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Federal Facilities Risk Impact Analysis(FRIA)

(Defense Facilities Pilot)

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February 25, 1999

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**DRAFT** Federal Facilities Risk Impact Analysis (FRIA)


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Similar risk evaluation components are found in the Human Health Risk Index (HHRI) used for Regional enforcement targeting, the Region 6 Environmental Justice Risk Index (EJRI), the Cumulative Risk Impact Analysis (CRIA), the Index of Watershed Indicators, and the Region 6 Vulnerability Assessment. The FRIA is an assessment tool to facilitate communication of technical and regulatory data upon which better agency decisions can be made. The FRIA is designed to better understand the unique issues surrounding federal defense facilities. The tool is not intended to be used alone in evaluating potential effects. The user must be familiar with the ranking criteria to appropriately consider the vulnerabilities of the affected environment and the potential for cumulative environmental impacts.

The methodology follows other Region 6 targeting projects by relying on GIS, electronic data files, and criteria developed with a 1-5 scoring system. Electronic data were used along with the following criteria to score each facility (1-5 scale) as to their impact/vulnerability.

The FRIA considers environmental vulnerabilities and potential effects of individual defense facilities by watershed subunits called Hydrologic Unit Catalogs or HUCs. A watershed subunit is created by merging watershed area data and State stream segment information. The HUC becomes the methodology's base analytical unit.

Cumulative risks are identified through evaluation of: 1) Area of Defense facilities; 2) environmental vulnerabilities (e.g., ground water depth or soil permeability) and 3) impacts from known Defense facilities (water quality, vector/odor, wildlife habitat) specific to each watershed subunit.

Cumulative risk criteria are summed using a mathematical algorithm. Key components of the algorithm are Area of Defense facilities($A_I$), Area of the Watershed Subunit ($A_{WS}$), Degree of Vulnerability ($D_V$), and Degree of Impact ($D_I$).

The FRIA algorithm is as follows:

$$FRIA = [EA_I / A_{WS}] \times D_V \times D_I$$

where:

FRIA = Potential for significant environmental risk

$A_I$ = Area of Defense facilities

$A_{WS}$ = Area of watershed subunit

$D_V$ = Degree of Vulnerability for subunit (e.g., ground water depth, rainfall, soil permeability, populated areas).

$D_I$ = Degree of Impact produced by Defense facilities within the watershed subunit.

The FRIA for defense facilities is calculated for each facility in a watershed subunit area. Total areas ($A_I$) of known facilities in a watershed subunit are scored from 1 to 4 based on the percentage of the watershed area they represent. Vulnerability and impact factors are identified, and criteria for each were developed. Each $D_V$ and $D_I$ criteria is scored from 1 to 5.

The calculations involve:

1) summing the areas for known facilities ($A_I$) and determining what percent of a watershed subunit is affected. ([$EA_I$ / $A_{WS}$] X 100); these percentages are scored on a 1 to 4 scale [no project(s) = 0 score].

2) summing the vulnerability and impact criteria scores, and calculating the average for $D_V$ and $D_I$ respectively;

3) multiplying the Area score by the average $D_V$ score and by the average $D_I$ score.

The <u>maximum score possible</u> in a watershed subunit (HUC) is 100. The summation factor ($EA_I$) is cumulative for defense facilities in the watershed subunit. Maximum rank for [$EA_I$ / $A_{WS}$] is 4, maximum for $D_V$ is 5, maximum score for $D_I$ is 5.

$$FRIA_{max} = [EA_I / A_{WS}] \times (D_V) \times (D_I)$$

$$= [4] \times (5) \times (5) = 100$$

I. **WATERSHED SUBUNIT AREA [$EA_I$ / $A_{WS}$] CRITERION**:
[$EA_I$ / $A_{WS}$] is the ratio of the cumulative area effected to the watershed subunit area evaluated. [$EA_I$ / $A_{WS}$]:

| Area | Score |
|---|---|
| 0% | 0 |
| < 5% | 1 |
| ≥ 5% and < 10% | 2 |
| ≥ 10% and < 15% | 3 |
| ≥ 15% | 4 |

**Databases:**
U.S. Geological Survey. 1995. Watershed Boundaries for Oklahoma, Joel Cederstrand and Allen Rey, Oklahoma City, OK.

**References:**
U.S. EPA. 1990. Region 6 Comparative Risk Project, Overview Report. Office of Planning and Analysis. Dallas, TX.

U.S. EPA. 1992. A Synoptic Approach to Cumulative Impact Assessment: A Proposed Methodology. Office of Research and Development, EPA/600/R-92/167, Washington, D.C.

U.S. EPA. Undated. New Source NPDES General Permit Environmental Information Documents. Office of Planning and Coordination. Dallas, TX.

US EPA. Index of Watershed Indicators

**Definitions, Assumptions, Limitations, Uncertainties:**
1) One square mile = 27,878,400 sq.ft.

2) The potential for negative environmental impact increases as the percentage of watershed subunits (HUC) occupied by Defense facilities increases.

3) Cumulative impacts can be measured by assessing Defense facilities impacts in watershed subunits.

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## II. **DEGREE OF VULNERABILITY ($D_V$) CRITERIA**:

$D_V$ is the sum of individual criterion scores divided by the number of vulnerability factors used in the Degree of Vulnerability ($D_V$) assessment. [$D_V$ scores / no. v]

1) **$D_V$ Criterion:**
**Ground Water Probability**

| Probability[1] | Score |
|---|---|
| ≤ 2.5% | 1 |
| > 2.5% and ≤ 5% | 2 |
| > 5% and ≤ 10% | 3 |
| > 10% and ≤ 20% | 4 |
| > 20% | 5 |

[1]Probability of ground water being within 6-8 ft. of surface.

**Databases:**
NRCS (National Resource Conservation Service), downloaded from NRCS in Oklahoma City, OK. Ten acre grid soils data. 1995/96?

U.S. EPA Region 6, GIS, ERI Directory, Subdirectory NewSoils.arp, (Jeff Danielson, CDSI)

**References:**
U.S. EPA Region 6, Mike Bechdol, Cross Functional Workgroup.

U.S. EPA. 1987. Drastic: A Standardized System for Evaluating Ground Water Pollution Potential Using Hydrogeologic Settings. EPA/600/2-87/035. Environmental Research Laboratory. Ada, OK.

**Definitions, Assumptions, Limitations, Uncertainties:**
1) Area of the facility is represented as the facility area plus a ten acre buffer around each site.

2) Only those 10 acres with a >20% probability of ground water being within six to eight feet of the surface(scaling score of 5) were used for the criteria site percentage estimate.

3) The six to eight foot soil profile estimates the probability of ground water vulnerability beneath the facility and buffer area.

4) The higher the probability of ground water beneath the facility the more vulnerable the resource.

5) This criteria is summed with the other three watershed vulnerability criteria and averaged for an overall watershed score.

