE IN ACCORDANCE WITH 40 CFR PART 273.

☐ UNIVERSAL WASTE - BATTERY

☐ UNIVERSAL WASTE - MERCURY THERMOSTAT(S)

☐ UNIVERSAL WASTE - PESTICIDE(S)

☐ UNIVERSAL WASTE - FLUORESCENT LAMPS (as authorized)

ACCUMULATION START DATE: _____

D.O.T. PROPER SHIPPING NAME AND ID OR NA NO. WITH PREFIX (REQUIRED DURING TRANSPORT, WHEN MATERIAL IS ALSO REGULATED BY 49CFR PARTS 172-180)

HANDLE WITH CARE!

Style UW2R ©1997 Printed by Labelmaster An American Labelmark Co Chicago, IL 60646 (800) 621-5808

Figure 1 Universal Waste Label

T09 0008-8005 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

5. History of this Document

Rev. no.:	Date:	Description of changes
00	2006-09-26	First edition - Reformatted & new number 27-Jul-2007
00	2010-01-01	Content and template updates

T09 0008-8005 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

Contents

Top 10 DO's and DO NOT's for Managing Used/Spent Aerosol Containers 2

1. Introduction 3

2. Process Description 3

2.1 What is a Hazardous Material? 3

2.2 General Chemical Categories 4

2.3 Hazardous Materials Used by Vestas 6

2.4 Empty Containers 6

2.5 Potential Chemical Incompatibilities 6

3. Generalized Process Diagram 7

4. How Hazardous Materials Are Regulated 7

4.1 Air Emissions 7

4.2 Stormwater Discharges 8

4.3 Wastewater Discharges 8

4.4 Hazardous Wastes 8

4.5 Uniform Fire Code 8

4.6 Warning Signs and Labeling 9

4.7 Separation of Incompatible Materials 9

4.8 Allowable Storage Limits 9

4.9 Requirements for Secondary Containment 10

5. Operating Requirements 10

5.1 Hazardous Material Storage 10

5.2 Making Chemical Changes 11

5.3 Stormwater 11

5.4 Inspections 12

5.5 Reporting Requirements 12

5.6 Recordkeeping Requirements 12

6. History of This Document 16

T09 0008-8006 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

Top 10 DO's and DO NOT's for Managing Used/Spent Aerosol Containers	
Do	**Do Not**
► Contact the site HazMat Coordinator or the Corporate Environmental Manager if you have any questions not answered in this document. ► Make sure the Vestas Chemical Evaluation Committee has approved any new chemicals PRIOR to purchase. ► Check the Material Safety Data Sheet (MSDS) for chemical products to determine if potential chemical incompatibilities may occur if the material is stored in the same area with other hazardous materials. ► Make sure that proper separation or segregation is provided for hazardous materials that may be incompatible with each other. ► All flammable and combustible liquids stored inside a building MUST be stored inside an approved storage cabinet. ► All hazardous materials must be stored in an area or inside a device that is equipped with secondary containment. ► All Vestas site personnel MUST make a conscious effort to assure that drips, leaks, and minor spillage of hazardous materials are immediately cleaned up with absorbent materials.	► Do NOT exceed the allowable storage limits for storing flammable and combustible materials. ► Do NOT dispose or discard any chemical container until it has been completely emptied. ► Any precipitation that comes into contact with a hazardous material MUST NOT be allowed to discharge to any soil, storm drain inlet, ditch, swale, etc.

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1. Introduction

This module provides an overview of ongoing operation and maintenance (O&M) requirements that are mandated by federal, state, and local hazardous material and fire code regulations for the following activities:

- General Storage of Hazardous Materials;
- Secondary Containment for Hazardous Material Storage; and
- Separation of Incompatible Materials.

These requirements are typically not mandated by environmental regulations, but rather they are required by the local hazardous material and fire codes. Mismanagement of hazardous materials can lead to releases to the environment, the production of hazardous wastes, or the production of wastewaters containing these substances.

The target users of this document are all Vestas personnel located at wind park service sites that have occasion to use or handle hazardous chemical products. This document specifically addresses how these products are to be stored and handled prior to their intended use.

This document does not cover all regulatory requirements applicable to the management of hazardous materials that may apply to Vestas.

2. Process Description

2.1 What is a Hazardous Material?

A number of U.S. federal agencies have attempted to define hazardous material, hazardous substance, etc., including the Department of Transportation (DOT), the Occupational Safety and Health Administration (OSHA), and the Environmental Protection Agency (EPA). Each agency has developed different lists and differing definitions.

DOT's definitions pertain to the classification of hazardous materials for the proper selection of shipping containers, labeling, truck placarding, and emergency response procedures. OSHA's definition pertains to classifying hazardous materials for determining worker protection requirements and occupational exposure standards. EPA's definitions cover a wide spectrum of considerations ranging from protection of surface and groundwater to defining hazardous wastes, and emergency notification procedures in the event of spills into the environment. Unfortunately, a consolidated list of hazardous materials/substances does not exist, but ranges from over 400 substances regulated by OSHA to over 62,000 regulated by EPA. Generally, there are about 2,000 hazardous chemical substances contained in all of the products that are readily available in commerce.

For Vestas' purposes, a hazardous material is broadly defined to mean any chemical substance in its pure or diluted form that is capable of causing physical harm to living things, structures, or the environment, or could be considered any form of a health hazard. Any product or substance that has a hazardous ingredient listed on its Material Safety Data Sheet (MSDS) is considered a hazardous material. This includes such common products as typewriter correcting fluid to multi-component specialty paint systems.

T09 0008-8006 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

2.2 General Chemical Categories

In order to ensure safe handling, packaging, and storage, new (and waste) chemicals must be stored by compatibility. Improper storage can cause fire, heat generation, container corrosion, poison gas evolution, and other dangerous conditions if incompatible chemicals mix. The classes and chemicals given below are intended to give the most common examples. Under most circumstances at Vestas, the MSDS for a product will contain chemical compatibility information that can be used to help determine how it should be handled and stored.

2.2.1 Flammable Gas

Flammable gases are gases under pressure, or compressed liquids that are gases at standard pressures and temperatures that will ignite in the presence of an ignition source.

Examples: propane, methane, acetylene, hydrogen.

2.2.2 Poison Gas

Poison gases are gases under pressure or compressed liquids that are gases at standard pressures and temperatures that are toxic.

Vestas should not have any reason to have this type of chemical onsite at any wind park.

Examples: methyl bromide, phosgene, tetraethyl pyrophosphate.

2.2.3 Flammable and Combustible Liquids

Flammable liquids are chemicals that have a flashpoint (FP) of 100°F[1] or less. In other words, it is a liquid that if warmed to 100°F it would give off enough vapor to ignite in the presence of an ignition source such as a flame. Combustible liquids are chemicals that have flashpoints greater than 100°F but less than 200°F.

Because of the discrepancy between defining flammable and ignitable from a practical standpoint, Vestas has chosen to call a flammable liquid a chemical with a flashpoint less than 140°F and a combustible liquid a chemical with a flashpoint greater than 140°F.

Class I Flammable Liquids (FP<100°F): alcohols, glycols, aldehydes, amides, esters, ethers, aromatic hydrocarbons, halogenated organics, ketones, and aliphatic saturated hydrocarbons.

Examples: Products containing isopropanol, acetaldehyde, ethyl acetate, xylenes, and hexanes. Automobile gasoline, methanol, and our natural gas odorant (Scentinel S-20) are all Class I Flammables.
Class II (100°F < FP < 140°F) and Class III (140°F < FP < 200°F) Combustible Liquids: aliphatic and aromatic amines, dithiocarbamates, carbamates, mercaptans, and other organic sulfides, nitriles, organic nitro compounds, and unsaturated aliphatic hydrocarbons.

Examples: Products containing ethanolamine, ethyl mercaptan, acetonitrile, ethyl nitrate, and butadiene.
No. 2 diesel fuel and kerosene are both considered Class II Combustibles (FP<130°F).

[1] Note that liquids with a flash point less than 140°F will also be considered an 'ignitable' hazardous waste when spent or no longer fit for use. These materials require special handling when produced. .

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2.2.4 Flammable Solids

Flammable solids include chemicals that are moisture and/or water reactive. For example, chemicals in this class can react with water to give off a flammable gas that may ignite (i.e., sodium metal releasing hydrogen gas), or can react with water to release heat (i.e., metal powders).

Vestas should not have any reason to have this type of chemical onsite at any wind park.

Examples: sodium metal, hydrides (sodium hydride), calcium carbide, sodium hydrosulfite, sodium methacrylate and powdered metals.

2.2.5 Oxidizers

Oxidizers are chemicals that, for the purpose of this definition, will supply oxygen or it's analog to either initiate or enhance the combustion of other materials.

Inorganic Oxidizers: nitric acid, perchloric acid, ammonium nitrate, potassium nitrate, and other nitrates, bromates, iodates, permanganates, chlorates, and chlorine gas.

Basic Inorganic Oxidizers (stabilized with sodium hydroxide): sodium hypochlorate.

Organic Oxidizers: tetranitromethane, benzoyl peroxide, and other carbon/hydrogen-based oxidizers.

2.2.6 Corrosives

Corrosives are most easily defined as chemicals with a pH of above 11 or below 3, or it is corrosive to the skin. When determining if a corrosive material will be considered a hazardous waste, the pH must be below 2 or greater than 12.5.

Inorganic Acids: sulfuric acid, hydrochloric acid, hydrofluoric acid, phosphoric acid.

Organic Acids: acetic acid, propionic acid, and formic acid.

Bases (caustics): sodium hydroxide, potassium hydroxide

2.2.7 Cyanide and Sulfide Compounds

These are compounds that can release toxic cyanide or sulfide gasses if exposed to acidic conditions. Substances not commonly considered to be acids can have pH's low enough to cause a release of cyanide and sulfide gasses.

Vestas should not have any reason to have this type of chemical onsite at any wind park.

Examples: potassium cyanide, ferric sulfide.

Note: sulfate compounds do not generally pose this hazard.

2.2.8 Poisons

The poisons class is the class for chemicals that only show a hazard due to toxicity.

Group One Poisons: alcohols, glycols, aldehydes, amides, esters, ethers, aromatic hydrocarbons, halogenated organics, ketones, and aliphatic saturated hydrocarbons.

Examples: Products containing ethylene glycol, glutraldehyde, formamide, dichlorobenzene, quinone, acetophenone.

Group Two Poisons: aliphatic and aromatic amines, dithiocarbamates, carbamates, and other organic sulfides, nitriles, organic nitro compounds, and unsaturated aliphatic hydrocarbons.

Examples: Products containing aniline, dithane, aldicarb, cyanogen, and chloropicrin.

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2.2.9 Pyrophorics

Pyrophorics are chemicals that will spontaneously ignite if exposed to the air. Vestas should not have any reason to have this type of chemical onsite at any wind park.

Example: silane gas, white phosphorous.

2.3 Hazardous Materials Used by Vestas

Fortunately, Vestas has done a good job minimizing the use of hazardous materials that present special handling and storage considerations. However, we do continue to use some chemical products that are hazardous and do require forethought in the manner that we handle, store, and use these products. Categories of hazardous materials that are in use or may be contained in products that we use include:

- Flammable Gases
- Class I and II Flammable Liquids
- Combustible Liquids
- Inorganic Oxidizers
- Corrosives
- Group One Poisons

2.4 Empty Containers

One of the frequent wastes that is produced are empty containers left after using a chemical product. For bulk materials such as oil, Vestas attempts to use suppliers that will take back empties (e.g., poly drums, etc.). However, a large number of chemical containers end up getting thrown away, scrapped, or recycled. In some cases the residues left in these seemingly empty containers may actually cause the container itself to be regulated as a hazardous waste.

From a regulatory perspective, a container is considered empty if:

- All material has been removed that can be removed using the practices commonly employed to remove materials from that type of container, e.g., pouring, pumping, tilting, and aspirating, ***and***
- No more than one inch of residue remains on the bottom of the container or inner liner.

Note: You must satisfy both conditions, above, for the container to be considered empty.

2.5 Potential Chemical Incompatibilities

One objective of this module is to improve all Vestas personnel's general understanding of the potential incompatibilities posed by various hazardous materials that may be used or stored at wind parks sites where Vestas is providing operations and maintenance services.

Based on the current types of hazardous materials used by Vestas, the general types of reactions that may occur if incompatibles are mixed together include:

- Evolution of heat that can cause splash hazards or lead to possible fire/explosive hazard conditions if either organic solvents are present in the material, or the heated mixture contacts combustible materials and a spark or ignition source is present.
- Evolution of innocuous and non-flammable gases that can cause excessive pressure buildup in vessels or containers causing unsafe storage conditions and potential splash hazards.
- Evolution of toxic gases that can quickly overcome personnel or can cause excessive pressure buildup in vessels or containers causing unsafe storage conditions and potential splash hazards.

T09 0008-8006 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

- Evolution of flammable gases that can ignite or explode in the presence of a spark or ignition source or can cause excessive pressure buildup in vessels or containers causing unsafe storage conditions and potential splash hazards.

It is beyond the scope of this module to provide extensive information on the chemistry and the potential incompatibilities for all materials used by Vestas, particularly since the universe of materials varies with time. The MSDS for a particular chemical product is required to provide general chemical incompatibility and hazardous chemical reaction byproduct information.

The Corporate Environmental Manager has a more detailed set of tools and instruction on performing specific chemical incompatibility evaluations including computer software to assist in these evaluations. If you have any question on the potential incompatibility of one or more chemicals in a waste or a product, contact the Corporate Environmental Manager.

3. Generalized Process Diagram

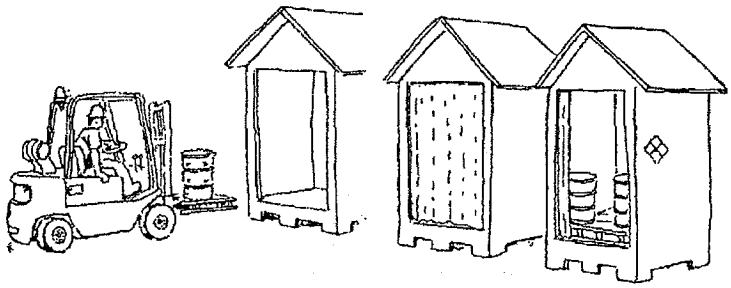

Figure 1: Proper Storage of Hazardous Materials is an Essential Environmental Practice at Vestas

4. How Hazardous Materials Are Regulated

This section summarizes key environmental requirements that apply to the onsite management of hazardous materials that are used by Vestas personnel while performing routine operation and maintenance activities. These requirements are primarily imposed by local, state, and federal regulations.

4.1 Air Emissions

Air emissions that may result from the generation and handling hazardous materials containing volatile organic compounds (VOCs) such as xylene, methyl ethyl ketone, and acetone, are regulated by state and federal air regulations. The primary use of VOC-containing products is for part cleaning or is contained in paint products such as aerosol cans. Though these chemicals are regulated by various agencies, Vestas' usage is small enough that we are not impacted by the regulations.

T09 0008-8006 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

4.2 Stormwater Discharges

State and local environmental agencies issue stormwater discharge permits based on the type of industrial activity conducted at a site-specific location. If the industrial activity is covered, a permit is required unless a demonstration is made that the potential for hazardous materials to come into contact with stormwater will not occur.

For facilities that have a stormwater NPDES permit, a written Stormwater Pollution Prevention Plan (SWPPP) is required to be prepared. The plan must describe physical and procedural steps that the permit holder has implemented to reduce or mitigate the chances of contaminating stormwater runoff. At least twice per year, permitted facilities are required to collect and analyze samples from various storm drain inlets for various pollutants to gauge the effectiveness of its pollution prevention practices. These results must be reported to the State each year.

At this time, no Vestas site operation has a stormwater NPDES permit.

The words HAZARDOUS MATERIAL purely and simply mean that any and all measures must be taken by Vestas to assure that these substances are not exposed to stormwater.

4.3 Wastewater Discharges

Placing (e.g., draining) any hazardous material into a sanitary sewer (e.g., draining an acid or a paint solvent into a sink) or septic tank system is not permissible. Attempts to render a surplus or spent hazardous material non-hazardous such as neutralizing an acid are not to be considered by any Vestas employee as a means of disposing one of these materials into the sewer system.

4.4 Hazardous Wastes

Many hazardous materials can be regulated as a hazardous waste when they become spent, dirty, obsolete, or are intended to be discarded. Federal and state hazardous waste regulations are applicable to the identification, onsite management, and disposal of hazardous wastes.

4.5 Uniform Fire Code

The Uniform Fire Code[2] (UFC) generally prescribes how hazardous materials must be stored at Vestas facilities. Local fire jurisdictions may adopt the UFC, the International Fire Code (IFC)[3], or some variant. These regulations have requirements that address the following:

Note: This is not an exhaustive list.

- Installation of warning signs and labeling;
- Separation of incompatible materials;
- Allowable storage volumes of hazardous materials within certain areas of buildings based on the type of occupancy in that area;
- Requirements for provision of secondary containment; and
- Other requirements (e.g., fire extinguishers, sprinkled fire suppression, etc.)

In most areas, the local Fire Department is responsible for performing periodic inspections of Vestas facilities to evaluate whether we are in conformance with the Code. Depending on the local municipal code, the Fire Marshal may have authority to issue citations or assess fines.

[2] Published by the Western Fire Chiefs Association, Fallbrook, CA, 2003.

[3] Published by the International Code Council, Falls Church, VA, 2003

T09 0008-8006 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

The 2003 edition of the UFC is just under 400 pages in length, thus it is beyond the scope of this module to provide extensive review of its requirements. The Corporate Environmental Manager has a copy of the UFC and is available to assist you in interpreting how these rules may affect your operation.

4.6 Warning Signs and Labeling

NO SMOKING signs must be posted in rooms or areas where hazardous materials are stored or dispensed and within 25 feet of outdoor storage, dispensing, or open-use areas.

Containers of hazardous materials must bear labels that identify the potential physical and health hazards associated with the material. If the labeling procedures used for our Worker-Right-To-Know program are followed, no additional labeling is required. The primary container must be labeled as well as any smaller containers that may be used for dispensing and day use (e.g., squirt bottles or other small containers).

When products are stored in an approved hazardous material storage cabinet (See Figure 2), a list of products stored in the cabinet must be posted on the outside of the cabinet. It is not necessary to post the inventory, but rather a list of products stored inside.

4.7 Separation of Incompatible Materials

Most of the hazardous materials that Vestas purchases are packaged in containers ranging in size from one pint to 55 gallons. Prior to purchase, and certainly prior to storing hazardous materials at your facility, the MSDS must be checked to determine if various products are compatible or incompatible with other products that may be stored/used in the same area.

Separation of incompatible materials must be provided when one or more incompatible materials are stored in containers that exceed one-half (1/2) gallon in size. Separation may be accomplished by:

- Segregating incompatible materials by a distance of at least 20 feet;
- Isolating incompatibles by a non-combustible partition or wall that extends at least 18 inches above the material stored; or
- Storing liquid and solid materials in approved hazardous material storage cabinets.

4.8 Allowable Storage Limits

This is one of the most complicated portions of the UFC/IFC. For Vestas's purposes, this is more appropriately characterized as exempt storage limits. That is, what are the maximum quantities that can be stored before special engineering or structural controls must be implemented to conform to the UFC/IFC. Further, it is the objective of Vestas to only have NOMINAL quantities of hazardous materials on-hand at any time to perform day-to-day activities. Ordering ANNUAL quantities of products shall not be done unless the Corporate Environmental Manager concurs on the purchase strategy.

For flammable and combustible hazardous materials (Refer to paragraph 2.2.3) the maximum amounts that can be stored in a control area[4] are:

- Class I-A Flammable (FP<73°F and boiling point <100°F) – **30 gallons**
- Class I-B Flammable (FP<73°F and boiling point >100°F) – **60 gallons**
- Class I-C Flammable (FP>73°F and <100°F) – **90 gallons**

[4] A control area is an area of a building or structure that is separated by not less than a one-hour fire resistive wall. The maximum number of control areas in a building cannot exceed four (4).

T09 0008-8006 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

- Combined Class I Flammables – **120 gallons**
- Class II Combustible (FP>100°F and <140°F) – **120 gallons**

IF all flammable and combustible liquids are stored in approved storage cabinets (See Figure 2), these limits can be increased by a factor of 2 (i.e., the Class I-A limit could be increased to 60 gallons, and so on).

It Is The Policy Of Vestas That All Flammable And Combustible Liquids That Are Stored INDOORS Be Stored In Approved Storage Cabinets Regardless Of Amount Stored Or Used At Your Facility.
Contact the Site HazMat Coordinator or the Corporate Environmental Manager for assistance in selecting and obtaining appropriate storage cabinets.

4.9 Requirements for Secondary Containment

The UFC defines threshold limits for volumes of hazardous materials above which secondary containment for spill control must be provided.

It is The Policy of Vestas That All Hazardous Materials (Liquids and Solids) Be Stored In an Area or Device Equipped with Some Form of Secondary Containment.
This policy applies to hazardous materials stored indoors AND outdoors. Secondary containment can be provided by installing containment berms/curbs and chemical resistant coatings, storing hazardous materials in approved storage cabinets equipped with secondary containment (See Figure 2), or by using portable containment devices (See Figure 3 and 4), or other means approved by the Corporate Environmental Manager.

Hazardous materials that are in use at a workstation or other area where the material is being used, applied, or consumed do not need to have secondary containment, however, it is strongly encouraged.

5. Operating Requirements

This section provides an overview of the regulatory requirements that pertain to the ongoing storage and management of hazardous materials. The general categories include:

- Storage requirements
- Managing stormwater
- Inspections
- Reporting and recordkeeping

Vestas personnel that use hazardous materials are responsible for assuring that all requirements identified below are fulfilled. Any deviation from, or exception to, these requirements must be reported to Vestas' Corporate Environmental Manager.

5.1 Hazardous Material Storage

This section provides an overview of the requirements that apply to the storage of hazardous materials.

5.1.1 All Vestas Operations

- ► Flammable and combustible liquid storage amounts must not exceed those allowed in Section 4.8.
- ► Indoor storage of flammable and combustible liquids must be done in approved storage cabinets.

T09 0008-8006 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

- ▶ All hazardous materials must be stored in an area or device that is equipped with secondary containment. See Section 4.9.
- ▶ Hazardous materials that are in use are encouraged to have secondary containment.

5.1.2 Mobile Operations

- ▶ If you know you will be transporting hazardous materials on fleet vehicles to a turbine unit or other location, it is strongly recommended that you place the materials into a tote or other container that will provide secondary containment while in transit.
- ▶ All fleet vehicles used for transporting hazardous materials must be equipped with a spill kit.

5.1.3 Hazardous Material Storage Area Operating Requirements

- ▶ Containers of hazardous materials must be stored in an area equipped with secondary containment.
- ▶ All storage areas must have appropriate warning signs, products must be properly labeled, and storage cabinets must have a list of products posted on the outside of the cabinet.
- ▶ Storage containers and containment areas must be visually inspected WEEKLY for evidence of corrosion, damage, leakage, or other deterioration.

5.2 Making Chemical Changes

Over time, the use of a particular hazardous material may be phased out and new products will become available to perform routine O&M tasks.

- ▶ Prior to the use of any new chemicals, it is essential that you submit the Material Safety Data Sheet (MSDS) and a Chemical Safety Evaluation Request (CSER) to Vestas' Chemical Evaluation Committee for review and approval.
- ▶ To the maximum extent possible, investigate the use of alternative chemicals that are less hazardous.

5.3 Stormwater

All Vestas personnel MUST make a conscious effort to assure that drips, leaks, and minor spillage of hazardous materials are immediately cleaned up with absorbent materials. (Absorbent materials must be collected and placed into a labeled drum or other suitable container until the site HazMat Coordinator or Corporate Environmental Manager can determine if the material needs to be tested.)

- ▶ Do not allow drips, leaks, etc., to enter into site storm drains, ditches, or swales, or percolate into the ground. Preventing the loss of even small amounts of hazardous chemicals into the stormwater system is a top priority for all Vestas personnel.
- ▶ Any precipitation that comes into contact with a hazardous material MUST NOT be allowed to discharge to any storm drain inlet, ditch, swale, etc.
- ▶ If your facility has an outdoor hazardous material storage area that is equipped with secondary containment, precipitation that accumulates within the containment area must first be visually inspected to make sure no leaks or spillage of hazardous materials has occurred into the containment area prior to discharging the accumulated water. If it is suspected or confirmed that leakage has occurred, the water must be collected or tested to confirm if it is suitable for discharge into the storm drainage system.

T09 0008-8006 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

5.4 Inspections

Each hazardous material storage area must be inspected to assure that the container is in satisfactory condition and to make sure any secondary containment systems are functioning properly and are receiving appropriate preventative maintenance to assure that no unacceptable releases to the environment occur.

Written records for daily visual inspections are recommended, but not required, unless a spill or release is discovered. Written records for weekly and monthly inspections are required.

At a minimum, inspection records **MUST** include the date and time of the inspection, the name of the individual making the observations, a notation of the observations made, and the date and nature of any repairs or other remedial actions.

5.4.1 Visually Inspect or Verify Daily

It is recommended that Facility personnel check areas where hazardous materials are stored every day to make certain the containers are in good condition and no releases are occurring.

5.4.2 Visually Inspect or Verify Weekly

- That container(s) of hazardous materials are stored in a secure and properly maintained area equipped with secondary containment and that there is no evidence of leakage.

5.4.3 Visually Inspect or Verify Monthly

- Check to assure that the list of products stored in any hazardous material cabinet(s) is current;
- Check to assure that an adequate inventory of spill response supplies is available at or near the area where the containers are located; and
- Emergency notification telephone numbers are posted at or near hazardous material storage areas.

5.5 Reporting Requirements

- At a minimum, inspection records MUST include the date and time of the inspection, the name of the individual making the observations, a notation of the observations made, and the date and nature of any repairs or other remedial actions; and
- All spills must be immediately reported (within 15 minutes of discovery) to the site HazMat Coordinator or Corporate Environmental Manager.

5.6 Recordkeeping Requirements

The Site HazMat Coordinator, or designee, must maintain the following records and documents:

- An emergency response Contingency Plan, Spill Prevention Control and Countermeasures Plan, (SPCC) or other plan. (If you are uncertain contact the Corporate Environmental Manager);
- Inspection logs kept for at least 3 years; and
- Training documents, including copies of training materials and personnel attendance log sheets.

