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(i) Museum or Federal agency that has possession or control of the human remains or cultural items; or

(ii) Lineal descendant, or an Indian Tribe or Native Hawaiian organization with potential cultural affiliation to the human remains or cultural items.

(2) The Review Committee may make an advisory finding of fact on questions related to:

(i) The identity of an object as human remains or cultural items;

(ii) The cultural affiliation of human remains or cultural items; or

(iii) The repatriation of human remains or cultural items.

(3) The Review Committee may make an advisory recommendation on disputes between affected parties. To facilitate the resolution of disputes, the Review Committee may:

(i) Consider disputes between an affected party identified in paragraph (c)(1)(i) of this section and an affected party identified in paragraph (c)(1)(ii) of this section;

(ii) Not consider disputes among lineal descendants, Indian Tribes, and Native Hawaiian organizations;

(iii) Not consider disputes among museums and Federal agencies;

(iv) Request information or presentations from any affected party; and

(v) Make advisory recommendations directly to the affected parties or to the Secretary of the Interior.

PART 11—NATURAL RESOURCE DAMAGE ASSESSMENTS

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AUTHORITY: 42 U.S.C. 9651(c), as amended.

SOURCE: 51 FR 27725, Aug. 1, 1986, unless otherwise noted.

Subpart A—Introduction

§ 11.10 Scope and applicability.

The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended, 42 U.S.C. 9601 *et seq.*, and the Clean Water Act (CWA), 33 U.S.C. 1251–1376, provide that natural resource trustees may assess damages to natural resources resulting from a discharge of oil or a release of a hazardous substance covered under CERCLA or the CWA and may seek to recover those damages. This part supplements the procedures established under the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 CFR part 300, for the identification, investigation, study, and response to a discharge of oil or release of a hazardous substance, and it provides a procedure by which a natural resource trustee can determine compensation for injuries to natural resources that have not been nor are expected to be addressed by response actions conducted pursuant to the NCP. The assessment procedures set forth in this part are not mandatory. However, they must be used by Federal or State natural resource trustees in order to obtain the rebuttable presumption contained in section 107(f)(2)(C) of CERCLA. This part applies to assessments initiated after the effective date of this final rule.

[53 FR 5171, Feb. 22, 1988]

§ 11.11 Purpose.

The purpose of this part is to provide standardized and cost-effective procedures for assessing natural resource damages. The results of an assessment performed by a Federal or State natural resource trustee according to these procedures shall be accorded the evidentiary status of a rebuttable presumption as provided in section 107(f)(2)(C) of CERCLA.

[53 FR 5171, Feb. 22, 1988]

§ 11.12 Biennial review of regulations.

The regulations and procedures included within this part shall be reviewed and revised as appropriate 2 years from the effective date of these rules and every second anniversary thereafter.

§ 11.13 Overview.

(a) *Purpose.* The process established by this part uses a planned and phased approach to the assessment of natural resource damages. This approach is designed to ensure that all procedures used in an assessment, performed pursuant to this part, are appropriate, necessary, and sufficient to assess damages for injuries to natural resources.

(b) *Preassessment phase.* Subpart B of this part, the preassessment phase, provides for notification, coordination, and emergency activities, if necessary, and includes the preassessment screen. The preassessment screen is meant to be a rapid review of readily available information that allows the authorized official to make an early decision on whether a natural resource damage assessment can and should be performed.

(c) *Assessment Plan phase.* If the authorized official decides to perform an assessment, an Assessment Plan, as described in subpart C of this part, is prepared. The Assessment Plan ensures that the assessment is performed in a planned and systematic manner and

that the methodologies chosen demonstrate reasonable cost.

(d) *Type A assessments.* The simplified assessments provided for in section 301(c)(2)(A) of CERCLA are performed using the standard procedures specified in subpart D of this part.

(e) *Type B assessments.* Subpart E of this part covers the assessments provided for in section 301(c)(2)(B) of CERCLA. The process for implementing type B assessments has been divided into the following three phases.

(1) *Injury Determination phase.* The purpose of this phase is to establish that one or more natural resources have been injured as a result of the discharge of oil or release of a hazardous substance. The sections of subpart E comprising the Injury Determination phase include definitions of injury, guidance on determining pathways, and testing and sampling methods. These methods are to be used to determine both the pathways through which resources have been exposed to oil or a hazardous substance and the nature of the injury.

(2) *Quantification phase.* The purpose of this phase is to establish the extent of the injury to the resource in terms of the loss of services that the injured resource would have provided had the discharge or release not occurred. The sections of subpart E comprising the Quantification phase include methods for establishing baseline conditions, estimating recovery periods, and measuring the degree of service reduction stemming from an injury to a natural resource.

(3) *Damage Determination phase.* The purpose of this phase is to establish the appropriate compensation expressed as a dollar amount for the injuries established in the Injury Determination phase and measured in the Quantification phase. The sections of subpart E of this part comprising the Damage Determination phase include guidance on acceptable cost estimating and valuation methodologies for determining compensation based on the costs of restoration, rehabilitation, replacement, and/or acquisition of equivalent resources, plus, at the discretion of the authorized official, compensable value, as defined in § 11.83(c) of this part.

(f) *Post-assessment phase.* Subpart F of this part includes requirements to be met after the assessment is complete. The Report of Assessment contains the results of the assessment, and documents that the assessment has been carried out according to this rule. Other post-assessment requirements delineate the manner in which the demand for a sum certain shall be presented to a responsible party and the steps to be taken when sums are awarded as damages.

[51 FR 27725, Aug. 1, 1986, as amended at 59 FR 14281, Mar. 25, 1994]

§ 11.14 Definitions.

Terms not defined in this section have the meaning given by CERCLA or the CWA. As used in this part, the phrase:

(a) *Acquisition of the equivalent* or *replacement* means the substitution for an injured resource with a resource that provides the same or substantially similar services, when such substitutions are in addition to any substitutions made or anticipated as part of response actions and when such substitutions exceed the level of response actions determined appropriate to the site pursuant to the NCP.

(b) *Air* or *air resources* means those naturally occurring constituents of the atmosphere, including those gases essential for human, plant, and animal life.

(c) *Assessment area* means the area or areas within which natural resources have been affected directly or indirectly by the discharge of oil or release of a hazardous substance and that serves as the geographic basis for the injury assessment.

(d) *Authorized official* means the Federal or State official to whom is delegated the authority to act on behalf of the Federal or State agency designated as trustee, or an official designated by an Indian tribe, pursuant to section 126(d) of CERCLA, to perform a natural resource damage assessment. As used in this part, authorized official is equivalent to the phrase ''authorized official or lead authorized official,'' as appropriate.

(e) *Baseline* means the condition or conditions that would have existed at the assessment area had the discharge

of oil or release of the hazardous substance under investigation not occurred.

(f) *Biological resources* means those natural resources referred to in section 101(16) of CERCLA as fish and wildlife and other biota. Fish and wildlife include marine and freshwater aquatic and terrestrial species; game, nongame, and commercial species; and threatened, endangered, and State sensitive species. Other biota encompass shellfish, terrestrial and aquatic plants, and other living organisms not otherwise listed in this definition.

(g) *CERCLA* means the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, 42 U.S.C. 9601 *et seq.*, as amended.

(h) *Committed use* means either: a current public use; or a planned public use of a natural resource for which there is a documented legal, administrative, budgetary, or financial commitment established before the discharge of oil or release of a hazardous substance is detected.

(i) *Control area* or *control resource* means an area or resource unaffected by the discharge of oil or release of the hazardous substance under investigation. A control area or resource is selected for its comparability to the assessment area or resource and may be used for establishing the baseline condition and for comparison to injured resources.

(j) *Cost-effective* or *cost-effectiveness* means that when two or more activities provide the same or a similar level of benefits, the least costly activity providing that level of benefits will be selected.

(k) *CWA* means the Clean Water Act, as amended, 33 U.S.C. 1251 *et seq.*, also referred to as the Federal Water Pollution Control Act.

(l) *Damages* means the amount of money sought by the natural resource trustee as compensation for injury, destruction, or loss of natural resources as set forth in section 107(a) or 111(b) of CERCLA.

(m) *Destruction* means the total and irreversible loss of a natural resource.

(n) *Discharge* means a discharge of oil as defined in section 311(a)(2) of the CWA, as amended, and includes, but is not limited to, any spilling, leaking, pumping, pouring, emitting, emptying, or dumping of oil.

(o) *Drinking water supply* means any raw or finished water source that is or may be used by a public water system, as defined in the SDWA, or as drinking water by one or more individuals.

(p) *EPA* means the U.S. Environmental Protection Agency.

(q) *Exposed to* or *exposure of* means that all or part of a natural resource is, or has been, in physical contact with oil or a hazardous substance, or with media containing oil or a hazardous substance.

(r) *Fund* means the Hazardous Substance Superfund established by section 517 of the Superfund Amendments and Reauthorization Act of 1986.

(s) *Geologic resources* means those elements of the Earth's crust such as soils, sediments, rocks, and minerals, including petroleum and natural gas, that are not included in the definitions of ground and surface water resources.

(t) *Ground water resources* means water in a saturated zone or stratum beneath the surface of land or water and the rocks or sediments through which ground water moves. It includes ground water resources that meet the definition of drinking water supplies.

(u) *Hazardous substance* means a hazardous substance as defined in section 101(14) of CERCLA.

(v) *Injury* means a measurable adverse change, either long- or short-term, in the chemical or physical quality or the viability of a natural resource resulting either directly or indirectly from exposure to a discharge of oil or release of a hazardous substance, or exposure to a product of reactions resulting from the discharge of oil or release of a hazardous substance. As used in this part, injury encompasses the phrases ''injury,'' ''destruction,'' and ''loss.'' Injury definitions applicable to specific resources are provided in § 11.62 of this part.

(w) *Lead authorized official* means a Federal or State official authorized to act on behalf of all affected Federal or State agencies acting as trustees where there are multiple agencies, or an official designated by multiple tribes

where there are multiple tribes, affected because of coexisting or contiguous natural resources or concurrent jurisdiction.

(x) *Loss* means a measurable adverse reduction of a chemical or physical quality or viability of a natural resource.

(y) *Natural Contingency Plan* or *NCP* means the National Oil and Hazardous Substances Contingency Plan and revisions promulgated by EPA, pursuant to section 105 of CERCLA and codified in 40 CFR part 300.

(z) *Natural resources* or *resources* means land, fish, wildlife, biota, air, water, ground water, drinking water supplies, and other such resources belonging to, managed by, held in trust by, appertaining to, or otherwise controlled by the United States (including the resources of the fishery conservation zone established by the Magnuson Fishery Conservation and Management Act of 1976), any State or local government, any foreign government, any Indian tribe, or, if such resources are subject to a trust restriction on alienation, any member of an Indian tribe. These natural resources have been categorized into the following five groups: Surface water resources, ground water resources, air resources, geologic resources, and biological resources.

(aa) *Natural resource damage assessment* or *assessment* means the process of collecting, compiling, and analyzing information, statistics, or data through prescribed methodologies to determine damages for injuries to natural resources as set forth in this part.

(bb) *Oil* means oil as defined in section 311(a)(1) of the CWA, as amended, of any kind or in any form, including, but not limited to, petroleum, fuel oil, sludge, oil refuse, and oil mixed with wastes other than dredged spoil.

(cc) *On-Scene Coordinator* or *OSC* means the On-Scene Coordinator as defined in the NCP.

(dd) *Pathway* means the route or medium through which oil or a hazardous substance is or was transported from the source of the discharge or release to the injured resource.

(ee) *Reasonable cost* means the amount that may be recovered for the cost of performing a damage assessment. Costs are reasonable when: the Injury Determination, Quantification, and Damage Determination phases have a well-defined relationship to one another and are coordinated; the anticipated increment of extra benefits in terms of the precision or accuracy of estimates obtained by using a more costly injury, quantification, or damage determination methodology are greater than the anticipated increment of extra costs of that methodology; and the anticipated cost of the assessment is expected to be less than the anticipated damage amount determined in the Injury, Quantification, and Damage Determination phases.

