Office of Environmental Quality
Environmental Management System
Module 2
Environmental Aspects & Impacts
Objectives

• Define the terms: Environment, Aspects, and Impacts
• Review the NCDOT Aspects and Impacts procedure, and the Aspects and Impacts Matrix Form
• Identify Environmental Aspects and Impacts
• Rank identified environmental Aspects and Impacts
• Determine the frequency of an Aspect
• Identify those Aspects that are significant
• Complete the Aspects and Impacts Matrix Form
• Understand where significant Aspects fit in your EMS
ISO14001 defines the environment as:

Surroundings in which an organization operates, including air, water, land, natural resources, flora, fauna, humans and their interrelation.
Environmental Aspects

Environmental Aspect is an organization's activities, products or services that can interact with the environment. There are two types of environmental aspects:

- **Direct Environmental Aspect** - Activities over which a company can be expected to have an influence and control. For example, emissions.

- **Indirect Environmental Aspect** - Actual or potential activities over which the organization can be expected to have an influence on, but no control over. For example, supply chains, customer controlled aspects, aspects managed elsewhere within the same company.
Environmental Aspects

can include:

Land Use
Energy Consumption
Water Consumption
Waste
Community Interactions
Examples of Aspects

Land Use

• On-site storage/containment/distribution/handling of solids, liquids, gases

• Interactions with natural surface or ground water on the property or wetlands

• Maintenance activities that disturb the earth

• Soil erosion

• Release of pesticides and fertilizers

• Remnants of past activities at the site (e.g., soil contamination)
Energy Consumption

• Electricity
• Fuel Oil
• Natural Gas
• Gasoline
• Propane
Community Interactions

- Noise pollution
- Odor, Vibration, Site Lighting
- Employee Commuting
- Trucking In and Out
- Dust Generation
- Electromagnetic Frequency Releases
- Recycling and Recovery Operations
- Appearance and Housekeeping
- Land Acquisition
Examples of Aspects

Waste

- Solvents
- Adhesives
- Inks
- Solder / Lead Wastes
- Oxidizers
- Paint and Related Waste
- Waste Treatment Sludge
- Contaminated Soil
- Asbestos
- Batteries
- Hazardous Liquids
Examples of Aspects

Water Consumption

• Site-owned Sources
• Municipal or Private Sources
• De-ionized Water
• Bottled Water
• Other
Environmental Impacts

Environmental Impact (effect)
Is any change in the environment, whether adverse or beneficial, wholly or partially, resulting from an organization’s activities, products, or services.

Significant Impact
An activity that results in a substantial impact on the environment and is usually due to abnormal conditions.
NCDOT Environmental Aspects and Impacts Matrix

<table>
<thead>
<tr>
<th>Department: XYZ</th>
<th>Data Last Updated: 10/21/2006</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Activities, Products, or Services (what we do)</th>
<th>Environmental Aspects</th>
<th>Environmental Impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Noise Pollution</td>
<td>Air Pollution</td>
</tr>
<tr>
<td></td>
<td>Groundwater Contamination</td>
<td>Soil Contamination</td>
</tr>
<tr>
<td></td>
<td>Sediment/Erosion</td>
<td>Habitat/Species</td>
</tr>
<tr>
<td></td>
<td>Natural Resource</td>
<td>Cultural/Community</td>
</tr>
<tr>
<td></td>
<td>User/Conservation</td>
<td>Effects</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Regulated Aspect</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Other</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total Impact</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Score (Total x Freq.)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Significant * S or NS (≤ 0.02)</td>
</tr>
</tbody>
</table>

Aspect List (possible aspects not limited to this list):

- AE = Air Emissions
- CA = Contract Administration
- HW = Hazardous Waste
- MH = Marine Habitat
- N = Noise
- NR = Natural Resource Use
- PI = Public/Personnel Interface
- RC = Recycle
- RL = Release (spills & leaks)
- SV = Solid Waste
- S/V = Storm Water & Waste Water
- SU = Surface Water
- PR = Permitting & Regulation

Comments:
Provides a process to identify environmental aspects, and to determine those that are significant and should be addressed as a priority by the EMS system.
Step 1

Identifying Aspects & Impacts

1) Select an activity, a product or service.

2) Identify as many environmental aspects as possible associated with the selected activity.