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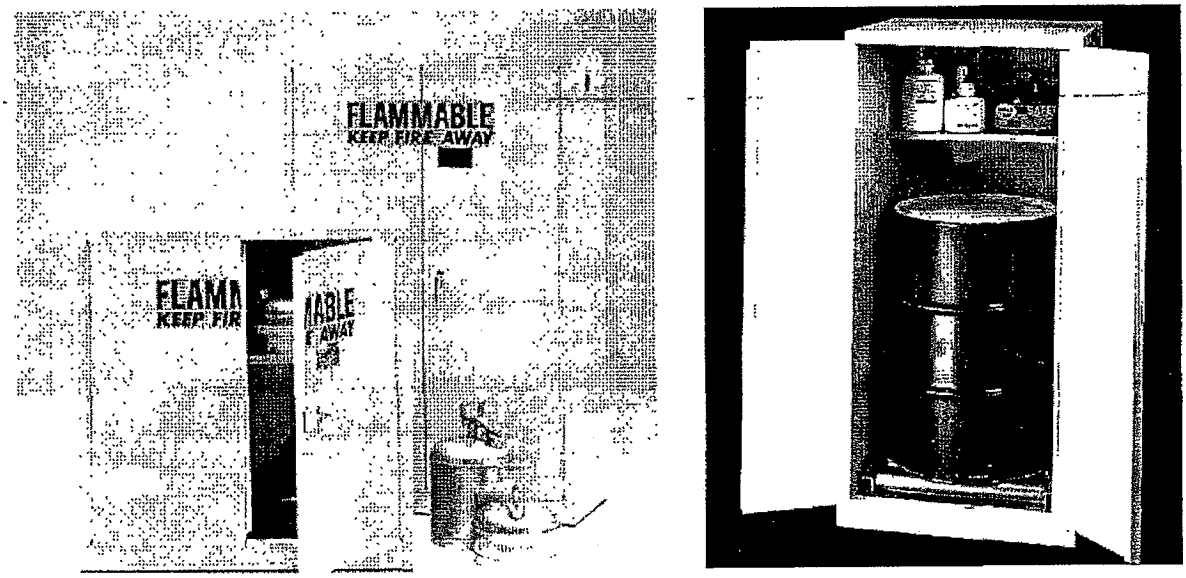

Figure 2: Example of Approved Flammable and Combustible Liquid Storage Cabinets

T09 0008-8006 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

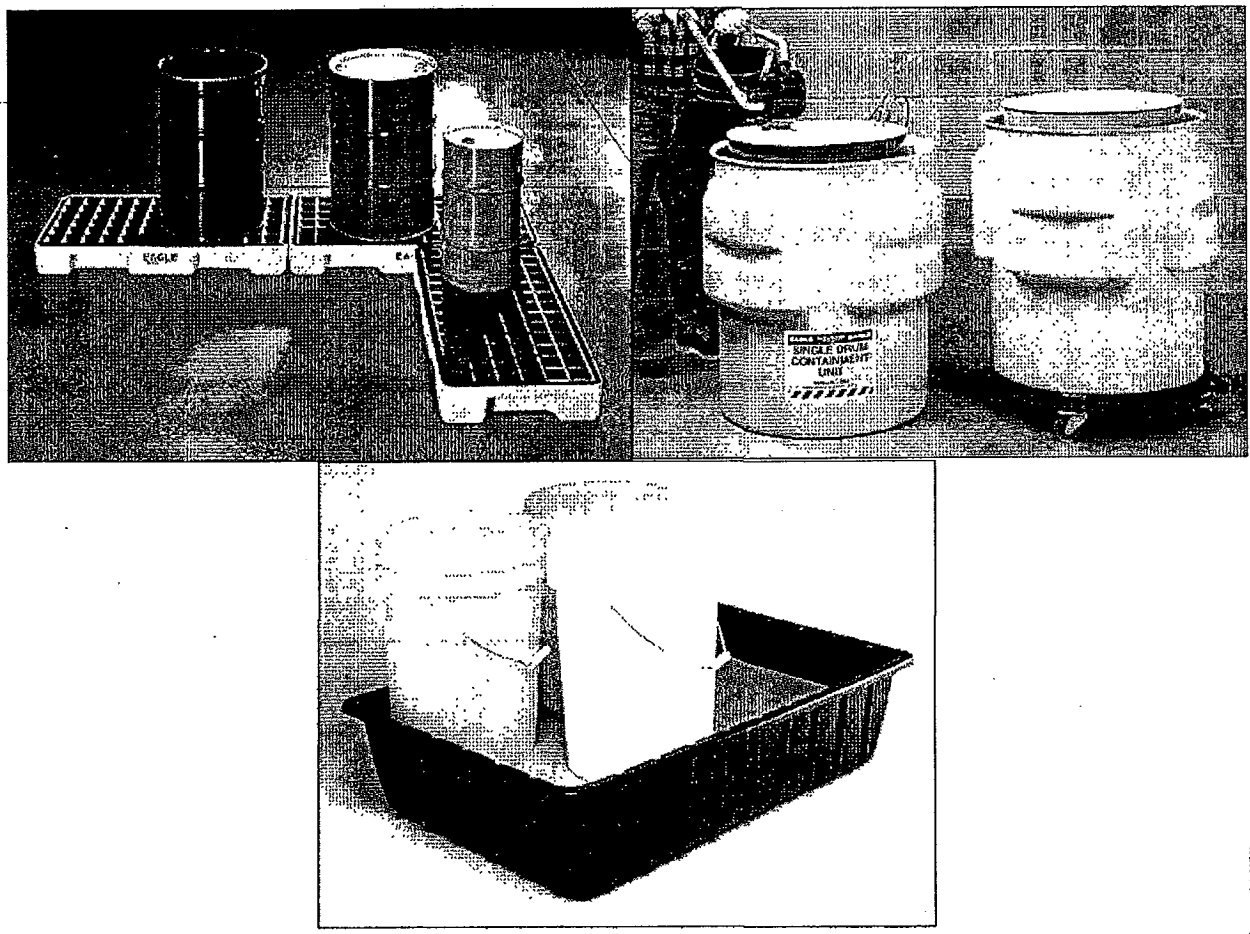

Figure 3: Example of Approved Portable Indoor or Covered Use Secondary Containment Device

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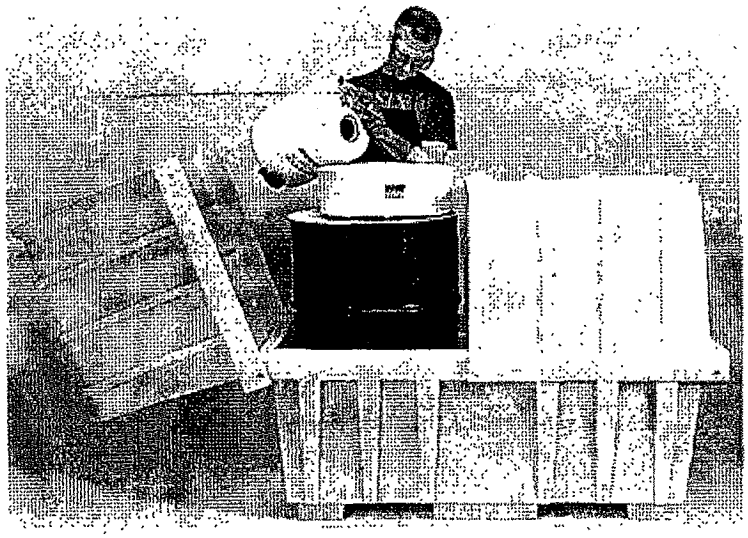

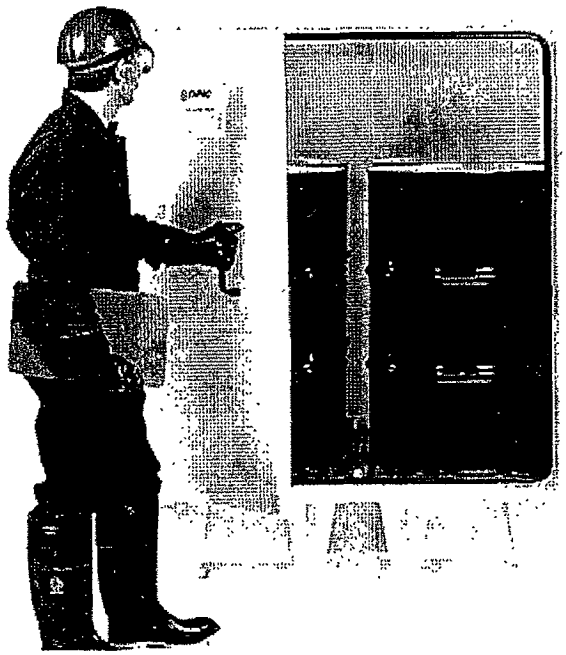

Figure 4: Example of Approved Outdoor Use Portable Secondary Containment Devices

T09 0008-8006 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

6. History of This Document

Rev. no.:	Date:	Description of changes
00	2006-07-26	First edition – Reformatted & renumbered 25-Jul-2007
01	2010-01-01	Template updates

T09 0008-8006 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

Vestas®

Aerosol Can Management

Contents

Top 10 DO's and DO NOT's for Managing Used/Spent Aerosol Containers....2
1. Introduction....3
2. Process Description....3
3. How Aerosol Cans Are Regulated....3
3.1 Air Emissions....3
3.2 Stormwater Discharges....3
3.3 Wastewater Discharges....4
3.4 Hazardous Wastes....4
4. Required Operating Practices....4
4.1 Waste Collection Requirements....4
4.2 Aerosol Can Puncturing Unit Requirements....5
4.3 Making Chemical Changes....6
4.4 Stormwater....6
4.5 Inspections....6
4.6 Reporting Requirements....7
4.7 Recordkeeping Requirements....7
5. History Of This Document....10

T09 0008-8007 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

Top 10 DO's and DO NOT's for Managing Used/Spent Aerosol Containers	
Do	**Do Not**
► Contact the site HazMat Coordinator or the Corporate Environmental Manager if you have any questions not answered in this document. ► Work with the site HazMat Coordinator or Corporate Environmental Manager to find alternatives to aerosol-based products. ► You are responsible for puncturing and draining all aerosol cans that you produce. ► Place drained aerosol cans into a dumpster or scrap metal bin. ► Make sure the container used for accumulating liquids from puncturing and draining aerosol cans is clearly labeled with the words "Hazardous Waste." ► If you will be operating the can puncturing station, make sure the carbon filter is properly fitted, the anti-static strap is properly attached, and that you have on safety goggles with splash protection prior to puncturing any cans.	► Do NOT dispose of any unpunctured and undrained aerosol cans into the trash. ► Do NOT puncture and drain any aerosol container that contains a STRONG OXIDIZER. ► Do NOT puncture and drain any spent aerosol container that has not been previously approved by Vestas's Chemical Evaluation Committee. ► Do NOT accumulate spent aerosol containers at your site for longer than 90 days before puncturing and draining.

T09 0008-8007 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

1. Introduction

This document provides an overview of ongoing operation and maintenance (O&M) requirements that are mandated by federal and state environmental regulations for the following waste products produced by Vestas operations:

- Used/Spent Aerosol Containers (e.g., touch-up paints, cleaners, lubricants, etc.).

The target users of this document are all Vestas site service personnel that have occasion to use products that are packaged in aerosol spray containers. This document specifically addresses how used aerosol containers are to be managed and disposed.

2. Process Description

It is the policy of Vestas to only allow aerosol-based products for essential uses where an alternative, non-aerosol product, cannot be safely or effectively substituted.

Over the years, Vestas has endeavored to reduce its use of products that are packaged in aerosol containers. Generally, aerosol products are not viewed as ENVIRONMENTALLY FRIENDLY, though product manufacturers have made strides to eliminate the use of propellants containing chlorofluorocarbons (CFCs).

Aerosol-based products such as spray cleaners, touch-up paints, primers, lubricants, insecticides, etc., normally contain highly flammable non-CFC propellants such as propane derivatives or isobutane. Regardless of the liquid product in the can, the propellant itself is highly flammable and potentially explosive. Most warning labels on the can will say something to the effect "Do not puncture or incinerate." Depending on the product, the contents may also have some hazardous properties. Paints, primers, and lubricants typically will contain solvents that have low flash points. Cleaners may be corrosive or also have a low flash point.

3. How Aerosol Cans are Regulated

This section summarizes key environmental requirements that apply to the handling and management of used/spent aerosol containers at Vestas. These requirements are primarily imposed by state or federal regulations.

3.1 Air Emissions

Vestas' use of aerosol spray products is considered to be an incidental use and are not specifically controlled by prevailing air regulations provided only consumer-type products are used (i.e., products you can readily purchase). Also, Vestas' Chemical Use Committee will review the proposed purchase of new aerosol products (when allowed) to confirm that no use restrictions are imposed by various state or federal air emission regulations.

3.2 Stormwater Discharges

State and local environmental agencies issue stormwater discharge permits based on the type of industrial activity conducted at a site-specific location. If the industrial activity is covered, a permit is required unless a demonstration is made that the potential for hazardous materials to come into contact with stormwater will not occur.

For facilities that have a stormwater NPDES permit, a written Stormwater Pollution Prevention Plan (SWPPP) is required to be prepared. The plan must describe physical and procedural steps that the

T09 0008-8007 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

permit holder has implemented to reduce or mitigate the chances of contaminating stormwater runoff. At least twice per year, permitted facilities are required to collect and analyze samples from various storm drain inlets for various pollutants to gauge the effectiveness of its pollution prevention practices. These results must be reported to the State each year.

At this time, no Vestas site operation has a stormwater NPDES permit.

As with any chemical product, care must be exercised with aerosol products to prevent the product and propellant from coming into contact with stormwater (such as allowing overspray to contact the ground).

3.3 Wastewater Discharges

Placing (e.g., draining) or spraying the contents of aerosol products into the sanitary sewer (e.g., spraying into a sink) or septic tank system is not permissible.

3.4 Hazardous Wastes

Any used/spent aerosol container that still contains any liquid OR any propellant is considered a hazardous waste and CANNOT be disposed into the trash.

Some states in which Vestas operates have determined that used/discarded aerosol containers are a hazardous waste *unless* they have been *completely* emptied and the propellant has been fully aspirated. That is, if an aerosol container contains any liquid OR any propellant, it is considered a hazardous waste. The two most common situations that occur with aerosol products that result in the can/product being considered a hazardous waste are:

- The spray nozzle clogs before the entire product has been used. What remains is an unusable, but partially filled aerosol product whose contents are still under pressure.
- The propellant is exhausted before all of the can contents have been used. What remains is a partially filled liquid product that cannot be emptied.

The only *legitimate* method to discard use/spent aerosol containers into the trash for disposal or into a scrap metal bin for recycling is to deactivate the container by *puncturing and completely draining* it prior to discarding. Vestas has purchased approved aerosol can deactivation units and installed them at all wind park service sites (See Figure 1). DO NOT use any other method to puncture and drain aerosol containers. Properly deactivated aerosol containers may be discarded into the trash, or metal recycling bin (if available at your location).

4. Required Operating Practices

This section provides an overview of the environmental regulatory requirements that pertain to managing spent aerosol containers including:

- Collection and storage requirements
- Inspections
- Reporting and recordkeeping

Vestas facility personnel that use aerosol products are responsible for assuring that all requirements identified in this document are fulfilled. Any deviation from, or exception to, these requirements must be reported to Vestas's Corporate Environmental Manager.

4.1 Waste Collection Requirements

T09 0008-8007 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

This section provides an overview of the minimum requirements that Vestas personnel must follow for the collection of used/spent aerosol containers prior to disposal or recycling. This includes aerosol containers that are produced during field/mobile activities. The waste collection requirements below apply unless spent containers are immediately deactivated using an approved device at your facility.

4.1.1 All Vestas Operations

- Used/spent aerosol containers MUST not be disposed of by throwing it in the trash, or placed in a metal recycling bin UNLESS the container has been properly punctured and drained first.

4.1.2 Mobile Operations

- Return all spent aerosol containers to your base Service Center.
- Deactivate the containers using the aerosol can deactivation unit.

4.1.3 Service Centers and Other Fixed Facilities

- If spent aerosol container(s) will not be immediately deactivated in the puncturing unit, place non-leaking spent aerosol containers into an appropriate container such as a 5-gallon closeable top safety container (see Figure 2);
- The employee that uses the aerosol container is ultimately responsible for depressurizing and proper disposal of the empty can.
- Make sure the accumulation container is clearly labeled with the words "Hazardous Waste;"
- The accumulation container must be kept closed, except when emptying or filling, to minimize the potential for spillage;
- If no depressurizing unit is available at your facility, contact Vestas' Corporate Environmental Manager.

4.2 Aerosol Can Puncturing Unit Requirements

- The puncturing unit must be equipped with the minimum features shown in Figure 1 (including a anti-static wire and goggles with splash protection);
- The carbon filter unit must be in good service. (Some carbon filters are packaged with an indicator that changes color when the carbon is spent, others are rated for puncturing a certain number of aerosol cans – check the filter before using the unit);
- See the facility HazMat Coordinator for replacement carbon filters.
- Make sure the liquid accumulation container is clearly labeled with the words "Hazardous Waste;"
- Prior to operating the puncturing device, make sure you are familiar with the operating instructions;
- BEFORE puncturing any container, CHECK the MSDS for the product to verify that the contents DO NOT contain a STRONG OXIDIZER. [See Table 1.]
- The release of strong oxidizers into the accumulation drum at the puncturing station could result in one or more of the following chemical reactions: evolution of heat, toxic gases, or flammable gases, and the potential for fire.
- If you are uncertain if the aerosol container contains a STRONG OXIDIZER, contact Vestas' Corporate Environmental Manager.

T09 0008-8007 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

- Assuming that the contents of the can may be safely drained into the accumulation container, follow the manufacturer's instructions for puncturing and draining the aerosol can(s).
- Record the date, number of spent aerosol cans that were punctured and drained, and your name on the log sheet that is located at the puncturing station.

4.3 Making Chemical Changes

Because of the potential chemical incompatibilities of mixing the liquids in aerosol-based products in the accumulation container of the puncturing unit, it is important that all new aerosol products be reviewed and approved by Vestas' Chemical Evaluation Committee prior to purchasing.

If you have spent aerosol containers for products that have not been approved by the Chemical Evaluation Committee, contact the site HazMat Coordinator, or the Corporate Environmental Manager prior to puncturing unapproved containers.

*** **The use of aerosol products that contain lead or chlorinated solvents such as trichloroethylene (TCE), 1,1,1-trichloroethane (TCA), or methylene chloride is strictly forbidden.** ***

4.4 Stormwater

All Vestas Service Site operations personnel are expected to make a conscious effort to assure that drips, leaks, and minor spillage of any chemical product or waste are immediately cleaned up with absorbent materials.

Absorbent materials must be collected and placed into a drum or other suitable container until the site HazMat Coordinator or Corporate Environmental Manager can determine proper disposal methods.

- All aerosol can storage is to be conducted under cover or indoors.
- Storage and operation of the aerosol can puncturing unit is to be conducted under cover or indoors.

4.5 Inspections

The containers used for accumulating spent aerosol cans, and the puncturing unit/container are required to be under an inspection program to assure that appropriate preventative maintenance is occurring and that no releases to the environment occur.

Written records for daily visual inspections are recommended, but not required, unless a spill or release is discovered. Written records for **WEEKLY** and **MONTHLY** inspections are required.

4.5.1 Visually Inspect or Verify Daily

It is *recommended* that Facility personnel check areas where spent aerosol containers are stored every day to make certain the containers are in good condition and no releases are occurring.

4.5.2 Visually Inspect or Verify Weekly

- That container(s) used for accumulating spent aerosol containers are kept closed (i.e., lid or cover is secured);
- That container(s) are stored in a secure area and properly maintained so that they do not leak, rupture, or tip over when being opened, handled, or stored;
- That each storage container and the container used for draining the punctured cans are marked with the words "Hazardous Waste"; and

T09 0008-8007 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

- That no spent aerosol cans have accumulated onsite for longer than 90 days without being punctured and drained.

4.5.3 Visually Inspect or Verify Monthly

- Check or estimate the liquid level in the container used for collecting drained liquids. If the container is approximately 75% full, contact the site HazMat Coordinator or the Corporate Environmental Manager to make arrangements for disposal of the waste liquids.
- Check the carbon filter on the puncturing station to make sure the carbon is not exhausted.
- Check to assure that an adequate inventory of spill response supplies is available at or near the area where the containers are located; and
- Emergency notification telephone numbers are posted at or near the can puncturing station.

4.6 Reporting Requirements

- At a minimum, inspection records **MUST** include the date and time of the inspection, the name of the individual making the observations, a notation of the observations made, and the date and nature of any repairs or other remedial actions; and
- All spills must be immediately reported (within 15 minutes of discovery) to the site HazMat Coordinator or Corporate Environmental Manager.

4.7 Recordkeeping Requirements

The Site HazMat Coordinator, or designee, must maintain the following records and documents:

- An emergency response Contingency Plan, Spill Prevention Control and Countermeasures Plan, (SPCC) or other plan. (If you are uncertain contact the Corporate Environmental Manager);
- Inspection logs kept for at least 3 years; and
- Training documents, including copies of training materials and personnel attendance log sheets.

T09 0008-8007 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

Table 1: List of Strong Oxidizers

(CHECK MSDS to make sure these are NOT in aerosol products that are to be punctured)
Items in ***BOLD ITALICS*** are fairly common ingredients in a number of products, especially cleaning and disinfecting supplies.

Ammonium chlorate
Ammonium dichromate
Ammonium nitridoosmate
Ammonium perchlorate
Ammonium periodate
Ammonium permanganate
Ammonium persulfate
Ammonium tetrachromate
Ammonium tetraperoxychromate
Ammonium trichromate
Antimony perchlorate

Barium bromate
Barium chlorate
Barium iodate
Barium nitrate
Barium perchlorate
Barium permanganate
Barium peroxide
Bromic acid
Bromine
Bromine monofluoride
Bromine pentafluoride
Bromine trifluoride
t-Butyl hypochlorite

Cadmium chlorate
Cadmium nitrate
Calcium bromate
Calcium chlorate
Calcium chlorite
Calcium hypochlorite
Calcium iodate
Calcium nitrate
Calcium perchromate
Calcium permanganate
Calcium peroxide
Chloric acid
Chlorine
Chlorine dioxide
Chlorine fluoroxide
Chlorine monofluoride
Chlorine monoxide
Chlorine pentafluoride
Chlorine trifluoride
Chlorine trioxide
Chromic acid
Chromyl chloride
Cobaltous nitrate
Copper nitrate

Dichloroamine
Dichloroisocyanuric acid

Ethylene chromic oxide

Fluorine
Fluorine monoxide

Guanidine nitrate

Hydrogen peroxide

Iodine pentoxide

Lead chlorite
Lead nitrate
Lithium hypochlorite
Lithium peroxide

Magnesium chlorate
Magnesium nitrate
Magnesium perchlorate
Magnesium peroxide
Manganese nitrate
Mercuric nitrate
Mercurous nitrate

Nickel nitrate
Nitrogen dioxide

Osmium amine nitrate
Osmium amine perchlorate
Oxygen difluoride
Perchloryl fluoride
Phosphorus oxybromide
Phosphorus oxychloride
Potassium bromate
Potassium dichloroisocyanurate
Potassium dichromate
Potassium nitrate
Potassium perchlorate
Potassium permanganate
Potassium peroxide

Silver nitrate
Sodium bromate
Sodium carbonate peroxide
Sodium chlorate
Sodium chlorite
Sodium dichloroisocyanurate
Sodium dichromate
Sodium hypochlorite
Sodium nitrate
Sodium nitrite
Sodium perchlorate
Sodium permanganate
Sodium peroxide
Strontium nitrate
Strontium peroxide
Sulfur trioxide
Sulfuric acid

Trichloroisocyanuric acid

Uranyl nitrate
Urea nitrate

Zinc ammonium nitrate
Zinc nitrate
Zinc permanganate
Zinc peroxide
Zirconium picramate

T09 0008-8007 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

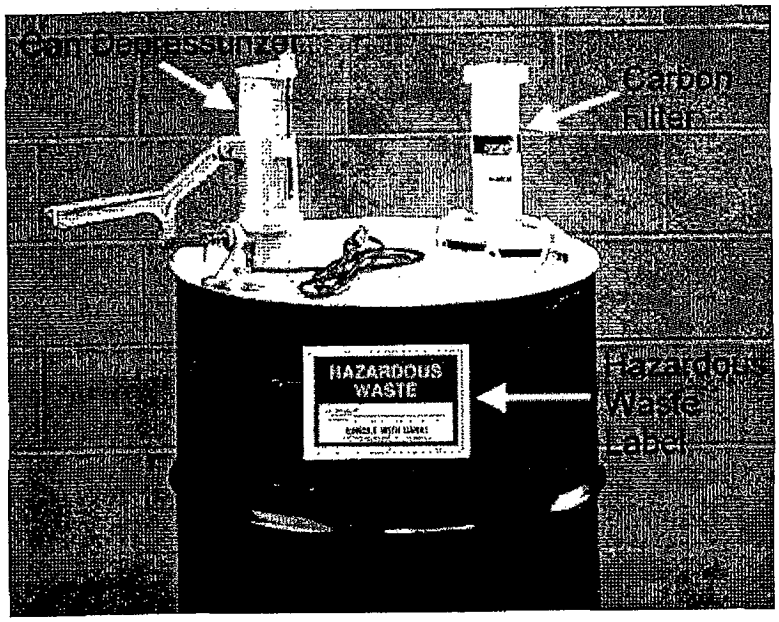

Figure 1 Proper Configuration for Aerosol Can Puncturing Unit

Figure 2 Recommended Spent Aerosol Can Accumulation Container

T09 0008-8007 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

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T09 0008-8007 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

Vestas®

Used Antifreeze and Glycol Management

Contents

Top 10 DO's and DO NOT's for Managing Used/Spent Aerosol Containers....2
1. Introduction....3
2. Process Description....3
3. How Used Antifreeze Is Regulated....3
3.1 Air Emissions....3
3.2 Stormwater Discharges....4
3.3 Wastewater Discharges....4
3.4 Hazardous Wastes....4
4. Required Operating Practices....4
4.1 Waste Collection Requirements....5
4.2 Waste Storage Area Operating Requirements....5
4.3 Making Chemical Changes....5
4.4 *Stormwater*....6
4.5 Inspections....6
4.6 Reporting Requirements....7
4.7 Recordkeeping Requirements....7
5. History of This Document....8

T09 0008-8009 Ver 02 - Approved - Exported from DMS: 2010-07-09 by ASUER

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Top 10 DO's and DO NOT's for Managing Used/Spent Antifreeze and Glycol Containers	
Do	**Do Not**
► Contact the site HazMat Coordinator or the Corporate Environmental Manager if you have any questions not answered in this document. ► Collect all used antifreeze in containers that are in good condition. ► Make sure the container is clearly labeled with the words "Used Antifreeze." ► Each container must be kept closed, except when emptying or filling, to minimize the potential for spillage; ► Spills of used antifreeze must be cleaned up immediately and appropriately managed. ► Work with the site HazMat Coordinator or Corporate Environmental Manager to arrange for proper storage and recycling of use antifreeze	► Do NOT mix used antifreeze with any waste or other material (e.g., solvents, cooling system flushes, used oil, motor fuels). ► Do NOT dispose of antifreeze in the trash, pouring it down the storm sewer, or putting it into septic systems. ► Do NOT allow drips, leaks, etc., including precipitation that comes into contact with antifreeze to enter into site storm drains, ditches, or swales, or percolate into the ground. ► Do NOT store drums of used antifreeze longer than 2 Months with out contacting the Corporate Environmental Manager to arrange for a vendor to pick up the drums.

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1. Introduction

This document provides an overview of ongoing operation and maintenance (O&M) requirements that are mandated by federal and state environmental regulations for the following waste products produced by Vestas operations:

- Used Antifreeze and Glycols (ethylene glycol or propylene glycol).