(ff) *Rebuttable presumption* means the procedural device provided by section 107(f)(2)(C) of CERCLA describing the evidentiary weight that must be given to any determination or assessment of damages in any administrative or judicial proceeding under CERCLA or section 311 of the CWA made by a Federal or State natural resource trustee in accordance with the rule provided in this part.

(gg) *Recovery period* means either the longest length of time required to return the services of the injured resource to their baseline condition, or a lesser period of time selected by the authorized official and documented in the Assessment Plan.

(hh) *Release* means a release of a hazardous substance as defined in section 101(22) of CERCLA.

(ii) *Replacement* or *acquisition of the equivalent* means the substitution for an injured resource with a resource that provides the same or substantially similar services, when such substitutions are in addition to any substitutions made or anticipated as part of response actions and when such substitutions exceed the level of response actions determined appropriate to the site pursuant to the NCP.

(jj) *Response* means remove, removal, remedy, or remedial actions as those phrases are defined in sections 101(23) and 101(24) of CERCLA.

(kk) *Responsible party or parties* and *potentially responsible party or parties* means a person or persons described in or potentially described in one or more of the categories set forth in section 107(a) of CERCLA.

(ll) *Restoration* or *rehabilitation* means actions undertaken to return an injured resource to its baseline condition, as measured in terms of the injured resource's physical, chemical, or biological properties or the services it previously provided, when such actions are in addition to response actions completed or anticipated, and when such actions exceed the level of response actions determined appropriate to the site pursuant to the NCP.

(mm) *SDWA* means the Safe Drinking Water Act, 42 U.S.C. 300f–300j–10.

(nn) *Services* means the physical and biological functions performed by the resource including the human uses of those functions. These services are the result of the physical, chemical, or biological quality of the resource.

(oo) *Site* means an area or location, for purposes of response actions under the NCP, at which oil or hazardous substances have been stored, treated, discharged, released, disposed, placed, or otherwise came to be located.

(pp) *Surface water resources* means the waters of the United States, including the sediments suspended in water or lying on the bank, bed, or shoreline and sediments in or transported through coastal and marine areas. This term does not include ground water or water or sediments in ponds, lakes, or reservoirs designed for waste treatment under the Resource Conservation and Recovery Act of 1976 (RCRA), 42 U.S.C. 6901–6987 or the CWA, and applicable regulations.

(qq) *Technical feasibility* or *technically feasible* means that the technology and management skills necessary to implement an Assessment Plan or Restoration and Compensation Determination Plan are well known and that each element of the plan has a reasonable chance of successful completion in an acceptable period of time.

(rr) *Trustee* or *natural resource trustee* means any Federal natural resources management agency designated in the NCP and any State agency designated by the Governor of each State, pursuant to section 107(f)(2)(B) of CERCLA, that may prosecute claims for damages under section 107(f) or 111(b) of CERCLA; or an Indian tribe, that may commence an action under section 126(d) of CERCLA.

(ss) *Type A assessment* means standard procedures for simplified assessments requiring minimal field observation to determine damages as specified in section 301(c)(2)(A) of CERCLA.

(tt) *Type B assessment* means alternative methodologies for conducting assessments in individual cases to determine the type and extent of short- and long-term injury and damages, as specified in section 301(c)(2)(B) of CERCLA.

(uu) *Indian tribe* means any Indian tribe, band, nation, or other organized group or community, including any Alaska Native village but not including any Alaska Native regional or village corporation, which is recognized as eligible for the special programs and services provided by the United States to Indians because of their status as Indians.

[51 FR 27725, Aug. 1, 1986, as amended at 53 FR 5171, Feb. 22, 1988; 59 FR 14281, Mar. 25, 1994]

§ 11.15 What damages may a trustee recover?

(a) In an action filed pursuant to section 107(f) or 126(d) of CERCLA, or sections 311(f) (4) and (5) of the CWA, a natural resource trustee who has performed an assessment in accordance with this rule may recover:

(1) Damages as determined in accordance with this part and calculated based on injuries occurring from the onset of the release through the recovery period, less any mitigation of those injuries by response actions taken or anticipated, plus any increase in injuries that are reasonably unavoidable as a result of response actions taken or anticipated;

(2) The costs of emergency restoration efforts under § 11.21 of this part;

(3) The reasonable and necessary costs of the assessment, to include:

(i) The cost of performing the preassessment and Assessment Plan phases and the methodologies provided in subpart D or E of this part; and

(ii) Administrative costs and expenses necessary for, and incidental to, the assessment, assessment planning, and restoration, rehabilitation, replacement, and/or acquisition of equivalent resources planning, and any restoration, rehabilitation, replacement,

and/or acquisition of equivalent resources undertaken; and

(4) Interest on the amounts recoverable as set forth in section 107(a) of CERCLA. The rate of interest on the outstanding amount of the claim shall be the same rate as is specified for interest on investments of the Hazardous Substance Superfund established under subchapter A of chapter 98 of the Internal Revenue Code of 1954. Such interest shall accrue from the later of: The date payment of a specified amount is demanded in writing, or the date of the expenditure concerned;

(b) The determination of the damage amount shall consider any applicable limitations provided for in section 107(c) of CERCLA.

(c) Where an assessment determines that there is, in fact, no injury, as defined in §11.62 of this part, the natural resource trustee may not recover assessment costs.

(d) There shall be no double recovery under this rule for damages or for assessment costs, that is, damages or assessment costs may only be recovered once, for the same discharge or release and natural resource, as set forth in section 107(f)(1) of CERCLA.

(e) Actions for damages and assessment costs shall comply with the statute of limitations set forth in section 113(g), or, where applicable, section 126(d) of CERCLA.

[51 FR 27725, Aug. 1, 1986, as amended at 52 FR 9095, Mar. 20, 1987; 53 FR 5172, Feb. 22, 1988; 59 FR 14281, Mar. 25, 1994; 61 FR 20609, May 7, 1996]

§11.16 [Reserved]

§11.17 Compliance with applicable laws and standards.

(a) *Worker health and safety*. All worker health and safety considerations specified in the NCP shall be observed, except that requirements applying to response actions shall be taken to apply to the assessment process.

(b) *Resource protection*. Before taking any actions under this part, particularly before taking samples or making determinations of restoration or replacement, compliance is required with any applicable statutory consultation or review requirements, such as the Endangered Species Act; the Migratory Bird Treaty Act; the Marine Protection, Research, and Sanctuaries Act; and the Marine Mammal Protection Act, that may govern the taking of samples or in other ways restrict alternative management actions.

[51 FR 27725, Aug. 1, 1986, as amended at 53 FR 5172, Feb. 22, 1988]

§11.18 Incorporation by reference.

(a) The following publications or portions of publications are incorporated by reference:

(1) Part II only (Fish-Kill Counting Guidelines) of ''Monetary Values of Freshwater Fish and Fish-Kill Guidelines,'' American Fisheries Society Special Publication Number 13, 1982; available for purchase from the American Fisheries Society, 5410 Grosvenor Lane, Bethesda, MD 20814, ph: (301) 897–8616. Reference is made to this publication in §§11.62(f)(4)(i)(B) and 11.71(l)(5)(iii)(A) of this part.

(2) Appendix 1 (Travel Cost Method), Appendix 2 (Contingent Valuation (Survey) Methods), and Appendix 3 (Unit Day Value Method) only of Section VIII of ''National Economic Development (NED) Benefit Evaluation Procedures'' (Procedures), which is Chapter II of *Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies,* U.S. Department of the Interior, Water Resources Council, Washington, DC, 1984, DOI/WRC/–84/01; available for purchase from the National Technical Information Service (NTIS), 5285 Port Royal Road, Springfield, VA 22161; PB No. 84–199–405; ph: (703) 487–4650. Reference is made to this publication in §11.83(a)(3) of this part.

(3) ''Uniform Appraisal Standards for Federal Land Acquisition'' (Uniform Appraisal Standards), Interagency Land Acquisition Conference, Washington, DC, 1973; available for purchase from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402; Stock Number 052–059–00002–0; ph: (202) 783–3238. Reference is made to this publication in §11.83(c)(2)(i) of this part.

(4) The CERCLA Type A Natural Resource Damage Assessment Model for Coastal and Marine Environments Technical Documentation, Volumes I-

VI, dated April 1996, including Revision I dated October 1997, and Revision II dated December 1999, prepared for the U.S. Department of the Interior by Applied Science Associates, Inc., A.T. Kearney, Inc., and Hagler Bailly Consulting, Inc. (NRDAM/CME technical document). Interested parties may obtain a copy of this document from the National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161; PB96–501788; ph: (703) 487–4650. Sections 11.34 (a), (b), and (e), 11.35(a), 11.36(b), 11.40(a), and 11.42(a), and Appendix II refer to this document.

(5) The CERCLA Type A Natural Resource Damage Assessment Model for Great Lakes Environments Technical Documentation, Volumes I-IV, dated April 1996, including Revision I dated October 1997, and Revision II dated December 1999, prepared for the U.S. Department of the Interior by Applied Science Associates, Inc., and Hagler Bailly Consulting, Inc. (NRDAM/GLE technical document). Interested parties may obtain a copy of this document from the National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161; PB96–501770; ph: (703) 487–4650. Sections 11.34 (a), (b), and (e), 11.35(a), 11.36(b), 11.40(a), and 11.42(a), and Appendix III refer to this document.

(b) The publications or portions of publications listed in paragraph (a) of this section are available for inspection at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202–741–6030, or go to: *http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html*. These incorporations by reference were approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a). These materials are incorporated as they exist on the date of the approval and a notice of any change in these materials will be published in the FEDERAL REGISTER.

[51 FR 27725, Aug. 1, 1986, as amended at 53 FR 9772, Mar. 25, 1988; 61 FR 20609, May 7, 1996; 62 FR 60459, Nov. 10, 1997; 65 FR 6014, Feb. 8, 2000; 69 FR 18803, Apr. 9, 2004]

§ 11.19 [Reserved]

Subpart B—Preassessment Phase

§ 11.20 Notification and detection.

(a) *Notification.* (1) Section 104(b)(2) of CERCLA requires prompt notification of Federal and State natural resource trustees of potential damages to natural resources under investigation and requires coordination of the assessments, investigations, and planning under section 104 of CERCLA with such trustees.

(2) The NCP provides for the OSC or lead agency to notify the natural resource trustee when natural resources have been or are likely to be injured by a discharge of oil or a release of a hazardous substance being investigated under the NCP.

(3) Natural resource trustees, upon such notification described in paragraphs (a) (1) and (2) of this section, shall take such actions, as may be consistent with the NCP.

(b) *Previously unreported discharges or releases.* If a natural resource trustee identifies or is informed of apparent injuries to natural resources that appear to be a result of a previously unidentified or unreported discharge of oil or release of a hazardous substance, he should first make reasonable efforts to determine whether a discharge or release has taken place. In the case of a discharge or release not yet reported or being investigated under the NCP, the natural resource trustee shall report that discharge or release to the appropriate authority as designated in the NCP.

(c) *Identification of co-trustees.* The natural resource trustee should assist the OSC or lead agency, as needed, in identifying other natural resource trustees whose resources may be affected as a result of shared responsibility for the resources and who should be notified.

[53 FR 5172, Feb. 22, 1988]

§ 11.21 Emergency restorations.

(a) *Reporting requirements and definition.* (1) In the event of a natural resource emergency, the natural resource trustee shall contact the National Response Center (800/424–8802) to report

the actual or threatened discharge or release and to request that an immediate response action be taken.

(2) An emergency is any situation related to a discharge or release requiring immediate action to avoid an irreversible loss of natural resources or to prevent or reduce any continuing danger to natural resources, or a situation in which there is a similar need for emergency action.

(b) *Emergency actions.* If no immediate response actions are taken at the site of the discharge or release by the EPA or the U.S. Coast Guard within the time that the natural resource trustee determines is reasonably necessary, or if such actions are insufficient, the natural resource trustee should exercise any existing authority he may have to take on-site response actions. The natural resource trustee shall determine whether the potentially responsible party, if his identity is known, is taking or will take any response action. If no on-site response actions are taken, the natural resource trustee may undertake limited off-site restoration action consistent with its existing authority to the extent necessary to prevent or reduce the immediate migration of the oil or hazardous substance onto or into the resource for which the Federal or State agency or Indian tribe may assert trusteeship.

