

SELF-ASSESSMENT CHECKLIST

HAZARDS ASSESSMENT

If the Hazards Survey identifies hazardous materials at the facility/site in excess of predetermined thresholds, a site/facility-specific Hazards Assessment is required. A Hazards Assessment includes the identification and characterization of hazardous materials specific to a site/facility, analyses of potential accidents or events, and evaluation of potential consequences. The Hazards Assessment also includes a determination of the size of the geographic area surrounding the site, known, as the Emergency Planning Zone (EPZ), within which special planning and preparedness activities are required to reduce the potential health and safety impacts from an event involving hazardous materials. The Hazardous Assessment provides the technical basis for the Hazardous Materials Program.

The Hazards Assessment products should be used to develop other program/response elements. For example:

- Emergency Actions Levels (EALs) - The Hazards Assessment provides the quantitative relationships between events and their consequences as well as the event descriptions and indications of barrier challenge and failure that serve as EAL statements.
- Emergency Response Organization (ERO) - The nature and severity of the events analyzed should provide the basis for both on-shift and on-call ERO staffing. Qualified staff should be designated to perform all response functions. Staffing levels and expertise for performing functions such as consequence assessment and medical support are directly determined by the hazards present at the site/facility.
- Notification and Communications - For facilities subject to hazardous material operational emergencies, the potentially affected areas, the transport times, and the impacts of hazardous material releases will define the need for systems, procedures, and staff to carry out notifications. The level of sophistication and redundancy in communications systems should be directly related to the potential need for performing rapid onsite and offsite notifications and requests for assistance.
- Offsite Response Interfaces - In addition to identifying the offsite parties to whom prompt emergency notifications must be made, the Hazards Assessment should be used to define needs for specialized offsite support such as ambulances, medical facilities and personnel, hazardous materials response teams, firefighting supporting, and public affairs interfaces.
- Consequence Assessment - Developing the source term data and performing the consequence calculations required in the Hazards Assessment will help establish that the consequence assessment models and/or techniques available for use during actual emergencies are appropriate for specific hazardous materials over the range of possible release and transport conditions. The Hazards Assessment Document, or a summary thereof, should be available to responders as a ready source of data on each facility's hazardous material inventory, barrier descriptions and failure modes, monitoring instruments, and emergency event scenarios.
- Emergency Medical Support - The hazards analyzed in the Hazards Assessment will define the medical support required. The Hazards Assessment should be used to determine the need for special preparations such as decontamination supplies; chelating, neutralizing and blocking agents; and medical staff training in treatment of victims exposed to site/facility specific hazards.

- Protective Actions and Reentry - EALs for Alert through General Emergency are based on calculated event consequences at various distances and the applicable protective action criteria. The consequence calculation results should be used directly to determine EAL-specific protective actions (onsite) and offsite Protective Action Recommendations to be used until real-time event information is available to perform consequence assessment.
- Emergency Public Information - The hazards analyzed in the Hazards Assessment and the extent of their impacts will directly dictate the content and geographical coverage of the Emergency Public Information program. The public information program should address the nature of the potential hazardous materials releases, the notifications and information systems in place, and protective actions most likely to be implemented (e.g., evacuation routes, guidelines for sheltering in place).
- Emergency Facilities and Equipment - The nature and potential for release of the hazards analyzed in the Hazards Assessment should dictate many of the specifications for facilities and equipment. Overall facility and site emergency potential will help define general needs, such as communications equipment and Emergency Operations Center size, while specific hazards may indicate need for specialized equipment such as protective clothing, portable monitoring instruments, decontamination supplies, consequence assessment computers, Hazardous Materials (HAZMAT) response vehicles and supplies, and facility data acquisition systems.
- Drills, Training, and Exercises - The Hazards Assessment combined with the Hazardous Waste Operations and Emergency Response (HAZWOPER) and Safety Analysis Report (SAR) programs provide a ready source of scenarios and source terms for use in developing facility-specific drills and exercises. Training, ranging from "general employee training" to ERO Manager, should be customized around the Hazards Assessment and HAZWOPER programs and their associated program elements.

Each of the above program/response elements will be addressed in separate self-assessment checklists.