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2) **$D_v$ Criterion: Rainfall**

| Rainfall | Score |
|---|---|
| < 12.5 in./yr | 1 |
| ≥ 12.5 in./yr and < 25 in./yr | 2 |
| ≥ 25 in./yr and < 37.5 in./yr | 3 |
| ≥ 37.5 in./yr and < 50 in./yr | 4 |
| ≥ 50 in./yr | 5 |

**Databases:**
Blacklands Research Center, 1995. Humus - Hydrologic Unit Modeling for the United States, USDA/NRCS, USDA/ARS, and Texas A&M University, College Station, TX.****Change New DB**USGS Runoff Data 1951-1981.**

**References:**
U.S. EPA Region 6, GIS, (Tom Nelson, 6WQ-CD)

U.S. EPA, 1991. Regional Assessment of Aquifer Vulnerability and Sensitivity in the Conterminous United States. EPA/600/2-91/043, Office of Research and Development, Washington, D.C.

**Definitions, Assumptions, Limitations, Uncertainties:**
1) The greater the annual rainfall, the more infiltration relative to factors such as slope and soil type to the groundwater.

2) The greater the annual rainfall, the more water available for runoff to surface water.

3) All known facilities in a watershed subunit (HUC) receive a comparable amount of annual rainfall.

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3) **$D_V$ Criterion: Surface Water Use**

| Supporting Designated Use | Score |
|---|---|
| ≥ 99% | 1 |
| < 99% and ≥ 76% | 2 |
| no data | 3 |
| < 76% and ≥ 50% | 4 |
| < 50 | 5 |

**Databases:**
U.S. EPA. 1994. Clean Water Act, Section 305 (b): Oklahoma State Water Quality Inventory Reports, 303 (d) List..Dallas, TX.

**References:**
U.S. EPA, 1994. Watershed Agricultural Impact Task Force, W.A.I.T. Report, Research Triangle Institute (RTI), Charles Spooner.

US EPA Website. Surf Your Watershed/ IWI 1995/6 305(b).http://www.epa.gov/surf/iwi

**Definitions, Assumptions, Limitations, Uncertainties:**
1) CWA 305(b) reports describe the surface water quality for 8 digit HUCs.

2) Stream segments with no data are assumed to be good quality.

3) Designated uses are defined in the referenced EPA W.A.I.T. report.

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4) **$D_v$ Criterion: [Runoff]**
**Distance to Surface Water**

| Distance to Vulnerable Water | Score |
|---|---|
| > 8,100 ft | 1 |
| ≤ 2,700 ft and > 8,100 ft | 2 |
| ≤ 900 ft and > 2,700 ft | 3 |
| ≤ 300 ft and > 900 ft | 4 |
| ≤ 300 ft | 5 |

**Databases:**
U.S. Census Bureau, 1992. TIGER/Line Census Files, (machine-readable data files) prepared by the Census Bureau, Washington,D.C.

RF3: not ready until March

**Definitions, Assumptions, Limitations, Uncertainties:**
1) Vulnerable surface waters for this criteria are only those in the U.S. Census Bureau, TIGER 1992 Database .

2) The closest surface water is defined to be the closest surface water down gradient from Federal facility pollution sources.

3) Distance to surface water is measured as straight line distance from the outer boundary of the facility with no buffer zone(incorporation of drainage distances are future enhancements).

4) This criteria may extend outside the watershed.

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5) **$D_V$ Criterion:**
**Population Residing Around Facility**

| Population (per square mile)[1] | Score |
|---|---|
| 0 | 1 |
| > 0 and ≥ 200 | 2 |
| > 200 and ≥ 1000 | 3 |
| > 1000 and ≥ 5000 | 4 |
| > 5000 | 5 |

[1]Within a four (4) mile radius around facility.

**Databases:**
U.S. Census Bureau, 1990. Census of Population and Housing, 1990: Public Law. (P.L.) 94-171 Data on CD-ROM (Name of State) [machine -readable data files] / prepared by the Bureau of the Census. -- Washington: The Bureau [producer and distributor], 1991.

**References:**
U. S. Environmental Protection Agency. 1989. Toxic Chemical Release Inventory Risk Screening Guide Volumes 1 and 2. US EPA Office of Pesticides and Toxic Substances. EPA 560/2-89-002.

**Definitions, Assumptions, Limitations, Uncertainties:**
1) Human population areas can be negatively impacted by known industries.

2) The closer populated areas are to known facilities, the more potential for negative impacts.

3) Environmental Justice Index (EJI) or other ethnic/demographic considerations will be conducted as a separate assessment.

4) The 4 mile radius extends from the border of the facility.

5) This criterion includes people residing on the Federal facility, e.g. a military base.

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6) **$D_v$ Criterion: Soil Permeability**

| Rating[1] | Score |
|---|---|
| < 0.02 in./hr | 1 |
| ≥ 0.02 in./hr and < 0.6 in./hr | 2 |
| ≥ 0.6 in./hr and < 2.0 in./hr | 3 |
| ≥ 2.0 in./hr and < 6.0 in./hr | 4 |
| ≥ 6.0 in./hr | 5 |

[1]Permeability ratings are by 10 acre grids. The average of the grids, inside or touching the facility boundary is ranked 1-5. In addition a site is scored a 5 if >20% of the facility area

**Databases:**
NRCS (National Resource Conservation Service), downloaded from NRCS in Oklahoma City, OK. Ten acre grid soils data. 1995/96?

**References:**
U.S. EPA, 1993. A Review of Methods for Assessing Aquifer Sensitivity and Ground Water Vulnerability to Pesticide Contamination. 813-R-93-002, Office of Water (WH-550), Washington, D.C.

Lin, H.S., H.D. Scott, and Jim McKinny, 1995. Identification of Optimal Locations for Sampling Ground Water of Pesticides in the Mississippi Delta Region of Eastern Arkansas, Department of Agronomy, University of Arkansas, Fayetteville, AR.

U.S. EPA, 1991. Regional Assessment of Aquifer Vulnerability and Sensitivity in the Conterminous United States. EPA/600/2-91/043, Office of Research and Development, Washington, D.C.

U.S. EPA, 1996. Vulnerability Assessment Methodology. Region 6 EPA, Ground Water Protection Branch, Dallas, TX

**Definitions, Assumptions, Limitations, Uncertainties:**
1) Soil and ground water characteristics are assumed to be consistent over the facility area. Slope of the land is not evaluated.

2) Permeability ratings refer to the weighted average in 6 inch increments of the upper six to eight feet.

3) Although facility activities may include some soil disturbance permeability ratings are based upon undisturbed soil conditions.

4) This criterion is summed with the other three watershed vulnerability criteria and averaged for an overall watershed score.

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7) **$D_v$ Criterion: Ground Water Quality**

| Average Nitrate-Nitrite | Score |
|---|---|
| < 3 mg/L | 1 |
| ≥ 3 mg/L and < 4.5 mg/L | 2 |
| ≥ 4.5 mg/L and < 6 mg/L | 3 |
| ≥ 6 mg/L and < 7.5 mg/L | 4 |
| ≥ 7.5 mg/L | 5 |

**Databases:**
Oklahoma Water Resources Board, 1993. Statistical Summary of Groundwater Quality Data: 1986-1991 for the Major Groundwater Basins in Oklahoma, FY 93 106 Groundwater Task 400, Planning and Management, Bob Fabian, Oklahoma City, OK.

**References:**
U.S. EPA. 1991. Protecting the Nation's Ground Water: EPA's Strategy for the 1990's (part D: Agency Policy on EPA's Use of Quality Standards in Ground Water Prevention and Remediation Activities). 21Z-1020. Office of the Administrator (WH-550G). Washington, D.C.