(c) *Limitations on emergency actions.* The natural resource trustee may undertake only those actions necessary to abate the emergency situation, consistent with its existing authority. The normal procedures provided in this part must be followed before any additional restoration actions other than those necessary to abate the emergency situation are undertaken. The burden of proving that emergency restoration was required and that restoration costs were reasonable and necessary based on information available at the time rests with the natural resource trustee.

[51 FR 27725, Aug. 1, 1986, as amended at 53 FR 5173, Feb. 22, 1988]

§ 11.22 Sampling of potentially injured natural resources.

(a) *General limitations.* Until the authorized official has made the determination required in § 11.23 of this part to proceed with an assessment, field sampling of natural resources should be limited to the conditions identified in this section. All sampling and field work shall be subject to the provisions of § 11.17 of this part concerning safety and applicability of resource protection statutes.

(b) *Early sampling and data collection.* Field samples may be collected or site visits may be made before completing the preassessment screen to preserve data and materials that are likely to be lost if not collected at that time and that will be necessary to the natural resource damage assessment. Field sampling and data collection at this stage should be coordinated with the lead agency under the NCP to minimize duplication of sampling and data collection efforts. Such field sampling and data collection should be limited to:

(1) Samples necessary to preserve perishable materials considered likely to have been affected by, and contain evidence of, the oil or hazardous substance. These samples generally will be biological materials that are either dead or visibly injured and that evidence suggests have been injured by oil or a hazardous substance;

(2) Samples of other ephemeral conditions or material, such as surface water or soil containing or likely to contain oil or a hazardous substance, where those samples may be necessary for identification and for measurement of concentrations, and where necessary samples may be lost because of factors such as dilution, movement, decomposition, or leaching if not taken immediately; and

(3) Counts of dead or visibly injured organisms, which may not be possible to take if delayed because of factors such as decomposition, scavengers, or water movement. Such counts shall be subject to the provisions of § 11.71(l)(5)(iii) of this part.

§ 11.23 Preassessment screen—general.

(a) *Requirement.* Before beginning any assessment efforts under this part, except as provided for under the emergency restoration provisions of § 11.21 of this part, the authorized official shall complete a preassessment screen

and make a determination as to whether an assessment under this part shall be carried out.

(b) *Purpose.* The purpose of the preassessment screen is to provide a rapid review of readily available information that focuses on resources for which the Federal or State agency or Indian tribe may assert trusteeship under section 107(f) or section 126(d) of CERCLA. This review should ensure that there is a reasonable probability of making a successful claim before monies and efforts are expended in carrying out an assessment.

(c) *Determination.* When the authorized official has decided to proceed with an assessment under this part, the authorized official shall document the decision in terms of the criteria provided in paragraph (e) of this section in a Preassessment Screen Determination. This Preassessment Screen Determination shall be included in the Report of Assessment described in §11.90 of this part.

(d) *Content.* The preassessment screen shall be conducted in accordance with the guidance provided in this section and in §11.24—Preassessment screen—information on the site and §11.25—Preassessment screen—preliminary identification of resources potentially at risk, of this part.

(e) *Criteria.* Based on information gathered pursuant to the preassessment screen and on information gathered pursuant to the NCP, the authorized official shall make a preliminary determination that all of the following criteria are met before proceeding with an assessment:

(1) A discharge of oil or a release of a hazardous substance has occurred;

(2) Natural resources for which the Federal or State agency or Indian tribe may assert trusteeship under CERCLA have been or are likely to have been adversely affected by the discharge or release;

(3) The quantity and concentration of the discharged oil or released hazardous substance is sufficient to potentially cause injury, as that term is used in this part, to those natural resources;

(4) Data sufficient to pursue an assessment are readily available or likely to be obtained at reasonable cost; and

(5) Response actions, if any, carried out or planned do not or will not sufficiently remedy the injury to natural resources without further action.

(f) *Coordination.* (1) In a situation where response activity is planned or underway at a particular site, assessment activity shall be coordinated with the lead agency consistent with the NCP.

(2) Whenever, as part of a response action under the NCP, a preliminary assessment or an OSC Report is to be, or has been, prepared for the site, the authorized official should consult with the lead agency under the NCP, as necessary, and to the extent possible use information or materials gathered for the preliminary assessment or OSC Report, unless doing so would unnecessarily delay the preassessment screen.

(3) Where a preliminary assessment or an OSC Report does not exist or does not contain the information described in this section, that additional information may be gathered.

(4) If the natural resource trustee already has a process similar to the preassessment screen, and the requirements of the preassessment screen can be satisfied by that process, the processes may be combined to avoid duplication.

(g) *Preassessment phase costs.* (1) The following categories of reasonable and necessary costs may be incurred in the preassessment phase of the damage assessment:

(i) Release detection and identification costs;

(ii) Trustee identification and notification costs;

(iii) Potentially injured resource identification costs;

(iv) Initial sampling, data collection, and evaluation costs;

(v) Site characterization and preassessment screen costs; and

(vi) Any other preassessment costs for activities authorized by §§11.20 through 11.25 of this part.

(2) The reasonable and necessary costs for these categories shall be limited to those costs incurred by the authorized official for, and specifically allocable to, site-specific efforts taken during the preassessment phase for assessment of damages to natural resources for which the agency or Indian

tribe is acting as trustee. Such costs shall be supported by appropriate records and documentation and shall not reflect regular activities performed by the agency or Indian tribe in management of the natural resource. Activities undertaken as part of the preassessment phase shall be taken in a manner that is cost-effective, as that phrase is used in this part.

[51 FR 27725, Aug. 1, 1986, as amended at 53 FR 5173, Feb. 22, 1988]

§ 11.24 Preassessment screen—information on the site.

(a) *Information on the site and on the discharge or release.* The authorized official shall obtain and review readily available information concerning:

(1) The time, quantity, duration, and frequency of the discharge or release;

(2) The name of the hazardous substance, as provided for in Table 302.4—List of Hazardous Substances and Reportable Quantities, 40 CFR 302.4;

(3) The history of the current and past use of the site identified as the source of the discharge of oil or release of a hazardous substance;

(4) Relevant operations occurring at or near the site;

(5) Additional oil or hazardous substances potentially discharged or released from the site; and

(6) Potentially responsible parties.

(b) *Damages excluded from liability under CERCLA.* (1) The authorized official shall determine whether the damages:

(i) Resulting from the discharge or release were specifically identified as an irreversible and irretrievable commitment of natural resources in an environmental impact statement or other comparable environmental analysis, that the decision to grant the permit or license authorizes such commitment of natural resources, and that the facility or project was otherwise operating within the terms of its permit or license, so long as, in the case of damages to an Indian tribe occurring pursuant to a Federal permit or license, the issuance of that permit or license was not inconsistent with the fiduciary duty of the United States with respect to such Indian tribe; or

(ii) And the release of a hazardous substance from which such damages resulted have occurred wholly before enactment of CERCLA; or

(iii) Resulted from the application of a pesticide product registered under the Federal Insecticide, Fungicide, and Rodenticide Act, 7 U.S.C. 135–135k; or

(iv) Resulted from any other federally permitted release, as defined in section 101(10) of CERCLA; or

(v) Resulting from the release or threatened release of recycled oil from a service station dealer described in section 107(a)(3) or (4) of CERCLA if such recycled oil is not mixed with any other hazardous substance and is stored, treated, transported or otherwise managed in compliance with regulations or standards promulgated pursuant to section 3014 of the Solid Waste Disposal Act and other applicable authorities.

(2) An assessment under this part shall not be continued for potential injuries meeting one or more of the criteria described in paragraph (b)(1) of this section, which are exceptions to liability provided in sections 107(f), (i), and (j) and 114(c) of CERCLA.

(c) *Damages excluded from liability under the CWA.* (1) The authorized official shall determine whether the discharge meets one or more of the exclusions provided in section 311 (a)(2) or (b)(3) of the CWA.

(2) An assessment under this part shall not be continued for potential injuries from discharges meeting one or more of the CWA exclusions provided for in paragraph (c)(1) of this section.

[51 FR 27725, Aug. 1, 1986, as amended at 52 FR 9095, Mar. 20, 1987; 53 FR 5173, Feb. 22, 1988]

§ 11.25 Preassessment screen—preliminary identification of resources potentially at risk.

(a) *Preliminary identification of pathways.* (1) The authorized official shall make a preliminary identification of potential exposure pathways to facilitate identification of resources at risk.

(2) Factors to be considered in this determination should include, as appropriate, the circumstances of the discharge or release, the characteristics of the terrain or body of water involved, weather conditions, and the known physical, chemical, and toxicological

properties of the oil or hazardous substance.

(3) Pathways to be considered shall include, as appropriate, direct contact, surface water, ground water, air, food chains, and particulate movement.

(b) *Exposed areas.* An estimate of areas where exposure or effects may have occurred or are likely to occur shall be made. This estimate shall identify:

(1) Areas where it has been or can be observed that the oil or hazardous substance has spread;

(2) Areas to which the oil or hazardous substance has likely spread through pathways; and

(3) Areas of indirect effect, where no oil or hazardous substance has spread, but where biological populations may have been affected as a result of animals moving into or through the site.

(c) *Exposed water estimates.* The area of ground water or surface water that may be or has been exposed may be estimated by using the methods described in appendix I of this part.

(d) *Estimates of concentrations.* An estimate of the concentrations of oil or a hazardous substance in those areas of potential exposure shall be developed.

(e) *Potentially affected resources.* (1) Based upon the estimate of the areas of potential exposure, and the estimate of concentrations in those areas, the authorized official shall identify natural resources for which he may assert trusteeship that are potentially affected by the discharge or release. This preliminary identification should be used to direct further investigations, but it is not intended to preclude consideration of other resources later found to be affected.

(2) A preliminary estimate, based on information readily available from resource managers, of the services of the resources identified as potentially affected shall be made. This estimate will be used in determining which resources to consider if further assessment efforts are justified.

Subpart C—Assessment Plan Phase

§ 11.30 What does the authorized official do if an assessment is warranted?

(a) If the authorized official determines during the Preassessment Phase that an assessment is warranted, the authorized official must develop a plan for the assessment of natural resource damages.

(b) *Purpose.* The purpose of the Assessment Plan is to ensure that the assessment is performed in a planned and systematic manner and that methodologies selected from subpart D for a type A assessment or from subpart E for a type B assessment, including the Injury Determination, Quantification, and Damage Determination phases, can be conducted at a reasonable cost, as that phrase is used in this part.

(c) *Assessment Plan phase costs.* (1) The following categories of reasonable and necessary costs may be incurred in the Assessment Plan phase of the damage assessment:

(i) Methodology identification and screening costs;

(ii) Potentially responsible party notification costs;

(iii) Public participation costs;

(iv) Exposure confirmation analysis costs;

(v) Preliminary estimate of damages costs; and

(vi) Any other Assessment Plan costs for activities authorized by §§ 11.30 through 11.38.

(2) The reasonable and necessary costs for these categories shall be limited to those costs incurred or anticipated by the authorized official for, and specifically allocable to, site specific efforts taken in the development of an Assessment Plan for a resource for which the agency or Indian tribe is acting as trustee. Such costs shall be supported by appropriate records and documentation, and shall not reflect regular activities performed by the agency or tribe in management of the natural resource. Activities undertaken as part of the Assessment Plan phase shall be taken in a manner that

is cost-effective, as that phrase is used in this part.

[51 FR 27725, Aug. 1, 1986, as amended at 53 FR 5174, Feb. 22, 1988; 59 FR 14281, Mar. 25, 1994; 61 FR 20609, May 7, 1996]

§ 11.31 What does the Assessment Plan include?

(a) *General content and level of detail.* (1) The Assessment Plan must identify and document the use of all of the type A and/or type B procedures that will be performed.

(2) The Assessment Plan shall be of sufficient detail to serve as a means of evaluating whether the approach used for assessing the damage is likely to be cost-effective and meets the definition of reasonable cost, as those terms are used in this part. The Assessment Plan shall include descriptions of the natural resources and the geographical areas involved. The Assessment Plan shall also include a statement of the authority for asserting trusteeship, or co-trusteeship, for those natural resources considered within the Assessment Plan. The authorized official's statement of the authority for asserting trusteeship shall not have the force and effect of a rebuttable presumption under §11.91(c) of this part. In addition, for type B assessments, the Assessment Plan shall include the sampling locations within those geographical areas, sample and survey design, numbers and types of samples to be collected, analyses to be performed, preliminary determination of the recovery period, and other such information required to perform the selected methodologies.