The target users of this document are Vestas service personnel that operate and/or maintain fleet equipment or perform maintenance on wind turbines or other fixed equipment that may contain glycol-based coolants (e.g., emergency generators or closed-loop cooling systems that contain ethylene or propylene glycol).

2. Process Description

Ethylene and propylene glycols are used as a coolant or heat transfer fluid in closed-loop cooling systems such as automobile radiators and other cooling systems. They are typically used in approximately a 50:50 mixture ratio with water. Despite its widespread use, ethylene glycol is a toxic chemical. Because of its sweet taste it is attractive to small children and animals. Propylene glycol is less toxic and has a bitter taste.

Ethylene and propylene glycol are colorless liquids, though the consumer product versions are typically lime green in color (added). Improper disposal or management of used antifreeze can damage aquatic organisms, cause overloading of wastewater treatment systems and contaminate groundwater.

During use, antifreeze can become contaminated with grit, traces of fuel and heavy metals from the engine. Contaminants such as benzene and lead may be high enough that will cause used antifreeze to be a considered a toxic hazardous waste by exceeding the Toxicity Characteristic Leaching Procedure (TCLP) thresholds set for these constituents. Glycols used in non-internal combustion engine applications will often contain low concentrations of chromium and other trace metals from pipe leaching, as well as corrosion inhibitors.

3. How Used Antifreeze is Regulated

This section summarizes key environmental requirements that apply to the handling and management of used antifreeze and ethylene glycol at Vestas. These requirements are primarily imposed by state regulations that are administered by the Department of Environmental Quality (DEQ) or other regulatory agency.

3.1 Air Emissions

Ethylene glycol is listed as a hazardous air pollutant (HAP) generally known or suspected to cause serious health problems. The Clean Air Act, as amended in 1990, directs EPA to set standards requiring major sources to sharply reduce routine emissions of toxic pollutants.

However, Vestas' use of ethylene glycol would be considered and incidental use, and no significant air emissions are expected from the handling or management of ethylene glycol.

T09 0008-8009 Ver 02 - Approved - Exported from DMS: 2010-07-09 by ASUER

VESTAS PROPRIETARY NOTICE

3.2 Stormwater Discharges

State and local environmental agencies issue stormwater discharge permits based on the type of industrial activity conducted at a site-specific location. If the industrial activity is covered, a permit is required unless a demonstration is made that the potential for hazardous materials to come into contact with stormwater will not occur.

For facilities that have a stormwater NPDES permit, a written Stormwater Pollution Prevention Plan (SWPPP) is required to be prepared. The plan must describe physical and procedural steps that the permit holder has implemented to reduce or mitigate the chances of contaminating stormwater runoff. At least twice per year, permitted facilities are required to collect and analyze samples from various storm drain inlets for various pollutants to gauge the effectiveness of its pollution prevention practices. These results must be reported to the State each year.

At this time, no Vestas site operation has a stormwater NPDES permit.

Discharges of glycols into stormwater, either directly or indirectly must be avoided at all costs.

3.3 Wastewater Discharges

The discharge of diluted and undiluted, new or used antifreeze is prohibited into the sanitary sewer without a permit or authorization from the local sewerage agency. If poured into a septic system, the antifreeze may damage the system by killing the microorganisms necessary for decomposition.

3.4 Hazardous Wastes

Based on available analytical data, used antifreeze that is recycled and properly managed according to its published "Best Management Practices" (BMPs) generally will not exhibit hazardous waste characteristics. Also, used antifreeze that is managed according to the BMPs and recycled is presumed to be managed in accordance with state hazardous waste regulations.

It is Vestas' policy is to collect used antifreeze in containers and ship it to an approved recycling facility. Onsite recycling with treatment units such as multi-stage cartridge filters or other systems is not permitted.

4. Required Operating Practices

This section provides an overview of the environmental regulatory requirements BMPs that pertain to ongoing operations that produce used or waste antifreeze. The general categories include:

- Collection and storage requirements
- Managing stormwater
- Inspections
- Reporting and recordkeeping

Vestas service personnel that produce used antifreeze, or operate/maintain the waste collection areas are responsible for assuring that all requirements identified below are fulfilled. Any deviation from, or exception to, these requirements must be reported to Vestas' Environmental Manager.

T09 0008-8009 Ver 02 - Approved - Exported from DMS: 2010-07-09 by ASUER

4.1 Waste Collection Requirements

This section provides an overview of the minimum requirements that Vestas personnel must follow for the collection of used antifreeze. Waste antifreeze will most likely be generated inside a the site maintenance shop or be drained from the cooling system(s) in the turbines:

- Antifreeze **MUST NOT** be disposed of by throwing it in the trash, pouring it down the storm sewer, or putting it into septic systems.
- Immediately collect used antifreeze in an appropriate container and transfer it into a compatible container such as a 55-gallon drum that is in good condition;
- **DO NOT** mix used antifreeze with any waste or other material (e.g., solvents, cooling system flushes, used oil, motor fuels);
- Make sure the container is clearly labeled with the words "Used Antifreeze;"
- Each container must be kept closed, except when emptying or filling, to minimize the potential for spillage;
- Spills of new or used antifreeze must be cleaned up immediately and appropriately managed. (Non-recyclable spill cleanup wastes must undergo a hazardous waste determination prior to disposal.); and
- Only one container can be used to accumulate used antifreeze within a single shop area. When filled, it must have the date labeled on the drum, and be moved into the storage area designated by Vestas's Corporate Environmental Manager within 3 days.

4.2 Waste Storage Area Operating Requirements

- Used antifreeze containers MUST be stored in a secure area and properly maintained so that they do not leak, rupture, or tip over when being opened, handled, or stored;
- An aisle space of at least 30 inches must be maintained between rows of containers so that the containers can be inspected;
- Volumes of accumulated used antifreeze should be minimized by routinely recycling to reduce the potential for environmental harm. Contact the Corporate Environmental Manager to arrange for shipment of drums; and
- Filled drums of used antifreeze must NOT be stored onsite for longer than 3 months prior to shipping it offsite to a recycling facility.

4.3 Making Chemical Changes

It is not expected that the composition of waste antifreeze will change substantially over time.

However, if product changes are made (e.g., changing from ethylene glycol to propylene glycol), the material must be reviewed and approved by Vestas' Chemical Evaluation Committee prior to making the change.

T09 0008-8009 Ver 02 - Approved - Exported from DMS: 2010-07-09 by ASUER

5. Stormwater

All Vestas service personnel are expected to make a conscious effort to assure that drips, leaks, and minor spillage of antifreeze and other uses of glycols are immediately cleaned up with absorbent materials. Used absorbent materials must be collected and placed into a drum or other suitable container until the site HazMat Coordinator or Corporate Environmental Manager can determine if the material needs to be tested.

- Do not allow drips, leaks, etc., to enter into site storm drains, ditches, or swales, or percolate into the ground. Preventing the loss of even small amounts of hazardous chemicals into the stormwater system is a top priority for all Vestas personnel.
- Any precipitation that comes into contact with antifreeze MUST NOT be allowed to discharge to any storm drain inlet, ditch, swale, etc.
- Daily visual checks are to be made in yard areas where fleet equipment is parked to detect radiator leaks.
- If your facility has a drum storage area that is equipped with secondary containment, precipitation that accumulates within the containment area must first be visually inspected to make sure no leaks or spillage of antifreeze has occurred into the containment area prior to discharging the accumulated water. If it is suspected or confirmed that leakage has occurred, the water must be collected or tested to confirm if it is suitable for discharge into the storm drainage system.

5.1 Inspections

The used antifreeze containers, waste storage areas, and general facility parking areas are required to be under an inspection program to assure that appropriate preventative maintenance is occurring and that no releases to the environment occur.

Written records for daily visual inspections are recommended, but not required, unless a spill or release is discovered. Written records for **WEEKLY** and **MONTHLY** inspections are required.

5.1.1 Visually Inspect or Verify Daily

It is *recommended* that Facility personnel check areas were antifreeze is used, drained, and stored every day to make certain the containers are in good condition and no releases are occurring. Areas where fleet vehicles are parked should be included in the daily visual inspection. Coolant reservoirs in the turbines should be checked during scheduled service activities.

5.1.2 Visually Inspect or Verify Weekly

- That used antifreeze containers are kept closed (i.e., bungs or cover is secured);
- That used antifreeze containers are stored in a secure area and properly maintained so that they do not leak, rupture, or tip over when being opened, handled, or stored;
- That the container is marked with the words **USED ANTIFREEZE**;
- That the **ACCUMULATION START DATE** (i.e., date when the drum was filled) is legible;
- That at least 30 inches of aisle space is available between drums; and
- If the date on any container is over 60 days old, notify the site HazMat Coordinator or the Corporate Environmental Manager to verify that a shipment is scheduled prior to reaching the 90-day onsite accumulation time limit.

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T09 0008-8009 Ver 02 - Approved - Exported from DMS: 2010-07-09 by ASUER

5.1.3 Visually Inspect or Verify Monthly

- That an adequate inventory of spill response supplies is available at or near the area where the containers are located; and
- Emergency notification telephone numbers are posted at or near the storage area.

5.2 Reporting Requirements

- At a minimum, inspection records MUST include the date and time of the inspection, the name of the individual making the observations, a notation of the observations made, and the date and nature of any repairs or other remedial actions; and
- All spills must be immediately reported (within 15 minutes of discovery) to the site HazMat Coordinator or Corporate Environmental Coordinator.

5.3 Recordkeeping Requirements

The Site HazMat Coordinator, or designee, must maintain the following records and documents:

- Proof of shipment that used antifreeze was shipped for recycling (e.g., an invoice or bill of lading for off-site recycling);
- An emergency response Contingency Plan, Spill Prevention Control and Countermeasures Plan, (SPCC) or other plan. (If you are uncertain contact the Corporate Environmental Coordinator);
- Inspection logs kept for at least 3 years; and
- Training documents, including copies of training materials and personnel attendance log sheets.

T09 0008-8009 Ver 02 - Approved - Exported from DMS: 2010-07-09 by ASUER

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6. History of This Document

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01	2010-01-01	Template updates
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T09 0008-8009 Ver 02 - Approved - Exported from DMS: 2010-07-09 by ASUER

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Used Oil Management

Contents

Top 10 DO's and DO NOT's for Managing Used Oil 2
1. Introduction 3
2. Process Description 3
2.1 What is Used Oil? 3
2.2 Used Oil is Not 3
2.3 Filter Cartridges 4
2.4 Empty Containers 4
3. Generalized Process Diagram 4
4. How Used Oil Is Regulated 5
4.1 Air Emissions 5
4.2 Stormwater Discharges 5
4.3 Wastewater Discharges 5
4.4 Hazardous Wastes 5
5. Operating Requirements 8
5.1 Used Oil Storage 8
5.2 Stormwater 9
5.3 Inspections 9
5.4 Reporting Requirements 10
5.5 Recordkeeping Requirements 10
6. History of This Document 13

T09 0008-8010 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

Top 10 DO's and DO NOT's for Managing Used Oil	
Do	**Do Not**
► Contact the site HazMat Coordinator or the Corporate Environmental Manager if you have any questions not answered in this document. ► Spent oil filters must drained and collected in a labeled drum, then sent to an offsite vendor for crushing and disposal or recycling. ► All tanks and containers of used oil must be labeled with the words "USED OIL," be in good condition, and kept closed except when adding or removing materials. ► All containers or tanks containing used oil must be stored in an area or inside a device that is equipped with secondary containment. ► All Vestas Service personnel MUST make a conscious effort to assure that drips, leaks, and minor spillage of new and used oil is immediately cleaned up with absorbent materials.	► Do NOT mix any solvents, cleaners, thinners, paint waste, antifreeze, or any non-oil liquid with used oil. ► Do NOT dispose or discard any oil or waste oil container until it has been completely emptied. ► Do NOT purchase 'terne plated' oil filter cartridges for use on equipment. These filters, when spent, will be regulated as a hazardous waste. ► It is NOT permissible to burn used oil in space heaters located at Vestas facilities. ► Any precipitation that comes into contact with an oily material or waste that creates a visible oil sheen MUST NOT be allowed to discharge to any storm drain inlet, ditch, swale, etc.

T09 0008-8010 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

1. Introduction

This document provides an overview of ongoing operation and maintenance (O&M) requirements that are mandated by federal, state, and local environmental regulations for the following activities:

- Generation, collection, accumulation, storage, and disposition of used (waste) oil from internal combustion engine crankcases such as fleet vehicles, turbines, generators, and other fixed/mobile equipment, as well as hydraulic fluids, non-PCB electrical insulating fluids, and other forms of petroleum or synthetic lubricants.

Mismanagement of used oil can lead to the inadvertent production of hazardous wastes, creation of oily stormwater or wastewater, and the generation of oily soil and debris that must be carefully managed at considerable expense to Vestas.

The target users of this document are all Vestas Service personnel that have occasion work with vehicles or wind turbine equipment with fluid reservoirs containing oil that must be changed or replaced. This document specifically addresses how these materials are to be collected, stored, and recycled/disposed when they become unfit (e.g., dirty) for their intended use.

2. Process Description

2.1 What is Used Oil?

State and federal regulations define used oil as any oil that has been refined from crude *or* synthetic oil that was used as a:

- Lubricant
- Electrical insulation fluid (e.g., non-PCB mineral oil from a transformer)
- Hydraulic fluid
- Heat transfer fluid
- Brake fluid
- Refrigeration oil
- Grease
- Machine cutting/cooling oils

Used oil can contain metal contaminants such as chromium, barium, lithium (greases), products of combustion (from internal combustion engines) such as polynuclear aromatic hydrocarbons (PAHs, many of which are suspected to be carcinogenic), additives to inhibit microbial growth or corrosion inhibitors, and viscosity extenders (to keep the oil from degrading under extreme temperature).

2.2 Used Oil is Not

Used oil, while broadly defined, above, does not include:

- Used oil mixed with hazardous waste
- Petroleum and synthetic based products used as a solvent such as a cleaner or degreaser
- Antifreeze (ethylene, triethylene, or propylene glycol)
- Wastewaters resulting from an oil/water separation process
- Oil contaminated soil, rock, building materials, and spill cleanup debris

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2.3 Filter Cartridges

In most instances, the generation of used oil also results in the production of used oil filters. These will typically be the spin-off type that comes pre-packaged in a metal filter housing or one that is a stand-alone cartridge that is inserted into a dedicated filter housing on the piece of equipment. The cartridge contains the filter media such as paper and a metal frame. On most light-duty applications, the metal will be galvanized or painted sheet metal and can be readily recycled. Filters from heavy equipment are often 'terne plated' (an alloy of lead and tin). As will be discussed in Section 4 of this module, the regulations are more stringent for 'terne plated' filter cartridges. The purchase and use of this type of cartridge should be avoided if at all possible. Check with your supplier before purchase of all filters to verify that they are not 'terne plated.'

2.4 Empty Containers

Empty containers left over after filling a piece of equipment or crankcase with oil and empty containers left after a used oil hauler 'stingers' waste oil into a tanker truck for transport may be regulated unless they are completely "empty." To the extent possible, Vestas attempts to use suppliers that will take back their bulk empties (e.g., poly or steel drums, etc.). However, a large number of chemical containers end up getting thrown away, scrapped, or recycled. In some cases the residues left in these seemingly "empty" containers may actually cause the container itself to be regulated as a hazardous waste.

A container is considered "empty" if:

- All materials have been removed that can be removed using the practices commonly employed to remove materials from that type of container, e.g., pouring, pumping, tilting, and aspirating, ***and***
- No more than one inch of residue remains on the bottom of the container or inner liner.

Note: You have to satisfy both conditions, above, for the container to be considered "empty."

3. Generalized Process Diagram

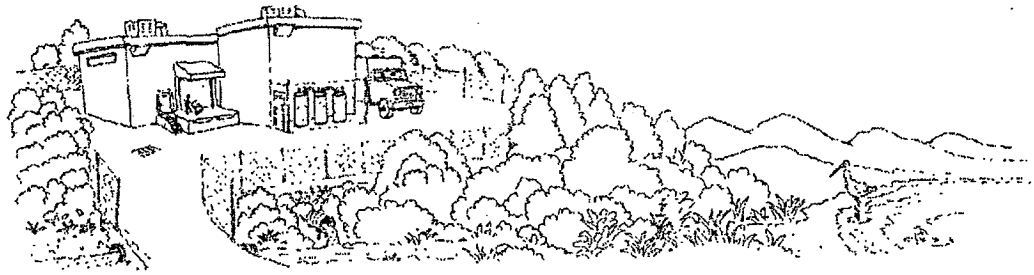

Figure 1 Proper Management of Used Oil is an Essential Environmental Practice at Vestas

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4. How Used Oil Is Regulated

This section summarizes key environmental requirements that apply to the onsite management of used or waste oils that are generated by Vestas personnel while performing routine operation and maintenance activities. These requirements are imposed by state and federal environmental regulations.

4.1 Air Emissions

No air emissions should result from our handling of used oils, unless the oil is mixed with volatile organic compounds (VOCs) such as xylene, methyl ethyl ketone, or acetone. If solvents do become mixed with used oil, it will likely be regulated as a hazardous waste. All volatile compounds must be kept separate from used oil.

4.2 Stormwater Discharges

4.2.1 State and local environmental agencies issue stormwater discharge permits based on the type of industrial activity conducted at a site-specific location. If the industrial activity is covered, a permit is required unless a demonstration is made that the potential for hazardous materials to come into contact with stormwater will not occur. Used oil is one of the primary hazardous materials, if managed outdoors or in a manner that can impact stormwater, will require a facility to obtain a permit.

4.2.2 For facilities that have a stormwater NPDES permit, a written Stormwater Pollution Prevention Plan (SWPPP) is required to be prepared. The plan must describe physical and procedural steps that the permit holder has implemented to reduce or mitigate the chances of contaminating stormwater runoff. At least twice per year, permitted facilities are required to collect and analyze samples from various storm drain inlets for various pollutants to gauge the effectiveness of its pollution prevention practices. These results must be reported to the State each year. If results are not within specified criteria, the discharger must implement physical facility improvements (that may include treatment) to assure that the criteria will be met in the future.

4.2.3 At this time, no Vestas site operation has a stormwater NPDES permit.

4.2.4 It is critical that all Vestas non-permitted facilities maintain this "No Exposure" exclusion with the DEQ or other regulatory agencies. All measures must be taken by Vestas to assure that used oil does not enter the stormwater collection system.

4.3 Wastewater Discharges

Placing (e.g., draining) used oil into the sanitary sewer (e.g., draining a cartridge filter into a sink or over a drain), storm sewer, catch basin, or septic tank system is not permissible.

4.4 Hazardous Wastes

Used oil is generally not regulated as a hazardous waste, *provided* it is recycled by being reprocessed or burned for legitimate energy recovery. Federal and state environmental regulations apply to the management of used oil.

It is the policy of Vestas to make sure that all used oil is handled and managed in a manner that assures it will be recycled. If you believe you must dispose of any quantity of used oil, contact Vestas's Corporate Environmental Manager before making any disposal decisions.

The remainder of this section provides an overview of specific used oil management requirements.

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4.4.1 Used Oil Collection and Storage

From the time oil is drained from the piece of equipment or vehicle, it must be completely contained until it is transferred to one of Vestas' waste contractors for offsite recycling:

- Used oil must be stored in tanks[1] or containers that are non-leaking and are in good condition. Good condition means the tank or container must not have any signs of severe rusting or apparent structural defects.
- The tanks or containers must be kept tightly closed at all times except to add or remove waste oil to the receptacle.
- Containers and tanks must be clearly labeled with the words "USED OIL" as shown in Figure 2.
- *Any amount of spilled material MUST be cleaned up immediately and properly contained.*

It Is the Policy Of Vestas That All Hazardous Materials (Liquids and Solids), including Used Oil Be Stored In An Area or Device Equipped With Some Form of Secondary Containment.

This policy applies to used oil stored indoors AND outdoors. Secondary containment can be provided by installing containment berms/curbs and chemical resistant coatings, storing used oil in approved storage cabinets equipped with secondary containment (See Figure 3), or by using portable containment devices (See Figure 4 and 5), or other means approved by the Corporate Environmental Manager.

4.4.2 Used Oil from Electrical Equipment

Vestas' service sites are generally new construction and any electrical equipment on the turbine units will be recent manufacture. It is very unlikely that any electrical equipment will contain polychlorinated biphenyls (PCBs).

If you must drain a piece of electrical equipment, or cleanup oil from a leaking transformer, capacitor, ballast, etc., contact the Vestas Corporate Environmental Manager first. We may choose to have an environmental contractor test the oil to verify that the oil does not contain any PCBs. Check the nameplate on the piece of equipment to see if it is stamped with non-PCB.

4.4.3 Used Oil for Dust Suppression

The regulations specifically prohibit the using used oil as a dust suppressant or as a pesticide (e.g., around fence posts or utility poles).

4.4.4 Used Oil Filters

Used oil filters, except 'terne plated' filters, are exempt from the hazardous waste regulations when they are properly processed before disposal or recycling. It is allowable to dispose properly drained filters into normal solid waste receptacles; however, it is Vestas' preference that all facilities make an effort to recycle used filters as scrap metal.

Each Vestas service garage has a 55-gallon container in which drained filters are placed prior to shipment to an offsite vendor for crushing and disposal, or recycling.

Used oil filters are not to be disposed in the general garbage.

[1] If you intend to store used oil in a tank (i.e., anything larger than a 55-gallon barrel), it must first be approved by the Vestas Environmental Department.

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4.4.5 Burning Used Oil in Space Heaters

Under certain conditions, the regulations allow used oil to be burned in space heaters at the location where the used oil is generated. **HOWEVER**, this practice is **NOT ALLOWED** at any Vestas facility. Vestas has made the determination that it is not in our best interest to allow facilities to burn their used oil.

4.4.6 Used Oil from Remote or Field Locations

When operations or maintenance activities require that used oil be generated inside a turbine pod or other wind park-related location, all reasonable precautions must be taken to prevent spilling any used (or new) oil and that it be carefully transported back to the Vestas service garage and placed into an appropriate used oil container:

Used oil produced from maintenance of a wind turbine that will be transferred back to the onsite Vestas service garage must be collected into a container that is: **a)** In good condition, **b)** can be closed, **AND, c)** is not leaking. Furthermore, the container must be labeled with the words **USED OIL.**

Upon arrival back at the garage, the used oil **MUST** be transferred into appropriate accumulation containers (e.g., 55-gallon barrel) before your work shift is over. **NO EXCEPTIONS.**

Any Vestas fleet vehicle used to transport a container of used oil, regardless of volume, must have an onboard spill kit equipped with sufficient supplies to completely cleanup a spill.

4.4.7 Fuel and Used Oil

Vestas does not allow the mixing of other fuels with used oil. Mixing gasoline, diesel, kerosene, and other fuels with oil can lower the flash point to below 140°F, which will cause the entire mixture to become regulated as a hazardous waste.

4.4.8 Hazardous Waste and Used Oil

Put simply, placing any quantity of hazardous waste into used oil can make the resulting mixture a hazardous waste that contains used oil[2]. **DO NOT** mix anything that may be considered a hazardous waste such as a solvent (acetone, MEK, toluene, etc.), cleaner, thinner, brake cleaner, electrical contact cleaner, or paint waste with used oil. If mixing does occur, contact the Corporate Environmental Manager so that the mixture can be managed before more used oil is added to the mixture.

4.4.9 Arranging for Waste Oil Shipments

Contact the Site HazMat Coordinator or Vestas' Corporate Environmental Manager for assistance in arranging for the pick-up of used oil. Vestas' Corporate Environmental Department is responsible for procuring qualified contractors to manage our used oil.

[2] The regulations allow small amounts of certain hazardous wastes to be mixed with used oil. However, it is Vestas' policy to prohibit the mixing of any hazardous waste with used oil.

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5. Operating Requirements

This section provides an overview of the regulatory requirements that pertain to the generation, storage and management of used oil. The general categories include:

- *Storage requirements*
- Managing stormwater
- Inspections
- Reporting and recordkeeping

Vestas service site personnel that generate or produce used oil are responsible for assuring that all requirements identified below are fulfilled. Any deviation from, or exception to, these requirements must be reported to Vestas's Corporate Environmental Manager.

5.1 Used Oil Storage

This section provides an overview of the requirements that apply to the storage of used oil.

5.1.1 All Vestas Operations

- Any quantity of used oil must be collected into an appropriate metal or plastic container that is non-leaking, is in good condition, and can be closed/sealed.
- The container must be labeled with the words "USED OIL."
- The container must be kept closed except when adding or removing oil.
- All used oil containers or tanks must be stored in an area or device that is equipped with secondary containment.

5.1.2 Mobile Operations

- If you know you will be doing a remote activity that requires you to transport used oil on fleet vehicles, place the materials into a tote or other container that will provide secondary containment while in transit.
- All Vestas fleet vehicles used for transporting hazardous materials must be equipped with a spill kit.

5.1.3 Used Oil Storage Area Operating Requirements

- Containers of used oil must be stored in an area equipped with secondary containment.
- Storage containers and containment areas must be visually inspected WEEKLY for evidence of corrosion, damage, leakage, or other deterioration.

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5.2 Stormwater

All Vestas Service personnel MUST make a conscious effort to assure that drips, leaks, and minor spillage of oils (crankcase, turbine, hydraulic, etc.) are immediately cleaned up with absorbent materials. (Absorbent materials must be collected and placed into a drum or other suitable container until the site HazMat Coordinator or Corporate Environmental Manager can determine if the material needs to be tested.)

- Do not allow drips, leaks, etc., to enter into site storm drains, ditches, or swales, or percolate into the ground. Preventing the loss of even small amounts of used oil into the stormwater system is a top priority for all Vestas personnel. Oil on water also leaves a telltale sheen that is unmistakable.
- Any precipitation that comes into contact with used oil MUST NOT be allowed to discharge to any storm drain inlet, ditch, swale, or into the ground, etc.
- If your facility has a outdoor hazardous material/used oil storage area that is equipped with secondary containment, precipitation that accumulates within the containment area must first be visually inspected to make sure no leaks or spillage of hazardous materials has occurred into the containment area prior to discharging the accumulated water. If it is suspected or confirmed that leakage has occurred as evidenced by a sheen or other indication, the water must be collected or tested to confirm if it is suitable for discharge into the storm drainage system.

5.3 Inspections

Each area used for storing used oil must be inspected to assure that each container is in satisfactory condition and to make sure any secondary containment systems are functioning properly and are receiving appropriate preventative maintenance to assure that no unacceptable releases to the environment occur.

Written records for daily visual inspections are recommended, but not required, unless a spill or release is discovered. Written records for weekly and monthly inspections are required.

At a minimum, inspection records **MUST** include the **a)** date and time of the inspection, **b)** the name of the individual making the observations, **c)** a notation of the observations made, and **d)** the date and nature of any repairs or other remedial actions.

5.3.1 Visually Inspect or Verify Daily

It is *recommended* that Facility personnel check areas where used oil is stored every day to make certain the containers are in good condition and no releases are occurring.

5.3.2 Visually Inspect or Verify Weekly

- That container(s) of used oil are stored in a secure and properly maintained area equipped with secondary containment and that there is no evidence of leakage.