**Definitions, Assumptions, Limitations, Uncertainties:**
1) The Maximum Contaminant Level (MCL) for nitrate in ground water is 10 mg/L established under the Safe Drinking Water Act.

2) Phosphates and other nutrients are not included in this criteria. Nutrients will be covered in separate criteria (i.e. Surface Water Quality)

3) Oklahoma ground water quality data is presented at the county and aquifer level. Approximation of sampling locations were derived from combining aquifer, watershed, river, and county location data.

4) Where counties include more than one aquifer, the watershed that incorporated a certain river was assumed to be associated with the aquifer with the same name as the river.

5) This criterion reflects the acute, non-chronic condition.

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8) **$D_v$ Criterion:**
**Economic (Environmental Justice)**

| Economic Ranking by EJ Method[1] | Score |
|---|---|
| Economic status is ≤ the State average | 1 |
| Status is ≤ 1.33 times the State avg. | 2 |
| Status is ≤ 1.66 times the State avg. | 3 |
| Status is ≤ 2 times the State avg. | 4 |
| Status is > 2 times the State avg. | 5 |

**Databases:**
U.S. Census Bureau, 1990. Census of Population and Housing, 1990: Public Law. (P.L.) 94-171 Data on CD-ROM (Name of State) [machine -readable data files] / prepared by the Bureau of the Census. -- Washington: The Bureau [producer and distributor], 1991.

U.S. Census Bureau 1990, TIGER 1992 update, STF3A Census Coverage, P.L. 94-171.

**References:**
U.S. EPA. 1995. Computer Assisted Environmental Justice Index Methodology (August 1995 Revision). Office of Planning and Analysis, Enforcement Division, Region 6 Environmental Protection Agency, Dallas, TX.

U.S. EPA. 1994. Executive Order 12898: "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations". 59 Federal Register Notice 7629 (1994).

Council of Environmental Quality. 1996. Draft Guidance of Addressing Environmental Justice under the National Environmental Policy Act (NEPA) (April, 1996). Executive Office of the President, Washington D.C.

U.S. EPA. 1992. Environmental Equity: Reducing Risk for All Communities. Office of Policy, Planning, and Evaluation (PM-221), EPA230-R-92-008, June 1992. Environmental Protection Agency,

Washington, D.C.

Lavelle, M., and M. Coyle. 1992. Unequal Protection: The Racial Divide in Environmental Law. The National Law Journal, Vol. 15, No. 3,2-12.

**Definitions, Assumptions, Limitations, Uncertainties:**
1) Demographic data will be 1990 STF3A Census coverage.

2) The economic analysis calculated for a four mile radius (minimum 50 square miles) from the boundary of the facility.

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9) **$D_v$ Criterion:**
**Minority (Environmental Justice)**

| Minority Ranking by EJ Method[1] | Score |
|---|---|
| Minority status is ≤ the State average | 1 |
| Status is ≤ 1.33 times the State avg. | 2 |
| Status is ≤ 1.66 times the State avg. | 3 |
| Status is ≤ 2 times the State avg. | 4 |
| Status is > 2 times the State avg. | 5 |

**Databases:**
U.S. Census Bureau 1990, Census of Population and Housing, Summary Tape File 3 on CD ROM (Name of State) [machine-readable data files] / prepared by the Bureau of the Census. --Washington: The Bureau [producer and distributor], 1992.

**References:**
U.S. EPA. 1995. Computer Assisted Environmental Justice Index Methodology (August 1995 Revision). Office of Planning and Analysis, Enforcement Division, Region 6 Environmental Protection Agency, Dallas, TX.
U.S. EPA. 1994. Executive Order 12898: "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations". 59 Federal Register Notice 7629 (1994).

Council of Environmental Quality. 1996. Draft Guidance of Addressing Environmental Justice under the National Environmental Policy Act (NEPA) (April, 1996). Executive Office of the President, Washington D.C.

U.S. EPA. 1992. Environmental Equity: Reducing Risk for All

Communities. Office of Policy, Planning, and Evaluation (PM-221), EPA230-R-92-008, June 1992. Environmental Protection Agency, Washington, D.C.

Lavelle, M., and M. Coyle. 1992. Unequal Protection: The Racial Divide in Environmental Law. The National Law Journal, Vol. 15, No. 3,2-12.

**Definitions, Assumptions, Limitations, Uncertainties:**
1) Demographic data will be 1990 STF3A Census coverage.

2) The minority analysis calculated for a four mile radius (minimum 50 square miles)from the boundary of the facility.

**EPA Contacts (name, mail-code, telephone number):**
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10) **$D_v$ Criterion: Surface Water Quantity**

| Stream & Shoreline | Score |
|---|---|
| < 0.917 mi/mi$^2$ | 1 |
| ≥ 0.917 mi/mi$^2$ and < 1.15 mi/mi$^2$ | 2 |
| ≥ 1.15 mi/mi$^2$ and < 1.43 mi/mi$^2$ | 3 |
| ≥ 1.43 mi/mi$^2$ and < 1.7 mi/mi$^2$ | 4 |
| > 1.7 mi/mi$^2$ | 5 |

**Databases:**
Vulnerable surface waters for this criteria are only those in the U.S. Census Bureau, TIGER 1992 Database .

[Rf-3 enhancement]

**References:**
Wetzel, R., 1983. Limnology, 2nd ed., Saunders College Publishing, New York, NY.

**Definitions, Assumptions, Limitations, Uncertainties:**
1) Surface waters are calculated for segment and shoreline distances for streams, rivers, and lakes. Scaling scores (rankings) are derived from total miles in a watershed divided by the area in square miles of associated HUCs.

2) River and lake surface water areas and depths are not considered.

3) The more surface water area present in a watershed, the higher potential for ecological impacts.

4) Shoreline is of considerable interest because of the sensitivity of associated ecological communities.

5) This criterion is summed with the other three watershed vulnerability criteria and averaged for an overall watershed score.

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11) **$D_v$ Criterion:**
**Water Quality (STORET Data)**

| # STORET Exceedances / Watershed $ft^2$ | Score |
|---|---|
| $< 5.00 \times 10^{-12}$ | 1 |
| $\geq 5.00 \times 10^{-12}$ and $< 5.00 \times 10^{-11}$ | 2 |
| $\geq 5.00 \times 10^{-11}$ and $< 5.00 \times 10^{-10}$ | 3 |
| $\geq 5.00 \times 10^{-10}$ and $< 5.00 \times 10^{-9}$ | 4 |
| $\geq 5.00 \times 10^{-9}$ | 5 |

**Databases:**
U.S. EPA, Storet Database, Paul Koska and Mike Bechdol

Index of Watershed Indicators- http://www.epa.gov/surf/iwi

**Definitions, Assumptions, Limitations, Uncertainties:**
1) Assessed Safe Drinking Water Act (SDWA) contaminants (22 volatile organic compounds, 35 organics/pesticides, 17 inorganics/metals, and trihalomethane) can adversely impact public health and surface water quality.

2) National primary drinking water standards, established under SDWA, are compared to STORET ambient water data. Comparisons for 65 SDWA contaminants were matched to surface (i.e. stream, lake, reservoir) and ground water (well and springs) STORET data.