(3) The Assessment Plan shall contain information sufficient to demonstrate that the damage assessment has been coordinated to the extent possible with any remedial investigation feasibility study or other investigation performed pursuant to the NCP.

(4) The Assessment Plan shall contain procedures and schedules for sharing data, split samples, and results of analyses, when requested, with any identified potentially responsible parties and other natural resource trustees.

(b) *Identification of types of assessment procedures.* The Assessment Plan must identify whether the authorized official plans to use a type A procedure, type B procedures, or a combination. Sections 11.34 through 11.36 contain standards for deciding which types of procedures to use. The Assessment Plan must include a detailed discussion of how these standards are met.

(c) *Specific requirements for type B procedures.* If the authorized official plans to use type B procedures, the Assessment Plan must also include the following:

(1) The results of the confirmation of exposure performed under §11.37;

(2) A Quality Assurance Plan that satisfies the requirements listed in the NCP and applicable EPA guidance for quality control and quality assurance plans;

(3) The objectives, as required in §11.64(a)(2) of this part, of any testing and sampling for injury or pathway determination; and

(4) The Restoration and Compensation Determination Plan developed in accordance with the guidance in §11.81 of this part. If existing data are not sufficient to develop the Restoration and Compensation Determination Plan as part of the Assessment Plan, the Restoration and Compensation Determination Plan may be developed later, after the completion of the Injury Determination or Quantification phases. If the Restoration and Compensation Determination Plan is published separately, the public review and comment will be conducted pursuant to §11.81(d) of this part.

(d) *Specific requirements for type A procedures.* If the authorized official plans to use a type A procedure, the Assessment Plan must also contain the information described in subpart D.

[51 FR 27725, Aug. 1, 1986, as amended at 52 FR 9095, Mar. 20, 1987; 53 FR 5174, Feb. 22, 1988; 59 FR 14281, Mar. 25, 1994; 61 FR 20609, May 7, 1996; 73 FR 57265, Oct. 2, 2008]

§ 11.32 How does the authorized official develop the Assessment Plan?

(a) *Pre-development requirements.* The authorized official shall fulfill the following requirements before developing an Assessment Plan.

(1) *Coordination.* (i) If the authorized official's responsibility is shared with

other natural resource trustees as a result of coexisting or contiguous natural resources or concurrent jurisdiction, the authorized official shall ensure that all other known affected natural resource trustees are notified that an Assessment Plan is being developed. This notification shall include the results of the Preassessment Screen Determination.

(ii) Authorized officials from different agencies or Indian tribes are encouraged to cooperate and coordinate any assessments that involve coexisting or contiguous natural resources or concurrent jurisdiction. They may arrange to divide responsibility for implementing the assessment in any manner that is agreed to by all of the affected natural resource trustees with the following conditions:

(A) A lead authorized official shall be designated to administer the assessment. The lead authorized official shall act as coordinator and contact regarding all aspects of the assessment and shall act as final arbitrator of disputes if consensus among the authorized officials cannot be reached regarding the development, implementation, or any other aspect of the Assessment Plan. The lead authorized official shall be designated by mutual agreement of all the natural resource trustees. If consensus cannot be reached as to the designation of the lead authorized official, the lead authorized official shall be designated in accordance with paragraphs (a)(1)(ii) (B), (C), or (D) of this section:

(B) When the natural resources being assessed are located on lands or waters subject to the administrative jurisdiction of a Federal agency, a designated official of the Federal agency shall act as the lead authorized official.

(C) When the natural resources being assessed, pursuant to section 126(d) of CERCLA, are located on lands or waters of an Indian tribe, an official designated by the Indian tribe shall act as the lead authorized official.

(D) For all other natural resources for which the State may assert trusteeship, a designated official of the State agency shall act as the lead authorized official.

(iii) If there is a reasonable basis for dividing the assessment, the natural resource trustee may act independently and pursue separate assessments, actions, or claims so long as the claims do not overlap. In these instances, the natural resource trustees shall coordinate their efforts, particularly those concerning the sharing of data and the development of the Assessment Plans.

(2) *Identification and involvement of the potentially responsible party.* (i) If the lead agency under the NCP for response actions at the site has not identified potentially responsible parties, the authorized official shall make reasonable efforts to identify any potentially responsible parties.

(ii) In the event the number of potentially responsible parties is large or if some of the potentially responsible parties cannot be located, the authorized official may proceed against any one or more of the parties identified. The authorized official should use reasonable efforts to proceed against most known potentially responsible parties or at least against all those potentially responsible parties responsible for significant portions of the potential injury.

(iii)(A) The authorized official shall send a Notice of Intent to Perform an Assessment to all identified potentially responsible parties. The Notice shall invite the participation of the potentially responsible party, or, if several parties are involved and if agreed to by the lead authorized official, a representative or representatives designated by the parties, in the development of the type and scope of the assessment and in the performance of the assessment. The Notice shall briefly describe, to the extent known, the site, vessel, or facility involved, the discharge of oil or release of hazardous substance of concern to the authorized official, and the resources potentially at risk. The Notice shall also contain a statement of authority for asserting trusteeship, or co-trusteeship, over those natural resources identified as potentially at risk.

(B) The authorized official shall allow at least 30 calendar days, with reasonable extensions granted as appropriate, for the potentially responsible party or parties notified to respond to the Notice before proceeding

with the development of the Assessment Plan or any other assessment actions.

(b) *Plan approval.* The authorized official shall have final approval as to the appropriate methodologies to include in the Assessment Plan and any modifications to the Assessment Plan.

(c) *Public involvement in the Assessment Plan.* (1) The authorized official must make the Assessment Plan available for review by any identified potentially responsible parties, other natural resource trustees, other affected Federal or State agencies or Indian tribes, and any other interested member of the public for a period of at least 30 calendar days, with reasonable extensions granted as appropriate. The authorized official may not perform any type B procedures described in the Assessment Plan until after this review period.

(2) Any comments concerning the Assessment Plan received from identified potentially responsible parties, other natural resource trustees, other affected Federal or State agencies or Indian tribes, and any other interested members of the public, together with responses to those comments, shall be included as part of the Report of Assessment, described in §11.90 of this part.

(d) *Plan implementation.* At the option of the authorized official and if agreed to by any potentially responsible party, or parties acting jointly, the potentially responsible party or any other party under the direction, guidance, and monitoring of the authorized official may implement all or any part of the Assessment Plan finally approved by the authorized official. Any decision by the authorized official to allow or not allow implementation by the potentially responsible party shall be documented in the Assessment Plan.

(e) *Plan modification.* (1) The Assessment Plan may be modified at any stage of the assessment as new information becomes available.

(2)(i) Any modification to the Assessment Plan that in the judgment of the authorized official is significant shall be made available for review by any identified potentially responsible party, any other affected natural resource trustees, other affected Federal or State agencies or Indian tribes, and any other interested members of the public for a period of at least 30 calendar days, with reasonable extensions granted as appropriate, before tasks called for in the modified plan are begun.

(ii) Any modification to the Assessment Plan that in the judgment of the authorized official is not significant shall be made available for review by any identified potentially responsible party, any other affected natural resource trustees, other affected Federal or State agencies or Indian tribes, and any other interested members of the public, but the implementation of such modification need not be delayed as a result of such review.

(f) *Plan review.* (1) After the Injury Determination phase is completed and before the Quantification phase is begun, the authorized official shall review the decisions incorporated in the Assessment Plan.

(2) The purpose of this review is to ensure that the selection of methodologies for the Quantification and Damage Determination phases is consistent with the results of the Injury Determination phase, and that the use of such methodologies remains consistent with the requirements of reasonable cost, as that term is used in this part.

(3) Paragraphs (f)(1) and (f)(2) of this section do not apply to the use of a type A procedure.

[51 FR 27725, Aug. 1, 1986, as amended at 53 FR 5174, Feb. 22, 1988; 59 FR 14282, Mar. 25, 1994; 61 FR 20609, May 7, 1996]

§11.33 What types of assessment procedures are available?

There are two types of assessment procedures:

(a) Type A procedures are simplified procedures that require minimal field observation. Subpart D describes the type A procedures. There are two type A procedures: a procedure for coastal or marine environments, which incorporates the Natural Resource Damage Assessment Model for Coastal and Marine Environments, Version 2.51 (NRDAM/CME); and a procedure for Great Lakes environments, which incorporates the Natural Resource Damage Assessment Model for Great Lakes

Environments, Version 1.51 (NRDAM/GLE).

(b) Type B procedures require more extensive field observation than the type A procedures. Subpart E describes the type B procedures.

[61 FR 20610, May 7, 1996, as amended at 62 FR 60459, Nov. 10, 1997; 65 FR 6014, Feb. 8, 2000]

§ 11.34 When may the authorized official use a type A procedure?

The authorized official may use a type A procedure only if:

(a) The released substance entered an area covered by the NRDAM/CME or NRDAM/GLE. Section 3.4, Volume III of the NRDAM/CME technical document (incorporated by reference, see §11.18) identifies the areas that the NRDAM/CME covers. Section 6.2, Volume III of the NRDAM/GLE technical document (incorporated by reference, see §11.18) describes the areas that the NRDAM/GLE covers;

(b) The NRDAM/CME or NRDAM/GLE cover the released substance. Table 7.1, Volume I of the NRDAM/CME technical document lists the substances that the NRDAM/CME covers. Table 7.1, Volume I of the NRDAM/GLE technical document lists the substances that the NRDAM/GLE covers;

(c) The released substance entered water at or near the surface;

(d) At the time of the release, winds did not vary spatially over the area affected by the release in a way that would significantly affect the level or extent of injuries;

(e) The authorized official is not aware of any reliable evidence that, for species that are likely to represent a significant portion of the claim, the species biomass is significantly lower than the species biomass assigned by the NRDAM/CME or the NRDAM/GLE Tables IV.2.1 through IV.2.115 and IV.5.1 through IV.5.77, Volume III of the NRDAM/CME technical document list the species biomasses in the NRDAM/CME. Tables III.3.17 through III.3.27 and III.3.40 through III.3.50, Volume III of the NRDAM/GLE technical document list the species biomasses in the NRDAM/GLE ; and

(f) Subsurface currents either: are not expected to significantly affect the level or extent of injuries; or are reasonably uniform with depth over the water column in the area affected by the release.

[61 FR 20610, May 7, 1996]

§ 11.35 How does the authorized official decide whether to use type A or type B procedures?

(a) If the authorized official determines under §11.34 that a type A procedure is available, the authorized official must then decide whether to use that procedure or use type B procedures. The authorized official must make this decision by weighing the difficulty of collecting site-specific data against the suitability of the averaged data and simplifying assumptions in the type A procedure for the release being assessed. The authorized official may use type B procedures if they can be performed at a reasonable cost and if the increase in accuracy provided by those procedures outweighs the increase in assessment costs. Section 1, Volume I of the NRDAM/CME technical document (incorporated by reference, see §11.18) lists the simplifying assumptions made in the NRDAM/CME. Volumes III through IV of the NRDAM/CME technical document list the data in the NRDAM/CME. Section 1, Volume I of the NRDAM/GLE technical document (incorporated by reference, see §11.18) lists the simplifying assumptions made in the NRDAM/GLE. Volume III of the NRDAM/GLE technical document lists the data in the NRDAM/GLE.

(b) The authorized official must use type B procedures rather than a type A procedure whenever a potentially responsible party:

(1) Submits a written request for use of type B procedures along with documentation of the reasons supporting the request; and

(2) Advances all reasonable costs of using type B procedures within a time frame acceptable to the authorized official.

(c) If there is no available type A procedure, the authorized official must use type B procedures to calculate all damages.

(d) Except as provided in paragraph (b) of this section, the authorized official may change the type of procedure used in light of comments received on

the Assessment Plan. [See §11.32(e)(2) to determine if the authorized official must provide for additional public review.] However, if the authorized official decides to use type B procedures in lieu of a type A procedure, and cannot confirm exposure under §11.37, the authorized official may not then use a type A procedure.