5.3.3 Visually Inspect or Verify Monthly

- Check to assure that an adequate inventory of spill response supplies is available at or near the area where the containers are located; and
- Emergency notification telephone numbers are posted at or near the storage area.

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5.4 Reporting Requirements

- At a minimum, inspection records MUST include the date and time of the inspection, the name of the individual making the observations, a notation of the observations made, and the date and nature of any repairs or other remedial actions; and
- All spills must be immediately reported (within 15 minutes of discovery) to the site HazMat Coordinator or Corporate Environmental Manager.

5.5 Recordkeeping Requirements

The Site HazMat Coordinator, or designee, must maintain the following records and documents:

- An emergency response Contingency Plan, Spill Prevention Control and Countermeasures Plan, (SPCC) or other plan. (If you are uncertain contact the Corporate Environmental Manager);
- Inspection logs kept for at least 3 years;
- Training documents, including copies of training;
- Copy of the annual State Fire Marshal hazardous substance survey forms; and
- Copies of all hazardous waste manifests or shipping papers from all used oil shipments.

Figure 2 Example of Used Oil Label that must be affixed to Tanks and Containers
(Labels are available from the Corporate Environmental Manager)

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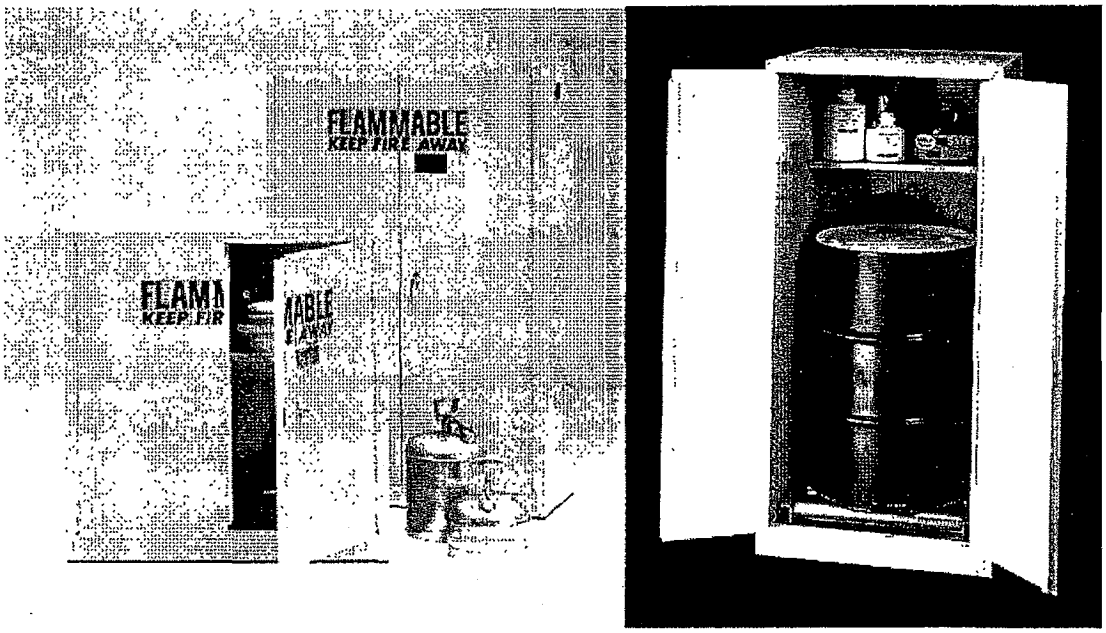

Figure 3 Example of Approved Flammable and Combustible Liquid Storage Cabinets that can be used for Used Oil

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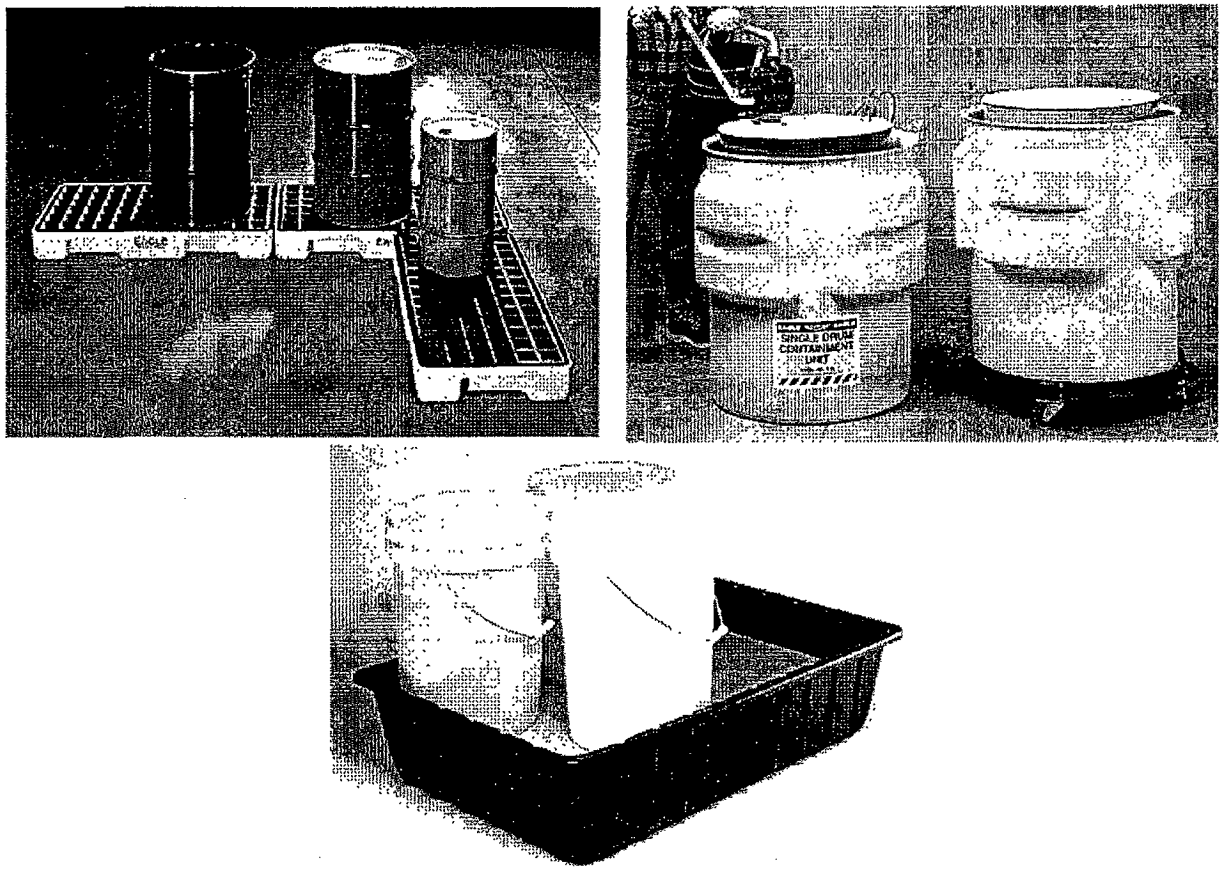

Figure 4 Example of Approved Portable Indoor or Covered Use Secondary Containment Devices Suitable for Used Oil Containers

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6. History of This Document

Rev. no.:	Date:	Description of changes
00	2006-07-26	First edition – Reformat and renumbered 25-Jul-2007
01	2010-01-01	Content and template updates

T09 0008-8010 Ver 01 - Approved - Exported from DMS: 2010-03-09 by ASUER

VAME Electrical Safety Manual

Contents

1. **Definitions** 3
2. **Program Administration** 8
2.1 Purpose and Policy 8
2.2 Scope 8
2.3 Responsibilities 8
2.4 Associated Documents 8
2.5 Program Review 9
2.6 Electrical Incident Reporting and Investigation Program 9
2.7 Contractor Requirements 9
2.8 Disciplinary Actions for Non-Compliance 10
2.9 Electrical Safety Team 10
2.10 Internal Auditing 11
2.11 External Auditing 12
3. **Employee Electrical Qualification and Safety Training** 13
3.1 Purpose 13
3.2 Responsibilities 13
3.3 Additional Requirements for Canadian Sites 13
3.4 General Requirements 13
3.5 Training Requirements 14
3.6 Job Qualification Requirements 15
3.7 Training Content 15
3.8 Retraining 16
4. **Electrical Approach Boundaries** 18
4.1 General Requirements 18
4.2 Shock Protection Boundaries 19
4.3 Arc Flash Protection Boundary 20
4.4 Barricade 20
4.5 Turbine Posting 20
5. **Electrical Personal Protective Equipment** 21
5.1 Shock Protection PPE 21
5.2 Arc Flash PPE 24
6. **Electrical Safe Work Practices** 27
6.1 Requirement for Deenergization 27
6.2 *Electrical Lockout (LOTO) and Grounding* 28
6.3 Voltage Testing 30

T09 0008-7990 Ver 03 - Approved - Exported from DMS: 2010-10-05 by ASUER

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6.4 *Job Manning Requirements* 32
6.5 Basic Electrical Work Practices 34
6.6 Electrical Troubleshooting 37
6.7 Energized Electrical Work Permit 38

7. Special Tasks 40
7.1 Infrared inspections 40
7.2 Portable generator connection and operation 40

8. Arc Flash Hazard Analysis 41
8.1 General 41
8.2 What is an Arc Flash Hazard Analysis 41
8.3 Requirements 42
8.4 Review and Approval 43
8.5 Labeling 43
8.6 Periodicity 46

9. Tools 47
9.1 Test Instruments 47
9.2 Live-line tool (Hot-stick/Shotgun) 48
9.3 Temporary Static Grounds 48
9.4 Temporary Personal Protective Grounds 49
9.5 Voltage-Rated Hand Tools 51
9.6 Portable power tools 52
9.7 Extension Cords 52
9.8 Fiberglass Ladders 53

10. Appendix A – VAME Energized Electrical Work Permit 55
11. Appendix B – VAME Electrical Safe Work Procedure Audit 57
12. Appendix C – *Training Level Matrix* 58
13. History of this Document 59

T09 0008-7990 Ver 03 - Approved - Exported from DMS: 2010-10-05 by ASUER

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1. Definitions

Approved: 1) accepted, certified, listed, or labeled by a recognized testing laboratory/agency (for example, UL Listed), or 2) acceptable to the authority having jurisdiction.

Arc Flash Hazard: A dangerous condition associated with the possible release of energy caused by an electric arc. An arc flash hazard may exist when energized electrical conductors or circuit parts are exposed or when they are within equipment in a guarded or enclosed condition, provided a person is interacting with the equipment in such a manner that could cause an electric arc. Under normal operating conditions, enclosed energized equipment that has been properly installed and maintained is not likely to pose an arc flash hazard.

Arc Flash Hazard Analysis (AFHA): A study investigating a worker's potential exposure to arc-flash energy, conducted for the purpose of injury prevention and the determination of safe work practices, arc flash protection boundary, and the appropriate levels of PPE.

Arc Flash Suit: A complete FR clothing and equipment system that covers the entire body, except for the hands and feet. This includes pants, jacket, and a beekeeper-type hood fitted with a face shield.

Arc Rating: The value attributed to materials that describes their performance to exposure to an electrical arc discharge. The arc rating is expressed in cal/cm^2 and is derived from the determined value of the arc thermal performance value (ATPV) or energy of breakopen threshold (EBT) (should a material system exhibit a breakopen response below the ATPV value) derived from the determined value of ATPV or EBT. (*Breakopen* is a material response evidenced by the formation of one or more holes in the innermost layer of flame-resistant material that would allow flame to pass through the material.)

Arc Rated: The maximum incident energy resistance demonstrated by a material (or a layered system of materials) prior to break-open or at the onset of a second-degree skin burn. Arc rating is normally expressed in cal/cm^2.

Boundary, Arc Flash Protection: When an arc flash hazard exists, an approach limit at a distance from a prospective arc source within which a person could receive a second degree burn if an electrical arc flash were to occur.

Boundary, Limited Approach: An approach limit at a distance from an exposed energized electrical conductor or circuit part within which a shock hazard exists.

Boundary, Prohibited Approach: An approach limit at a distance from an exposed energized electrical conductor or circuit part within which work is considered the same as making contact with the electrical conductor or circuit part.

Boundary, Restricted Approach: An approach limit at a distance from an exposed energized electrical conductor or circuit part within which there is an increased risk of shock, due to electrical arc over combined with inadvertent movement, for personnel working in close proximity to the energized electrical conductor or circuit part.

Circuit Breaker: A device designed to open and close a circuit by nonautomatic means and to open the circuit automatically on a predetermined overcurrent without damage to itself when properly applied within its rating.

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Deenergized: Free from any electrical connection to a source of voltage and from electrical charge; not having a voltage different from that of the earth.

Deenergized Work: Deenergized work shall be considered any work performed on or near equipment and circuits that has been placed in an electrical safe work condition by a Lockout /Tagout procedure that meets the requirements outlined in the VAME LOTO Program.

Deranged Equipment: Electrical equipment that has been subjected to an electrical failure shall be considered deranged equipment until its electrical integrity can be verified by testing and inspection.

Device: A unit of an electrical system that carries or controls electric energy as its principal function.

Disconnecting Means: A device, or group of devices, or other means by which the conductors of a circuit can be disconnected from their source of supply.

Disconnecting (or Isolating) Switch (Disconnector, Isolator): A mechanical switching device used for isolating a circuit or equipment from a source of power.

Electrical Hazard: A dangerous condition such that contact or equipment failure can result in electric shock, arc flash burn, thermal burn, or blast.

Electrical Safety: Recognizing hazards associated with the use of electrical energy and taking precautions so that hazards do not cause injury or death.

Electrical Safety Team: A three-member team consisting of an electrical engineer, a technical trainer, and a technician, all thoroughly familiar with electrical safety concepts. The Electrical Safety Team holds various responsibilities outlined in this manual, and reports to VAME HSE for all matters of electrical safety.

Electrically Safe Work Condition: A state in which an electrical conductor or circuit part has been disconnected from energized parts, locked/tagged in accordance with established standards, tested to ensure the absence of voltage, and grounded if determined necessary. In the generic term, this is a Zero-Energy State.

Enclosed: Surrounded by a case, housing, fence, or wall(s) that prevents persons from accidentally contacting energized electrical conductors or circuit parts.

Enclosure: The case or housing of apparatus, or the fence or walls surrounding an installation to prevent personnel from accidentally contacting energized electrical conductors or circuit parts or to protect the equipment from physical damage.

Energized: Electrically connected to, or is, a source of voltage.

Energy Control Coordinator: A LOTO Specialist who has been designated by the Site Manager / Construction Manager to be the primary person in charge of the administration of the LOTO Program at the site location. The Energy Control Coordinator's duties are further defined in the VAME LOTO Program (HSE073).

Equipment: A general term, including material, fittings, devices, appliances, luminaries, apparatus, machinery, and the like used as a part of, or in connection with, an electrical installation.

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Electrical Hazard: A dangerous condition such that contact or equipment failure can result in electrical shock, arc flash burn, thermal burn, or blast injury.

Electrical Safety Manual: This document.

Electrical Safety Program: The culmination of documents, policies, procedures and programs that exist for the purpose of electrical safety.

Energized Electrical Work Permit: This permit is required to perform work on energized electrical systems. Exceptions are troubleshooting and voltage testing. The form is found in Appendix A.

Energized Work: Energized work shall be considered any work that the employee is exposed to an electrical hazard. An example would be making contact with any object that has the potential of 50 volts (AC or DC) or higher. Energized work is also considered by VAME as any work within the restricted approach boundary where inadvertent movement by the employee could cause contact with any object that has the potential of 50 volts or higher. VAME considers any work that places the employee in a high risk factor due to flash and blast hazard as energized work.

Exposed (as applied to energized electrical conductors or circuit parts): Capable of being inadvertently touched or approached nearer than a safe distance by a person. It is applied to electrical conductors or circuit parts that are not suitably guarded, isolated, or insulated.

Externally Operable: Capable of being operated without exposing the operator to contact with energized electrical conductors or circuit parts.

Feeder: All circuit conductors between the service equipment, the source of a separately derived system, or other power supply source and the final branch-circuit overcurrent device.

Flame-Resistant (FR): The property of a material whereby combustion is prevented, terminated, or inhibited following the application of a flaming or non-flaming source of ignition, with or without subsequent removal of the ignition source.

Fuse: An over-current protective device with a circuit opening fusible part that is heated and severed by the passage of overcurrent through it.

Grounded (Grounding): Connected (connecting) to ground or to a conductive body that extends the ground connection.

Ground-Fault Circuit-Interrupter (GFCI): A device intended for the protection of personnel that functions to deenergize a circuit or portion thereof within an established period of time when a current to ground exceeds the values established for a Class A device. Class A ground-fault circuit-interrupters trip when the current to ground is 6 mA or higher and do not trip when the current to ground is less than 4 mA.

Guarded: Covered, shielded, fenced, enclosed, or otherwise protected by means of suitable covers, casings, barriers, rails, screens, mats, or platforms to remove the likelihood of approach or contact by persons or objects to a point of danger.

Hazard Risk Category (HRC): PPE clothing categories identified in NFPA 70E.

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Incident Energy: The amount of energy impressed on a surface, a certain distance from the source, generated during an electrical arc event. One of the units used to measure incident energy is calories per centimeter squared (cal/cm^2).

Insulated: Separated from other conducting surfaces by a dielectric (including air space) offering a high resistance to the passage of current. When an object is said to be insulated, it is understood to be insulated for the conditions to which it is normally subject. Otherwise, it is, within the purpose of these rules, uninsulated.

Labeled: Equipment or materials to which has been attached a label, symbol, or other identifying mark of an organization that is acceptable to the authority having jurisdiction and concerned with product evaluation, which maintains periodic inspection of production of labeled equipment or materials, and by whose labeling the manufacturer indicates compliance with appropriate standards or performance in a specified manner.

Live Parts: Energized conductive components.

Neutral Conductor: The conductor connected to the neutral point of a system that is intended to carry current under normal conditions.

On or Near: On or near refers to work within the limited approach boundary.

Personal Protective Grounds: Grounding conductors that are designed to carry the maximum fault current that could appear at the point of grounding for the time necessary to clear the fault.

Qualified Person: One who has skills and knowledge related to the construction and operation of the electrical equipment and installations and has received safety training to recognize and avoid the hazards involved.

Root Cause: An incident's most basic cause that can be reasonably identified, and, when mitigated, will prevent (or significantly reduce the likelihood or consequences of) the incident's recurrence.

Separately Derived System: A premises wiring system whose power is derived from a source of electric energy or equipment other than a service. Such systems have no direct electrical connection, including a solidly connected grounded circuit conductor, to supply conductors originating in another system.

Shock Hazard: A dangerous condition associated with the possible release of energy caused by contact or approach to energized electrical conductors or circuit parts.

Short-Circuit Current Rating: The prospective symmetrical fault current at a nominal voltage to which an apparatus or system is able to be connected without sustaining damage exceeding defined acceptance criteria.

Single-Line Diagram: A diagram that shows, by means of single lines and graphic symbols, the course of an electric circuit or system of circuits and the component devices or parts used in the circuit or system.

Static Grounds: Grounding conductors designed to dissipate induced voltages.

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Switch, Isolating: A switch intended for isolating an electric circuit from the source of power. It has no interrupting rating, and it is intended to be operated only after the circuit has been opened by some other means.

Switching Device: A device designed to close, open, or both, one or more electric circuits.

Ultimate Point of Isolation: During a grid outage, this is the upstream isolation device that is used for lockout. It still has voltage on the line (grid) side. Other isolation points downstream are all deenergized on both the line and load side.

Unqualified Person: A person who is not qualified to perform electrical work. VAME Level 0 or 1 Unqualified Technician.

Utilization Equipment: Equipment that utilizes electric energy for electronic, electromechanical, chemical, heating, lighting, or similar purposes.

Ventilated: Provided with a means to permit circulation of air sufficient to remove an excess of heat, fumes, or vapors.

Vestas Offsite Manager: The immediate supervisor for the Site Manager or Construction Manager. Their permission is required for certain activities.

Voltage (of a Circuit): The greatest root-mean-square (rms) (effective) difference of potential between any two conductors of the circuit concerned.

Voltage, Nominal: A nominal value assigned to a circuit or system for the purpose of conveniently designating its voltage class (e.g., 120/240 volts, 480Y/277 volts, 600 volts). The actual voltage at which a circuit operates can vary from the nominal within a range that permits satisfactory operation of equipment.

Voltage to Ground: For grounded circuits, the voltage between the given conductor and that point or conductor of the circuit that is grounded; for ungrounded circuits, the greatest voltage between the given conductor and any other conductor of the circuit.

Working On (energized electrical conductors or circuit parts): Coming in contact with energized electrical conductor or circuit parts with the hands, feet, or other body parts, with tools, probes, or with test equipment, regardless of the personal protective equipment a person is wearing. There are two categories of "working on": *Diagnostic (testing)* is taking readings or measurements of electrical equipment with approved test equipment that does not require making any physical change to the equipment; *repair* is any physical alteration of electrical equipment (such as making or tightening connections, removing or replacing components, etc.).

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2. Program Administration

2.1 Purpose and Policy

2.1.1 VAME believes incidents and injuries are preventable. While the company has an obligation to provide a safe and healthful workplace, each employee has a personal responsibility to maintain that safe environment through safe performance of tasks. Through joint efforts, an incident and injury free work environment can be achieved and maintained.

2.1.2 The purpose of this document is to establish the minimum requirements for an electrical safety program. This written manual has been developed as the written component of VAME's Electrical Safety Program.

2.1.3 The objectives of this manual are to:

a) Establish a method for identifying and mitigating potential electrical hazards in the workplace.

b) Establish VAME's standard practices related to electrical safety in the workplace.

c) Comply with US and Canadian regulatory requirements for electrical safety in the workplace.

2.2 Scope

WARNING: The procedures covered by this publication must be carried out only by persons who are knowledgeable in the operation and maintenance of wind turbines and in the practice of electrical safety and who have been trained and certified by Vestas as Qualified Persons. These instructions are intended only for such Qualified Persons. They are NOT intended to be a substitute for adequate training and experience in safety procedures for this type of equipment. Failure to obtain the proper training and certification and to observe the precautions described in this Electrical Safety Manual may result in serious injury or death.

2.2.1 This program applies to all VAME employees working at wind turbines in the US and Canada. It covers employees and contractors who work on or near exposed energized electrical conductors or circuit components operating at between 50 volts and 40,000 volts.

2.2.2 Each wind farm location's management shall maintain written plans or procedures that, at a minimum, comply with all local, state, provincial and federal laws and regulations that apply to the facility.

2.2.3 Each wind farm location shall comply with the most stringent requirement established either by local law or by this Electrical Safety Manual.

2.3 Responsibilities

Responsibility for complying with the requirements of the Electrical Safety Program ultimately rests with each individual employee. To eliminate hazardous conditions and practices in the workplace, specific responsibilities are designated to certain positions under the Electrical Safety Program.

2.4 Associated Documents

United States. Occupational Safety & Health Administration. OSHA Standards on Electrical Safety - Code of Federal Regulations, Title 29, Subpart J, The Control of Hazardous Energy (Lockout/Tagout), Subpart S, "Electrical" (parts 1910. 331 – 335). Washington, D.C.: OSHA, 1994.

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T09 0008-7990 Ver 03 - Approved - Exported from DMS: 2010-10-05 by ASUER

United States. Occupational Safety & Health Administration. OSHA Standards on Electrical Safety - Code of Federal Regulations, Title 29, Subpart R, "Electrical Generation, Transmission & Distribution" (parts 1910.269). Washington, D.C.: 1994.

United States. National Fire Protection Association. Standard for Electrical Safety in the Workplace (NFPA 70E). Quincy, MA: National Fire Protection Association, 2004.

Canada. Canadian Safety Association. CSA Z462-08, Workplace Electrical Safety. Mississauga, ON: Canadian Safety Association, 2008.

VAME Safety Manual

2.5 Program Review

2.5.1 This written program will be reviewed annually by the HSE Department, in conjunction with the Electrical Safety Team.

2.5.2 Additionally, this program shall be reviewed within 90 days of the release of any revision to the referenced standards.

2.6 Electrical Incident Reporting and Investigation Program

2.6.1 All incidents shall be reported and investigated in accordance with VAME Incident Reporting, Investigation, and Prevention Policy.

2.6.2 All electrical HSE Notifications shall be reviewed by the Electrical Safety Team. Post incident investigation reports will be provided to the Electrical Safety Team for review.

2.6.3 A mandatory medical assessment shall immediately follow any electric shock incident or arc flash exposure, however minor. Return to work will require following the Return to Work check sheet (DMS #0008-8015).

2.6.4 In the event of a serious electrical incident, the Electrical Safety Team will conduct a site audit and investigation.

2.6.5 The results of the Electrical Safety Team audit and investigation, including corrective actions, will be forwarded to the management team for review.

2.7 Contractor Requirements

2.7.1 All contractors are expected to comply with the requirements of this section and shall perform all tasks in a manner that assures the safety of the contractor's employees and the safety of VAME employees.

2.7.2 Contractors shall contact the VAME Energy Control Coordinator whenever a need arises to perform work on energized electrical circuitry. The contractor shall assure that an Energized Electrical Work Permit request is completed and approved prior to initiation of the work.

2.7.3 Contractors shall furnish proof that all personnel who will perform electrically related tasks are Qualified for the tasks they will perform before job task (work) begins.

2.7.4 Upon request, the contractor shall provide full disclosure regarding any regulatory citations that have been issued against the company and contacted sub-contractors during the previous five years, the resolution of those citations, and any pending regulatory action(s) against the company.

T09 0008-7990 Ver 03 - Approved - Exported from DMS: 2010-10-05 by ASUER

2.7.5 All equipment necessary for contractor and sub-contract employees to perform electrical work in a safe manner, including personal protective equipment, tools and instruments, warning signs, barriers and barricades, and insulated tools shall be furnished by the contractor to his employees and used as prescribed.

2.7.6 VAME reserves the right to immediately stop any work that is deemed unsafe by VAME until the contractor or sub-contractor corrects the deficiencies.

2.7.7 Repeated instances of unsafe conduct, conditions, and violations of applicable regulatory standards or VAME policy may result in cessation of the project, termination of the contract, and potential removal from consideration for future work.

2.8 Disciplinary Actions for Non-Compliance

2.8.1 Failure to comply with the requirements of this standard may result in disciplinary action up to and including termination.

2.8.2 Failure of a contractor or sub-contractor to follow specified procedures and/or observation of the contractor engaging in activities deemed to be unsafe may result in the immediate cessation of the activity, removal of that company or individual from current and future contracts.

2.9 Electrical Safety Team

VAME shall maintain a small team of employees to help steer the Electrical Safety Program.