3) Exceedances are defined as STORET sampling station data reporting chemical concentration greater than the SDWA MCLs (Maximum Concentration Levels). Sixteen years of data were evaluated.

4) Exceedances are based on 0.5 MCL for IOCs, VOCs, SOCs, RADS, and nitrates for the data years, 1990-1996.

5) Eight digit HUCs were evaluated. The ranking values were the quotients of the number of exceedances in specific HUCs divided by the area in square feet of the associated HUC.

6) This criterion is summed with the other three watershed vulnerability criteria and averaged for an overall watershed score.

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12) **$D_v$ Criterion: Wildlife Habitats**

| Coverage of HUC Subunit | Score |
|---|---|
| < 20% | 1 |
| ≥ 20% and < 30% | 2 |
| ≥ 30% and < 40% | 3 |
| ≥ 40% and < 50% | 4 |
| > 50% | 5 |

**Databases:**
NRCS, 1995. Landuse Dataset, Oklahoma City, OK

**References:**
Department of the Interior, 1976. A Land Use and Land Cover Classification System for Use with Remote Sensor Data, James Anderson, third printing 1978.

**Definitions, Assumptions, Limitations, Uncertainties:**
1) Wildlife Habitats are represented by wetlands, rangelands, forest lands, woodlands, including bottomlands.

2) Percent coverage is quantitative only. No decisions as to wildlife habitat quality were made.

3) There is no association between this vulnerability score for wildlife habitats and the potential effect, if any, on listed Federal Endangered and Threatened Species, subject to the requirements of the ESA.

5) The EPA will conduct a separate review with the U.S. Corps of Engineers and/or the U.S. Natural Resources Conservation Service, as necessary, to document compliance with Section 404 of the Clean Water Act.

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13) **$D_v$ Criterion: Air Quality**

| Distance from nonattainment area | Score |
|---|---|
| > 10 miles | 1 |
| 6 to 10 miles | 2 |
| 2 to 5 miles | 3 |
| ≤ 2 miles | 4 |
| 0 miles | 5 |

**Databases:**
CFR Part 81 Clean Air Act. Http://www.epa.gov/airs/nonattn.html

**References:**
CFR Part 81 Clean Air Act

**Definitions, Assumptions, Limitations, Uncertainties:**
1) For any of the 7 criteria pollutants; ozone, lead, particulates, CO, $SO_x$, $NO_x$.

2) Air nonattainment areas were used to calculate this score.

**EPA Contacts (name, mail-code, telephone number):**
Sharon Osowski (6EN-XP), Region 6, Dallas, TX (x7506)
Gerald Carney (6EN-XP), EPA Region 6, Dallas, TX (x6523)
Jeff Danielson (CDSI Contractor) EPA Region 6, Dallas, TX (x8559)

14) **$D_V$ Criterion: Other Industries, Pollution Sources, or Protected Lands(Quadmapper Data[1] & state data)**

| Number within a two mile buffer | Score |
|---|---|
| No industries or land areas | 1 |
| One industry or land area | 2 |
| Two industries or land areas | 3 |
| Three industries or land areas | 4 |
| Four industries or land areas | 5 |

[1]Locations for solid waste landfills, water supply intake points, RCRA Sites, Indian Reservations, Superfund (NPL) sites, Federal Facilities, and Toxic Release Inventory (TRI) sites.

**Database:**
Quadmapper Database

**References:**
U.S. EPA, 1996. Region 6 EPA Geographic Information System (GIS) Data Library. Quadmapper Documentation , Office of Planning and Coordination, Dallas, TX.

**Definitions, Assumptions, Limitations, Uncertainties:**
1) Watersheds can be negatively effected by the cumulative impacts of defense facilities in combination with other industries.

2) Other industries are defined as those in the Region 6 EPA Quadmapper database and state databases.

3) Industries within two miles of defense facilities are factors in the assessment of cumulative environmental impacts.

4) This criteria may extend outside the watershed.

**EPA Contacts (name, mail-code, telephone number):**
Gerald Carney (6EN-XP), EPA Region 6, Dallas, TX (x6523)
David Parish (6EN-X), EPA Region 6, Dallas, TX (x8352)
Jeff Danielson (CDSI Contractor) EPA Region 6, Dallas, TX (x8559)

## III. **DEGREE OF IMPACT ($D_I$) CRITERIA**

$D_I$ is the sum of individual impact criteria scores divided by the number of impact factors used in the Degree of Impact ($D_I$) assessment. [ $D_I$ scores / no. I]

1) **$D_I$ Criterion: TRI reported Air Releases**

| Pounds released to air | Score |
|---|---|
| ≤ 300,000 | 1 |
| > 300,000 to ≤ 1,000,000 | 2 |
| > 1,000,000 to ≤ 2,000,000 | 3 |
| > 2,000,000 to ≤ 5,000,000 | 4 |
| > 5,000,000 | 5 |

**Databases:**
U. S. Environmental Protection Agency. 1995. Toxic Release Inventory. TRI Data: SARA Community Right-to-know. Washington, D.C.

Information supplied by facility.

**References:**
U. S. Environmental Protection Agency. 1989. Toxic Chemical Release Inventory Risk Screening Guide Volumes 1 and 2. US EPA Office of Pesticides and Toxic Substances. EPA 560/2-89-002.

**Definitions, Assumptions, Limitations, Uncertainties:**
1) US EPA requires manufacturing industries to estimate their annual releases of specific hazardous chemicals to air. The releases are reported in pounds per year.

2) Air releases are from stack and fugitive emissions.

3) Chemical releases to air can have a negative impact upon the environment and human health around the release point.

4) Chemical releases occur over a one year time period and not as a one time event.

5) TRI releases are estimates.

6) TRI releases may not represent all the industrial chemical releases to air.

**EPA Contacts (name, mail-code, telephone number):**
Gerald Carney (6EN-XP), EPA Region 6, Dallas, TX (x6523)
Sharon Osowski (6EN-XP), EPA Region 6, Dallas, TX (x7506)
Jeff Danielson (CDSI Contractor) EPA Region 6, Dallas, TX (x8559)

2) **$D_I$ Criterion: Water Releases**

| Pounds released to water | Score |
|---|---|
| ≤ 300,000 | 1 |
| > 300,000 to ≤ 1,000,000 | 2 |
| > 1,000,000 to ≤ 2,000,000 | 3 |
| > 2,000,000 to ≤ 5,000,000 | 4 |
| > 5,000,000 | 5 |

**Databases:**
U. S. Environmental Protection Agency. 1995. Toxic Release Inventory. TRI Data: SARA Community Right-to-know. Washington, D.C.

Information supplied by facility.

**References:**
U. S. Environmental Protection Agency. 1989. Toxic Chemical Release Inventory Risk Screening Guide Volumes 1 and 2. US EPA Office of Pesticides and Toxic Substances. EPA 560/2-89-002.

**Definitions, Assumptions, Limitations, Uncertainties:**
1) US EPA requires manufacturing industries to estimate their annual releases of specific hazardous chemicals to water. The releases are reported in pounds per year.

2) Chemical releases to water can have a negative impact upon the environment and human health around the release point.

4) Chemical releases occur over a one year time period and not as a one time event.

5) TRI releases are estimates.

6) TRI releases may not represent all the industrial chemical releases to water.