[61 FR 20610, May 7, 1996]

§ 11.36 May the authorized official use both type A and type B procedures for the same release?

(a) The authorized official may use both a type A procedure and type B procedures for the same release if:

(1) The type B procedures are cost-effective and can be performed at a reasonable cost;

(2) There is no double recovery; and

(3) The type B procedures are used only to determine damages for injuries or compensable values that do not fall into the categories addressed by the type A procedure. [Sections 11.14(v) and 11.62 define ''injury.'' Section 11.83(c)(1) defines ''compensable value.'']

(b) The type A procedures address the following categories of injury and compensable value:

(1) Direct mortality of species covered by the NRDAM/CME or NRDAM/GLE resulting from short-term exposure to the released substance. Volume IV of the NRDAM/CME technical document (incorporated by reference, see §11.18) lists the species that the NRDAM/CME covers. Section 3, Volume III of the NRDAM/GLE technical document (incorporated by reference, see §11.18) lists the species that the NRDAM/GLE covers;

(2) Direct loss of production of species covered by the NRDAM/CME or NRDAM/GLE resulting from short-term exposure to the released substance;

(3) Indirect mortality of species covered by the NRDAM/CME or NRDAM/GLE resulting from disruption of the food web by direct mortality or direct loss of production;

(4) Indirect loss of production of species covered by the NRDAM/CME or NRDAM/GLE resulting from disruption of the food web by direct mortality or direct loss of production;

(5) Lost assimilative capacity of water column and sediments;

(6) Lost economic rent for lost commercial harvests resulting from any closures specified by the authorized official and/or from population losses;

(7) Lost recreational harvests resulting from any closures specified by the authorized official and/or from population losses;

(8) For the type A procedure for coastal and marine environments, lost wildlife viewing, resulting from population losses, by residents of the States bordering the provinces in which the population losses occurred. [A province is one of the geographic areas delineated in Table 6.1, Volume I of the NRDAM/CME technical document.] For the type A procedure for Great Lakes environments, lost wildlife viewing, resulting from population losses, by residents of local areas bordering the provinces in which the population losses occurred. [A province is one of the geographic areas delineated in Table 8.1, Volume I of the NRDAM/GLE technical document.];

(9) Lost beach visitation due to closure; and

(10) For the type A procedure for Great Lakes environments, lost boating due to closure.

(c) If the authorized official uses both type A and type B procedures, he or she must explain in the Assessment Plan how he or she intends to prevent double recovery.

(d) When the authorized official uses type B procedures for injuries not addressed in a type A procedure, he or she must follow all of subpart E (which contains standards for determining and quantifying injury as well as determining damages), §11.31(c) (which addresses content of the Assessment Plan), and §11.37 (which addresses confirmation of exposure). When the authorized official uses type B procedures for compensable values that are not included in a type A procedure but that result from injuries that are addressed in the type A procedure, he or she need not follow all of subpart E, §11.31(c), and §11.37. Instead, the authorized official may rely on the injury predictions of the type A procedure and simply use

the valuation methodologies authorized by §11.83(c) to calculate compensable value. When using valuation methodologies, the authorized official must comply with §11.84.

[61 FR 20610, May 7, 1996]

§11.37 Must the authorized official confirm exposure before implementing the Assessment Plan?

(a) Before including any type B methodologies in the Assessment Plan, the authorized official must confirm that at least one of the natural resources identified as potentially injured in the preassessment screen has in fact been exposed to the released substance.

(b) *Procedures.* (1) Whenever possible, exposure shall be confirmed by using existing data, such as those collected for response actions by the OSC, or other available studies or surveys of the assessment area.

(2) Where sampling has been done before the completion of the preassessment screen, chemical analyses of such samples may be performed to confirm that exposure has occurred. Such analyses shall be limited to the number and type required for confirmation of exposure.

(3) Where existing data are unavailable or insufficient to confirm exposure, one or more of the analytical methodologies provided in the Injury Determination phase may be used. The collection and analysis of new data shall be limited to that necessary to confirm exposure and shall not include testing for baseline levels or for injury, as those phrases are used in this part.

[51 FR 27725, Aug. 1, 1986. Redesignated and amended at 61 FR 20610, 20611, May 7, 1996]

§11.38 Assessment Plan—preliminary estimate of damages.

(a) *Requirement.* When performing a type B assessment pursuant to the requirements of subpart E of this part, the authorized official shall develop a preliminary estimate of: the anticipated costs of restoration, rehabilitation, replacement, and/or acquisition of equivalent resources for the injured natural resources; and the compensable value, as defined in §11.83(c) of this part, of the injured natural resources, if the authorized official intends to include compensable value in the damage claim. This preliminary estimate is referred to as the preliminary estimate of damages. The authorized official shall use the guidance provided in this section, to the extent possible, to develop the preliminary estimate of damages.

(b) *Purpose.* The purpose of the preliminary estimate of damages is for reference in the scoping of the Assessment Plan to ensure that the choice of the scientific, cost estimating, and valuation methodologies expected to be used in the damage assessment fulfills the requirements of reasonable cost, as that term is used in this part. The authorized official will also use the preliminary estimate of damages in the review of the Assessment Plan, as required in §11.32(f) of this part, to ensure the requirements of reasonable cost are still met.

(c) *Steps.* The preliminary estimate of damages should include consideration of the ability of the resources to recover naturally and, if relevant, the compensable value through the recovery period with and without possible alternative actions. The authorized official shall consider the following factors, to the extent possible, in making the preliminary estimate of damages:

(1) The preliminary estimate of costs of restoration, rehabilitation, replacement, and/or acquisition of equivalent resources should include consideration of a range of possible alternative actions that would accomplish the restoration, rehabilitation, replacement, and/or acquisition of the equivalent of the injured natural resources.

(i) The preliminary estimate of costs should take into account the effects, or anticipated effects, of any response actions.

(ii) The preliminary estimate of costs should represent the expected present value of anticipated costs, expressed in constant dollars, and should include direct and indirect costs, and include the timing of those costs. The provisions detailed in §§11.80–11.84 of this part are the basis for the development of the estimate.

(iii) The discount rate to be used in developing the preliminary estimate of costs shall be that determined in accordance with the guidance in §11.84(e) of this part.

(2) The preliminary estimate of compensable value should be consistent with the range of possible alternatives for restoration, rehabilitation, replacement, and/or acquisition of equivalent resources being considered.

(i) The preliminary estimate of compensable value should represent the expected present value of the anticipated compensable value, expressed in constant dollars, accrued through the period for the restoration, rehabilitation, replacement, and/or acquisition of equivalent resources to baseline conditions, *i.e.*, between the occurrence of the discharge or release and the completion of (A) the restoration or rehabilitation of the injured natural resources to a condition where they can provide the level of services available at baseline, or (B) the replacement and/or acquisition of equivalent natural resources capable of providing such services. The estimate should use the same base year as the preliminary estimate of costs of restoration, rehabilitation, replacement, and/or acquisition of equivalent resources. The provisions detailed in §§11.80–11.84 of this part are the basis for the development of this estimate.

(ii) The preliminary estimate of compensable value should take into account the effects, or anticipated effects, of any response actions.

(iii) The discount rate to be used in developing the preliminary estimate of compensable value shall be that determined in accordance with the guidance in §11.84(e) of this part.

(d) *Content and timing.* (1) In making the preliminary estimate of damages, the authorized official should rely upon existing data and studies. The authorized official should not undertake significant new data collection or perform significant modeling efforts at this stage of the assessment planning phase.

(2) Where possible, the authorized official should make the preliminary estimate of damages before the completion of the Assessment Plan as provided for in §11.31 of this part. If there is not sufficient existing data to make the preliminary estimate of damages at the same time as the assessment planning phase, this analysis may be completed later, at the end of the Injury Determination phase of the assessment, at the time of the Assessment Plan review.

(3) The authorized official is not required to disclose the preliminary estimate before the conclusion of the assessment. At the conclusion of the assessment, the preliminary estimate of damages, along with its assumptions and methodology, shall be included in the Report of the Assessment as provided for in §11.91 of this part.

(e) *Review.* The authorized official shall review, and revise as appropriate, the preliminary estimate of damages at the end of the Injury Determination and Quantification phases. If there is any significant modification of the preliminary estimate of damages, the authorized official shall document it in the Report of the Assessment.

[59 FR 14282, Mar. 25, 1994. Redesignated at 61 FR 20610, May 7, 1996, as amended at 73 FR 57266, Oct. 2, 2008]

Subpart D—Type A Procedures

§11.40 What are type A procedures?

(a) A type A procedure is a standardized methodology for performing Injury Determination, Quantification, and Damage Determination that requires minimal field observation. There are two type A procedures: the type A procedure for coastal and marine environments; and the type A procedure for Great Lakes environments. The type A procedure for coastal and marine environments incorporates a computer model called the Natural Resource Damage Assessment Model for Coastal and Marine Environments Version 2.51 (NRDAM/CME). The NRDAM/CME technical document (incorporated by reference, see §11.18) includes and explains the NRDAM/CME. The type A procedure for Great Lakes environments incorporates a computer model called the Natural Resource Damage Assessment Model for Great Lakes Environments Version 1.51 (NRDAM/GLE). The NRDAM/GLE technical document (incorporated by reference, see §11.18) includes and explains the NRDAM/GLE. The authorized official must follow §§11.41 through 11.44 when using the type A procedures.

(b) The reasonable and necessary costs incurred in conducting assessments under this subpart shall be limited to those costs incurred or anticipated by the authorized official for, and specifically allocable to, incident-specific efforts taken in the assessment of damages for natural resources for which the agency or Indian tribe is acting as trustee. Such costs shall be supported by appropriate records and documentation, and shall not reflect regular activities performed by the agency or the Indian tribe in management of the natural resource. Activities undertaken as part of the damage assessment shall be taken in a manner that is cost-effective, as that phrase is used in this part.

[52 FR 9096, Mar. 20, 1987, as amended at 53 FR 5175, Feb. 22, 1988; 61 FR 20611, May 7, 1996; 62 FR 60459, Nov. 10, 1997; 65 FR 6014, Feb. 8, 2000]

§ 11.41 What data must the authorized official supply?

(a) The NRDAM/CME and the NRDAM/GLE require several data inputs to operate. The authorized official must develop the following data inputs:

(1) The identity of the released substance;

(2) The mass or volume of the identified substance that was released;

(3) The duration of the release;

(4) The time of the release;

(5) The location of the release;

(6) The wind conditions;

(7) The extent of response actions;

(8) The extent of any closures;

(9) The implicit price deflator; and

(10) For the NRDAM/CME, the condition of the currents and tides.

(b) The authorized official must change the data in the NRDAM/CME and the NRDAM/GLE for the following parameters if he or she is aware of more accurate data:

(1) Air temperature;

(2) Water temperature at the surface;

(3) Total suspended sediment concentration;

(4) Mean settling velocity of suspended solids; and

(5) Habitat type.

(c)(1) If the release occurred in Alaska and the authorized official is not aware of any reliable evidence that ice was absent from the site of the release, then he or she must turn on the ice modeling function. Otherwise, the authorized official must leave the ice modeling function off.

(2) If the release occurred in the Great Lakes and the authorized official is aware of reliable evidence that ice was absent from the site of the release, then he or she must turn off the ice modeling function.

(d) The authorized official must develop the data inputs and modifications and include them in the Assessment Plan in the format specified in Appendix II (for the NRDAM/CME) or Appendix III (for the NRDAM/GLE).

[61 FR 20611, May 7, 1996]

§ 11.42 How does the authorized official apply the NRDAM/CME or NRDAM/GLE?

(a) The authorized official must perform a preliminary application of the NRDAM/CME or NRDAM/GLE with the data inputs and modifications developed under § 11.41. Volume II of the NRDAM/CME technical document (incorporated by reference, see § 11.18) describes how to apply the NRDAM/CME. Volume II of the NRDAM/GLE technical document (incorporated by reference, see § 11.18) describes how to apply the NRDAM/GLE. For cases involving releases of two or more substances or a release of a mixture of substances, the authorized official may only apply the NRDAM/CME or NRDAM/GLE once using only one of the substances.