Other uses of the Hazards Assessment results, beyond developing specific elements of the Operational Emergency Management Program, include the following;

- Comprehensive and defensible inventory of all hazardous material.
- Quantitative accident analysis for use as a cross-check of or input to the SAR process.
- Development of recommendations for minimizing or segmenting hazardous materials inventories.
- Quantitative inputs to the fire preplanning and hazardous material spill prevention/cleanup plans.
- Accident range effluent monitoring capability evaluation and recommendations for upgrades.
- Identification of facility hardware and/or procedures modifications which would be beneficial in the avoidance and mitigation of events analyzed.

The checklist on the following pages is to aid Emergency Managers in performing a self-assessment of Hazards Assessments to determine if all of the requirements of DOE Order 151.1A have been met. For more detailed guidance on preparation of a Hazards Assessment, refer to Volume II of the Emergency Management Guide, DOE Guide 151.1-1.

Review Criteria for Hazards Assessments for Facility/Facilities _____	Yes	No	Not Applicable
HAZARDS ASSESSMENTS			
1. IDENTIFICATION AND DESCRIPTION OF THE FACILITY AND OPERATIONS A clear, accurate, and unambiguous written and schematic description of the facility and its operations should be provided. For Hazards Assessments (HAs) purposes, several structures or component units with a common or related purpose may constitute a single facility (e.g., a waste tank farm may be defined as one facility because it is composed of a number of units of approximately the same nature and purpose under common management and operational control). Does the HA address the areas below:			
a. General site information related to the:			
(1) Mission?			
(2) Operations?			
(3) Physical characteristics, including an assessment of the site exposure to external and natural phenomena hazards?			
b. The location of the facility relative to other facilities:			
(1) On the same site?			
(2) The site boundaries?			
(3) The nearest public access locations?			
(4) Transportation networks such as highways, railroads, and rivers?			
c. For transportation actions, indicate the information below relative to the likelihood or severity of an accident:			
(1) The type of materials transported?			
(2) The containers and vehicles used?			
(3) The routes?			
(4) The speeds?			
(5) The number of shipment per year?			
(6) Other controls (e.g., escorts or overpacks)?			

Review Criteria for Hazards Assessments for Facility/Facilities _____	Yes	No	Not Applicable
Comments: (A brief explanation should be provided for any "NO" response.)			
2. IDENTIFICATION AND SCREENING OF HAZARDS (CHEMICAL OR RADIOACTIVE MATERIAL) Were the following sources considered in identifying hazards significant enough to include in your facility's operational emergency hazardous material program:			
a. Non-radioactive material inventory information contained in records and data bases that support compliance with the reporting requirements of the:			
(1) Emergency Planning and Community Right-to-Know Act (EPCRA)?			
(2) Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)?			
b. Effluent release permits for byproduct off-gases from processes reviewed?			
c. Reporting information, such as:			
(1) Safety Analysis Reports (SARs)?			
(2) Technical Safety Requirements (TSRs)?			
(3) Subordinate facility operating procedures and limits inventory information for most radioactive and some non-radioactive hazardous materials?			
d. Material Control and Accountability records on current holdings and authorized limits for Special Nuclear Material?			
e. Documentation for hazards of a transient or intermittent nature containing relevant hazardous material inventory information such as:			
(1) Test plans?			
(2) Process safety assessments?			

(3) Other controlling documentation?			
<p style="text-align: center;">Review Criteria for Hazards Assessments</p> <p style="text-align: center;">for Facility/Facilities _____</p>	Yes	No	Not Applicable
f. Vulnerability Analysis of hazardous materials identified as targets (e.g., radioactive materials at risk from theft, diversion, or sabotage)(usually classified lists)?			
Were the following references used in screening quantities or thresholds to eliminate the need to analyze significant hazards?			
g. The lowest quantity listed as a Threshold Quantity in 29 CFR 1910.119?			
h. The lowest quantity listed as a Threshold Quantity in 40 CFR 68.130?			
i. Threshold Planning Quantity in 40 CFR 355 for those chemicals listed?			
j. Reportable Quantities (RQs) for hazardous substances listed in 40 CFR 302.4 for chemicals not listed in the references in Items 2g through 2i above?			
k. Toxic chemicals not listed in Items 2g through 2j included on the hazard list for full characterization?			
l. Screening quantities for toxic chemicals not listed in Items 2g through 2j above documented based on the physical and toxicological properties of the materials and conservative (i.e., tending to yield the largest impact) consequence modeling?			
m. The quantities listed in CFR 30.72, Schedule C, for radioactive materials requiring consideration of the need for emergency planning for licensed byproduct material used for screening thresholds for the radionuclides listed?			
n. Screening quantities for radioactive materials not listed in Item 2m above documented based on the properties of the materials and conservative consequence modeling?			
o. Biohazardous materials/agents specifically identified in guidelines established by the Center for Disease Control?			
Common hazardous materials, such as vehicle fuel and commonly used small quantities of solvents or gases, which are used in a wide variety of facilities and operating environments, can be hazardous to a limited extent by themselves or in combination with other materials. Were screening quantities developed for the following or listed with a brief statement of the rationale for excluding them from further analysis:			