2.9.1 Team Composition

The Electrical Safety Team shall be composed of the following mandatory representatives, who shall be designated in writing by the HSE Director:

a) Electrical Engineering: one electrical engineer shall be designated as the Electrical Safety Engineer. The Electrical Safety Engineer shall be a registered professional engineer with experience in power engineering, power systems maintenance, arc flash hazard analysis, and a background in electrical work supervision.

b) Technical Support: one technician from the Technical Support group shall be designated as the Electrical Safety Technician. The Electrical Safety Technician shall be a Level 3 Qualified Technician with site experience as an Energy Control Coordinator.

c) Technical Training: one trainer from the Technical Training department shall be designated as the Electrical Safety Trainer. The Electrical Safety Trainer shall be a Level 3 Qualified Technician with site experience as an Energy Control Coordinator and as an instructor for the LOTO Specialist and the Electrical Safety for Qualified Workers courses.

2.9.2 Team Responsibilities

a) Electrical Safety Program Review

The Electrical Safety Team shall lead the annual review of the Electrical Safety Program. The Electrical Safety Team shall be responsible for ensuring that the Electrical Safety Program remains up to date with new turbine technologies, electrical work tasks and electrical safety standards.

b) Issue Resolution

T09 0008-7990 Ver 03 - Approved - Exported from DMS: 2010-10-05 by ASUER

The Electrical Safety Team shall be the VAME authority in resolving technical or program interpretation questions. As a result of technical interpretations, the Electrical Safety Team will publish an Electrical Safety Notice for issues that merit dissemination. Some technical interpretations may require a revision of the Electrical Safety Manual outside of the normal annual revision cycle. In all cases, all interpretations or revisions shall be communicated in writing to the following groups:

- Technology/Electrical Engineering
- Technical Training
- HSE
- Technical Support
- Construction
- Service

c) **Additional Training**

When new interpretations or revisions require additional training, the Electrical Safety Team shall coordinate with the Technical Training Department to ensure that adequate and timely training is made available to technicians.

d) **Audits**

The Electrical Safety Team shall review the results of electrical audits and identify areas where the Electrical Safety Manual or the training program require revisions.

e) **Incident Investigation**

The Electrical Safety Team shall also perform those duties outlined in section 2.6.

2.10 Internal Auditing

2.10.1 The strength of the Electrical Safety Program rests in large part on the effectiveness of the internal audit program. There will not be any 100% audits. Instead, audit requirements shall focus on those elements that are most critical in improving electrical safety for the technician. These focus elements are determined from incident reporting and are expected to vary over time. Any electrical audit is primarily expected to quantify electrical skill level and safety attitude, as these are the root elements of safe electrical behavior.

2.10.2 There are three types of internal audit required by this program.

a) **Site Electrical Audit**

A Site Electrical Audit focuses on records, training effectiveness, material condition of equipment, condition of PPE, etc.

b) **Personal Electrical Work Practices Audit**

A personal work practices audit focuses on one particular technician at a time. The technician is observed performing a particular electrical task and is evaluated on the basis of his or her behavior, technical competency, skill level, and safety attitude.

c) **Training Audit**

The Training Audit focuses on the training performed by the Technical Training department. The audit will evaluate both the content of the course and the effectiveness of the instructor.

T09 0008-7990 Ver 03 - Approved - Exported from DMS: 2010-10-05 by ASUER

2.10.3 **Periodicity**

a) The site manager shall conduct a Site Electrical Audit and a Personal Electrical Work Practices Audit quarterly. Copies of the audits shall be sent to the Electrical Safety Team for review.

b) The construction manager shall conduct one Site Electrical Audit and a Personal Electrical Work Practices Audit for each project, during the pre-commissioning phase. Copies of the audits shall be sent to the Electrical Safety Team for review.

c) The Electrical Safety Team shall pick three service sites and one construction site per year, and perform an onsite Site Electrical Audit and a Personal Electrical Work Practices Audit quarterly. These audits shall take the place of the regularly scheduled audits.

d) The Electrical Safety Team shall audit each electrical safety course given at the Technical Training Center annually.

2.10.4 **Documentation**

a) All audits shall be documented and kept on file by the Electrical Safety Team.

b) The documentation shall be made available on request to the HSE department.

2.11 External Auditing

2.11.1 The HSE department shall ensure that a qualified external organization is hired to perform an external audit of VAME's Electrical Safety Program.

2.11.2 The external audit shall be scheduled no more than annually, but no less than every three years.

2.11.3 The results of the audit shall be presented to both the HSE department and the Electrical Safety Team. The Electrical Safety Team shall then prepare a report and plan of action within 30 days of receiving the audit report.

T09 0008-7990 Ver 03 - Approved - Exported from DMS: 2010-10-05 by ASUER

3. Employee Electrical Qualification and Safety Training

3.1 Purpose

This section provides overview information on the electrical safety training requirements established for specific job assignments. For an employee to be qualified and authorized to perform a task safely they must have safety training and demonstrated skills as required for that task.

3.2 Responsibilities

Responsibility for complying with the requirements of the Electrical Safety Program ultimately rests with each employee, contractor, sub-contractor, and vendor. To eliminate hazardous conditions and practices in the workplace, specific responsibilities will be designated to certain positions set forth by the employee's direct manager under the Electrical Safety Program.

3.3 Additional Requirements for Canadian Sites

3.3.1 Where Canadian regulations require that electrical work be performed by technicians with certifications above those required elsewhere in this manual, these requirements shall be followed.

3.3.2 Journeymen Electricians, Apprentice Electricians, and High Voltage workers who are hired as Vestas Technicians to comply with Canadian regulations for electrical work shall also meet the training and qualification requirements of Section 3 of this manual.

3.4 General Requirements

3.4.1 All new technicians must receive the Basic Safety Course before receiving job assignments. This training provides an overview of the OSHA, COHS, and VAME requirements prior to employees commencing work. Specialized safety training and/or on-the-job training is provided to each employee based on assigned tasks and duties.

3.4.2 All other employees shall complete a LOTO e-learning course within 30 days of hire to enable the employee to recognize electrical hazards and become aware of the LOTO Program should they visit a wind turbine site.

3.4.3 This section only applies to the electrical safety training requirements. Additional safety training is addressed within the overall safety training program.

Required Electrical Safety Training Topics Covered in This Program
Electrical Safe Work Practices
Electrical Lockout/Tagout
Personal Protective Equipment (PPE)
Personal Protective Grounds
Power Hand Tool inspection, marking and record keeping
Proper use of inspection of calibrated test equipment
Standby person training
Proper use and inspection of insulated tools
Electrical Emergency/Rescue Procedures

T09 0008-7990 Ver 03 - Approved - Exported from DMS: 2010-10-05 by ASUER

3.5 Training Requirements

The employee's immediate manager shall ensure the appropriate level of safety training is provided prior to the employee performing any work in a wind turbine. The immediate manager shall maintain a local record of training in each employee's file and forward an electronic copy to the Technical Training Department. The following is a list of electrical qualification levels at each VAME location.

3.5.1 Level 0 – Escorted Visitor - Unqualified Worker

a) Training Requirements:

Visitor orientation and safety briefing

b) Scope of Work:

- Cannot perform electrical work.
- Cannot enter into the arc flash protection boundary or limited approach boundary.
- Must install LOTO (locks and/or tags) under the supervision of a Level 2 qualified escort.
- Must wear Class 0 clothing and PPE.

3.5.2 Level 1 – Unqualified Worker

a) Training Requirements

Basic Safety Course

b) Scope of Work

- Must install LOTO (locks and/or tags) while in a turbine that is under LOTO.
- Can perform non-electrical work around energized electrical equipment as long as the cabinets are closed and remain closed.
- Cannot enter the limited approach boundary.
- Can work in electrical cabinets that have been properly isolated under the LOTO program.
- Can perform work under instruction as a Level 2 Qualified Worker.

3.5.3 Level 2 - Qualified Worker

a) Training Requirements

- Level 1 certification
- Electrical Safety For Qualified Workers (Part of Fundamentals)
- LOTO Qualified person qualification

b) Scope of Work

Cannot perform those tasks specifically identified as requiring Level 3 qualification. Can perform basic electrical work, including:

- Electrical LOTO.

T09 0008-7990 Ver 03 - Approved - Exported from DMS: 2010-10-05 by ASUER

- Voltage testing.
- Component replacement on locked out parts.
- HV switch operation and transformer grounding.
- Can perform work under instruction as a Level 3 Qualified Worker.

3.5.4 **Level 3 - Qualified Worker**

a) **Training Requirements**

- Level 2 qualification
- Turbine theory class
- LOTO Specialist qualification

b) **Scope of Work**

- Can perform all Level 2 work, plus:
- Work under an energized work permit
- Complex troubleshooting
- Interlock bypassing

3.6 Job Qualification Requirements

3.6.1 All escorted visitors shall complete the visitor orientation and safety briefing prior to entering a wind turbine.

3.6.2 All VAME Technicians shall qualify to Level 2, and work to qualify to Level 3.

3.6.3 The Energy Control Coordinator shall qualify to Level 3 as a prerequisite for the position. In addition, this person shall demonstrate in-depth knowledge of the Electrical Safety Program and the LOTO Program and be designated in writing by his/her immediate manager as the Energy Control Coordinator.

3.6.4 VAME Site Managers and Construction Managers shall complete the Electrical Safety for Qualified Workers portion of the Fundamentals Course.

3.6.5 VAME Electrical Engineers shall complete the Electrical Safety for Qualified Workers portion of the Fundamentals Course.

3.7 Training Content

3.7.1 The VAME Technical Training Director shall ensure that the electrical courses developed to qualify technicians meet the following generic requirements outlined in NFPA 70E / CSA Z462.

3.7.2 In addition, training content shall include a mixture of classroom and supervised hands-on exercises.

3.7.3 A qualified person shall be trained and knowledgeable of the construction and operation of equipment or a specific work method and be trained to recognize and avoid the electrical hazards that might be present with respect to that equipment or work method.

T09 0008-7990 Ver 03 - Approved - Exported from DMS: 2010-10-05 by ASUER

3.7.4 Such persons shall also be familiar with:

a) The proper use of the special precautionary techniques, personal protective equipment, including arc-flash, insulating and shielding materials, and insulated tools and test equipment.

b) The skills and techniques necessary to distinguish exposed energized electrical conductors and circuit parts from other parts of electrical equipment.

c) The skills and techniques necessary to determine the nominal voltage of exposed energized electrical conductors and circuit parts.

d) The approach distances specified in Section 4 of this manual and the corresponding voltages to which the qualified person will be exposed.

e) The decision-making process necessary to determine the degree and extent of the hazard and the personal protective equipment and job planning necessary to perform the task safely.

f) Tasks that are performed less often than once per year shall require retraining before the performance of the work practices involved.

g) Employees shall be trained to select an appropriate voltage detector and shall demonstrate how to use a device to verify the absence of voltage, including interpreting indications provided by the device. The training shall include information that enables the employee to understand all limitations of each specific voltage detector that may be used.

3.8 Retraining

3.8.1 Retraining on this program shall be conducted annually.

3.8.2 Retraining on this program shall be conducted following any electrical incident unless VAME determines the incident requires the termination of employment.

3.8.3 An employee shall receive additional training (or retraining) under any of the following conditions:

a) If the supervision or annual inspections indicate that the employee is not complying with the safety-related work practices.

b) If new technology, new types of equipment, or changes in procedures necessitate the use of safety-related work practices.

3.8.4 **Refresher Training**

The Technical Training department shall put together a monthly electrical safety training lesson on a slideshow or similar method. Monthly topics shall include, but are not limited to:

- Voltage glove inspection
- Electrical approach boundaries
- Energized electrical work permit
- Electrical LOTO
- High-voltage switchgear and electrical grounding
- Basic circuit theory
- Electrical diagrams

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T09 0008-7990 Ver 03 - Approved - Exported from DMS: 2010-10-05 by ASUER

- Basic troubleshooting
- Body positioning
- Voltage testers
- Voltage-rated tools
- Electrical incidents review

a) The monthly lesson shall be distributed to all sites, and all technicians shall cover the training as a safety meeting discussion topic during the month.

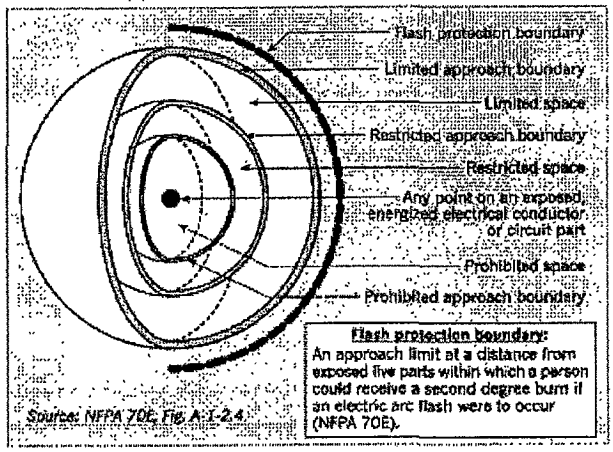
b) The Technical Training department shall track completion of the training.

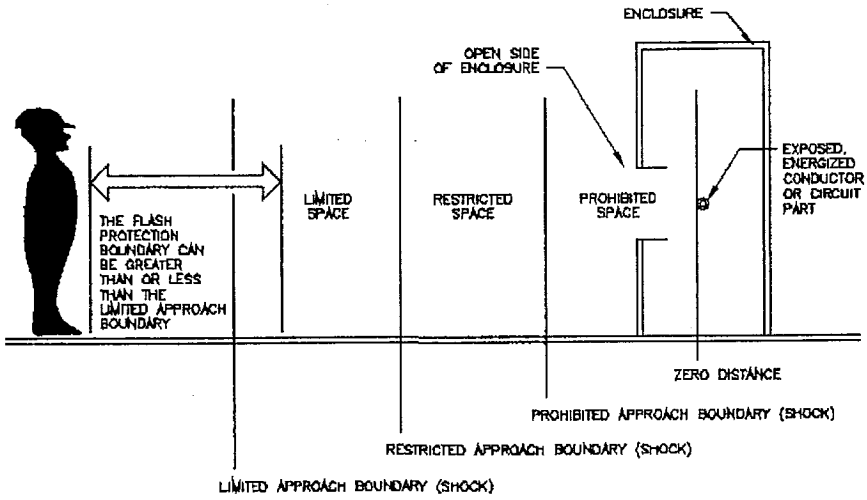
T09 0008-7990 Ver 03 - Approved - Exported from DMS: 2010-10-05 by ASUER

4. Electrical Approach Boundaries

4.1 General Requirements

Electrical approach boundaries are defined by NFPA 70E/CSA Z462.





T09 0008-7990 Ver 03 - Approved - Exported from DMS: 2010-10-05 by ASUER

Table 4.1 - Shock Protection Approach Boundaries

Nominal System Voltage Range, Phase to Phase	*Limited Approach Boundary*	*Restricted Approach Boundary*	*Prohibited Approach Boundary*
Less than 50 V	Not Specified	Not Specified	Not Specified
50 V - 300 V	3 ft 6 in	Avoid Contact	Avoid Contact
301 V - 750 V	3 ft 6 in	1 ft 0 in	0 ft 1 in
751 V - 15 kV	5 ft 0 in	2 ft 2 in	0 ft 7 in
15.1 kV - 36 kV	6 ft 0 in	2 ft 7 in	0 ft 10 in

4.2 Shock Protection Boundaries

4.2.1 General

All shock protection boundaries are defined based on equipment voltage alone. Shock protection boundaries are not defined unless an energized conductor is exposed or the worker is physically operating an electrical device.

4.2.2 Limited Approach Boundary

a) The Limited Approach Boundary is the closest distance that an unqualified person can approach exposed energized conductors without escort.

b) An unqualified worker may be escorted within the Limited Approach Boundary by a qualified worker, but may never enter the Restricted Approach Boundary.

4.2.3 Restricted Approach Boundary

a) The Restricted Approach Boundary may only be entered by a qualified worker.

b) All parts of the qualified worker that enter the Restricted Approach Boundary must be insulated from the equipment voltage.

c) All tools that enter the Restricted Approach Boundary must be insulated for the equipment voltage.

4.2.4 Prohibited Approach Boundary

a) Entering the Prohibited Approach Boundary is considered the same as making contact with the exposed energized conductor.

T09 0008-7990 Ver 03 - Approved - Exported from DMS: 2010-10-05 by ASUER

b) An Energized Electrical Work Permit is required to enter the Prohibited Approach Boundary, unless performing voltage testing or troubleshooting.

4.3 Arc Flash Protection Boundary

4.3.1 General

The arc flash protection boundary is defined as the distance from an exposed energized conductor at which the arc flash energy is calculated to be 1.2 cal/cm^2. This is the energy where unprotected, exposed skin would receive a second degree burn in the event of an arc flash.

4.3.2 Working Distance

The arc flash energy is calculated by an Arc Flash Hazard Analysis (AFHA). The AFHA assumes a typical working distance depending on the type of electrical gear. The arc flash energy is calculated at the specified working distance. This energy is the basis for the required arc flash protective equipment.

4.3.3 Requirements

Only qualified workers are permitted to enter the arc flash boundary. All personnel within the arc flash boundary must be suited for the arc flash energy at the working distance.

4.3.4 Application to Wind Turbines

a) The AFHA sets the approach boundary for arc flash based on the available energy. In a wind turbine, the arc flash boundary is set primarily by the physical layout.

b) For electrical work in the nacelle, where access is severely restricted, the arc flash boundary is designated as the plane of the yaw bearing. All personnel in the nacelle during electrical work that requires arc flash PPE will wear the same PPE as the person doing the work. In addition, no one is allowed in the hub or on the roof during this time. Personnel who do not don the required arc flash PPE should move to the yaw deck or below until the electrical work is complete.

c) For electrical work at the bottom of the tower, the arc flash boundary is at the bottom of the tower access stairs. All personnel in the tower during electrical work that requires arc flash PPE will wear the same PPE as the person doing the work. Personnel who do not wish to don the required arc flash PPE should move away from the tower until the electrical work is complete.

4.4 Barricade

4.4.1 General

All electrical work areas will be signed and barricaded. Personnel entering the work must be fully briefed on the work and fully equipped with the appropriate levels of personal protective equipment.

4.5 Turbine Posting

4.5.1 *High Voltage Sign*

All turbines will have a "Danger – High Voltage" sign posted on the turbine door. The sign will conform to ANSI Z535 standards for safety signing.

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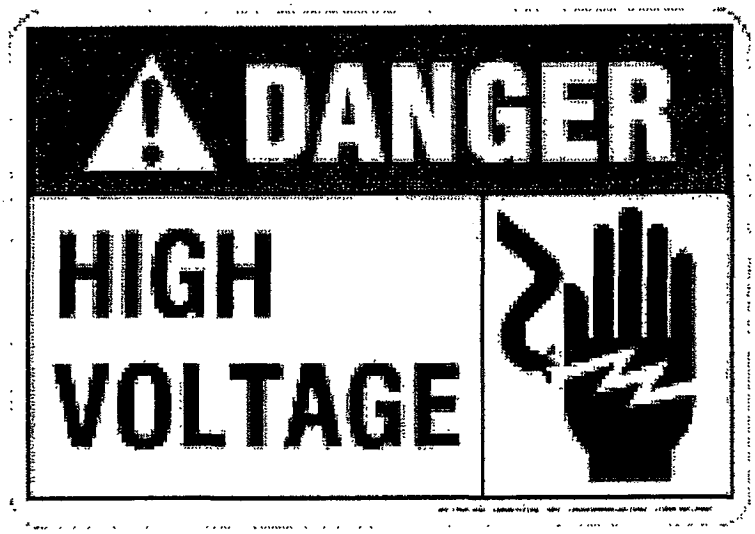
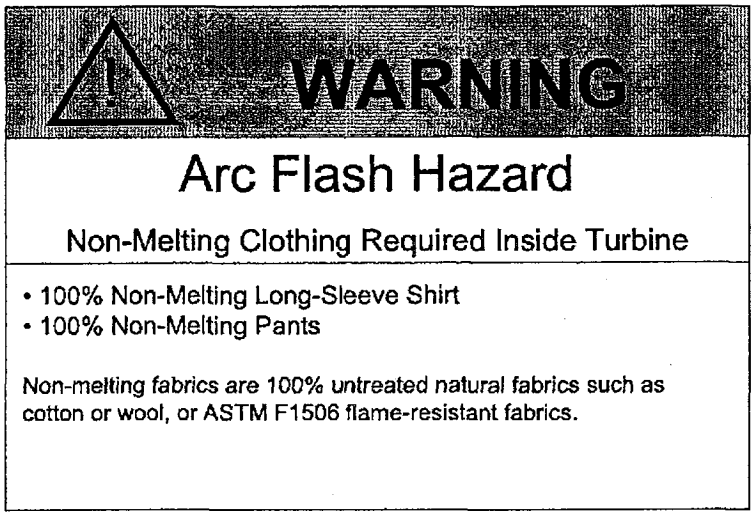


4.5.2 Arc Flash Hazard – Non-Melting Clothing Sign

All turbines will have a "Warning – Arc Flash Hazard – Non-Melting Clothing Required" sign posted on the turbine door.



5. Electrical Personal Protective Equipment

5.1 Shock Protection PPE

T09 0008-7990 Ver 03 - Approved - Exported from DMS: 2010-10-05 by ASUER

5.1.1 Prohibited Articles

Conductive articles of jewelry, such as watch bands, bracelets, rings, necklaces, metal-framed glasses, PDA's, cell phones, pagers and oversized belt buckles shall be removed from the worker's body whenever entering the Limited Approach Boundary.

5.1.2 Rubber Insulated Protective Equipment

a) Each individual who is assigned protective equipment shall be responsible for the care and storage of the issued equipment.

b) All new protective rubber equipment shall be tested by a certified testing laboratory and documented prior to being issued for service.

c) Rubber insulating protective equipment shall be inspected for damage before each use and immediately following any incident that can reasonably be suspected of having caused damage. Insulating equipment with any of the following defects shall not be used:

- A hole, tear, puncture, or cut.
- Ozone cutting or ozone checking (the cutting action produced by ozone on rubber under mechanical stress into a series of interlacing cracks).
- An embedded foreign object.
- Any of the following texture changes: swelling, softening, hardening, or becoming sticky or inelastic.
- Any other defect that damages the insulating properties.

5.1.3 Rubber Insulating Gloves

a) When exposed to electrical hazards of 50 volts or greater, approved rubber insulating gloves shall be used. At no time shall the voltage rating of the glove be exceeded. Gloves shall conform to ANSI/ASTM D120 - Standard Specification for Rubber Insulating Gloves, and ASTM F496 - Specification for In-Service Care of Insulating Gloves and Sleeves.

b) Each Qualified employee shall test their rubber gloves prior to each use. To test gloves for pinholes and other damage, fill the glove with air, roll up the cuff of the glove to make a seal, and squeeze the glove. Then hold the inflated glove close to the face and ear to feel and listen for air escaping from holes.

c) Defective rubber gloves shall not be used and shall be removed from service. If a rubber protective glove is found to be defective, then one of the fingers of the glove shall be cut off. The glove pair shall be exchanged for a new set.

d) Care of Gloves - Gloves in service shall be kept cuff-down in canvas glove bags. Gloves shall not be folded, creased, or rolled while in storage. Gloves shall be protected from heat, ozone, or prolonged exposure to the direct rays of the sun, and from contact with sharp articles or materials likely to damage gloves or cause deterioration of the rubber. Clean only with lukewarm water and mild soap detergent. Do not use solvents, oils, or grease on rubber gloves.

e) Rubber protective gloves shall be tested at intervals not to exceed 6 months (3 months in Oregon).

T09 0008-7990 Ver 03 - Approved - Exported from DMS: 2010-10-05 by ASUER

f) Gloves covered under this written program are designated by voltage rating. The electrical properties that correspond to these classes are shown below in Table 5.1. The voltage glove rating shall be selected based on the equipment's line-to-line voltage rating.

g) The required cuff lengths for the gloves are indicated in Table 5.1.

Table 5.1 – Voltage Requirements

Glove Class	Class Color	Proof Test Voltage AC/DC	Max. Use Voltage AC/DC	Required Cuff Length
0	[illegible]	5,000/20,000	1,000/1,500	14 inches
4	Orange	40,000/70,000	36,000/54,000	16 inches

h) The insulating gloves are to be returned to the individual's Inventory Coordinator or Safety Coordinator to be exchanged every six months (three months in Oregon) for a fresh pair of insulating gloves. A glove test date will be stamped or permanently marked on the inside of the glove. In no case is an issued glove to be used beyond its expiration date, which is 1 year (6 months in Oregon) from the test date.

i) **Storage**

When not in use, the gloves are to be stored in a glove bag kept in a location as cool, dark, and dry as possible. The gloves should be stored in a horizontal position to minimize the stress on the edge creases. The location shall be free as practicable from ozone, chemicals, oils, solvent, damaging vapors and fumes, and away from electrical discharge and sunlight. Gloves shall be stored in their natural shape. Gloves may be kept inside of protectors or in a bag, box, or container that is designed for and used exclusively for them. Gloves shall not be stored folded, creased, inside out, compressed, or in any manner that will cause stretching or compression.

j) **Leather Protectors**

The protector leather gloves shall be worn over the insulating rubber gloves to prevent mechanical damage. The leather protector glove shall be sized so that the insulating glove shall not be deformed from its natural shape.

The top cuff of the protector glove shall be shorter than the roller top of the insulating glove by at least the distance specified in Table 5.2 below.

Table 5.2 – Leather Protector Cuff Requirements

Glove Class	Distance (in)
0	0.5
4	4

T09 0008-7990 Ver 03 - Approved - Exported from DMS: 2010-10-05 by ASUER

Leather gloves that have been used for any other purpose shall not be used to protect insulating gloves. Protector gloves shall not be used if they have holes, tears, or other defects that affect their ability to give mechanical protection to the insulating glove.

Care should be exercised to keep the protector gloves as free as possible from oils, grease, chemicals, and other materials that may injure the insulating gloves. Protector gloves that become contaminated with injurious materials to the extent that damage may occur to the insulating glove shall not be used as protector gloves unless they have been thoroughly cleaned of the contaminating substance.

The inner surface of the protector gloves should be inspected for sharp pointed objects. This inspection should be made as often as the rubber gloves are inspected.

k) **Cloth Glove Liners**

Cloth gloves may be worn inside the insulating gloves for warmth in the winter and to absorb perspiration in the hot weather.

5.1.4 Rubber Insulating Blankets

a) Rubber insulating blankets shall be used to provide additional protection when work is being performed adjacent to exposed, energized parts. Blankets shall conform to ASTM D1048 - Standard Specification for Rubber Insulating Blankets and ASTM F479 - Standard Specification for In-Service Care of Insulating Blankets.

b) Blankets shall be inspected prior to each use. Defective blankets shall not be used and shall be removed from service.

c) Care of Blankets - Blankets shall be stored in a cool, dark, and dry location free from ozone, chemicals, oils, solvents, damaging vapors and fumes, and away from electrical discharges. Blankets shall be stored in a container that is designed for and used exclusively for them and shall not be kept folded, creased, distorted, or compressed in any manner that will cause stretching or compression.

d) Blankets shall be cleaned as necessary to remove foreign substances and shall be wiped clean of any oil, grease or other damaging substances as soon as practicable. Clean only with lukewarm water and mild soap detergent. Rinse thoroughly with water to remove all of the soap or detergent.

e) Rubber insulating blankets shall be tested at intervals not to exceed 12 months (6 months in Oregon).