**EPA Contacts (name, mail-code, telephone number):**
Gerald Carney (6EN-XP), EPA Region 6, Dallas, TX (x6523)

3) **$D_I$ Criterion: Spills of Hazardous Materials**

| Number of **RQ**s spilled over 2 years | Score |
|---|---|
| < 1 | 1 |
| 1 to 2 | 2 |
| 2 to 4 | 3 |
| 4 to 8 | 4 |
| > 8 | 5 |

**Databases:**
ERNS

Information supplied by facility.

**References:**
U. S. Environmental Protection Agency. Title III/CERCLA/RCRA Consolidated List of Chemicals. November 1990.

**Definitions, Assumptions, Limitations, Uncertainties:**
1) Number reported to ERNS. All Spills are not reported.

2) Spills to any medium, air, water, or soil.

3) Spills are only reported when over one pound of material.

4) If a facility does not report a specific chemical as spilled, a conservative default will be used.

5) Amount spilled is in units of total Rqs (Reportable Quantities) for spilled chemical species and/or radionuclides.

6) Reportable Quantities (RQs) are defined by CERCLA.

7) Number of spills are calculated from the date of application and prior two years.

8) Hazardous materials include RCRA and non-RCRA hazardous waste.

9) Number of spills are cumulative over a two year period.

**EPA Contacts (name, mail-code, telephone number):**
Gerald Carney (6EN-XP), EPA Region 6, Dallas, TX (x6523)
Hank May (6PD-T), EPA Region 6, Dallas, TX (x7297)
Steve Mason (6SF-RP), EPA Region 6, Dallas, TX (x2292)

4) **$D_I$ Criterion: Significant Noncompliance**

| Number within 2 years | Score |
|---|---|
| Noncompliance in 0 EPA program | 1 |
| Noncompliance in 1 EPA programs | 2 |
| Noncompliance in 2 EPA programs | 3 |
| Noncompliance in 3 EPA programs | 4 |
| No data; or noncompliance in >3 | 5 |

**Databases:**
IDEA/NEIC each program.

Information supplied by facility.

**References:**

**Definitions, Assumptions, Limitations, Uncertainties:**
1) Decisions as to whether a facility get inspected or not may be determined by other factors such as proximity to other facilities, sector, location, etc.

2) IDEA database is a compilation of other databases and therefore is a month outdated at any time.

3) No data was scored highest because it is unknown whether violations were present.

4) Environmentalinclude RCRA, AIR, NPDES, etc.

5) The definition of Significant Non-compliance (SNC) differs per media or program.

**EPA Contacts (name, mail-code, telephone number):**
Eva Steele (6EN-X), EPA Region 6, Dallas, TX (x7211)
Gerald Carney (6EN-XP), EPA Region 6, Dallas, TX (x6523)
Sharon Osowski (6EN-XP), EPA Region 6, Dallas, TX (x7506)
Mike Michaud (6EN-AS), EPA Region 6, Dallas, TX (x6491)

5) **$D_I$ Criterion**:
**Hazardous Materials Stored on Site**

| Maximum Number of **RQ** in inventory | Score |
|---|---|
| ≤ 10 | 1 |
| > 10 to 50 | 2 |
| > 50 to 100 | 3 |
| > 100 to 500 | 4 |
| > 500 | 5 |

**Databases:**
TRI 1995.

Information supplied by facility.

**References:**
U. S. Environmental Protection Agency. Title III/CERCLA/RCRA Consolidated List of Chemicals. November 1990.

**Definitions, Assumptions, Limitations, Uncertainties:**
1) Inventory stored is in units of total RQs (Reportable Quantities) for (spilled) chemical species and/or radionuclides.

2) Reportable Quantities (RQs) are defined by CERCLA.

3) Maximum total inventory of all hazardous materials stored on site at any time during the previous two years.

4) Addresses acute toxicity consequences from accidental releases.

5) All materials are stored according to the appropriate regulations and standard protocols.

6) Hazardous materials include RCRA and non-RCRA hazardous waste.

**EPA Contacts (name, mail-code, telephone number):**
Gerald Carney (6EN-XP), EPA Region 6, Dallas, TX (x6523)
Hank May (6PD-T), EPA Region 6, Dallas, TX (x7297)

6) **$D_I$ Criterion: Groundwater Protection**

| Distance of Nearest Well from Source | Score |
|---|---|
| ≥ 500 feet | 1 |
| ≥ 400 but < 500 feet | 2 |
| ≥ 300 but < 400 feet | 3 |
| ≥ 200 but < 300 feet | 4 |
| < 200 feet | 5 |

**Databases:**
Oklahoma Licensing Board.

Information supplied by facility.

**References:**
Dendy, D. and M. Ladd 1996. Comments on Draft Cumulative Risk Analysis, ACCORD Agriculture, Inc., Farnsworth, TX.

Goan, Charles. 1992. "Well Water Protection on Poultry Farms." University of Tennessee Agricultural Extension Service.

**Definitions, Assumptions, Limitations, Uncertainties:**
1) Well location is a potential factor contributing to possible ground water contamination.

2) Well and shaft (outside of well pipe) are potential conduits for ground water contamination.

3) Well head protection criteria does not consider construction and design parameters.

4) Does not include Superfund, RCRA corrective action, or other EPA mandated wells on contaminated sites.

5) Source is defined as the closest location of a potential environmental storage or treatment area, including landfills, impoundments, hazardous materials storage sites.

6) Includes PWS community water wells.

**EPA Contacts (name, mail-code, telephone number):**
Joe Swick (6EN-XP), EPA Region 6, Dallas, TX (x7456)
Gerald Carney (6EN-XP), EPA Region 6, Dallas, TX (x6523)
Sharon Osowski (6EN-XP), EPA Region 6, Dallas, TX (x7506)

7) **$D_I$ Criterion: Wildlife Habitat Affected**

| Acres Affected | Score |
|---|---|
| < 10% | 1 |
| ≥ 10% and < 20% | 2 |
| ≥ 20% and < 30% | 3 |
| ≥ 30% and < 40% | 4 |
| ≥ 40% | 5 |

**Databases:**
U.S. EPA, 1996. Region 6 EPA Geographic Information System (GIS) Data Library. State Land Use Data Set, Office of Planning and Coordination, Dallas, TX.

USGS Girus database.

**References:**
Endangered Species Act of 1977, as amended.

**Definitions, Assumptions, Limitations, Uncertainties:**
1) Net effects include both direct and indirect, or the total impacts of the facility (e.g. site and road construction and facility operation).

2) Wildlife habitats include floodplains, wetlands, bottomland hardwoods, rangelands, upland forests and grasslands.

3) "Acres affected" are compiled from State land use data sets.

4) The EPA will conduct a separate review with the U.S. Fish and Wildlife Service, and/or the National Marine Fisheries Service, as necessary, to document compliance with the Endangered Species Act (ESA).

5) The EPA will conduct a separate review with the U.S. Corps of Engineers and/or the U.S. Natural Resources Conservation Service, as necessary, to document compliance with Section 404 of the Clean Water Act.

6) There is no intended correlation between this impact score for wildlife habitats and the potential effect, if any, on listed Federal Endangered and Threatened Species, subject to the requirements of the ESA.