(b) If the preliminary application of the NRDAM/CME or NRDAM/GLE indicates damages in excess of $100,000, then the authorized official must decide whether to:

(1) Limit the portion of his or her claim calculated with the type A procedure to $100,000; or

(2) Compute all damages using type B procedures.

[61 FR 20611, May 7, 1996]

§ 11.43 Can interested parties review the results of the preliminary application?

After completing the preliminary application of the NRDAM/CME or NRDAM/GLE, if the authorized official decides to continue with the type A

procedure, he or she must issue an Assessment Plan for public comment as described in §11.32. The Assessment Plan must include the information described in §11.31, the data inputs and modifications developed under §11.41, and a summary of the results of the preliminary application. The Assessment Plan must also identify a contact from whom a complete copy of the printout of the preliminary application can be obtained.

[61 FR 20612, May 7, 1996]

§11.44 What does the authorized official do after the close of the comment period?

(a) The authorized official must carefully review all comments received on the Assessment Plan, provide substantive responses to all comments, and modify the Plan as appropriate. [See §11.32(e)(2) to determine if the authorized official must provide for additional public review.]

(b) If, after reviewing the public comments, the authorized official decides to continue with the type A procedure, he or she must then perform a final application of the NRDAM/CME or NRDAM/GLE, using final data inputs and modifications based on §11.41 and any reliable information received during the public review and comment period.

(c) After completing the final application of the NRDAM/CME or NRDAM/GLE, the authorized official must prepare a Report of Assessment. The Report of Assessment must include the printed output from the final application as well as the Preassessment Screen Determination and the Assessment Plan.

(d) If the authorized official is aware of reliable evidence that a private party has recovered damages for commercial harvests lost as a result of the release, the authorized official must eliminate from the claim any damages for such lost harvests that are included in the lost economic rent calculated by the NRDAM/CME or NRDAM/GLE.

(e) If the authorized official is aware of reliable evidence that the NRDAM/CME or NRDAM/GLE application covers resources beyond his or her trustee jurisdiction, the authorized official must either:

(1) Have the other authorized official(s) who do have trustee jurisdiction over those resources join in the type A assessment; or

(2) Eliminate any damages for those resources from the claim for damages.

(f) If the final application of the NRDAM/CME or NRDAM/GLE, adjusted as needed under paragraphs (d) and (e), calculates damages in excess of $100,000, then the authorized official must limit the portion of his or her claim calculated with the type A procedure to $100,000.

(g) After preparing the Report of Assessment, the authorized official must follow the steps described in subpart F.

[61 FR 20612, May 7, 1996]

Subpart E—Type B Procedures

§11.60 Type B assessments—general.

(a) *Purpose.* The purpose of the type B assessment is to provide alternative methodologies for conducting natural resource damage assessments in individual cases.

(b) *Steps in the type B assessment.* The type B assessment consists of three phases: §11.61—Injury Determination; §11.70—Quantification; and §11.80—Damage Determination, of this part.

(c) *Completion of type B assessment.* After completion of the type B assessment, a Report of Assessment, as described in §11.90 of this part, shall be prepared. The Report of Assessment shall include the determinations made in each phase.

(d) *Type B assessment costs.* (1) The following categories of reasonable and necessary costs may be incurred in the assessment phase of the damage assessment:

(i) Sampling, testing, and evaluation costs for injury and pathway determination;

(ii) Quantification costs (including baseline service determination and resource recoverability analysis);

(iii) Restoration and Compensation Determination Plan development costs including:

(A) Development of alternatives;

(B) Evaluation of alternatives;

(C) Potentially responsible party, agency, and public reviews;

(D) Other such costs for activities authorized by §11.81 of this part;

(iv) Cost estimating and valuation methodology calculation costs; and

(v) Any other assessment costs authorized by §§ 11.60–11.84 of this part.

(2) The reasonable and necessary costs for these categories shall be limited to those costs incurred or anticipated by the authorized official for, and specifically allocable to, site-specific efforts taken in the assessment of damages for a natural resource for which the agency or Indian tribe is acting as trustee. Such costs shall be supported by appropriate records and documentation, and shall not reflect regular activities performed by the agency or the Indian tribe in management of the natural resource. Activities undertaken as part of the damage assessment phase shall be taken in a manner that is cost-effective, as that phrase is used in this part.

[51 FR 27725, Aug. 1, 1986, as amended at 53 FR 5175, Feb. 22, 1988; 59 FR 14283, Mar. 25, 1994]

§ 11.61 Injury determination phase—general.

(a) *Requirement.* (1) The authorized official shall, in accordance with the procedures provided in the Injury Determination phase of this part, determine: whether an injury to one or more of the natural resources has occurred; and that the injury resulted from the discharge of oil or release of a hazardous substance based upon the exposure pathway and the nature of the injury.

(2) The Injury Determination phase consists of § 11.61—general; § 11.62—injury definition; § 11.63—pathway determination; and § 11.64—testing and sampling methods, of this part.

(b) *Purpose.* The purpose of the Injury Determination phase is to ensure that only assessments involving well documented injuries resulting from the discharge of oil or release of a hazardous substance proceed through the type B assessment.

(c) *Injury Determination phase steps.* (1) The authorized official shall determine whether the potentially injured resource constitutes a surface water, ground water, air, geologic, or biological resource as defined in § 11.14 of this part. The authorized official shall then proceed in accordance with the guidance provided in the injury definition section, § 11.62 of this part, to determine if the resource is injured.

(2) The authorized official shall follow the guidance provided in the testing and sampling methods section, § 11.64 of this part, in selecting the methodology for determining injury. The authorized official shall select from available testing and sampling procedures one or more procedures that meet the requirements of the selected methodologies.

(3) The authorized official shall follow the guidance provided in the pathway section, § 11.63 of this part, to determine the route through which the oil or hazardous substance is or was transported from the source of the discharge or release to the injured resource.

(4) If more than one resource, as defined in § 11.14(z) of this part, has potentially been injured, an injury determination for each resource shall be made in accordance with the guidance provided in each section of the Injury Determination phase.

(d) *Selection of methodologies.* (1) One of the methodologies provided in § 11.64 of this part for the potentially injured resource, or one that meets the acceptance criteria provided for that resource, shall be used to establish injury.

(2) Selection of the methodologies for the Injury Determination phase shall be based upon cost-effectiveness as that phrase is used in this part.

(e) *Completion of Injury Determination phase.* (1) Upon completion of the Injury Determination phase, the Assessment Plan shall be reviewed in accordance with the requirements of § 11.32(f) of this part.

(2) When the authorized official has determined that one or more of the natural resources has been injured as a result of the discharge or release, the authorized official may proceed to the Quantification and the Damage Determination phases.

(3) When the authorized official has determined that an injury has not occurred to at least one of the natural resources or that an injury has occurred but that the injury cannot be linked to the discharge or release, the authorized official shall not pursue further assessment under this part.

§ 11.62 Injury determination phase—injury definition.

(a) The authorized official shall determine that an injury has occurred to natural resources based upon the definitions provided in this section for surface water, ground water, air, geologic, and biological resources. The authorized official shall test for injury using the methodologies and guidance provided in § 11.64 of this part. The test results of the methodologies must meet the acceptance criteria provided in this section to make a determination of injury.

(b) *Surface water resources.* (1) An injury to a surface water resource has resulted from the discharge of oil or release of a hazardous substance if one or more of the following changes in the physical or chemical quality of the resource is measured:

(i) Concentrations and duration of substances in excess of drinking water standards as established by sections 1411–1416 of SDWA, or by other Federal or State laws or regulations that establish such standards for drinking water, in surface water that was potable before the discharge or release;

(ii) Concentrations and duration of substances in excess of water quality criteria established by section 1401(1)(D) of SDWA, or by other Federal or State laws or regulations that establish such criteria for public water supplies, in surface water that before the discharge or release met the criteria and is a committed use, as the phrase is used in this part, as a public water supply;

(iii) Concentrations and duration of substances in excess of applicable water quality criteria established by section 304(a)(1) of the CWA, or by other Federal or State laws or regulations that establish such criteria, in surface water that before the discharge or release met the criteria and is a committed use, as that phrase is used in this part, as a habitat for aquatic life, water supply, or recreation. The most stringent criterion shall apply when surface water is used for more than one of these purposes;

(iv) Concentrations of substances on bed, bank, or shoreline sediments sufficient to cause the sediment to exhibit characteristics identified under or listed pursuant to section 3001 of the Solid Waste Disposal Act, 42 U.S.C. 6921; or

(v) Concentrations and duration of substances sufficient to have caused injury as defined in paragraphs (c), (d), (e), or (f) of this section to ground water, air, geologic, or biological resources, when exposed to surface water, suspended sediments, or bed, bank, or shoreline sediments.

(2)(i) The acceptance criterion for injury to the surface water resource is the measurement of concentrations of oil or a hazardous substance in two samples from the resource. The samples must be one of the following types, except as specified in paragraph (b)(3) of this section:

(A) Two water samples from different locations, separated by a straight-line distance of not less than 100 feet; or

(B) Two bed, bank, or shoreline sediment samples from different locations separated by a straight-line distance of not less than 100 feet; or

(C) One water sample and one bed, bank, or shoreline sediment sample; or

(D) Two water samples from the same location collected at different times.

(ii) In those instances when injury is determined and no oil or hazardous substances are detected in samples from the surface water resource, it must be demonstrated that the substance causing injury occurs or has occurred in the surface water resource as a result of physical, chemical, or biological reactions initiated by the discharge of oil or release of a hazardous substance.

(3) If the maximum straight-line distance of the surface water resource is less than 100 feet, then the samples required in paragraph (b)(2)(i) (A) and (B) of this section should be separated by one-half the maximum straight-line distance of the surface water resource.

(c) *Ground water resources.* (1) An injury to the ground water resource has resulted from the discharge of oil or release of a hazardous substance if one or more of the following changes in the physical or chemical quality of the resource is measured:

(i) Concentrations of substances in excess of drinking water standards, established by sections 1411–1416 of the SDWA, or by other Federal or State laws or regulations that establish such

standards for drinking water, in ground water that was potable before the discharge or release;

(ii) Concentrations of substances in excess of water quality criteria, established by section 1401(1)(d) of the SDWA, or by other Federal or State laws or regulations that establish such criteria for public water supplies, in ground water that before the discharge or release met the criteria and is a committed use, as the phrase is used in this part, as a public water supply;

(iii) Concentrations of substances in excess of applicable water quality criteria, established by section 304(a)(1) of the CWA, or by other Federal or State laws or regulations that establish such criteria for domestic water supplies, in ground water that before the discharge or release met the criteria and is a committed use as that phrase is used in this part, as a domestic water supply; or

(iv) Concentrations of substances sufficient to have caused injury as defined in paragraphs (b), (d), (e), or (f) of this section to surface water, air, geologic, or biological resources, when exposed to ground water.

(2) The acceptance criterion for injury to ground water resources is the measurement of concentrations of oil or hazardous substance in two ground water samples. The water samples must be from the same geohydrologic unit and must be obtained from one of the following pairs of sources, except as specified in paragraph (c)(3) of this section:

(i) Two properly constructed wells separated by a straight-line distance of not less than 100 feet; or

(ii) A properly constructed well and a natural spring or seep separated by a straight-line distance of not less than 100 feet; or

(iii) Two natural springs or seeps separated by a straight-line distance of not less than 100 feet.

(3) If the maximum straight-line distance of the ground water resource is less than 100 feet, the samples required in paragraph (c)(2) of this section should be separated by one-half of the maximum straight-line distance of the ground water resource.

(4) In those instances when injury is determined and no oil or hazardous substance is detected in samples from the ground water resource, it must be demonstrated that the substance causing injury occurs or has occurred in the ground water resource as a result of physical, chemical, or biological reactions initiated by the discharge of oil or release of hazardous substances.

(d) *Air resources.* An injury to the air resource has resulted from the discharge of oil or release of a hazardous substance if one or more of the following changes in the physical or chemical quality of the resource is measured:

(1) Concentrations of emissions in excess of standards for hazardous air pollutants established by section 112 of the Clean Air Act, 42 U.S.C. 7412, or by other Federal or State air standards established for the protection of public welfare or natural resources; or

(2) Concentrations and duration of emissions sufficient to have caused injury as defined in paragraphs (b), (c), (e), or (f) of this section to surface water, ground water, geologic, or biological resources when exposed to the emissions.