5.2 Arc Flash PPE

5.2.1 Prohibited Clothing

Synthetic materials, such as acetate, nylon, polyester, polypropylene, spandex, and acrylic will melt when exposed to the heat of an arc blast and should not be worn inside the turbine at any time. Any synthetic material outerwear should be removed once inside the wind turbine.

5.2.2 Clothing Category Ratings

a) Vestas will use three classes of protective clothing: Class 0, Class 2 and Class 4.

b) Class 0 clothing is required by all persons, qualified or unqualified, to enter a turbine.

T09 0008-7990 Ver 03 - Approved - Exported from DMS: 2010-10-05 by ASUER

c) Class 2 clothing is required whenever working within the arc flash boundary of equipment rated from 1.2 cal/cm^2 to 8 cal/cm^2.

d) Class 4 clothing is required whenever working within the arc flash boundary of equipment rated from 8.1 cal/cm^2 to 40 cal/cm^2.

e) Specific arc flash clothing requirements are listed in detail in Table 4.1.

5.2.3 Exceptions to Class 0 Clothing Requirements

a) For Class 0 clothing only, miscellaneous items such as gloves and hats are exceptions to be made as required by the task at hand.

b) The long-sleeve shirt is not required when climbing the turbine, but must be worn both in the bottom of the tower and in the nacelle.

c) The fall protection harness is also a required exception. Remember to remove the fall protection harness and all non-arc-rated outerwear prior to performing electrical work. The fall protection harness must be staged for quick access in case an emergency descent is required.

d) These exceptions do not apply to Class 2 or 4 arc flash PPE.

5.2.4 Layering

a) When wearing arc-rated clothing, the outermost layer must always be arc-rated. Inner layers must be of non-melting clothing all the way to the skin.

b) It is acceptable, but not required, to wear the Class 2 clothing underneath the Class 4 suit.

5.2.5 Limitations

a) Arc-rated clothing is designed to limit the injury to a second-degree burn and protect the face. It will mitigate the seriousness of the burns but will not prevent physical trauma injuries.

b) Incident energies greater than 40 cal/cm² are classified "Dangerous". NFPA 70E has no clothing class for energies greater than 40 cal/cm². Any task on the electrical equipment is prohibited. In cases like this, it is recommended that the upstream electrical equipment be turned off before servicing the electrical equipment or modify the electric equipment in order to reduce the incident range so that the equipment can be safely serviced[1].

Table 5.2

VAME Personal Protective Clothing Minimum Requirements for Protection from Flash Energy

[1] Some manufacturers make arc flash suits rated to 100 cal/cm^2. This was based on a previous edition of NFPA 70E that is obsolete. Although 100 cal/cm^2 offers greater flash protection, the blast energy is too great. Engineered fixes shall only be used if they are approved by the VAME Technology/Electrical Engineering department.

T09 0008-7990 Ver 03 - Approved - Exported from DMS: 2010-10-05 by ASUER

NFPA 70E Clothing Category	*Clothing Description*
Class 0	Nonmelting materials (i.e. untreated cotton, wool, rayon or silk, or a blend of these materials) with a fabric weight at least 4.5 oz/yd ^{2} (some dress shirts are too light) : 1. Long-sleeve shirt 2. Pants Protective Equipment: 1. Safety glasses or goggles 2. Leather work shoes
Class 2	FR clothing, minimum arc rating (ATPV) of 8 cal/cm ^{2}: 1. Arc-rated long-sleeve shirt 2. Arc rated pants } or Arc-rated coveralls 3. Arc-rated arc flash suit hood FR Protective Equipment: 1. Hard hat 2. Safety glasses or goggles 3. Hearing protection (ear canal inserts) 4. Leather gloves 5. Leather work shoes
Class 4	FR clothing, minimum arc rating (ATPV) of 40 cal/cm ^{2}: 1. Arc-rated arc flash suit jacket 2. Arc-rated arc flash suit pants 3. Arc-rated arc flash suit hood FR Protective Equipment: 1. Hard hat 2. Safety glasses or goggles 3. Hearing protection (ear canal inserts) 4. Leather gloves 5. Leather work shoes

5.2.6 Standards for Arc-Rated Clothing

a) All clothing used as arc flash PPE shall conform to ASTM F1506. Such clothing is identified by a tag that specifies the arc rating in one of three ways:

- Arc Thermal Performance Value, e.g. ATPV 16.8 cal/cm^2

T09 0008-7990 Ver 03 - Approved - Exported from DMS: 2010-10-05 by ASUER

VESTAS PROPRIETARY NOTICE

- Break-Through Energy, e.g. EBT 12.1 cal/cm^2
- Hazard/Risk Category, e.g. HRC 2

b) ATPV refers to the material's ability to resist ignition. EBT refers to the material's ability to resist breaking open. One or the other will be the limiting parameter for the arc-rating. FR clothing that does not have a tag identifying its arc flash rating is not suitable for electrical work.

c) Arc-rated fabric usually is composed of 100% cotton or a cotton-synthetic blend. The fabric is impregnated with a chemical that is activated by the arc flash to prevent ignition. The fabric is then tested to determine the arc rating. Manufacturer's laundry instructions must be followed to ensure FR effectiveness. Some arc-rated fabric is made of Nomex. However, only articles that have an arc rating tag shall be used. Do not assume that all Nomex articles meet the requirements for arc flash.

5.2.7 Inspections

The arc-rated clothing shall be examined by the technician for rips, tears, and/or flaws in the material or workmanship prior to each use. If they are damaged in any way, they shall not be used.

6. Electrical Safe Work Practices

6.1 Requirement for Deenergization

Before beginning any construction or maintenance work that requires activities that will place the employee within the Limited Approach Boundary or the Arc Flash Boundary of exposed energized parts, the equipment shall be placed in an electrically safe work condition.

6.1.1 Exceptions to the Requirement For Deenergization

T09 0008-7990 Ver 03 - Approved - Exported from DMS: 2010-10-05 by ASUER

a) If it can be demonstrated that deenergizing introduces additional or increased hazards or is infeasible due to equipment design or operational limitations as specified in the guidelines set forth in OSHA 29 CFR 1910. 333 or 1910.269, then the equipment may remain energized and the work will be classified as energized work. Energized work shall require a VAME Energized Electrical Work Permit.

b) An example of additional or increased hazards include, but are not limited to:

- Removal of illumination for an area

c) An example of energized work being allowed because de-energizing is infeasible due to equipment design or operational limitations are as follows:

- Performing diagnostics or startup
- Performing testing or troubleshooting

6.1.2 Exceptions to the Energized Electrical Work Permit

A VAME Energized Electrical Work Permit is not required to perform visual inspection, voltage testing, or troubleshooting of a circuit. However, the worker shall still follow all requirements for entering the electrical approach boundaries.

6.2 Electrical Lockout (LOTO) and Grounding

6.2.1 Establishing an Electrically Safe Work Condition

An electrically safe work condition shall be achieved when performed in accordance with the VAME LOTO Program and verified by the following process:

a) Determine all possible sources of electrical supply to the specific equipment. Check applicable up-to-date drawings, diagrams, and identification tags.

b) After properly interrupting the load current, open the disconnecting device(s) for each source.

c) Wherever possible, visually verify that all blades of the disconnecting devices are fully open or that drawout-type circuit breakers are withdrawn to the fully disconnected position.

d) Apply lockout/tagout devices in accordance with the VAME LOTO Program.

e) Use an adequately rated voltage detector to test each phase conductor or circuit part to verify they are deenergized. Follow the Test-Verify-Test three-point test method.

f) Where the possibility of induced voltages or stored electrical energy exists, ground the phase conductors or circuit parts before touching them. Where it could be reasonably anticipated that the conductors or circuit parts being deenergized could contact other exposed energized conductors or circuit parts, apply ground connecting devices rated for the available fault duty.

6.2.2 Electrical requirements for proper lockout points

a) All lockout points must consist of positive energy isolation devices such as disconnect switches and circuit breakers.

b) All isolating devices used as lockout points must be capable of accepting an approved lockout device that physically prevents the actuation of the isolating device.

c) Fuses are not an acceptable lockout point.

T09 0008-7990 Ver 03 - Approved - Exported from DMS: 2010-10-05 by ASUER

Exception: Certain conditions may require the removal of fuses as the only available lockout point. This requires the approval of the Electrical Safety Team, who will also determine additional steps required to safely remove the fuses and place a lockout device on the fuseholder or cabinet.

d) Where the lockout point requires disconnection of wires, the wire ends must be electrically taped (insulated) and tagged out in such a way that prevents the reconnection of the wires.

e) All lockout points must have a safe and accessible way to verify deenergization. There can be no circuit breakers, fuses, interlocks, contactors, diodes, or automatically controlled devices between the isolation device and the test point.

6.2.3 Grounding requirements

Grounding is required under the following circumstances:

a) Possibility of induced voltages

Where deenergized lines are run next to high-voltage energized lines, the magnetic fields may induce a build-up of static charge in the deenergized conductor. When this is found (through experience), a suitable shorting ground device shall be applied to the deenergized conductors. This could be short lengths of small-gauge bare stranded copper wire connecting the lines to ground

Where capacitor banks may build up a charge, the deenergized capacitor bank shall be shorted out with an approved shorting ground device. The capacitor grounding device shall have a resistor sized to dissipate the expected maximum charge in less than five seconds.

b) Possibility of reenergization

Deenergized equipment might become energized through the following causes:

- Overhead lines fall on bare deenergized conductors
- Temporary generator is installed inadvertently on a locked out circuit
- Miscommunication between customer and contractor at the point of common lockout control.

If these cases are reasonably possible, then grounds must be applied to the circuit that is locked out. Ground straps must be rated to withstand the maximum short-circuit current available at the point of grounding for the time necessary to clear the fault. This rating shall be identified in conjunction with the Arc Flash Hazard Analysis.

c) High voltage equipment

All work performed within the limited approach boundary of equipment rated above 1000 V will require the application of grounds. Ground straps must be rated to withstand the maximum short-circuit current available at the point of grounding for the time necessary to clear the fault. This rating shall be identified in conjunction with the Arc Flash Hazard Analysis.

6.2.4 Voltage testing at the equipment:

T09 0008-7990 Ver 03 - Approved - Exported from DMS: 2010-10-05 by ASUER

a) In addition to placing the equipment in an electrically safe work condition, in accordance with Section 6.2.1, the technician shall also verify absence of voltage after opening the electrical enclosure for the equipment to be worked upon.

b) The voltage test shall follow the test-verify-test three-point test method described in Section 6.3.

6.3 Voltage Testing

6.3.1 Purpose of Voltage Testing

The voltage test performed in conjunction with the lockout procedure is intended to identify remaining system voltage present under the following conditions:

a) Selection of wrong isolation point

In the case where Circuit A is to be isolated, and the device for Circuit B is inadvertently selected as the isolation point.

b) Mechanical or electrical failure of isolation device

The isolation device may fail internally. One or all of the phases may still be closed even though the device shows all external indications of being open.

c) Circuit backfeed or alternate power source

Another source of energy may still be energizing the circuit. This could be a UPS, a temporary generator, incorrect wiring, or other source of energy.

d) Residual charge

A circuit may retain a built-up capacitive charge, or may be powered from a DC supply.

6.3.2 Selection of Voltage Detector

Only Vestas approved voltage detectors may be used to measure voltage.

a) Selection of test probes

Test probes must be selected to match the physical requirements of the test point. Some test points are shielded, and the exposed portion of the test leads must be long enough to reach the conductors.

b) Contact versus Non-Contact

All equipment rated above 1000 V shall only be tested with a non-contact, proximity type voltage detector attached to a live-line tool.

6.3.3 Selection of PPE

a) Shock Protection

Rubber insulated gloves with leather protectors shall be worn for the voltage test. The voltage glove rating shall exceed the rated line-to-line voltage of the equipment to be tested.

b) Arc Flash Protection

T09 0008-7990 Ver 03 - Approved - Exported from DMS: 2010-10-05 by ASUER

Arc flash clothing shall be worn for the voltage test. The arc flash level classification shall exceed the line-side arc flash energy of the device to be tested.

6.3.4 Test-Verify-Test (Three-Point Test Method)

Whenever verifying the absence of voltage, the voltage detector shall be functionally tested before and after verification. The functional test is called the test, while the absence of voltage test on the circuit of interest is called the verification.

Voltage testing requires following the proper procedures for entering electrical approach boundaries, including donning the arc flash and shock protection PPE appropriate for the circuits to be tested.

a) Test, Low Voltage

The test shall consist of measuring voltage on a known energized circuit. The known energized circuit can be:

- A 24 VDC circuit
- A 110 VAC lighting circuit
- A 230 VAC circuit
- The line side power of the disconnect
- A handheld portable device specifically designed for this application

b) Test, High Voltage

Non-contact voltage detectors shall be tested before and after each use. The test shall consist of detecting energized voltage on a known energized circuit. The known live circuit can be:

- An energized fluorescent light fixture
- A handheld portable device specifically designed for this application

c) Verification

Verification shall consist of the following steps, in order:

- Check voltage on each phase, phase-to-ground
- Check voltage on each phase, phase-to-phase

The phase-to-phase check is not possible when using the non-contact voltage detector on high voltage circuits. However, the phase-to-ground voltage check on high voltage circuits is always followed by the application of temporary personal protective grounds.

6.3.5 Grid outage

A grid outage occurs whenever the power to the turbine transformer high voltage disconnect is lost. This can be isolated to a single string or for the entire wind farm. This presents a problem with standard lockout points, as a voltage test is not valid when there is no voltage on the line side of the intended lockout point.

a) Planned Grid Outage

When a grid outage is planned, the Energy Control Coordinator shall establish the electrical lockout and grounding plan in conjunction with the customer. All VAME

VESTAS PROPRIETARY NOTICE

T09 0008-7990 Ver 03 - Approved - Exported from DMS: 2010-10-05 by ASUER

technicians working on turbines within the grid outage boundary shall lockout at the ultimate point of isolation where there is still voltage on the line side of the disconnect. The Energy Control Coordinator may elect to set up a group lockout to facilitate the logistics of locking out on the customer's equipment.

Once the lockout is established at the ultimate point of isolation, VAME technicians may prepare for grid energization and lockout at isolation points on the turbines. At the turbine lockout points, VAME technicians shall perform a continuity check through all three phases of the isolation point disconnect(s) in addition to the voltage test. Once the disconnect(s) has (have) been verified open, the disconnect(s) can be locked out.

Sequence:

1. Lockout the grid side of the breaker at the ultimate point of isolation.
2. Open the lockout isolation device.
3. Perform a voltage check on the grid side of the lockout isolation device.
4. Perform a voltage check on the generator or load side of the lockout isolation device.
5. Once absence of voltage has been verified on both sides of the lockout isolation device: Perform a continuity check through all three phases of the lockout isolation device.
6. Lockout the lockout isolation device.

When the customer is ready to reenergize the grid, the Energy Control Coordinator shall require all VAME technicians to exit the towers and clear their lockout of the grid. All technicians shall remain clear of the turbines until the grid is reenergized. Once the grid is reenergized, all electrical lockout points at the turbines shall be retested for absence of voltage. Technicians may then resume work inside the turbines.

b) Unplanned Grid Outage

An unplanned grid outage can occur at any time while technicians are performing electrical work. In the event of an unplanned grid outage, all technicians shall immediately exit the tower. Communications with the customer shall be established to determine the cause of the outage and the proper procedure for resuming work.

If the unplanned grid outage will be extended, then the Energy Control Coordinator shall follow the instructions for a Planned Grid Outage in a) .

Technicians shall not reenter the turbine until cleared by site management.

6.4 Job Manning Requirements

6.4.1 Minimum Requirement

Electrical work shall never be performed alone. The minimum manning requirement for electrical work is two technicians. One technician is required to be a Level 2 Qualified technician, while the second technician must have completed Basic Safety.

The requirement above does not apply to equipment which has been placed in an electrically safe work condition.

6.4.2 Requirement for a Standby Person

A standby person shall be required for the following electrical work conditions:

T09 0008-7990 Ver 03 - Approved - Exported from DMS: 2010-10-05 by ASUER

a) Work on high-voltage equipment

b) Work requiring a Class 4 arc flash suit

c) Work requiring an Electrical Energized Work Permit

6.4.3 Duties of a Standby Person

a) The primary responsibility of the Standby Person is to remain out of harm's way and to initiate the Emergency Response Plan in case of an electrical incident.

b) The Standby Person shall have no other duties.

c) The Standby Person shall not observe the electrical work being performed.

d) The Standby Person shall be a technician who has completed Basic Safety and has a current Cardio-Pulmonary Resuscitation (CPR) certification.

e) The Standby Person shall remain outside of the Arc Flash Boundary and the Limited Approach Boundary for the duration of the work.

f) The Standby Person shall participate in the Job Safety Analysis and shall be fully briefed on the specifics of the job.

g) The Standby Person shall be given an insulated rescue hook.

h) The Standby Person shall have a reliable means to immediately initiate the Emergency Response Plan, either by radio or cell phone.

i) One Standby Person is sufficient for work both uptower and downtower, provided two rescue hooks are staged before the start of the job. However, the Standby Person cannot be used for simultaneous jobs in more than one turbine.

j) In the event of an incident, the Standby Person shall:

- Initiate the Emergency Response Plan
- Assist walking workers in exiting the tower
- Assist conscious workers in administering first aid
- Not approach an unconscious victim, but may use an insulated rescue hook to remove the victim from potentially energized gear.
- Administer CPR to unconscious victims after they have been removed from potentially energized gear.

6.4.4 Requirement for Two Qualified Technicians

a) Two Level 2 qualified technicians shall be required to ground the high-voltage transformer.

b) Two qualified technicians shall be required to perform work under an Electrical Energized Work Permit. At least one shall be a Level 3 Qualified Technician.

c) Two qualified technicians shall be required to perform troubleshooting work. At least one shall be a Level 3 Qualified Technician.

6.4.5 Working Under the Instruction of a Qualified Technician

a) A technician who is undergoing on-the-job training and who, in the course of such training, has demonstrated an ability to perform duties safely at his or her level of training and who

T09 0008-7990 Ver 03 - Approved - Exported from DMS: 2010-10-05 by ASUER

is under the direct supervision of a qualified technician shall be considered to be a qualified technician for the performance of those duties.

b) A technician working under instruction shall not be considered the Standby Person.

6.5 Basic Electrical Work Practices

6.5.1 Safe Work Approach

a) In accordance with the Safe Work Approach program a Job Safety Analysis (JSA) will be conducted prior to performing electrical work. If determined during the JSA that there is no safe work instruction, technicians are not familiar with the safety hazards, or there is a high risk situation, the technician must prepare a Pre-Task Plan (PTP). The PTP must be approved by the site management or his/her designated delegate. In any event all safety concerns shall be mitigated prior to commencing the task.

b) Knowledge in the specifics of the Job Safety Analysis in itself does not make an employee qualified to work on or near energized or potentially energized exposed electrical parts. Work practices shall be established for each work area, which will include, at a minimum, the specific electrical safety concerns/activities referenced by the JSA. The content and quality of informal and formal field training (On-the-Job-Training or OJT) and classroom training, as well as, establishing levels of experience in electrical safe work practices, shall be consistent with the requirements of the Job Safety Analysis and the specific electrical hazard prevention of any operation being performed.

6.5.2 Alertness

Employees must remain alert at all times when working near exposed electrical parts or in situations where electrical hazards may exist. If alertness appears to be recognizably impaired due to illness, fatigue, or other reasons, that employee is not permitted to work on or near areas containing electrical hazards.

6.5.3 Blind Reaching

Employees must never reach blindly into areas that may contain live circuits.

6.5.4 Illumination

Employees shall not enter the area containing exposed electrical circuits unless adequate illumination is provided. Employees shall not penetrate the Limited Approach Boundary of any piece of equipment containing exposed electrical circuits unless adequate illumination is provided to light the inside of the equipment. This illumination may be in the form of existing lighting, droplights or temporary lighting. When obstructions or lack of illumination prevent proper visibility, the employee is not permitted to perform the task if there is a possibility that exposed parts may be contacted.

6.5.5 Return to work

Qualified workers who leave a worksite unattended must perform a voltage check upon returning to the worksite prior to resuming work.

6.5.6 Body Positioning

a) The worker shall consider how to position his or her body to minimize the chance of incidental contact with exposed energized conductors. The worker shall always position his or her body in such a way as to prevent slipping, tripping or falling into energized equipment.

T09 0008-7990 Ver 03 - Approved - Exported from DMS: 2010-10-05 by ASUER

b) The worker shall not bend over at the waist to perform electrical work, as this could lead to falling into energized gear. Instead, the worker shall get down on the knees at some distance away from the cabinet, then approach the cabinet to perform the work from a kneeling or sitting position.

c) When accessing a cabinet above the worker's eye level, the worker shall use an approved fiberglass step-stool or step-ladder to provide adequate access. Non-approved items such as toolboxes, buckets, or miscellaneous parts are not allowed for access to electrical equipment.

d) When operating a load-rated switch, circuit breaker, or other device specifically designed as a means for a disconnect the worker should also consider his or her body position. The worker should position his or her body to the side of the circuit breaker to minimize the exposure to the body should an arc blast occur during the operation.

e) Doors, hinged panels, and the like shall be secured to prevent their swinging into an employee and causing the employee to contact exposed energized electrical conductors or circuit parts.

6.5.7 Handling of tools

a) A tool often slips when force is applied. When a tool slips, the worker who is providing the force cannot stop the tool (and his or her hand) from moving in an unintended direction. When selecting a body position, the worker should consider what his or her hand would contact if the tool should slip.

b) Conductive materials, tools, and equipment that are in contact with any part of an employee's body shall be handled in a manner that prevents accidental contact with energized electrical conductors or circuit parts. Such materials and equipment include, but are not limited to, long conductive objects, such as ducts, pipes and tubes, conductive hose and rope, metal-lined rules and scales, steel tapes, pulling lines, metal scaffold parts, structural members, and chains.

6.5.8 Cabinet Enclosures

a) All electrical cabinet covers shall be closed and fully bolted or latched when not opened for inspection or work.

b) When temporary cables are required to be placed through a cover opening, the cabinet shall be treated as if it were opened. All electrical approach boundaries and PPE requirements shall be in effect.

6.5.9 Housekeeping

a) Cleaning inside electrical cabinets shall not be performed unless the cabinet has been placed in an electrically safe work condition.

b) Personnel performing cleaning around the exterior of cabinets that have not been placed in an electrically safe work condition shall be mindful to prevent foreign debris, sprays and dusts from entering the cabinet.

c) Flammable materials shall not be left around energized electrical equipment. Where flammable materials are used, they shall be removed from the nacelle prior to energizing any electrical equipment.

d) Combustible materials shall not be stored around electrical equipment. Oily rags shall be removed each time workers leave the turbine.

T09 0008-7990 Ver 03 - Approved - Exported from DMS: 2010-10-05 by ASUER

6.5.10 Deranged Equipment

a) Whenever a piece of electrical equipment has been subjected to a severe electrical failure, it is considered deranged equipment until its electrical integrity can be verified by testing and inspection. The normal means of de-energization may not be sufficient. Indications of severe electrical failure include but are not limited to:

- Smoke, charring or fire
- Arcing, arc flash or arc blast
- Severe physical damage or deformation
- Report of sparking
- Report of electric shock

b) Determining if equipment is deranged is a judgment call. Employees should err on the side of caution. Deranged equipment must be treated with more caution than equipment in normal operating condition. Normal LOTO and deenergization procedures may not be sufficient to provide adequate safety.

c) Prior to beginning work on deranged equipment, a Pre-Task Plan (PTP) must be conducted with a Level 3 Qualified Technician.

d) Any work will begin with extensive voltage tests that include testing of the cabinet external casing and other normally grounded metal surfaces.

6.5.11 Operation of Disconnecting Means

a) Routine Operation

Only load-rated switches, circuit breakers, or other devices specifically designed as disconnecting means shall be used for the opening, reversing, or closing of circuits under load conditions. Cable connectors not of the load-break type, fuses, terminal lugs, and cable splice connections shall not be permitted to be used for such purposes, except in an emergency.

b) Reclosing Circuits After Protective Device Operation

After a circuit is deenergized by a circuit protective device, the circuit shall not be manually reenergized until it has been determined that the equipment and circuit can be safely energized. The repetitive manual reclosing of circuit breakers or reenergizing circuits through replaced fuses shall be prohibited. When it is determined from the design of the circuit and the overcurrent devices involved that the automatic operation of a device was caused by an overload rather than a fault condition, examination of the circuit or connected equipment shall not be required before the circuit is reenergized.

c) Remote Operating Switching Units

Where available, a remote operating switching unit shall be used to open or close an electrical disconnect.

Where the available arc flash energy is calculated to be greater than 40 cal/cm^2 at the working distance required for manual switching, a remote operating switching unit shall be used to open or close an electrical disconnect. If a remote operating switching unit is not available, then another isolation point must be identified to allow a worker to perform the disconnect safely.

T09 0008-7990 Ver 03 - Approved - Exported from DMS: 2010-10-05 by ASUER

6.5.12 Visual Inspection

There is often a requirement to visually inspect energized gear without performing any work. The following guidelines summarize the requirements for visual inspection.

Energized electrical equipment may be visually inspected without placing it in an electrically safe work condition under the following conditions:

a) The exposed energized circuits are not more than 1000 Volts.

b) Cover panels are hinged or can be removed without risking breaking the plane of the opening.

c) The equipment is not deranged.

d) Only Level 2 qualified technicians, qualified supervisors, or qualified engineers may perform the visual inspection.

e) Non-qualified personnel must stay at distance no less than 10 feet.

f) The worker must wear the arc flash PPE required by the cabinet label.

g) The worker must wear Class 0 (1000 V) voltage gloves.

h) No part of any tool or body may enter:

- For circuits less than 300 Volts: do not cross the plane of the opening.
- For circuits 300-1000 Volts: do not enter the Restricted Approach Boundary.

i) The worker must position his/her body in such a way as to preclude inadvertent movement that would break the plane of the opening or the Restricted Approach Boundary.

j) An energized electrical work permit is not required for a visual inspection.

6.5.13 Overhead Energized Lines

a) Employees must maintain a minimum 11 foot distance from energized overhead lines with any body part, a conductive material, a tool, or piece of equipment unless qualified to perform the work.

b) If contact with energized overhead lines is possible, the lines should be deenergized. These precautions must be taken before work in the area begins.

c) If the lines cannot be deenergized, employees must maintain a safe distance from the conductors. Employees working in elevated positions must avoid contact with energized conductors, unless they are qualified, protected, and authorized to do so.

6.6 Electrical Troubleshooting

6.6.1 Definition

Electrical troubleshooting is the process of fault isolation by working within the Limited Approach Boundary of an energized circuit.

6.6.2 Troubleshooting includes:

a) Voltage measurement

b) Current measurement

c) Operation of circuit breakers or disconnects

T09 0008-7990 Ver 03 - Approved - Exported from DMS: 2010-10-05 by ASUER

d) Operation of automatic control devices though interaction with the turbine processor

6.6.3 **Troubleshooting does not include:**

a) Component replacement

b) Scheduled equipment testing & maintenance

c) Installation of wire jumpers

d) Manual operation of motor contactors

e) Disconnecting a wire from its termination point

6.6.4 **Component replacement**

When the troubleshooting process indicates that one of the tasks in 6.6.3 needs to be performed, then the circuit must be placed in an electrically safe work condition. Once the component is replaced or the circuit is modified, the circuit can be reenergized and troubleshooting can resume.