**EPA Contacts (name, mail-code, telephone number):**
Joe Swick (6EN-XP), EPA Region 6, Dallas, TX (X7456)
Gerald Carney (6EN-XP), EPA Region 6, Dallas, TX (X6523)
Sharon Osowski (6EN-XP), EPA Region 6, Dallas, TX (X7506)

8) **$D_I$ Criterion**:
**Endangered and Threatened Species**

| Section 7 Compliance[1] | Score |
|---|---|
| Yes | 1 |
| No | 5 |

[1]Section 7 of Endangered Species Act of 1977

**Databases:**
Information supplied by facility.

**References:**
U.S. Department of Interior. 1977. Endangered Species Act. US Fish and Wildlife Service, Washington DC.

U. S. EPA. 1970. "Implementation Regulations for the National Environmental Policy Act", Washington, DC.

**Definitions, Assumptions, Limitations, Uncertainties:**
1) Federal non-compliance constitutes potential significant adverse impacts on listed endangered and threatened species.

2) Section 7 decision based on consultation with and advice of the US Fish and Wildlife Service.

**EPA Contacts (name, mail-code, telephone number):**
Joe Swick (6EN-XP), EPA Region 6, Dallas, TX (x7456)
Sharon Osowski (6EN-XP), EPA Region 6, Dallas, TX (x7506)

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9) **$D_I$ Criterion**: **Cultural Resources**

| Section 106 Compliance[1] | Score |
|---|---|
| Yes | 1 |
| No | 5 |

[1]Section 106 of National Historic Preservation Act

**Database:**
Information supplied by facility.

**References:**
National Historic Preservation Act of 1966, as amended, 16 U. S. C. Section 470-470w-6.

U. S. EPA. 1970. "Implementation Regulations for the National Environmental Policy Act", Washington, DC.

**Definitions, Assumptions, Limitations, Uncertainties:**

1) Federal non-compliance constitutes potential significant adverse impacts on cultural resources or historic properties.

2) Section 106 decision is based on consultation with and the advice of the State Historical Preservation Office.

**EPA Contacts (name, mail-code, telephone number):**
Joe Swick (6EN-XP), EPA Region 6, Dallas, TX (x7456)
Sharon Osowski (6EN-XP), EPA Region 6, Dallas, TX (x7506)

10) **$D_I$ Criterion: Violations**

| Number within 2 years | Score |
|---|---|
| 0 | 1 |
| 1 | 2 |
| 2-3 | 3 |
| 4-5 | 4 |
| > 5 or No data | 5 |

**Databases:**
IDEA/NEIC each program

Information supplied by facility.

**References:**

**Definitions, Assumptions, Limitations, Uncertainties:**

1) Decisions as to whether a facility get inspected or not may be determined by factors such as proximity to other facilities, sector, location, and last inspection date.

2) Violations are the result of an EPA or state inspection in any media or program.

3) IDEA database is a compilation of other databases and therefore is a month outdated at any time.

4) No data was scored higher because it is unknown whether violations were present.

5) Noncompliance events are those that occur or are continuing within a two year time frame.

6) IDEA database is a compilation of other databases and therefore is a month outdated at any time.

7) Violations can be in any media or program.

**EPA Contacts (name, mail-code, telephone number):**
Eva Steele (6EN-X), EPA Region 6, Dallas, TX (x7211)

Gerald Carney (6EN-XP), EPA Region 6, Dallas, TX (x6523)
Sharon Osowski (6EN-XP), Region 6, Dallas, TX (x7506)

11) **$D_I$ Criterion: Environmental Project Budget**

| | Score |
|---|---|
| Have budget, funds obligated &/or project completed for past year | 1 |
| Have budget, funds programmed/budgeted for current and out years | 2 |
| Have budget, funds exist projects that rate(s) CMPA,INOV, ESDP | 3 |
| Have budget, funds are not programmed or obligated current or out years | 4 |
| No budget | 5 |

**Databases:**
U. S. Environmental Protection Agency. 1997. FEDPLAN: Federal Agency Environmental Program Planning.

Information supplied by facility.

**Definitions, Assumptions, Limitations, Uncertainties:**

1) In accordance with Executive Order 12088 and Office of Management and Budget (OMB) Circulars A-106 and A-11, Federal agencies are required to submit environmental plans to the Director of OMB through the Environmental Protection Agency.

2) The primary objective of OMB Circular A-106 is to ensure that Federal agencies identify all of their environmental requirements and target resources to address them.

3) Budget year : The next fiscal year for which estimates are submitted; Past year: The fiscal year immediately preceding the current year; Current Year: The fiscal year immediately preceding the budget year; Out years or future years: The first through the sixth fiscal year following the budget year; Programmed/Budgeted: Funds are expected to be available to accomplish project; Obligated: Funds obligated against each project, or actually spent on project execution.

4) CMPA (Compliance Agreement):projects required to support signed agreements; INOV (Inspection/Notice of Violation) projects to correct deficiencies cited; ESDP (Established Standards Deadline in Past) Other projects required immediately because statutory or regulatory deadline passed

5) No budget figures can be released. Submission of timely data to EPA is sometimes uncertain

**EPA Contacts (name, mail-code, telephone number):**
Joyce Stubblefield, (6EN-XP), EPA Region 6, Dallas, TX (x7430)
Tim Dawson (6MD-HX), EPA Region 6, Dallas, TX (x2218)

12) **$D_I$ Criteria: Environmental Assessment**

| | Score |
|---|---|
| Independent assessment/s performed | 1 |
| Self assessment/s performed | 3 |
| No Environmental assessment/s performed | 5 |

**Database:**
FEDPLAN: (PGMT) Environmental Program Management Costs

**Definitions, Assumptions, Limitations, Uncertainties:**

1) An environmental assessment is a review or audit of the organizations environmental system which may include current compliance status with applicable environmental laws.

2) An independent assessment is an environmental assessment conducted by personnel independent of the area/s being assessed.

3) A self assessment is an environmental assessment conducted by personnel which are affiliated with the area/s being assessed.

4) The result of any self or independent environmental assessments benefits the facility by establishing baseline conditions and/or results in corrective actions. Environmental assessments does not include those conducted under the National Environmental Policy Act (NEPA) for proposed Federal actions. Time frame for consideration is limited to the last five years.

5) The degree of benefit is not measured by this indicator. The impacted media are unknown without further analyses.

6) Corrective action follow-through is an uncertainty.

**EPA Contacts (name, mail-code, telephone number):**
Joyce Stubblefield (6EN-XP), EPA Region 6, Dallas, TX (X6430)
Tim Dawson (6MD-HX), EPA Region 6, Dallas, TX (X2218)

13) **$D_I$ Criterion**:
**RCRA Permitted Units at Facility**

| Number of Permitted | Score |
|---|---|
| 1 | 1 |
| 2 | 2 |
| 3 | 3 |
| 4 | 4 |
| >4 | 5 |

**Databases:**
Information supplied by facility.

RCRIS

**References:**
Resource Conservation and Recovery Act of 1976, as amended.

**Definitions, Assumptions, Limitations, Uncertainties:**
1) Only units directly affecting groundwater are included.

2) Units include waste piles, landfills, land application and surface impoundments.

3) All units are assumed to be operating.

4) Waste stored for greater than 90 days.