Review Criteria for Hazards Assessments for Facility/Facilities _____	Yes	No	Not Applicable
p. The material is commonly used by the general public including any substance used for personal, family, or household purposes or is present in the same form and concentration as a product packaged for distribution and used by the general public (e.g., bleach, motor oil, gasoline)?			
q. The material is monolithic solid under normal conditions and does not present an airborne exposure concern (e.g., lead bricks)?			
r. The material is not hazardous to humans as a result of inhalation, ingestion, or dermal exposure?			
s. The material has a vapor pressure of less than or equal to 0.5mmHg @ 25°C <u>and</u> an Emergency Response Planning Guideline (ERPG) ERPG-2 or equivalent value of greater than or equal to 1 ppm?			
t. The material is used in a laboratory setting and in laboratory scale (end user) quantities?			
u. The possible effect of the materials listed in Items 2o through 2s were considered as initiators or promoters of releases of other more hazardous materials?			
v. Results of the screening process and the basis for the conclusion were documented to demonstrate compliance with the Order requirements?			
Comments: (A brief explanation should be provided for any "NO" response.)			
3. CHARACTERIZATION OF HAZARDS REMAINING AFTER SCREENING After facility hazards were identified and screened, was further characterization performed on those hazards exceeding screening thresholds?			
a. If you answered yes to the above, both radioactive and non-radioactive hazardous materials should be documented in a tabular format. Does the table include the following information:			
(1) Maximum quantity of the materials in appropriate units (pounds, kilograms, curies, becquerels) and its storage or process locations?			

Review Criteria for Hazards Assessments for Facility/Facilities _____	Yes	No	Not Applicable
(2) A description of the conditions under which the material is stored or used, including process systems or containers that hold the material and barriers that may impact its release or dispersion (e.g., shipping containers, buildings, berms, sumps, or catch basins)?			
(3) Security and access controls identified for the storage and use locations?			
(4) The properties of the material that are needed for determination of source term and consequence analysis, such as:			
(a) Physical form and chemical characteristics of the material (e.g., solid, liquid, gaseous, particle size, flammability, chemical reactivity, density) which it is stored, processed, used, or transported?			
(b) Radiological characteristics which it is stored, processed, used, or transported?			
(c) Temperature under which it is stored, processed, used, or transported?			
(d) Pressure conditions under which it is stored, processed, used, or transported?			
(5) A description of engineered controls, safeguards, or safety systems designed to prevent or mitigate a hazardous material release? (These may include both automatic and manually activated mitigative systems (e.g., fire sprinklers, filters, scrubbers, isolation dampers), as well as passive mitigative features and engineered geometry or configuration controls for fissionable materials.)			
(6) A description of administrative controls that would prevent or mitigate the initiation of a hazardous material release, such as:			
(a) Limits on the total quantity of a material in a single place or container?			
(b) Restrictions on where certain materials can be used or stored?			
b. For facilities where criticality incidents are considered credible, was the analysis of the postulated criticality events in the SAR referred to in determining the total yield of gaseous and volatile fission products?			