6.7 Energized Electrical Work Permit

6.7.1 **Where Required**

When working on energized electrical conductors or circuit parts that are not placed in an electrically safe work condition (i.e., for the reasons of increased or additional hazards or infeasibility per 6.1.2), work to be performed shall be considered energized electrical work and shall be performed by written permit only.

6.7.2 **Elements of Work Permit**

The energized electrical work permit shall include, but not be limited to, the following items:

a) A description of the circuit and equipment to be worked on and their location

b) Justification for why the work must be performed in an energized condition

c) A description of the safe work practices to be employed

d) Results of the shock hazard analysis

e) Determination of shock protection boundaries

f) Results of the arc flash hazard analysis

g) The arc flash protection boundary

h) The necessary personal protective equipment to safely perform the assigned task

i) Means employed to restrict the access of unqualified persons from the work area

j) Evidence of completion of a job briefing, including a discussion of any job-specific hazards

k) Energized work approval (authorizing or responsible management, safety officer, or owner, etc.) signature(s)

6.7.3 **Authority**

a) The Energized Electrical Work Permit must be completed by a Level 3 Qualified Technician.

b) The Energized Electrical Work Permit must be reviewed and approved by the Energy Control Coordinator.

T09 0008-7990 Ver 03 - Approved - Exported from DMS: 2010-10-05 by ASUER

c) Permission to perform work under an Energized Electrical Work Permit must be granted by the Vestas Offsite Manager.

6.7.4 Form

The form for the Energized Electrical Work Permit is including in Appendix A.

T09 0008-7990 Ver 03 - Approved - Exported from DMS: 2010-10-05 by ASUER

7. Special Tasks

7.1 Infrared inspections

All infrared scans are performed with equipment and/or systems in an energized state due to load current requirements in order to have a successful scan.

7.1.1 Work Distance

During an infrared scan no employee or contractor will break the Restricted Approach Boundary of the electrical equipment that has the doors open or covers removed.

7.1.2 Employee Clothing Requirement

Employees shall wear the personal protective clothing specified by the Flash Hazard Label on the piece of equipment.

7.1.3 Permissions

a) Infrared inspections on low-voltage equipment shall follow the requirements of Visual Inspection in section 6.5.12.

b) Infrared inspections on high-voltage equipment shall require an Energized Electrical Work Permit per section 6.7.

7.2 Portable generator connection and operation

7.2.1 When portable generators will be used, the Energy Control Coordinator shall coordinate with the customer and all contractors to ensure that everyone knows of the possibility of electrical backfeed.

7.2.2 A LOTO Procedure shall be established in accordance with the VAME LOTO Program (HSE073) to prevent electrical backfeed prior to wiring in the portable generator.

7.2.3 The Energy Control Coordinator shall review all existing LOTO Procedures and verify that they are adequate and take into consideration the possibility of electrical backfeed. Rated ground straps shall be installed where required by 6.2.3b) .

7.2.4 Equipment powered from a portable generator rated at less than 600 Volts, 200 kVA, shall be treated as having the potential of a Class 0 arc flash (< 1.2 cal/cm^2). When required to install a larger portable generator, contact the VAME Electrical Engineering department for assistance in determining the required arc flash PPE.

7.2.5 The portable generator wires must be completely removed from the turbine prior to allowing restoration of normal grid power to the turbine.

T09 0008-7990 Ver 03 - Approved - Exported from DMS: 2010-10-05 by ASUER

8. Arc Flash Hazard Analysis

8.1 General

8.1.1 Description of an Arc Flash

Arc flash hazards are present in Vestas wind turbines. An arc flash event presents a dangerous, potentially fatal or life-altering hazard to the technician in three distinct ways:

a) An arc can produce enough flash energy to ignite clothing, burn skin and cause permanent eye damage. The flash is powerful enough to penetrate standard clothing and burn the skin directly. Arc flashes with an incident energy above 1.2 cal/cm^2 will cause a second-degree burn to unprotected skin. When the clothing ignites, the fire continues to burn the victim. Synthetic fabrics such as polypropylene, fleece and acrylics will melt into the skin and significantly aggravate the burn injuries.

b) The arc can produce extremely high temperatures (35,000 degrees F) that vaporize the electrical components. Copper busbar expands over 67,000 times in volume as it transitions from a solid to a gas. This can result in a blast force that propels the technician against obstacles in the background.

c) The blast can also release a burning cloud of copper fragments and smoke. The technician can inhale the cloud, resulting in severe throat and lung injuries. The blast also releases high-velocity projectiles that can seriously injure or kill the worker.

8.1.2 Causes of an Arc Flash

An arc flash is most often initiated by human interaction with electrical equipment. This includes switching a breaker, or performing a voltage test. Sometimes it could be as simple as a loose piece of hardware within the cabinet. As the cabinet is bumped, nudged or otherwise shaken, the hardware can fall onto the buswork and initiate a flash.

8.1.3 Other Hazards

It is important to remember that Vestas technicians are exposed to many hazards, including rotating machinery, confined spaces, physical exertion, fall from heights, and more. Arc flash is another hazard that needs to be addressed. However, at no point should arc flash concerns override other precautions that should be considered. Sound judgment, proper evaluation of hazards, and good work planning should always prevail.

8.2 What is an Arc Flash Hazard Analysis

The available arc flash energy is different from turbine to turbine, and from site to site. The arc flash energy is determined by performing an arc flash hazard analysis (AFHA). The analysis uses sophisticated computer software with turbine and grid specific parameters as inputs to calculate short circuit currents and tripping times.

The amount of arc flash energy available at the point of fault depends on several factors. Primarily, the energy is related to the available short-circuit current and the amount of time until the protective device interrupts the fault.

8.2.1 Short-Circuit Current

T09 0008-7990 Ver 03 - Approved - Exported from DMS: 2010-10-05 by ASUER

This is the maximum current supplied to the equipment under a fault condition. It is limited only by upstream system characteristics and is normally measured in thousands of amperes.

8.2.2 Arc Clearing Time

This is the total time from sensing the overcurrent to extinguishing the arc. Protective devices typically rely on an inverse-time sensing of current. This means that if the current is low enough, it will take longer to trip, and in some cases, the total released arc flash energy will be greater.

Where arc flash detectors are installed, this is the total time from sensing the arc to extinguishing the arc. The trip is instantaneous and does not have an inverse-time characteristic. The time to extinguish the arc is determined only by the reaction time of relays and the mechanical characteristic of the breakers.

In a low-voltage arcing fault, the arc impedance also limits the short-circuit current. The current may be low enough to delay the tripping of protective devices, resulting in a more severe arc flash. This can also happen at the far end of a wind farm, where long feeder lines contribute a significant amount of line resistance.

Changing the model or setting of an overcurrent protective device will have a direct effect on arc flash energies.

8.2.3 Expectation of an Arc Flash Hazard

a) Voltage Level

Arc flash energy is only partly dependent on system voltage. However, arc flash hazards are not expected on systems whose rated voltage is 240 VAC or less and that are supplied from a transformer rated at less than 125 KVA.

b) DC Circuits

Although DC circuits can be very energetic and sustain powerful arcs, current standards cannot calculate the arc flash energy related to DC faults. In wind turbines, DC circuits less than 110 VDC are not considered an arc flash hazard. Inverter system DC buses are accounted for in c) .

c) Inverter Systems

Turbine rotor current control systems contain power electronic circuits that operate at variable frequencies, currents and voltages that fall outside of the normal parameters where arc flash calculations are useful.

All power electronics cabinets used for rotor current control shall be marked for Class 2 arc flash PPE.

8.3 Requirements

8.3.1 Customer Responsibility

The AFHA must take into account the entire contribution from the collection grid. For this reason, the AFHA will be performed by the customer or the customer's preferred electrical engineering contractor. The AFHA report must be reviewed and approved by a licensed professional engineer with significant experience in electric power engineering.

8.3.2 VAME Engineering Responsibility

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T09 0008-7990 Ver 03 - Approved - Exported from DMS: 2010-10-05 by ASUER

VAME shall provide an Arc Flash Information Packet (AFIP) to the customer in order to accurately model the turbine for the AFHA. The AFIP shall be prepared by the VAME Electrical Engineering department.

8.4 Review and Approval

8.4.1 Once the AFHA is complete, the customer shall submit a report to the VAME Electrical Engineering group. The VAME Electrical Safety Engineer will review the report and interact as necessary with the author of the report to resolve any issues.

8.4.2 The Electrical Safety Engineer cannot approve the report as he or she does not have the required site information. However, the Electrical Safety Engineer shall verify that the results are consistent with expectations and that anomalies are corrected or satisfactorily explained.

8.4.3 Once the AFHA has been reviewed and determined satisfactory, the Electrical Safety Engineer shall:

a) Keep a copy of the original AFHA for record keeping.

b) Transfer the cabinet PPE information to a master record of arc flash energies for each site.

c) Instruct the Technical Support department that a new AFHA has been documented.

8.4.4 The Technical Support department shall:

a) Use the data in the master record to print out arc flash labels for all cabinets and turbines at the site.

b) Create the necessary Work Order(s) in SAP to affix the arc flash labels on all the turbines at the site.

c) Communicate the results of the AFHA to the Site Manager and Energy Control Coordinator, or to the Project Manager for new construction sites.

8.4.5 **Arc Flash Energy Greater Than 40 Cal/cm^2**

a) Incident energies greater than 40 cal/cm^2 are classified "Dangerous". NFPA 70E has no clothing class for energies greater than 40 cal/cm^2. Any task on the electrical equipment is prohibited. In cases like this, it is recommended that the upstream electrical equipment be turned off before servicing the electrical equipment or modify the electric equipment in order to reduce the incident range so that the equipment can be safely serviced.

b) If the AFHA shows that any turbine cabinet has an arc flash energy greater than 40 cal/cm^2, VAME shall contact the customer and determine a course of action. The site manager shall be notified and no electrical work shall be performed on that equipment. Procedures shall be developed to safely work around the issue in the short term. In the long term, VAME shall work with the customer to reduce the arc flash energy to below 40 cal/cm^2.

8.5 Labeling

There are two Flash Hazard Labels used at VAME. The first is a Flash Hazard Label with a heading of "WARNING" (Figure 7.1) and the second is a Flash Hazard Label with a heading of "DANGER" (Figure 7.2).

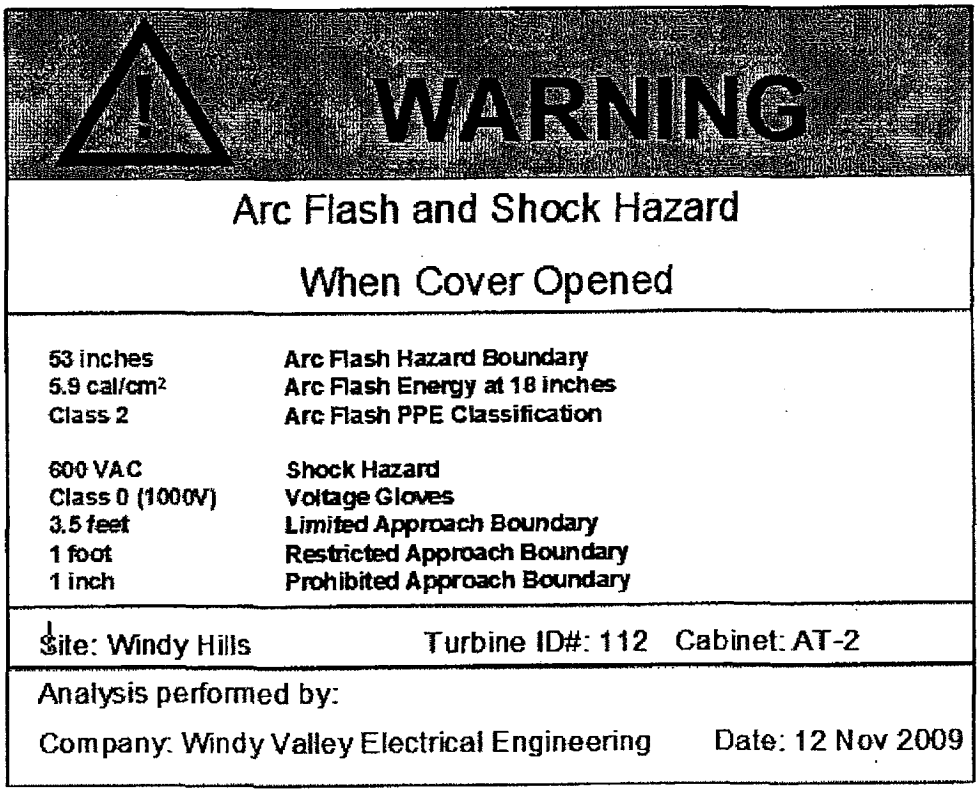
8.5.1 **WARNING - Flash Hazard Label**

T09 0008-7990 Ver 03 - Approved - Exported from DMS: 2010-10-05 by ASUER

Employees or contractors shall follow the instructions and requirements on the Flash Hazard Label to protect themselves from electrical hazards.

Figure 8.5.1

Example of a Flash Hazard WARNING Label



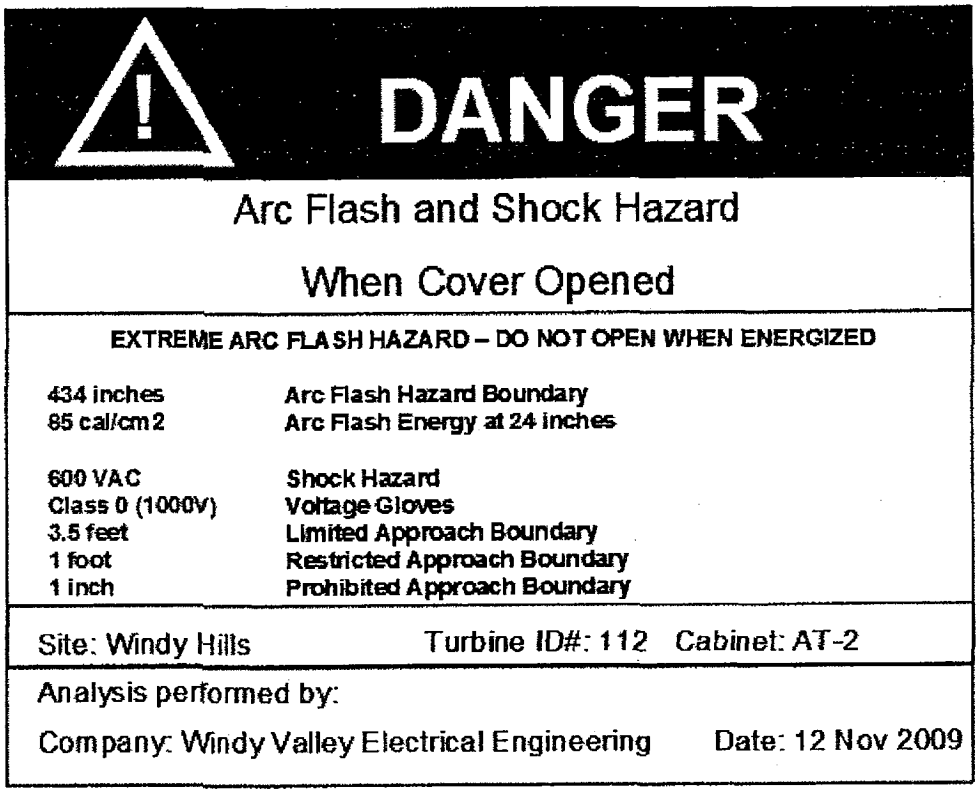
T09 0008-7990 Ver 03 - Approved - Exported from DMS: 2010-10-05 by ASUER

8.5.2 DANGER - Flash Hazard Label

Employees or contractors shall NOT perform any task on these pieces of equipment due to fact that the arc flash energy level exceeds 40 cal/cm^2.

Figure 8.5.2

Example of a Flash Hazard DANGER Label



T09 0008-7990 Ver 03 - Approved - Exported from DMS: 2010-10-05 by ASUER

8.6 Periodicity

8.6.1 The AFHA shall be renewed every five years to account for changes in the grid configuration and advances in standards.

8.6.2 Additionally, the AFHA shall be renewed every time the basic assumptions for the study are modified, including:

a) Phased expansion to the wind farm

b) Wind turbine generator replacement with different generator parameters

c) Change to overcurrent protective device settings

d) Transformer replacement with different impedance or power rating

e) Any other change in the collection grid which may impact the results of the arc flash study.

T09 0008-7990 Ver 03 - Approved - Exported from DMS: 2010-10-05 by ASUER

9. Tools

9.1 Test Instruments

9.1.1 General

a) Test instruments and equipment and all associated test leads, cables, power cords, probes, and connectors shall be visually inspected before each use for external defects and damage.

b) If there is a defect or evidence of damage that might expose an employee to injury, the defective or damaged item shall be removed from service, and no employee may use it until necessary repairs and tests to render the equipment safe have been completed.

c) Test instruments and equipment and their accessories shall be rated for the circuits and equipment to which they will be connected.

9.1.2 Voltage Meters

a) A voltage meter is a device which physically contacts the circuit to measure voltage. This is also called a contact voltage meter.

b) Voltage meters shall be voltage-rated for the circuits and equipment to which they will be connected.

c) The minimum IEC 61010-1 Measurement Category for all voltage meters is Category III at 1000V, Category IV at 600V.

d) Voltage meters shall be listed with UL and CSA.

e) Voltage meters shall be calibrated biannually by a certified independent laboratory.

f) All voltage measuring tools will be visually inspected daily before use for the following:

- Valid calibration dates
- Integrity of test leads, cables, probes, and connectors, external defects/damage

If the voltage measuring tool shows defects or damage it shall be removed from service and no employee shall use it until repairs and tests necessary to render the equipment safe have been made.

9.1.3 Contact Voltage Detector

a) A contact voltage detector is a device which physically contacts the circuit to detect voltage. It does not provide a precise measurement of voltage, although in some cases it may indicate the nominal voltage level.

b) A contact voltage detector does not require periodic recalibration.

c) Contact voltage detectors shall be voltage-rated for the circuits and equipment to which they will be connected.

d) The minimum IEC 61010-1 Measurement Category for all contact voltage detectors is Category III at 1000V, Category IV at 600V.

e) Voltage detectors shall be listed with UL and CSA.

f) All contact voltage detectors will be visually inspected daily before use for the integrity of test leads, cables, probes, connectors, and external defects or damage. If the contact vol-

T09 0008-7990 Ver 03 - Approved - Exported from DMS: 2010-10-05 by ASUER

tage detector shows defects or damage it shall be removed from service and no employee shall use it until repairs and tests necessary to render the equipment safe have been made.

9.1.4 **Non-Contact Voltage Detector**

a) A non-contact voltage detector is a device which does not physically contact the circuit to measure voltage. Instead it detects the induced field in the proximity of an energized conductor.

b) Non-contact voltage detectors are required for use on high voltage circuits.

c) Non-contact voltage detectors are permitted to be used on low voltage circuits, but shall not be the means to verify deenergization for LOTO.

d) Non-contact high voltage detectors shall only be used by attaching the detector to a live line tool, so that the technician does not penetrate the Restricted Approach Boundary.

e) A non-contact voltage detector does not require periodic recalibration.

9.2 Live-line tool (Hot-stick/Shotgun)

9.2.1 A live-line tool is required for entering the Restricted Approach Boundary of any system rated above 1000V.

9.2.2 Live line tools shall be only used with rubber insulating gloves that are rated for the system voltage.

9.2.3 The clamp-type hot stick, also called a shotgun, shall be used to apply temporary personal protective grounds. Proper use of the shotgun requires practice.

9.2.4 Live line tools shall be inspected prior to use.

9.2.5 Live line tools shall be tested every two years unless an inspection determines a need.

9.3 Temporary Static Grounds

9.3.1 Purpose

The installation of Static Grounds at the work location protects employees from the following hazards:

a) **Electrostatic Induction**

A deenergized line may pick up a static charge from parallel energized circuits in the area. The amount of charge depends on such things as the length of the parallel, the distance between the lines, atmospheric condition, etc., and can reach values that are hazardous to employees.

b) **Electromagnetic Induction**

When a deenergized line parallels a line carrying either load or fault current, the deenergized line may have a voltage induced on it in the same manner as the secondary of a transformer.

9.3.2 Temporary Static Grounds shall not be used where Temporary Personal Protective Grounds are required.

9.3.3 Rating of Temporary Static Grounds

T09 0008-7990 Ver 03 - Approved - Exported from DMS: 2010-10-05 by ASUER

a) Temporary Static Grounds do not need to be sized to carry the maximum fault current that could appear at the point of grounding for the time necessary to clear the fault. However, static grounds must meet all other requirements of personal protective grounds.

b) Temporary Static grounds shall be constructed of #6 stranded copper insulated cable, colored green and yellow, with booted clamp connections. They shall be permanently marked with "Temporary Static Ground" on the ground lead.

9.4 Temporary Personal Protective Grounds

9.4.1 Purpose

The installation of Temporary Personal Protective Grounds at the work location protects employees from the following hazards:

a) Accidental closing

Although all potential feeds for a deenergized circuit are required to be visibly open and tagged out prior to the commencement of work, the possibility of someone inadvertently energizing the circuit still remains.

b) Accidental Contact

A deenergized circuit could come in contact with another energized circuit or the deenergized circuit could be energized through human error.

c) Equipment Failure

The insulation of the switching devices opened to de-energize the circuit could either break down or track over, and energize the line on which work is being done.

d) Backfeed

In addition to the primary sources, there are several secondary sources that can cause current to flow in a deenergized circuit. Some examples of these sources include parallel transformers, instrument transformers, metering installations and auxiliary generators.

9.4.2 Requirements of Temporary Personal Protective Grounds

When a worker comes into contact with a grounded line, the worker is in parallel with the protective grounds. The voltage the worker would be exposed to should the line/equipment become energized would depend on the resistance of the protective grounds and the distance between the grounds and the worker. For proper protection, protective grounds must fulfill the following requirements:

a) Low Resistance

Personal Protective Grounds must conduct virtually all fault current and provide low enough resistance to cause all protective devices to operate in a timely manner. In order to facilitate this, protective grounds need:

- Clean connections
- Tight connections
- Adequate capacity to clear the fault current in the circuit

b) Inspection and Testing

T09 0008-7990 Ver 03 - Approved - Exported from DMS: 2010-10-05 by ASUER

Protective grounds and grounding equipment shall be inspected and tested at least annually. In addition, protective grounds shall be given a visual inspection before each use.

c) **Connection at Proper Points**

The resistance of the conductors and the earth between the work location and the grounds are part of the total resistance of the protective grounding circuit. For this reason, grounds should be placed at the work location, if possible. This is known as "single point grounding" and this method is the most effective method of protective grounding. When a grounded neutral conductor is available, it should be connected to the protective grounding circuit.

9.4.3 Movement of Personal Protective Grounds

The electric fields produced when large currents flow through grounding cables will cause the cables to whip violently. For this reason, grounding cables should be kept as short as possible and placed such that workers are not injured should whipping of cables occur.

9.4.4 Applying Personal Protective Grounds

a) All grounding clamps shall be placed on conductors rated 1000V or less with approved rubber insulating gloves.

b) All grounding clamps shall be placed on primary conductors rated over 1000V with approved rubber insulating gloves and approved company standard live-line tool.

c) Only approved grounding cables and clamps shall be used for personal protective grounding.

d) Before applying grounds to any conductor, the conductor must be tested for the absence of voltage with an approved tester, to verify the conductor is in fact deenergized. The function of the tester should also be verified before and after each voltage test for circuit voltages greater than 1000 volts.

e) The surfaces of all grounding connections must be cleaned at the point where ground clamps are to be applied.

f) For most locations, a ball type connection with a protective rubber boot has been installed at the line and ground point.

g) On structures, special grounding clamps that can be attached to angle iron are required.

h) Some structures are equipped with grounding pads. In these cases, the normal grounding clamp must be removed and the cable attached to the via a bolted connection.

i) Grounding clamps shall not be installed over cable termination paddles.

j) When applying Personal Protective Grounds to deenergized equipment, the grounding cables shall be connected to the ground before being brought near the conductor that is to be grounded.

k) All grounding connections should be made so they do not interfere with the work.

l) Personal Protective Grounds should be carefully laid out, and if necessary, tied securely so as not to present a hazard to the workers.

m) Workers should avoid standing near earth grounds, to which protective grounding systems are attached.

T09 0008-7990 Ver 03 - Approved - Exported from DMS: 2010-10-05 by ASUER

n) Personal Protective Grounds shall never be installed in series with a fuse or switch.

o) When removing grounds, the grounding cable to each conductor shall be first removed before the ground connection point is removed.

9.4.5 Rating of Personal Protective Grounds

a) Personal Protective Grounds shall be rated in accordance with ASTM F 855-09 or EN/IEC 61230:2008.

b) Personal Protective Grounds shall be of sufficient size to carry the maximum fault current that could appear at the point of grounding for the time necessary to clear the fault.

9.5 Voltage-Rated Hand Tools

When working within the Restricted Approach Boundary of exposed energized conductors or electrical parts, workers shall only use voltage-rated hand tools.

9.5.1 General

a) The term "voltage-rated hand tools" refers to both *insulated* and *insulating* hand tools.

b) Insulated hand tools are constructed from conductive material or components and have electrical insulation applied on the exterior surface.

c) Insulating hand tools are constructed from nonconductive material. Insulating hand tools might have metal or other conductive inserts for reinforcement but, essentially, the tool must be constructed of nonconductive material.

d) Voltage-rated hand tools are not intended to serve as primary protection from shock or electrocution. Although insulated hand tools might provide adequate shock protection for circuits below 1000 VAC, workers must select and wear PPE that provides protection from shock and arc flash without considering the hand tool rating. Although insulated and insulating hand tools include insulation from electrical sources of up to 1000 VAC, the primary function of the insulation is to reduce the risk of initiating an arcing fault.

e) The insulating coating of insulated hand tools may consist of a single layer, but normally it consists of two layers of contrasting colors. The interior layer provides 100 percent protection from shock to the full rating of the tool. The contrasting color of the exterior layer provides a method for inspecting the tool for damage.

9.5.2 Requirements

a) Any cut or abrasion that exposes any of the inner layers constitutes significant damage and suggests that the tool shall not be used. The damaged tool should be replaced with a new tool.

b) Workers shall visually inspect each voltage-rated tool before each use. If the interior layer is visible, the tool shall be discarded.

c) The manufacturer must mark voltage-rated hand tools as follows:

- Manufacturer's name or trademark
- Type or product reference
- Double triangle symbol (International 1000 V symbol)
- The marking "1000 V"

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T09 0008-7990 Ver 03 - Approved - Exported from DMS: 2010-10-05 by ASUER

- Year of manufacture

d) Only hand tools that meet the requirements of ASTM F1505 shall be purchased. A storage toolbox shall be purchased with the tools. The tools shall be kept in the storage toolbox when not in use. The toolbox, with the tools, shall be stored in a location that is clean and dry.