5) The greater the number of permitted units, the greater the chance for potential environmental impact.

**EPA Contacts (name, mail-code, telephone number):**
Larry Brnicky (6PD-N), EPA Region 6, Dallas, TX (x8303)
Sharon Osowski (6EN-XP), EPA Region 6, Dallas, TX (x7506)

14) **$D_I$ Criterion**:
**RCRA Hazardous Waste Disposal**

| Pounds of Waste | Score |
|---|---|
| 0 - 100 lbs/day | 1 |
| 101 - 1,000 lbs/day | 3 |
| >1,000 lbs/day | 5 |

**Databases:**
Information supplied by facility.

RCRIS

**References:**
Resource Conservation and Recovery Act of 1976, as amended.

**Definitions, Assumptions, Limitations, Uncertainties:**
1) All waste is considered equally hazardous whether waste is listed or meets constituent definition.

2) The criterion numbers represent an average calculated annually by the facility.

3) This criterion does not take into account toxicity.

4) Disposal actions include the use of landfills, land application, surface impoundments, injection wells, and ocean dumping.

5) Waste is assumed to be properly and adequately disposed of in an permitted location.

6) The greater the amount of waste disposed, the greater the chance for potential environmental impact.

7) Hazardous waste definitions, including disposal regulations are as defined in RCRA.

**EPA Contacts (name, mail-code, telephone number):**
Larry Brnicky (6PD-N), EPA Region 6, Dallas, TX (x8303)
Sharon Osowski (6EN-XP), EPA Region 6, Dallas, TX (x7506)

15) **$D_I$ Criterion**:
**RCRA Waste Disposal Tracking**

| | Score |
|---|---|
| "Cradle-to-grave" tracking | 1 |
| Written procedures in place, spot check annually | 2 |
| Written procedures in place, spot check biennially | 3 |
| Written procedures in place, no spot checks | 4 |
| No tracking | 5 |

**Databases:**
Information supplied by facility.

RCRIS

**References:**
Resource Conservation and Recovery Act of 1976, as amended.

**Definitions, Assumptions, Limitations, Uncertainties:**
1) All waste is considered equally hazardous whether waste is listed or meets constituent definition.

2) Proper and adequate waste disposal means that all appropriate laws and regulations have been followed.

3) This criteria does not take into account toxicity.

4) Disposal actions include the use of landfills, land application, surface impoundments, injection wells, and ocean dumping.

**EPA Contacts (name, mail-code, telephone number):**
Larry Brnicky (6PD-N), EPA Region 6, Dallas, TX (x8303)
Sharon Osowski (6EN-XP), EPA Region 6, Dallas, TX (x7506)

16)**$D_I$ Criterion**:RCRA Corrective Action

| Number of SWMUs | | Score |
|---|---|---|
| 0 - 1 | RCRA Corrective Actions | 1 |
| 2 - 4 | RCRA Corrective Actions | 2 |
| 5 - 10 | RCRA Corrective Actions | 3 |
| 10 - 25 | RCRA Corrective Actions | 4 |
| >25 | RCRA Corrective Actions | 5 |

**Databases:**
Information supplied by facility.

SMUS-RCRIS

**References:**
Resource Conservation and Recovery Act of 1976, as amended.

**Definitions, Assumptions, Limitations, Uncertainties:**
1) SWMUs are identified in State/Federal permit/order.

2) RCRA corrective actions can be ongoing.

3) The number of RCRA corrective actions does not affect nor disclose actual cleanup progress.

4) SWMU is defined as a solid waste management unit.

5) The process of a RCRA corrective action includes a facility investigation, site delineation, problem assessment, listing and evaluation of alternative remedies, and clean up.

6) RCRA Corrective Action includes all types of solid waste management units used in the past at a facility. Primarily abandoned dump sites which may or may not have been covered adequately.

**EPA Contacts (name, mail-code, telephone number):**
Larry Brnicky (6PD-N), EPA Region 6, Dallas, TX (x8303)
Sharon Osowski (6EN-XP), EPA Region 6, Dallas, TX (x7506)

17) **$D_I$ Criterion: Multimedia Inspections**

| Within 2 years | Score |
|---|---|
| Yes | 1 |
| No | 5 |

**Databases:**
IDEA/NEIC each program

Information supplied by facility.

**References:**

**Definitions, Assumptions, Limitations, Uncertainties:**
1) Decisions as to whether a facility get inspected or not may be determined by factors such as proximity to other facilities, sector, location, and last inspection date.

2) IDEA database is a compilation of other databases and therefore is a month outdated at any time.

3) IDEA database is a compilation of other databases and therefore is a month outdated at any time.

4) Violations can be in any media or program.

**EPA Contacts (name, mail-code, telephone number):**
Eva Steele (6EN-X), EPA Region 6, Dallas, TX (x7211)
Gerald Carney (6EN-XP), EPA Region 6, Dallas, TX (x6523)
Sharon Osowski (6EN-XP), Region 6, Dallas, TX (x7506)

18) **$D_I$ Criterion: Pollution Prevention**

| Activity (within last 2 years) | Score |
|---|---|
| Pollution Prevention Plan and >4 of the listed activities | 1 |
| Pollution Prevention Plan + 4 of the listed activities | 2 |
| Pollution Prevention Plan + 3 of the listed activities | 3 |
| Pollution Prevention Plan only | 4 |
| No Pollution Prevention activities | 5 |

**Databases:**

**References:**

**Definitions, Assumptions, Limitations, Uncertainties:**
1) Acceptable Pollution Prevention activities include: establishing a Pollution Prevention Plan, source reduction, waste treatment, recycling, training of personnel or partnership with other entities for pollution prevention activities, and recognition or award for pollution prevention activities.

2) Pollution Prevention is any practice that (1) reduces the amount of any hazardous substance, pollutant, or contaminant entering any waste stream or otherwise released into the environment (including fugitive emissions) prior to recycling, treatment, or disposal; and (2) reduces the hazardous to public health and the environment associated with the release of such substances, pollutants, or contaminants.

3) Recycling is defined as a series of activities by which materials that are no longer useful to the generator are collected, sorted, processed, and converted into raw materials and used in the production of new products.

4) Treatment is defines as any method, technique, or process designated to change the physical, or biological character or composition of any hazardous waste so as to neutralize such waste, or to render non-hazardous.

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**EPA Contacts (name, mail-code, telephone number):**
Eli Martinez (6EN-XP), EPA Region 6, Dallas, TX (x2119)
Joyce Stubblefield (6EN-XP), EPA Region 6, Dallas, TX (x6430)

**19) $D_I$ Criterion: Model Energy Code(MEC)**

| % over MEC Guidelines | Score |
|---|---|
| >25% | 1 |
| 20-25% | 2 |
| 11-20% | 3 |
| 5-10% | 4 |
| < 5% | 5 |

**Databases:**

**References:**
E.O. 12843 Procurement Requirements and Policies for Federal Agencies for Ozone-Depleting Substances (April 23, 1993)

E.O. 12844 Federal Use of Alternative Fueled Vehicles (April 21,1993)

E.O. 12845 Requiring Agencies to Pursue Energy-Efficient Computer Equipment (April 21, 1993)

E.O. 12873 Federal Acquisition, Recycling and Waste Prevention (October 20,1993)

E.O. 12902 Energy Efficiency and Water Conversation at Federal Facilities (March 8, 1994)

Energy Policy Act of 1992

Climate Change Action Plan (CCAP)

**Definitions, Assumptions, Limitations, Uncertainties:**

1) The use of energy efficient practices in the construction of buildings are to follow Model Energy Code for both Residential and Commercial buildings in all Federal facilities. In following these guidelines software is used as an easy check for compliance. The Model Energy Code includes new construction as well as renovation.