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c. Where the material consists of a reactor core or irradiated fuel containing mixed fission products, were the relevant factors that define the radiotoxicity of the mixture (e.g., enrichment, burnup, age) analyzed and the case that produces the largest impact selected?			
d. For those facilities having a documented vulnerability analysis, was the target list used to obtain information regarding the quantity of certain hazards and the conditions under which they were stored, handled, and used? (Note: Identified targets may include both hazardous materials and essential parts of the system of barriers, controls, and protection features that keep them in safe condition.)			
e. Were other materials and hazard sources, such as flammable or explosive materials and energy sources used in the characterization?			
f. Were the reactive properties of the hazardous materials assessed and the possibility of interactions between substances considered?			
Comments: (A brief explanation should be provided for any "NO" response.)			
<p>4. ANALYSIS OF EMERGENCY EVENTS AND CONDITIONS</p> <p>The combination of events and conditions that could cause releases of each of the hazardous materials characterized in Section 3 above should be determined. "Release" is used here to mean, primarily, an airborne release as this pathway typically represents the most time-urgent situation and requires a rapid, coordinated, emergency response on the part of the facility, collocated facilities, and surrounding jurisdictions to protect workers, the public, and environment. If the release involves an aquatic or ground pathway and could have a near-term effect on the workers or the public (e.g., through a community water supply), it should be considered in the HA.</p>			
a. Did the HA analyze events covering the full range of possible initiators and severity levels? For example:			
(1) Were external causes such as:			
(a) Impacts of natural phenomena?			
(b) Accidents at nearby facilities?			

(c) Vehicle crashes?			
<p style="text-align: center;">Review Criteria for Hazards Assessments</p> <p style="text-align: center;">for Facility/Facilities _____</p>	Yes	No	Not Applicable
(d) Aircraft crashes?			
(2) Were malevolent acts and “severe” events included in the HA since they represent the upper end of the consequence spectrum for which recognition and response may be essential to mitigation of both the event and its health and safety consequences?			
b. Was the primary barrier, the one closest to the material, analyzed? For example, in the case of gaseous or liquid materials, the tank, cylinder, process piping, or other container is usually the primary barrier. For materials that are prevented from being released by their own structure or physical form, consider that form or structure as the barrier.			
c. Were possible initiating events that could initiate a release identified for each set of barrier failures that could lead to the release of hazardous material?			
d. Were possible accident mechanisms that could initiate a release identified for each set of barrier failures that could lead to the release of hazardous material?			
e. Were possible equipment failures that could initiate a release identified for each set of barrier failures that could lead to the release of hazardous material?			
f. Were contributing events or conditions that could influence the progression of the scenario or alter the magnitude or nature of the consequences incorporated into the analysis?			
g. Was the time calculated for events that take a finite amount of time between the initiator and the barrier failure (e.g., a loss of purge flow to a tank resulting in a buildup to a flammable mixture)?			
h. When estimating the magnitude of the release from the primary barrier, were the following actions taken?			
(1) For each cause of failure, was a quantitative estimate developed of the:			
(a) Material at Risk (MAR)?			
(b) Amount of material available to be acted on by a given physical stress?			

(c) Damage Ratio (DR), which is the fraction of the MAR impacted by the actual conditions under evaluation?			
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(2) Were the physical properties of the material (i.e., volatility, viscosity, melting point, and vapor pressure) under which it is stored and the postulated mode of barrier failure considered?			
(3) Were the temperature conditions under which it is stored and the postulated mode of barrier failure considered?			
(4) Were the pressure conditions under which it is stored and the postulated mode of barrier failure considered?			
(5) If multiple containers of the same hazardous material exist in the facility, was the possibility that the same event may cause a release from more than one container (e.g., seismic event or a forklift ramming two or more drums of material), and that the failure of one container could lead to failure of others considered?			
i. Was the Leak Path Failure (LPF) determined by characterizing the effectiveness of secondary barriers and mitigating features?			
j. Was an estimate made of the radiological source term using the following information found in DOE-HDBK 3010-94 or DOE-STD-1027:			
(1) Airborne Release Fractions (ARFs)?			
(2) Respirable Fractions (RFs)?			
(3) Airborne Release Rates (ARRs)?			
k. Was an estimate made of the chemical source term based on the material properties using basic physical and chemical principles?			
l. Were malevolent acts (theft, sabotage, terrorism) including the use of explosives or flammable materials as possible release initiators analyzed? (Note: In most cases, malevolent act scenarios will produce releases and consequences similar to those that could be caused by accidental or other external initiators. If approximately the same level of damage and source term might also be caused by an act of sabotage in the same location, the malevolent act can simply be considered a second initiator for the same basic fire/explosion condition.)			
m. Were the results of the Fire Hazards Analysis (FHA) reviewed to determine if the HA needs to analyze the release of toxic materials from fires that could occur in common industrial buildings?			