(e) *Geologic resources.* An injury to the geologic resource has resulted from the discharge of oil or release of a hazardous substance if one or more of the following changes in the physical or chemical quality of the resource is measured:

(1) Concentrations of substances sufficient for the materials in the geologic resource to exhibit characteristics identified under or listed pursuant to section 3001 of the Solid Waste Disposal Act, 42 U.S.C. 6921;

(2) Concentrations of substances sufficient to raise the negative logarithm of the hydrogen ion concentration of the soil (pH) to above 8.5 (above 7.5 in humid areas) or to reduce it below 4.0;

(3) Concentrations of substances sufficient to yield a salt saturation value greater than 2 millimhos per centimeter in the soil or a sodium adsorption ratio of more than 0.176;

(4) Concentrations of substances sufficient to decrease the water holding capacity such that plant, microbial, or invertebrate populations are affected;

(5) Concentrations of substances sufficient to impede soil microbial respiration to an extent that plant and microbial growth have been inhibited;

(6) Concentrations in the soil of substances sufficient to inhibit carbon mineralization resulting from a reduction in soil microbial populations;

(7) Concentrations of substances sufficient to restrict the ability to access, develop, or use mineral resources within or beneath the geologic resource exposed to the oil or hazardous substance;

(8) Concentrations of substances sufficient to have caused injury to ground water, as defined in paragraph (c) of this section, from physical or chemical changes in gases or water from the unsaturated zone;

(9) Concentrations in the soil of substances sufficient to cause a toxic response to soil invertebrates;

(10) Concentrations in the soil of substances sufficient to cause a phytotoxic response such as retardation of plant growth; or

(11) Concentrations of substances sufficient to have caused injury as defined in paragraphs (b), (c), (d), or (f), of this section to surface water, ground water, air, or biological resources when exposed to the substances.

(f) *Biological resources.* (1) An injury to a biological resource has resulted from the discharge of oil or release of a hazardous substance if concentration of the substance is sufficient to:

(i) Cause the biological resource or its offspring to have undergone at least one of the following adverse changes in viability: death, disease, behavioral abnormalities, cancer, genetic mutations, physiological malfunctions (including malfunctions in reproduction), or physical deformations; or

(ii) Exceed action or tolerance levels established under section 402 of the Food, Drug and Cosmetic Act, 21 U.S.C. 342, in edible portions of organisms; or

(iii) Exceed levels for which an appropriate State health agency has issued directives to limit or ban consumption of such organism.

(2) The method for determining injury to a biological resource, as defined in paragraph (f)(1)(i) of this section, shall be chosen based upon the capability of the method to demonstrate a measurable biological response. An injury can be demonstrated if the authorized official determines that the biological response under consideration can satisfy all of the following acceptance criteria:

(i) The biological response is often the result of exposure to oil or hazardous substances. This criterion excludes biological responses that are caused predominately by other environmental factors such as disturbance, nutrition, trauma, or weather. The biological response must be a commonly documented response resulting from exposure to oil or hazardous substances.

(ii) Exposure to oil or hazardous substances is known to cause this biological response in free-ranging organisms. This criterion identifies biological responses that have been documented to occur in a natural ecosystem as a result of exposure to oil or hazardous substances. The documentation must include the correlation of the degree of the biological response to the observed exposure concentration of oil or hazardous substances.

(iii) Exposure to oil or hazardous substances is known to cause this biological response in controlled experiments. This criterion provides a quantitative confirmation of a biological response occurring under environmentally realistic exposure levels that may be linked to oil or hazardous substance exposure that has been observed in a natural ecosystem. Biological responses that have been documented only in controlled experimental conditions are insufficient to establish correlation with exposure occurring in a natural ecosystem.

(iv) The biological response measurement is practical to perform and produces scientifically valid results. The biological response measurement must be sufficiently routine such that it is practical to perform the biological response measurement and to obtain scientifically valid results. To meet this criterion, the biological response measurement must be adequately documented in scientific literature, must produce reproducible and verifiable results, and must have well defined and accepted statistical criteria for interpreting as well as rejecting results.

(3) Unless otherwise provided for in this section, the injury determination must be based upon the establishment of a statistically significant difference in the biological response between samples from populations in the assessment area and in the control area. The determination as to what constitutes a statistically significant difference must be consistent with the quality assurance provisions of the Assessment Plan. The selection of the control area shall be consistent with the guidance provided in §11.72 of this part.

(4) The biological responses listed in this paragraph have been evaluated and found to satisfy the acceptance criteria provided in paragraph (f)(2) of this section. The authorized official may, when appropriate, select from this list to determine injury to fish and wildlife resources or may designate another response as the determiner of injury provided that the designated response can satisfy the acceptance criteria provided in paragraph (f)(2) of this section. The biological responses are listed by the categories of injury for which they may be applied.

(i) *Category of injury—death*. Five biological responses for determining when death is a result of exposure to the discharge of oil or release of a hazardous substance have met the acceptance criteria.

(A) *Brain cholinesterase (ChE) enzyme activity*. Injury has occurred when brain ChE activity in a sample from the population has been inhibited by at least 50 percent compared to the mean for normal brain ChE activity of the wildlife species. These enzymes are in the nervous system of vertebrate organisms and the rate of ChE activity is associated with the regulation of nerve impulse transmission. This biological response may be used to confirm injury when anti-ChE substances, such as organophosphorus and carbamate pesticides, are suspected to have resulted in death to bird and mammal species.

(B) *Fish kill investigations*. Injury has occurred when a significant increase in the frequency or numbers of dead or dying fish can be measured in accordance with the procedures for counting dead or dying fish contained in Part II (Fish-Kill Counting Guidelines) of ''Monetary Values of Freshwater Fish and Fish-Kill Counting Guidelines,'' American Fisheries Society Special Publication Number 13, 1982 (incorporated by reference, see §11.18).

(C) *Wildlife kill investigations*. Injury has occurred when a significant increase in the frequency or number of dead or dying birds or mammal species can be measured in a population sample from the assessment area as compared to a population sample from a control area. Wildlife kill investigations may be used when acute mortality has occurred to multiple wildlife species, or when detectable quantities of oil or hazardous substances have adherred to, bound to, or otherwise covered surface tissue, or had been ingested or inhaled by dead or dying bird or mammal species.

(D) *In situ bioassay*. Injury has occurred when a statistically significant difference can be measured in the total mortality and/or mortality rates between population samples exposed in situ to a discharge of oil or a release of hazardous substance and those in a control site. In situ caged or confined bioassay may be used to confirm injury when oil or hazardous substances are suspected to have caused death to fish species.

(E) *Laboratory toxicity testing*. Injury has occurred when a statistically significant difference can be measured in the total mortality and/or mortality rates between population samples of the test organisms placed in exposure chambers containing concentrations of oil or hazardous substances and those in a control chamber. Published standardized laboratory fish toxicity testing methodologies for acute flow-through, acute static, partial-chronic (early life stage), and chronic (life cycle) toxicity tests may be used to confirm injury. The oil or hazardous substance used in the test must be the exact substance or a substance that is reasonably comparable to that suspected to have caused death to the natural population of fish.

(ii) *Category of injury—disease*. One biological response for determining when disease is a result of exposure to the discharge of oil or release of a hazardous substance has met the acceptance criteria.

(A) *Fin erosion.* Injury has occurred when a statistically significant difference can be measured in the frequency of occurrence of fin erosion (also referred to as fin rot) in a population sample from the assessment area as compared to a sample from the control area. Fin erosion shall be confirmed by appropriate histological procedures. Fin erosion may be used when oil or hazardous substances are suspected to have caused the disease.

(iii) *Category of injury—behavioral abnormalities.* Two biological responses for determining when behavioral abnormalities are a result of the exposure to the discharge of oil or release of a hazardous substance have met the acceptance criteria.

(A) *Clinical behavioral signs of toxicity.* Injury has occurred when a statistically significant difference can be measured in the frequency of occurrence of clinical behavioral signs of toxicity in a population sample from the assessment area as compared to a sample from the control area. Clinical behavioral signs of toxicity are characteristic behavioral symptoms expressed by an organism in response to exposure to an oil or hazardous substance. The clinical behavioral signs of toxicity used shall be those that have been documented in published literature.

(B) *Avoidance.* Injury has occurred when a statistically significant difference can be measured in the frequency of avoidance behavior in population samples of fish placed in testing chambers with equal access to water containing oil or a hazardous substance and the control water. The oil or hazardous substance used in the test must be the exact substance or a substance that is reasonably comparable to that suspected to have caused avoidance to the natural populations of fish. This biological response may be used to confirm injury when oil or hazardous substances are suspected to have resulted in avoidance behavior in fish species.

(iv) *Category of injury—cancer.* One biological response for determining when cancer is a result of exposure to the discharge of oil or release of a hazardous substance has met the acceptance criteria.

(A) *Fish neoplasm.* Injury has occurred when a statistically significant difference can be measured in the frequency of occurrence of the fish neoplasia when comparing population samples from the assessment area and a control area. Neoplasms are characterized by relatively autonomous growth of abnormal cells that by proliferation infiltrate, press upon, or invade healthy tissue thereby causing destruction of cells, interference with physiological functions, or death of the organism. The following type of fish neoplasia may be used to determine injury: liver neoplasia and skin neoplasia. The neoplasms shall be confirmed by histological procedures and such confirmation procedures may also include special staining techniques for specific tissue components, ultra-structural examination using electron microscopy to identify cell origin, and to rule out or confirm viral, protozoan, or other causal agents. Fish neoplasm may be used to determine injury when oil or hazardous substances are suspected to have been the causal agent.

(v) *Category of injury—physiological malfunctions.* Five biological responses for determining when physiological malfunctions are a result of exposure to the discharge of oil or release of a hazardous substance have met the acceptance criteria.

(A) *Eggshell thinning.* Injury has occurred when eggshell thicknesses for samples for a population of a given species at the assessment area are thinner than those for samples from a population at a control area, or are at least 15 percent thinner than eggshells collected before 1946 from the same geographic area and stored in a museum. This biological response is a measure of avian eggshell thickness resulting from the adult bird having assimilated the oil or hazardous substance. This biological response may be used when the organochlorine pesticide DDT or its metabolites are suspected to have caused such physiological malfunction injury.

(B) *Reduced avian reproduction.* Injury has occurred when a statistically significant difference can be measured in the mean number of young fledged per active nest when comparing samples from populations in the assessment

area and a control area. The fledging success (the number of healthy young leaving the nest) shall be used as the measurement of injury. Factors that may contribute to this measurement include egg fertility, hatching success, and survival of young. This biological response may be used when oil or hazardous substances are suspected to have reduced the nesting success of avian species.

(C) *Cholinesterase (ChE) enzyme inhibition*. Injury has occurred when brain ChE activity in a sample from the population at the assessment area shows a statistically significant inhibition when compared to the mean activity level in samples from populations in a control area. These enzymes are in the nervous systems of vertebrate organisms and the rate of ChE activity is associated with the regulation of nerve impulse transmission. This biological response may be used as a demonstration of physiological malfunction injury to birds, mammals, and reptiles when anti-ChE substances, such as organophosphorus and carbamate pesticides, have been discharged or released.

(D) *Delta-aminolevulinic acid dehydratase (ALAD) inhibition*. Injury has occurred when the activity level of whole blood ALAD in a sample from the population of a given species at an assessment area is significantly less than mean values for a population at a control area, and ALAD depression of at least 50 percent can be measured. The ALAD enzyme is associated with the formation of hemoglobin in blood and in chemical detoxification processes in the liver. This biological response is a measure of the rate of ALAD activity. This biological response may be used to determine injury to bird and mammal species that have been exposed to lead.

(E) *Reduced fish reproduction*. Injury has occurred when a statistically significant difference in reproduction success between the control organisms and the test organisms can be measured based on the use of published standardized laboratory toxicity testing methodologies. This biological response may be used when the oil or hazardous substance is suspected to have caused a reduction in the reproductive success of fish species. Laboratory partial-chronic and laboratory chronic toxicity tests may be used. The oil or hazardous substance used in the test must be the exact substance or a substance that is reasonably comparable to that suspected to have caused reduced reproductive success in the natural population of fish.