2) Many levels of Energy efficiency are possible. For instance the use of 12 SEER HVAC systems, tinted and spectrally select low emissivity glazing for glass, attic ventilation to reduce heat build-up, perimeter of slab foundation insulation, use of high R sheathing, use of radiant barriers on sidewalls and in attic, placement of duct and mechanical equipment of conditioned space. All of these will improve energy efficiency of a structure.

3) The ultimate goal is a 70 percent reduction in energy consumption to receive the highest rating.

4) Energy Policy Act of 1992 (EPAct) authorizes DOE, Department of Commerce and US EPA and other Federal agencies to work in tandem to reduce the energy consumption of appliances, set standards of efficiency, promote new technologies and reduce pollution through increased efficiency. The EPAct provides for mandatory standards as well as voluntary development and adoption of housing standards, commercial building code standards and labeling of a select group of consumer products.

5) E.O 12843 directs federal agencies and facilities to change procurement policies to reduce the use of ozone depleting substances earlier than Montreal Protocol phase-out schedules. A reduction of ozone depleting includes less use of a substance such as R-22 and elimination of CFC-11 and 12.

6) E.O. 12844 places the federal government in a leadership role in the demand for and use of alternative fueled vehicles.

7) E.O. 12845 encourage market transformation through increased purchase of energy-efficient computer products that save money and reduce pollution.

8) E.O. 12873 directs executive agencies to increase the purchase of 1) products containing recovered materials and 2) environmentally preferable products. The order also encourages agencies to intensify their recycling and waste prevention activities.

9) E.O. 12902 encourages increased use of energy and water saving-saving products in federal facilities. Purchasing of products in the top of the market for energy and water efficiency leads to large savings on annual utility bills.

10) Climate Change Action Plan (CCAP) promotes voluntary partnerships to reduce and prevent pollution through cost effective practices that conserve energy and waste. Federal facilities are asked to implement energy efficiency practices and waste reduction practices by taking advantage of energy saving practices such as 1) the use of energy efficient construction practices and technologies, 2) energy efficient office equipment, 3) energy efficient appliances, 4) recycling of glass, aluminum, steel, office paper, and newspaper, 5) reuse of landscape (yard) wastes.

**EPA Contacts (name, mail-code, telephone number):**
Patrick Kelly (6PD-T), EPA Region 6, Dallas, TX (x7316)
Joyce Stubblefield (6EN-XP), EPA Region 6, Dallas, TX (x6430)

20) **$D_I$ Criterion: Energy Efficient Office Equipment**

| % Facility Upgrade | Score |
|---|---|
| >40% | 1 |
| 31-40% | 2 |
| 21-30% | 3 |
| 11-20% | 4 |
| ≤10% | 5 |

**Databases:**

**References:**
See Criterion 19.

**Definitions, Assumptions, Limitations, Uncertainties:**

1) This criterion measures the percentage of your facility that has upgraded to energy efficient office equipment, operating as it was intended.

2) Energy Efficient Office Equipment includes Copy Machines, Facsimile Machines, Computers, Computer Monitors, Scanners, Printers.

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21)**$D_I$ Criterion**: **Energy Efficient (EE) Appliances**

| % improvement on the EE scale | Score |
|---|---|
| > 80% | 1 |
| 61-80% | 2 |
| 41-60% | 3 |
| 21-40% | 4 |
| ≤ 20% | 5 |

**Databases:**

**References:**

See criterion 19.

**Definitions, Assumptions, Limitations, Uncertainties:**
1) Residential and commercial appliances include Refrigerators, Dishwashers, Washing Machines, and Room Air-conditioners.

2) In replacing these appliances life cycle issues should be taken into consideration. As an example, a cheaper price tag on a room air conditioner that may cost $400 may end up costing in excess of $2000 to operate over a ten year period. Similarly a $600 room air conditioner with similar cooling capacity will consume $1200 over a ten period.

3) Different appliances have different efficiency ratings.

4) The benchmark can be found on Federal Trade Commission Energy Guide placed on every appliance by federal law. They are a guidepost (not necessarily actual) measure of its energy efficiency.

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22)**$D_I$ Criterion**: **Lighting System Upgrade**

| % reduction in energy usage | Score |
|---|---|
| >25% | 1 |
| 21-25% | 2 |
| 16-20% | 3 |
| 11-15% | 4 |
| ≤10% | 5 |

**Databases:**

**References:**

See criterion 19.

**Definitions, Assumptions, Limitations, Uncertainties:**

1) Since the passage of EPAct, energy efficiency is being standardized on all appliances, consumer electronics, lighting products and mechanical systems.

2) Energy Star Buildings and Green Lights Program participants have demonstrated a reduction of 45 percent after renovating to Green Lights standards.

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23)**$D_I$ Criterion**: **Million Solar Roofs Initiative**

| No. of solar products used | Score |
|---|---|
| ≥5 | 1 |
| 4 | 2 |
| 2-3 | 3 |
| 1 | 4 |

**Databases:**

**References:**

See criterion 19.

**Definitions, Assumptions, Limitations, Uncertainties:**

1) Solar technologies include: solar hot water heaters, photovoltaic landscape lighting, photovoltaic street lighting, remote water pumping, and photovoltaic panels for power generation.

2) Solar Thermal Energy is a simple way to preheat air for boilers and furnace air-intakes and water for residential and commercial use. It is possible to achieve significant reductions in energy consumption for hot water.

3) Solar energy is a free source that has shown that it can routinely provide 70 percent of domestic and commercial hot water.

4) The design of solar thermal hot water systems are now built and tested in accordance with strict federal and industry standards. Recognizing this advance in ability to perform in both Canada as well as desert environments of the southwest.

5) Solar Photovoltaic Energy has seen tremendous reduction in price over the last ten years. Commercial sales of units as low as $4.50 per watt are now available. This makes photovoltaic installations economical for remote water pumping, street lighting, remote locations and new construction in areas where line extensions, excavation or other costs are high.

6) Solar photovoltaic energy can be store on batteries or distributed across the power grid to others. Solar photovoltaic technology is now capable of substantially offsetting the peak demand of energy thus providing greater cost saving in the commercial sector where peak demand charges during daylight hours are high.

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24)**$D_I$ Criterion: Federal Energy Management Program**

| % reduction from baseline | Score |
|---|---|
| >12% | 1 |
| 10-12% | 2 |
| 7- 9% | 3 |
| 4- 6% | 4 |
| ≤ 3% | 5 |

**Databases:**

**References:**

See criterion 19.

**Definitions, Assumptions, Limitations, Uncertainties:**

1) The Federal Energy Management Program (FEMP) is an Executive order which outlines the reduction of energy consumption by federal facilities by 30 percent in 2005 from 1985 levels, and 20 percent for industrial federal facilities by 2005 using 1990 as the baseline year.

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