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Comments: (A brief explanation should be provided for any "NO" response.)			
<p>5. ESTIMATION OF CONSEQUENCES</p> <p>Potential consequences of the hazardous material release scenarios developed in Section 4 should be estimated to determine the areas potentially affected, the need for protective actions, and the time available to take those actions. The consequences of hazardous material releases should be estimated using models and calculational methods that are most appropriate to the material released and to the physical characteristics of the site and its atmospheric dispersion conditions and, if applicable, hydrologic dispersion conditions.</p>			
<p>a. Were consequence assessment models used for emergency planning and response purposes and for Safety Analysis Report Evaluation Guide comparisons at the facility used to conduct the HA?</p>			
<p>b. Was the selection of dispersion and consequence models justified in the HA document (i.e., the applicability of the model to the release mode, the site geographic features, and atmospheric conditions typically experienced at the site)? (Note: The results of any experimental verification or validation of the models should be cited as well as any known limitations or sources of inaccuracy.)</p>			
<p>c. Were the consequences of each radiological and chemical release summarized in the form of a graph or table that gives the dose or concentration versus distance out to a distance beyond that at which protective action criteria are exceeded?</p>			
<p>d. Was a distinction made regarding events that have only a local impact and events that impact areas of the site outside the immediate vicinity of the facility?</p>			
<p>e. Were other onsite receptor locations of interest identified for each facility including:</p>			
<p>(1) Adjacent facilities with significant occupancy?</p>			
<p>(2) Protected area boundaries?</p>			

(3) Any locations accessible to the general public or occupied by private sector facilities, such as:			
(a) Roads?			
Review Criteria for Hazards Assessments for Facility/Facilities _____	Yes	No	Not Applicable
(b) Visitor centers?			
(c) Parking lots?			
(d) Commercial facilities?			
(e) Operating areas on the site?			
(4) Emergency response facilities, such as:			
(a) Emergency Operations Centers?			
(b) Evacuation staging areas?			
(c) Medical aid stations?			
(d) Fire stations?			
f. Was the site boundary receptor (i.e., the nearest location to the facility where DOE does not have full ownership and control over access to the property) determined?			
g. Were other offsite locations considered in the consequence analysis such as:			
(1) Schools?			
(2) Hospitals?			
(3) Nursing homes?			
(4) Prisons?			
(5) Industrial complexes?			
(6) Evacuation routes?			
(7) Major transportation facilities?			
(8) Emergency Operations Centers?			
(9) Concentrations of population?			

h. Was the maximum distance at which consequences exceed the applicable protective action criterion or threshold for early (acute) lethality determined in addition to calculating consequences at a specific receptor, such as the facility boundary?			
i. Was the maximum distance at which consequences exceed the applicable protective action criterion or threshold for early (acute) lethality determined in addition to calculating consequences at a specific receptor, such as the nearest site boundary?			

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Review Criteria for Hazards Assessments for Facility/Facilities _____	Yes	No	Not Applicable
j. Was the elapsed time from the initiation of the event or condition until each consequence threshold is exceeded at the receptor points and distances of interest determined? (Note: For each release scenario, dispersion condition, downwind distance, and hazardous material, this elapsed time is the time available to recognize the event and carry out the necessary protective action (onsite) or to make the necessary protective action recommendation (offsite). The available time will largely determine what protective actions are feasible for a particular type of release.)			
k. Were the results of the consequence calculations summarized in tabular form to aid in the correlation of potential impacts with appropriate event classification criteria (i.e., EALs) and protective response actions?			
Comment: (A brief explanation should be provided for any "NO" response.) <div style="text-align: center; font-size: 2em; opacity: 0.5;">DRAFT</div>			
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EMERGENCY PLANNING ZONES			
The Emergency Planning Zone (EPZ) is an area within which the facility/site should support the local, state, and/or tribal authorities in planning and preparedness activities to protect people living and working there. Among these activities are identification of response organizations; establishment of effective communications to notify the public and the responsible authorities within the EPZ; development of public information and education materials; training and provision of equipment for offsite emergency workers; identification of predetermined response actions; and development and testing of response procedures. The EPZs for a DOE facility or operation should be developed in cooperation with the responsible state, local, and tribal authorities and other tenant site facilities.			
1. Were the following issues considered when developing and proposing an EPZ:			
a. Emergency plans or general planning and preparedness information outlining responsibilities for each state government during hazardous material emergency conditions within their jurisdictions?			