9.6 Portable power tools

9.6.1 Portable power tools shall be properly stored when not in use.

9.6.2 Power tools shall never be suspended by the cord.

9.6.3 Electrical power tools shall be visually inspected before each day's use for external defects, such as deformed or missing pins or insulation damage, and for indications of possible internal damage.

9.6.4 Ground prongs shall not be removed. Power tools whose ground prong is found to have been removed shall not be used.

9.6.5 Tools found damaged or defective, shall be tagged "out-of-service," by the user and not used until repaired and tested in accordance with the manufactures recommendations.

9.6.6 Electrical portable power tools (except for battery-powered or double-insulated types) shall be grounded by a grounding conductor, which is contained within the same cable or cord as the circuit conductors.

9.6.7 When used outside or in wet and damp location, or when the user is well grounded, portable electric power tools shall be connected to ground-fault circuit interrupters (GFCI's).

9.6.8 Tools shall be cleaned and maintained in accordance with the manufacturer's instructions.

9.6.9 **Equipment Assured Grounding Program**

All grounded portable electrical power tools shall be:

a) Tested in accordance with manufacturers recommendation before initial use after purchase and annually thereafter.

b) Tested before being returned to service following any repairs.

c) Tested before being returned to service after any incident that can reasonably be suspected to have caused damage.

d) Have a label placed on the male end to identify the test date and name of the technician performing the test.

e) The following tests shall be performed on all grounded portable electric power tools:

- All grounded conductors shall be tested for continuity.
- Insulation resistance test on all conductors, minimum 1.0 megaohms.

9.7 Extension Cords

Extension Cords shall be inspected before each day's use by the employee utilizing the extension cord. This inspection will include the jacket and the ground pin.

T09 0008-7990 Ver 03 - Approved - Exported from DMS: 2010-10-05 by ASUER

9.7.1 **All extension cords shall be:**

a) Tested before being returned to service following any manufacturer recommended repairs.

b) Tested before being returned to service after any incident that can reasonably be suspected to have caused damage.

9.7.2 **The following tests shall be performed on all extension cords:**

a) All grounded conductors shall be tested for continuity.

b) Insulation resistance test on all conductors, minimum 1.0 megohms.

c) Both tests shall be performed using an approved multimeter. The insulation resistance test shall not exceed the voltage rating of the wires in the cord.

9.7.3 Extension Cords shall not to be used in wet locations unless designed for the purpose or GFCI protected.

9.7.4 Ground prongs shall not be removed. Extension cords whose ground prong is found to have been removed shall not be used.

9.7.5 Extension Cords connected to equipment may not be used for raising or lowering the equipment.

9.7.6 Extension Cords may not be fastened with staples or otherwise hung in such a fashion that could damage the outer jacket or insulation.

9.7.7 Adapters that interrupt the continuity of the equipment grounding connection may not be used.

9.7.8 Employees' hands must not be wet when plugging and unplugging extension cords and cord-and-plug connected equipment if energized equipment is involved.

9.8 Fiberglass Ladders

9.8.1 Only fiberglass portable ladders shall be used in wind turbines.

9.8.2 Fiberglass ladders shall be duty rated to at least Type 1 (250 pounds) according to the ANSI A14.5-2000 standard for fiberglass ladders. Where the combined weight of the person using the ladder and tools or equipment exceeds 250 pounds a higher duty rating shall be used (Type 1A – 300 pounds or Type 1AA – 375 pounds).

9.8.3 Fiberglass ladders shall be inspected before each day's use by the employee utilizing the ladder.

9.8.4 Fiberglass ladders found damaged or defective, shall be tagged "out-of-service," reported to the immediate manager and not used until repaired.

T09 0008-7990 Ver 03 - Approved - Exported from DMS: 2010-10-05 by ASUER

T09 0008-7990 Ver 03 - Approved - Exported from DMS: 2010-10-05 by ASUER

10. Appendix A – VAME Energized Electrical Work Permit

Site Location/Name: _____ Turbine/Pad Location: _____

PART 1: TO BE COMPLETED BY THE REQUESTER

(1) **Description of Circuit /Equipment/Job Location:**

_____

(2) **Description of work to be done:**

_____

(3) **Justification for why the work must be performed in an energized condition:**

_____

_____

_____ _____

Requester/Title Date

PART 2: TO BE COMPLETED BY ELECTRICALLY QUALIFIED PERSON DOING THE WORK

(4) **Detailed job procedure to be used in performing the above work:**

_____

_____

(5) **Results of the Shock Hazard Analysis:**

a. Highest voltage to be tested de-energized: _____

b. Highest voltage to be worked on energized: _____

c. Other voltages within workspace: _____

d. Explain why this job has to be completed on energized equipment.

_____

_____

(6) **Determination of Shock Protection Boundaries:**

a. Prohibited Approach Boundary: ____ feet ____ inches

b. Restricted Approach Boundary: ____ feet ____ inches

c. Limited Approach Boundary: ____ feet ____ inches

(7) **Results of Flash Hazard Analysis:**

a. Maximum exposure level: ____ cal/cm^2 at ____ inches

b. Arc Flash Boundary (> 1.2 cal/cm^2): ____ feet ____ inches

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T09 0008-7990 Ver 03 - Approved - Exported from DMS: 2010-10-05 by ASUER

VAME Energized Electrical Work Permit

(8) Necessary PPE to safely perform the task: (check all that apply)

	Voltage gloves, Class 0, w/leather outers		Voltage gloves, Class 4, w/leather outers
	Safety Glasses		FR Clothing, Class 0
	FR Clothing, Class 2		FR Clothing, Class 4
	Arc-rated flash hood, Class 2		Arc-rated flash hood, Class 4
	Class E Hard Hat		Leather Safety Shoes
	Voltage-rated tools		Hearing protection
	Voltage-rated blanket		Barricade

(9) Means employed to restrict the access of unqualified persons from the work area:

a. Caution Tape Barricade ☐
Minimum boundary distance: ____ feet ____ inches
b. Standby Person(s) Name: _____ ☐
c. Standby Person(s) Qual level: _____ ☐
d. Standby Person briefed on job tasks and Emergency Response Plan ☐
e. JSA/PTP complete ☐

Qualified Workers	Date	Qualified Workers	Date

Standby Person: I have been briefed on the work tasks for this Energized Electrical Work Permit and I fully understand my role as the Standby Person.

_____ _____
Standby Person Date

PART 3: TO BE COMPLETED BY ENERGY CONTROL COORDINATOR

☐ JSA has been verified and completed ☐ PTP has been verified and completed

_____
Energy Control Coordinator ☐ Check if per phone conversation Date: _____

_____
Vestas Offsite Manager ☐ Check if per phone conversation Date: _____

*Completed form must be placed in turbine during work

*Form shall be retained by Energy Control Coordinator following job completion

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11. Appendix B – VAME Electrical Safe Work Procedure Audit

VAME Electrical Safe Work Procedure Audit

Level * Qualification

Name of Auditor: _____ Date of Audit: _____

Name of worker to be audited: _____ Site Name: _____

Description of work task: _____

_____

Safe Work Procedure Questions:	Yes	No
1) Does this work require an Energized Work Permit?	☐	☐
1.a) If yes, was it completed correctly?	☐	☐
2) Is the worker qualified to perform this task?	☐	☐
3) Is the JSA filled out accurately and completely?	☐	☐
4) Have the hazards been identified correctly?	☐	☐
5) Is the worker wearing any prohibited articles or clothing?	☐	☐
6) Is the worker's PPE in satisfactory condition?	☐	☐
7) Have the worker's gloves been tested in the last 6 months?	☐	☐
8) Is the worker's equipment in satisfactory condition?	☐	☐
9) Has the worker's Voltage Tester been calibrated within the last year?	☐	☐
10) Has the proper PPE been selected?	☐	☐
11) Is the worker using the 3 point test method?	☐	☐
12) Has the equipment been locked out in accordance with VAME ESP?	☐	☐
13) Is there a written procedure for this task?	☐	☐
13.a) If yes, is the worker following the written procedure?	☐	☐

Qualification Questions:

1)

2)

3)

4)

5)

Comments: _____

_____

Signature of Auditor _____ DATE: _____

T09 0008-7990 Ver 03 - Approved - Exported from DMS: 2010-10-05 by ASUER

12. Appendix C - Training Level Matrix

This Training Level Matrix summarizes the levels outlined in both the VAME LOTO Program and the VAME Electrical Safety Manual.

Training Level	Persons	LOTO Program	Electrical Safety Program
Electrically Unqualified Workers			
Level 0	Escorted visitors	Affected Person Not authorized to perform lockout unless under direct supervision of an escort	General site orientation Not authorized to perform electrical work, or to enter within the Limited Approach Boundary or Arc Flash Boundary of any electrical system.
Level 1	Vestas personnel that are not technicians Approved contractors	Authorized Person Authorized to apply personal lockout locks to a system that has been locked out by a Qualified Person	Basic Safety / Electrical Safety for Non-Electrical Workers Not authorized to perform electrical work, or to enter within the Limited Approach Boundary or Arc Flash Boundary of any electrical system.
Electrically Qualified Workers			
Level 2	Vestas Technicians Approved electrical contractors	Qualified Person Authorized to place turbine equipment in a safe working condition, establishing a lockout, in accordance with a LOTO Procedure	Fundamentals / Electrical Safety for Qualified Workers Authorized to perform electrical work and to enter within the Limited Approach Boundary or Arc Flash Boundary of any electrical system for which they have been trained.
Level 3	Senior Vestas Technicians	LOTO Specialist Authorized to design equipment LOTO Procedures	Turbine Theory / Electrical Safety for Qualified Workers Authorized to perform complex electrical troubleshooting, interlock bypassing, and permit-required energized electrical work.

T09 0008-7990 Ver 03 - Approved - Exported from DMS: 2010-10-05 by ASUER

13. History of this Document

Rev. no.:	Date:	Description of changes
00	2009-Oct-22	New document (for reference only)
01	2009-Dec-22	Initial release
02	2010-May-07	Addition of Warning to Section 2.2
03	2010-Oct-01	Link updates in Sections 2.4 and 2.6

T09 0008-7990 Ver 03 - Approved - Exported from DMS: 2010-10-05 by ASUER

Vestas

Vestas Americas Fire Protection and Prevention

Contents

1. Purpose 1
2. Scope 1
3. References 1
4. General Requirements 1
5. Hot Work 2
6. Flammable Liquids 2
7. Fire Protection and Prevention 2
8. History of this Document 3

1. Purpose

To ensure that Vestas Americas maintains an Occupational Safety, Health and Environmental program that creates a safe work environment for Vestas Americas employees and others on Vestas Americas worksites, meets the needs of the communities in which we do business and is compliant with all applicable governmental regulations.

2. Scope

Vestas Americas – All locations

3. References

- OSHA 29 CFR Parts 1910 and 1926 (United States)
- Occupational Health and Safety Act, Regulation and Code (Canada)
- OHSAS 18001 Clause 4.2 Occupational Health & Safety Policy

4. General Requirements

4.1 The work environment must be assessed prior to beginning any work, noting the possibility of a fire occurring, the proximity of fire fighting equipment and safe escape routes in the event of fire.

4.2 The persons on the site must be instructed in fire procedures.

4.3 All fire-fighting equipment must be located so that it is easy to spot and easy to access. The equipment must be checked and maintained at scheduled intervals. The persons on the site must know the location of fire extinguishers.

4.4 An alarm system, e.g. the telephone (landline or mobile), radio calls, sirens, etc. must be established for alerting all employees on-site and the nearest local emergency services in the event of an emergency. Telephone numbers and reporting instructions must be conspicuously posted at phones and employee entrances and outlined by the respective site's Emergency Response Plan (DMS 0008-7901).

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4.5 Occurrence of fires on the site must be prevented. The risk of fire can be limited when the guidelines listed below are followed.

- Compliance with the site-specific smoking rules.
- Oily rags should be stored in waste containers labeled for hazardous waste. Oily rags should not be discarded in ordinary rubbish bins or buckets.
- Minimize the use of flammable liquids.
- Internal combustion engine powered equipment (e.g. portable generators) must be placed in such a way that the exhaust is clear of any combustible materials.

5. Hot Work

5.1 Welding and torching is not allowed until approved by a regional safety specialist.

5.2 Before starting up hot works, the condition of the equipment must be inspected.

5.3 The proper personal protective equipment (PPE) for welding work must be worn.

5.4 The welding area must be well-ventilated and mechanical ventilation may be required.

5.5 A welding screen must be used when welding in the vicinity of any other person(s).

5.6 A fire watch must be employed if welding, burning, use of open flame torches or grinding is performed in an area where combustibles or flammables are present. The fire watch must be equipped with proper fire extinguishing equipment. Combustibles should be moved or carefully protected from sparks.

5.7 When welding outside, it is important to be especially aware of the wind, dry weeds, fuel tanks, etc.

6. Flammable Liquids

6.1 If flammable liquids are stored on-site, they must be stored in a secure area in approved packaging and be provided with a spill tray.

6.2 No other flammable liquid storage facilities (either mobile or stationary) may be installed at the site without prior approval from the site manager.

6.3 Access to mobile tankers on the site will only be given to vehicles that have been fitted with a suitably sized chemical spill kit.

6.4 In case of a flammable liquid spill or leakage, the spill must be contained immediately and the contaminated material disposed of in approved packaging and to an approved recipient. The defective tank(s) or container(s) must be flushed out and packaging must be safely disposed of.

7. Fire Protection and Prevention

7.1 Prior to beginning any work, assess your work environment, noting the possibility of a fire occurring, the proximity of firefighting equipment, and a safe escape route in the event of a fire.

7.2 All firefighting equipment shall be conspicuously located, shall be easily accessible, and will be inspected and maintained on a regularly scheduled basis.

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7.3 Internal combustion engine powered equipment (e.g.: portable generators), shall be so situated that the exhausts are clear of any combustible materials.

7.4 Smoking is prohibited on site except in designated areas. Smoking is forbidden in any turbine.

7.5 Gasoline or other flammable liquids should never be used for cleaning. Use approved cleaning agents only.

7.6 Oily rags should be stored in an appropriate receptacle labeled for them. Do not discard OILY rags in regular rubbish bins.

7.7 A fire extinguisher rated 2A or better shall be provided for each 3,000 square feet of protected building area or major fraction thereof.

7.8 Travel distance from any point of the building to the nearest fire extinguisher shall not exceed 50 feet.

7.9 Fire extinguishers are to be inspected by a competent person monthly and annually by a certified inspector.

7.10 Fire extinguishers are to be unobstructed and readily accessible.

7.11 A fire extinguisher, rated not less than 10B, shall be provided within 50 feet of wherever more than 5 gallons of flammable or combustible liquids or 5 pounds of flammable gas are being used on the site (this requirement does not apply to motor vehicle fuel tanks). Fire extinguishers are also required to be up tower when working.

8. History of this Document

Rev. no.:	Date:	Description of changes
00	01-Jan-2010	New document

T09 0009-2997 Ver 00 - Approved - Exported from DMS: 2010-03-09 by ASUER

Vestas®

First Aid/CPR Procedures

Medical Emergencies

Contents

1. Purpose **2**
2. Scope **2**
3. Definitions **2**
4. Regulatory References **3**
4.1 OSHA 29 CFR 1910.1030 3
5. Appendices **3**
5.1 A - First Aid Incident Log 3
6. General Requirements **3**
6.1 Localization 3
6.2 Emergency Response 3
6.3 First Aid Kits and Supplies 3
6.4 First Aid and CPR Training Requirements 4
6.5 Blood-Borne/Air-borne Pathogens Exposure 4
7. Responsibilities **5**
7.1 Vestas Americas Site Supervisor or Construction Manager 5
7.2 Subcontractors: US 5
7.3 Subcontractors: Canada 5
8. Instructions **5**
8.1 Aiding an injured worker 5
8.2 Contacting Emergency Assistance 6
8.3 Transportation of an injured worker 6
8.4 After the injured worker has been transported 7
Appendix A **8**

T09 0010-8007 Ver 00 - Approved - Exported from DMS: 2010-05-15 by ASUER

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1. Purpose

Vestas Americas requires a First Aid procedure that is both site specific and general to address Vestas Americas emergency response procedures.

2. Scope

Vestas Americas – All locations

3. Definitions

Word	Definition
Blood	Human blood, saliva components, and products made from human blood, feces, and urine.
Blood-borne Pathogens	Pathogenic microorganisms that are present in human blood and can cause disease in humans. These pathogens include, but are not limited to, Hepatitis B Virus (HBV), Hepatitis C (HBC) and Human Immunodeficiency Virus (HIV).
Air-borne Pathogens	Infection causing micro organisms spread by droplets expelled into the air by coughing or sneezing. These pathogens include but are not limited to Tuberculosis (TB), German Measles (Rubella) and Influenza.
Contaminated	The presence of, or, the reasonably anticipated presence of, blood or other potentially infectious materials on an item or surface.
Decontamination	Use of physical or chemical means to remove, inactivate, or destroy blood-borne pathogens on a surface or item to a point where they are no longer capable of transmitting infectious particles. The surface or item is rendered safe for handling, use or disposal.
Universal Protections	The practice of specific methods of hygiene and control methods (such as the use of gloves, masks and other devices) to prevent the unintentional contact with the blood or bodily fluids of another person.

T09 0010-8007 Ver 00 - Approved - Exported from DMS: 2010-05-15 by ASUER

VESTAS PROPRIETARY NOTICE

4. Regulatory References

4.1 OSHA 29 CFR 1910.1030

5. Appendices

5.1 A - First Aid Incident Log

6. General Requirements

6.1 Localization

6.1.1 In some cases, Vestas Americas has implemented a requirement that may exceed a state or provincial requirement. The higher level requirement in the Safety Manual will prevail.

6.1.2 In the event that a state or provincial requirement exceeds a Safety Manual procedure, the higher level requirement will prevail.

6.1.3 Complete the information on the First Aid Incident Log, Appendix A.

6.2 Emergency Response

6.2.1 Vestas Americas worksites shall implement the Emergency Response Plan (DMS# 0008-7901) that is both specific to the site and general to address Vestas emergency response procedures. It describes in general terms the major categories of an emergency, which are:

- Accidents, including automobile accidents that result in or could result in a serious injury or loss of life
- Major fire, or incidents where damage has occurred or threatens Company and / or public property
- Spill of chemicals

6.2.2 The Emergency Response Plan contains telephone numbers of appropriate state or provincial regulatory agencies for Vestas Americas personnel to contact in times of emergency.

6.2.3 This Safety Manual contains some general rules when dealing with emergencies; however, no list of rules can possibly cover every contingency. Use your training and refer to the Vestas Emergency Response Plan when dealing with any emergency for further assistance and direction.

6.2.4 Do not risk your safety or the safety of others at any time.

6.3 First Aid Kits and Supplies

6.3.1 Vestas shall provide first aid supplies and facilities as required under the various state and provincial Workers' Compensation Acts and OH&S Acts and Regulations.

6.3.2 The first aid kit requirements vary depending on the size and type of job and the number of workers.

6.3.3 Detailed requirements, including the contents of kits, are available in the various provincial Workplace Health and Safety legislation. A copy of these regulations and codes will be available at the field office for immediate and unrestricted access by workers.

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6.3.4 First aid kits will be available at all work locations. For remote locations, additional kits may be stored in operators' vehicles. First aid kits in remote locations will be upgraded to recognize the severity of potential injuries on the worksite and the possibility of delay in arrival of medical assistance or transport.

6.3.5 First Aid kits should not contain any prescription or non-prescription drugs. The inclusion of symptom-relief medication(s) is beyond the scope of the state and provincial legislation. The routine inclusion of over-the-counter medication(s) in first aid kits is not recommended as there is no established benefit and there is a potential for problems. If an employer determines that it is necessary to provide over-the-counter medication(s) in a first aid kit, a physician should be asked to prepare a policy and procedure to cover their use.

6.3.6 Eyewash stations shall be available at all locations where chemicals and other controlled products are handled, stored, or transported. They will be checked at least monthly and their condition documented. If necessary, portable eyewash stations may be transported in workers' trucks to remote locations.

6.4 First Aid and CPR Training Requirements

6.4.1 All Vestas Americas field personnel are to maintain current certification in Standard First Aid and basic CPR. This will provide sufficient understanding to treat most minor injuries.

6.4.2 Contractors working for Vestas Americas should have a significant percentage of their personnel trained in Standard First Aid and CPR. The required number of trained first aid responders and related equipment on a project site is determined prior to job commencement.

6.5 Blood-Borne/Air-borne Pathogens Exposure

6.5.1 This exposure plan is established to protect occupationally exposed employees from hazards of blood-borne/air-borne pathogens, in particular Hepatitis B, Hepatitis C Virus, HIV, and TB.

6.5.2 The Health and Safety representative shall be responsible for the establishment, implementation, and maintenance of all aspects of this procedure. These procedures will be reviewed and updated in accordance with the regulations.

6.5.3 All Vestas Americas field personnel are provided with training in Universal Protections and Blood Borne Pathogens. This training may be included in the First Aid and CPR training or it may be completed as a separate topic.

6.5.4 Any employee who is exposed to the blood of an injured worker will:

- Immediately notify their supervisor of the exposure
- Thoroughly wash the affected area
- Request a Hepatitis shot from a local medical provider. An employee is not required (may refuse) to receive the Hepatitis shot. If the shot is provided, the cost is covered by Vestas Americas.

The exposure will be noted on the Incident Report Form (DMS# 0008-7917) and forwarded to the Safety Department (per the Incident Reporting Procedure (DMS# 0008-7912)).

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7. Responsibilities

7.1 Vestas Americas Site Supervisor or Construction Manager

7.1.1 It is the responsibility of the Vestas supervisor in charge to ensure that:

- First aid requirements are determined
- First aid personnel, equipment and transportation are provided
- First aid personnel are suitably trained and experienced
- Injured Worker Transportation Plan is completed and reviewed with all affected workers and is available in all required locations
- For remote locations: Prior arrangements have been made with the providers of air evacuation services (helicopter or fixed wing), and
- Air evacuation providers are aware of the specific work locations or designated transfer points.

7.2 Subcontractors: US

7.2.1 The Subcontractor will designate in writing the name of at least one employee (for every ten employees).

7.2.2 Currently trained and certified in CPR/First Aid, through an approved program.

7.2.3 Training will be conducted and certified through EMP America, American Red Cross, or other recognized programs.

7.2.4 Proof of current training will be provided to Vestas – AWT.

7.2.5 For each additional ten employees, another employee will be designated in writing.

7.2.6 Refer to American Subcontractor Requirements (DMS 0008-6835).

7.3 Subcontractors: Canada

7.3.1 All subcontractors will designate in writing the names of employees currently trained and certified in CPR/First Aid, through an approved program.

7.3.2 Training will be conducted and certified through an accredited training provider which meets provincial requirements.

7.3.3 Proof of current training will be provided to Vestas – CWT.

7.3.4 The number of trained personnel must meet applicable provincial requirements.

7.3.5 Refer to Canadian Subcontractor Requirements (DMS 0008-7999).

8. Instructions

8.1 Aiding an injured worker

8.1.1 Immediately request assistance from the site office and/or the nearest co-worker.

8.1.2 Your job is to administer first aid and keep your patient as comfortable as possible while waiting for further help and transportation to a medical treatment facility.

T09 0010-8007 Ver 00 - Approved - Exported from DMS: 2010-05-15 by ASUER

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8.1.3 If the patient is able to safely move with your assistance (without causing themselves additional injury) to a location where they can be attended by medical personnel, use your best judgement in doing so.

8.1.4 If this is not possible, have the patient stay where they are. Provide comfort and first aid until additional help arrives.

8.1.5 Unconscious patients: Unless the patient is in danger of sustaining additional injury, do not move them. Assess their condition and provide first aid and/or CPR as needed based on whether or not they are breathing.

8.1.6 If you discover an injured person who will likely die without your assistance, you are duty bound to assist to the best of your ability.

8.2 Contacting Emergency Assistance (911 or other emergency number from your Emergency Response Plan)

8.2.1 When contacting the hospital, medical aid station, or other medical provider, they will want the following information. The order in which you provide the information is important. By providing your name and contact number first, they can get back to you if contact is lost, or additional information is required:

- Contact name;
- Contact number, alternate number and/or radio frequency;
- Location, physical description, longitude/latitude, directions to location;
- Number of patients requiring transport;
- Age of patient(s);
- Condition and types of injury;
- Treatment already provided;
- Type of first aid/medical aid available on site;
- Type of transport requested; and
- Location of transfer point.

8.3 Transportation of an injured worker

8.3.1 A Vestas supervisor has the authority to make any arrangements necessary regarding treatment and transportation to sustain life in extenuating circumstances.

8.3.2 Unless the injury is very minor, it is recommended that injured employee be transported by medical transport.

8.3.3 In no case should employees drive themselves to a medical facility – they must be accompanied (driven) by another employee.

8.3.4 Certain jurisdictions, British Columbia being one, leave the decision as to when and how to transport in the hands of the first aid attendant who administers treatment. The attendant's, or more senior medical practitioner's, decision to transport takes precedence over any decision to the contrary by non-medical personnel.

T09 0010-8007 Ver 00 - Approved - Exported from DMS: 2010-05-15 by ASUER

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8.3.5 The mode of transportation will be by ambulance in most emergency situations. However, in some circumstances, it may be necessary to transport the victim to the nearest medical aid facility by air.

8.3.6 In either event, call the nearest medical aid station and provide all of the necessary details. If the medical aid facility has access to the air ambulance services for both fixed wing and rotary aircraft, advise them according to your needs.

8.4 After the injured worker has been transported

8.4.1 Complete the Incident Report Form (DMS# 0008-7917), including all information related to the incident (per the Incident Reporting Procedure (DMS# 0008-7912)).

8.4.2 Notify all contacts on the on the Emergency Response Plan, based on the nature of the incident.

T09 0010-8007 Ver 00 - Approved - Exported from DMS: 2010-05-15 by ASUER

Appendix A

In Case of Accident, Injury, or Illness

NOTIFY YOUR SUPERVISOR IMMEDIATELY

SUPERVISOR WILL PERFORM THE FOLLOWING:

Determine the severity of injury or illness and the appropriate response.

Major medical issues (such as altered level of consciousness, severe bleeding, chest pains, seizures, and loss of breathing) require immediate medical intervention.
- **Call 9-911 for paramedics and ambulance**
- **Send someone to direct emergency response personnel to the appropriate area.**

Minor medical issues (such as sprains, strains, and minor cuts with controllable bleeding) require timely transport to a medical facility.
- **Notify medical facility and authorize treatment (see facilities below).**
- **Arrange for non-ambulance transport to the appropriate treatment facility.**

First Aid issues (such as paper cuts, splinters, and minor burns) require a qualified First Aid Provider (see below). The First Aid Provider treats the injury and completes First Aid Log below.

Monday – Friday, 7:00 am to 7:00 pm (Occupational Clinic)	All Other Times (Emergency Room)
Address & Phone:	**Address & Phone:**

Emergency First Aid Providers

Responder	Location/Shift	Extension	Direct Dial	Cell

First Aid Treatment Log

Name of Injured	Date	Type of Injury	1st Aid Provider	Supplies Used

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