3) Identify as many actual and potential, positive and negative, environmental impacts associated with each identified aspect.
Identify Activities, Products, Services

Identify and list the main Activities, Products, or Services within the scope of the EMS. List these in Column #1 of the Aspects and Impacts Matrix.
Consider which activities may have abnormal conditions and indicate the abnormal condition status in Column # 2. An example of an abnormal condition could be severe weather or operating on back-up power generators.
- For each activity, or sub-activity, list all associated environmental aspects.
- Then identify how each of these activities or sub-activities interact with the environment or cause environmental interactions.
- List or describe the environmental aspects in Column #3.
**Step 2**  
**Ranking Aspects**

For each aspect, score each environmental impact identified as either a detrimental or beneficial impact. Do this for both normal and abnormal conditions. (Columns 4-16)

<table>
<thead>
<tr>
<th>Detrimental</th>
<th>Score</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-10</td>
<td>High Impact</td>
<td>Environmental effects are likely to cause local or regional community destruction or degradation, or environmental legislation or regulations apply</td>
</tr>
<tr>
<td>-5</td>
<td>Medium Impact</td>
<td>Environmental effects are possible or there is noticeable environmental degradation</td>
</tr>
<tr>
<td>-1</td>
<td>Low Impact</td>
<td>Environmental effects are not likely, or the activity is not regulated</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Beneficial</th>
<th>Score</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Low Impact</td>
<td>Minimal beneficial environmental effects are possible</td>
</tr>
<tr>
<td>5</td>
<td>Medium Impact</td>
<td>Beneficial environmental effects are likely</td>
</tr>
<tr>
<td>10</td>
<td>High Impact</td>
<td>Highly beneficial environmental effects are likely to occur</td>
</tr>
</tbody>
</table>
Add the total score of Environmental impacts in Column # 17
Step 3
Determine Frequency

Review the identified aspects and rate each aspect for frequency in Column 18:
- Expected/Often (3)
- Occasional (2)
- Unlikely/Rare (1)
Step 4

Add the Total Score

In Column # 19 calculate the score by multiplying Total Impact Column (17) by Frequency Column (18).
### Step 5
Determine Significance

Once the significant aspects have been identified (those with a score of \(-S1\) or \(S2\)) enter S for significant or NS for not significant in column 20.
### Determining Significance Example

#### NCDOT Environmental Aspects and Impacts Matrix

| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U |
| 1 | NCDOT OEO | Environmental Aspects and Impacts Matrix |  |
| 2 | Division: NCDOT Div: Unit | Rev Date: |  |
| 3 | Prepared By: | SS1400 revs: |  |
| 4 | Number & Rev: NCDOT-Lt-GenOps-09a Rev: | Revision: |  |
| 5 | NCDOT-Lt-GenOps-09 | Documentation #: |  |

#### Department: XYZ

| Data Last Updated: 10/24/2006 |

#### Activities, Products, or Services (what we do)

| Code | Environmental Aspects | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| Pe | Release Spills | -1 | -5 | -10 | -5 | -1 | -1 | -1 | -1 | Y | -32 | 1 | -32 | Y |
| Lt | Land Use | -1 | -1 | -5 | -5 | -10 | -5 | -5 | -5 | -5 | N | -52 | 1 | -52 | Y |
| O | Hazardous Waste | -1 | -1 | -5 | -5 | -10 | -5 | -1 | -1 | -1 | -1 | Y | -27 | 2 | -54 | Y |
| S | Land Use Landfill | -1 | -1 | -10 | -10 | -5 | -5 | -5 | -5 | -5 | Y | -67 | 3 | -134 | Y |
| R | Recycle Materials | -1 | 5 | -5 | 5 | -1 | 5 | 10 | 5 | 10 | N | -41 | 3 | 123 | Y |
| E | Air Pollution/CO2 | -1 | -10 | -1 | -1 | -1 | -1 | -1 | -1 | -1 | N | -19 | 1 | -19 | Y |

#### Aspect List (possible aspects not limited to this list)

| AE | Air Emissions |
| CA | Contract Administration |
| Hu | Hazardous Waste |
| NHP | Change Marine Habitat |

AC = Air Emissions  
CA = Contract Administration  
Hu = Hazardous Waste  
NHP = Change Marine Habitat  
N = Noise  
NR = Natural Resource Use  
PL = Public/Personnel Interface  
PC = Policy  
R = Recycle  
PRL = Release (spills & leaks)  
SB = Surface Water  
P = Permitting & Regulation  
VT = Vehicle Travel  
SVW = Storm Water & Waste Water
Where Do Significant Aspects Fit in Your EMS?

- Use of an EMS helps to manage your significant Aspects, and Impacts
- Objectives and targets for your significant Aspects should be considered
- Employees need to be aware of significant environmental aspects of their jobs
- Organizations should consider communicating significant Aspects and documents externally
- Organization should have procedures to monitor operations & activities that can have significant impact(s)
Summary

• Significant Aspects are defined based on Division/Unit specific criteria

• A formal procedure is used to evaluate significant Environmental Aspects and Impacts

• When identifying Aspects and Impacts, look beyond activities covered by laws and regulations

• Aspects determined to have significant impacts are reviewed periodically by your EMS Team
Contact Information

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