Review Criteria for Hazards Assessments for Facility/Facilities _____	Yes	No	Not Applicable
b. Emergency plans or general planning and preparedness information outlining responsibilities for each tribal government during hazardous material emergency conditions within their jurisdictions?			
c. Emergency plans or general planning and preparedness information outlining responsibilities for each local government during hazardous material emergency conditions within their jurisdictions?			
d. An EPZ associated with a particular DOE facility or operation in which government and facility managers determine that special planning and preparedness efforts are warranted as a means of apportioning preparedness resources to the areas where they are most needed?			
e. Defining the EPZ for the given type of protective response action listed below, and understanding that responsible authorities during an emergency will assess the actual conditions existing at that time and determine whether protective response action is warranted:			
(1) Evacuation?			
(2) Sheltering?			
(3) Food pathway intervention?			
f. Protective response actions may be needed in areas outside the EPZ if warranted by the actual conditions?			
g. Based on the results of the information analyzed, is the final EPZ no larger than 10 miles (16km)?			
2. Were the following items taken into consideration regarding onsite transportation accidents involving hazardous materials:			
a. Transportation of hazardous materials within the site analyzed either:			
(1) In a HA for the fixed facility(ies) with which the materials are associated? <u>OR</u>			
(2) In a special HA covering all transportation activity on the site?			
b. Emergency plans and procedures included criteria by which to categorize and classify a range of onsite transportation accidents?			
c. The EPZ for a site was not extended beyond the site boundary solely on the basis of potential consequences of a transportation accident if the transportation activity is comparable (in terms of materials, quantities, and mode of shipment) to that normally conducted on public routes?			

Review Criteria for Hazards Assessments for Facility/Facilities _____	Yes	No	Not Applicable
Comment: (A brief explanation should be provided for any "NO" response.)			
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MAINTAINING THE HAZARDS ASSESSMENT			
1. Is the HA reviewed at least annually?			
2. Is the HA updated prior to significant changes to the site/facility or hazardous material inventories?			
3. Is the maintenance of the HA monitored through existing administrative processes and commitment tracking systems?			
4. Is the review schedule for HAs specified in the Emergency Readiness Assurance Plan (ERAP)?			
5. Were transitory hazards such as short-duration storage of large quantities of hazardous materials appropriately documented in the:			
a. Respective facility HA?			
b. Test plans?			
c. Other controlling safety documents for transitory hazards?			
d. Special abbreviated HA?			
6. Were transitory hazards such as the short-term assembly and testing of nuclear explosive devices appropriately documented in the:			
a. Respective facility HA?			
b. Test plans?			
c. Other controlling safety documents for transitory hazards?			
d. Special abbreviated HA?			
7. Is the HA reviewed due to changes in offsite or onsite population or transportation features of the site and environs, such as new highways?			

<p>8. Were the results of each review documented and reported to the management responsible for facility operations and emergency preparedness?</p>			
<p style="text-align: center;">Review Criteria for Hazards Assessments for Facility/Facilities _____</p>	Yes	No	Not Applicable
<p>9. If the review identified no significant changes in facility, process, or potential emergency consequences, was a finding to that effect documented?</p>			
<p>10. If the review identified significant changes, were the changes documented and reported? (Note: The report should address (1) the possible effects on the adequacy of facility and site emergency plans; (2) any temporary compensatory measures that are being considered or implemented; and (3) a schedule for updating the analysis, reporting the results, and proposing any needed changes to the site's emergency planning or response program.)</p>			
<p>Comment: (A brief explanation should be provided for any "NO" response.)</p> <p style="text-align: center; font-size: 2em; opacity: 0.5;">DRAFT</p>			