(vi) *Category of injury—physical deformation*. Four biological responses for determining when physical deformations are a result of exposure to the discharge of oil or release of a hazardous substance have met the injury acceptance criteria.

(A) *Overt external malformations*. Injury has occurred when a statistically significant difference can be measured in the frequency of overt external malformation, such as small or missing eyes, when comparing samples from populations of wildlife species from the assessment area and a control area. This biological response may be used as a demonstration of injury when such physical deformations are observed in wildlife species exposed to oil or hazardous substances.

(B) *Skeletal deformities*. Injury has occurred when a statistically significant difference can be measured in the frequency of skeletal deformities, such as defects in growth of bones, when comparing samples from populations of wildlife species from the assessment area and a control area. This biological response may be used as a demonstration of injury when such physical deformations are observed in wildlife species exposed to oil or hazardous substances.

(C) *Internal whole organ and soft tissue malformation*. Injury has occurred when a statistically significant difference can be measured in the frequency of malformations to brain, heart, liver, kidney, and other organs, as well as soft tissues of the gastrointestinal tract and vascular system, when comparing samples from populations of wildlife species in the assessment area and a control area. This biological response may be used as a demonstration of injury when such physical deformations are observed in wildlife species exposed to oil or hazardous substances.

(D) *Histopathological lesions.* Injury has occurred when a statistically significant difference can be measured in the frequency of tissue or cellular lesions when comparing samples from populations of wildlife species from the assessment area and a control area. This biological response may be used as a demonstration of injury when such physical deformations are observed in wildlife species exposed to oil or hazardous substances.

§ 11.63 Injury determination phase—pathway determination.

(a) *General.* (1) To determine the exposure pathways of the oil or hazardous substance, the following shall be considered:

(i) The chemical and physical characteristics of the discharged oil or released hazardous substance when transported by natural processes or while present in natural media;

(ii) The rate or mechanism of transport by natural processes of the discharged oil or released hazardous substance; and

(iii) Combinations of pathways that, when viewed together, may transport the discharged oil or released hazardous substance to the resource.

(2) The pathway may be determined by either demonstrating the presence of the oil or hazardous substance in sufficient concentrations in the pathway resource or by using a model that demonstrates that the conditions existed in the route and in the oil or hazardous substance such that the route served as the pathway.

(3) To the extent that the information needed to make this determination is not available, tests shall be conducted and necessary data shall be collected to meet the requirements of this section. Methods that may be used to conduct these additional tests and collect new information are described in § 11.64 of this part.

(b) *Surface water pathway.* (1) When the surface water resource is suspected as the pathway or a component of the pathway, the authorized official shall determine, using guidance provided in this paragraph, whether the surface water resource, either solely or in combination with other media, served as the exposure pathway for injury to the resource.

(2)(i) Using available information and such additional tests as necessary, it should be determined whether the surface water resource downstream or downcurrent of the source of discharge or release has been exposed to the oil or hazardous substance.

(ii) When the source of discharge or release is on an open water body, such as a marsh, pond, lake, reservoir, bay, estuary, gulf, or sound, it should be determined, using available information and such additional tests as necessary, whether the surface water resource in the vicinity of the source of discharge or release has been exposed to the oil or hazardous substance.

(3)(i) If a surface water resource is or likely has been exposed, the areal extent of the exposed surface water resource should be estimated, including delineation of:

(A) Channels and reaches:

(B) Seasonal boundaries of open water bodies; and

(C) Depth of exposed bed, bank, or shoreline sediments.

(ii) As appropriate to the exposed resource, the following should be determined:

(A) Hydraulic parameters and streamflow characteristics of channels and reaches;

(B) Bed sediment and suspended sediment characteristics, including grain size, grain mineralogy, and chemistry of grain surfaces;

(C) Volume, inflow-outflow rates, degree of stratification, bathymetry, and bottom sediment characteristics of surface water bodies;

(D) Suspended sediment concentrations and loads and bed forms and loads of streams and tidally affected waters; and

(E) Tidal flux, current direction, and current rate in coastal and marine waters.

(4)(i) Using available information and data from additional tests as necessary, the mobility of the oil or hazardous substance in the exposed surface water resource should be estimated. This estimate should consider such physical and chemical characteristics of the oil or hazardous substance

as aqueous solubility, aqueous miscibility, density, volatility, potential for chemical degradation, chemical precipitation, biological degradation, biological uptake, and adsorption.

(ii) Previous studies of the characteristics discussed in paragraph (b)(4)(i) of this section should be relied upon if hydraulic, physical, and chemical conditions in the exposed surface water resource are similar to experimental conditions of the previous studies. In the absence of this information, those field and laboratory studies necessary to estimate the mobility of the oil or hazardous substance in surface water flow may be performed.

(5)(i) The rate of transport of the oil or hazardous substance in surface water should be estimated using available information and with consideration of the hydraulic properties of the exposed resource and the physical and chemical characteristics of the oil or hazardous substance.

(ii) Transport rates may be estimated using:

(A) The results of previous time-of-travel and dispersion studies made in the exposed surface water resource before the discharge or release;

(B) The results of previous studies, conducted with the same or similar chemical substances to those discharged or released under experimental conditions similar to the hydraulic, chemical, and biological conditions in the exposed surface water resource;

(C) The results of field measurements of time-of-travel and dispersion made in the exposed or comparable surface water resource, using natural or artificial substances with transport characteristics that reasonably approximate those of the oil or hazardous substance; and

(D) The results of simulation studies using the results of appropriate time-of-travel and dispersion studies in the exposed or comparable surface water resource.

(c) *Ground water pathway.* (1) When ground water resources are suspected as the pathway or a component of the pathway, the authorized official shall determine, using guidance provided in this paragraph, whether ground water resources, either solely or in combination with other media, served as the exposure pathway for injury to the resource.

(2) Using available information and such additional tests as necessary, it should be determined whether the unsaturated zone, the ground water, or the geologic materials beneath or downgradient of the source of discharge or release have been exposed to the oil or hazardous substance.

(3) If a ground water resource is or likely has been exposed, available information and such additional tests should be used as necessary to determine the characteristics of the unsaturated zone, as well as any aquifers and confining units containing the exposed ground water, in the vicinity of the source of discharge or release. The characteristics of concern include:

(i) Local geographical extent of aquifers and confining units;

(ii) Seasonal depth to saturated zone beneath the site;

(iii) Direction of ground water flow in aquifers;

(iv) Local variation in direction of ground water flow resulting from seasonal or pumpage effects;

(v) Elevation of top and bottom of aquifer and confining units;

(vi) Lithology, mineralogy, and porosity of rocks or sediments comprising the unsaturated zone, aquifers, and confining units;

(vii) Transmissivity and hydraulic conductivity of aquifers and confining units; and

(viii) Nature and amount of hydraulic connection between ground water and local surface water resources.

(4)(i) Using available information and such additional tests as necessary, the mobility of the oil or hazardous substance within the unsaturated zone and in the exposed ground water resources should be estimated. This estimate should consider local recharge rates and such physical and chemical characteristics of the oil or hazardous substance as aqueous solubility, aqueous miscibility, density, volatility, potential for chemical degradation, chemical precipitation, biological degradation, biological uptake, and adsorption onto solid phases in the unsaturated zone, aquifers, and confining units.

(ii) Previous studies of the characteristics discussed in paragraph (c)(4)(i) of

this section should be relied upon if geohydrologic, physical, and chemical conditions in the exposed ground water resource are similar to experimental conditions of the previous studies. In the absence of this information, field and laboratory studies may be performed as necessary to estimate the mobility of the oil or hazardous substance within the unsaturated zone and in ground water flows.

(5)(i) The rate of transport of the oil or hazardous substance in ground water should be estimated using available information and with consideration of the site hydrology, geohydrologic properties of the exposed resource, and the physical and chemical characteristics of the oil or hazardous substance.

(ii) Transport rates may be estimated using:

(A) Results of previous studies conducted with the same or similar chemical substance, under experimental geohydrological, physical, and chemical conditions similar to the ground water resource exposed to the oil or hazardous substance;

(B) Results of field measurements that allow computation of arrival times of the discharged or released substance at downgradient wells, so that an empirical transport rate may be derived; or

(C) Results of simulation studies, including analog or numerical modeling of the ground water system.

(d) *Air pathway.* (1) When air resources are suspected as the pathway or a component of the pathway, the authorized official shall determine, using guidance provided in this paragraph, whether the air resources either solely or in combination with other media, served as the exposure pathway for injury to the resource.

(2) Using available information, air modeling, and additional field sampling and analysis, it should be determined whether air resources have been exposed to the discharge of oil or release of a hazardous substance.

(3)(i) If an air resource is or has likely been exposed, available information and such additional tests as necessary should be used to estimate the areal extent of exposure and the duration and frequency of exposure of such areas to emissions from the discharge of oil or release of a hazardous substance.

(ii) The areal extent of exposure is defined as the geographical surface area or space where emissions from the source of discharge or release are found or otherwise determined to be present for such duration and frequency as to potentially result in injury to resources present within the area or space.

(4) Previous studies of the characteristics discussed in paragraph (d)(3)(i) of this section should be relied upon if the conditions in the exposed air resource are similar to experimental conditions of the previous studies. In the absence of this information, air sampling and analysis methods identified in §11.64(d) of this part, air modeling methods, or a combination of these methods may be used in identifying the air exposure pathway and in estimating the areal extent of exposure and duration and frequency of exposure.

(5) For estimating the areal extent, duration, and frequency of exposure from the discharge or release, the following factors shall be considered as may be appropriate for each emissions event:

(i) The manner and nature in which the discharge or release occurs, including the duration of the emissions, amount of the discharge or release, and emergency or other time critical factors;

(ii) The configuration of the emitting source, including sources such as ponds, lagoons, pools, puddles, land and water surface spills, and venting from containers and vessels;

(iii) Physical and chemical properties of substances discharged or released, including volatility, toxicity, solubility, and physical state;

(iv) The deposition from the air and re-emission to the air of gaseous and particulate emissions that provide periodic transport of the emissions; and

(v) Air transport and dispersion factors, including wind speed and direction, and atmospheric stability and temperature.

(e) *Geologic pathway.* (1) When geologic resources are suspected as the

pathway or a component of the pathway, the authorized official shall determine, using guidance provided in this paragraph, whether geologic resources, either solely or in combination with other media, served as the exposure pathway for injury to the resource.

(2)(i) Using available information and the methods listed in §11.64(e) of this part, it should be determined whether any element of the geologic resource has been exposed to the oil or hazardous substance. If a geologic resource is or has likely been exposed, the areal extent of the exposed geologic resource, including the lateral and vertical extent of the dispersion, should be estimated.

(ii) To determine whether the unsaturated zone served as a pathway, the guidance provided in paragraph (c) of this section should be followed.

(f) *Biological pathway*. (1) When biological resources are suspected as the pathway or a component of the pathway, the authorized official shall determine, using the guidance provided in this paragraph, whether biological resources, either solely or in combination with other media, served as the exposure pathway for injury to the resource.

(2) Biological pathways that resulted from either direct or indirect exposure to the oil or hazardous substance, or from exposure to products of chemical or biological reactions initiated by the discharge or release shall be identified. Direct exposure can result from direct physical contact with the discharged oil or released hazardous substance. Indirect exposure can result from food chain processes.

(3) If the oil or hazardous substance adhered to, bound to, or otherwise covered surface tissue, or was ingested, or inhaled but not assimilated, the area of dispersion may be determined based upon chemical analysis of the appropriate tissues or organs (such as leaves, lungs, stomach, intestine, or their contents) that were directly exposed to the oil or hazardous substance.

(4) If the oil or hazardous substance was assimilated, the areal dispersion may be determined based upon one or more of the following alternative procedures:

(i) If direct exposure to the biological resource has occurred, chemical analysis of the organisms that have been exposed may be performed.

(ii) If indirect exposure to the biological resource has occurred, either chemical analysis of free-ranging biological resources using one or more indicator species as appropriate, or laboratory analysis of one or more in situ placed indicator species as appropriate may be performed.

(A) *Indicator species,* as used in this section, means a species of organism selected consistent with the following factors to represent a trophic level of a food chain:

(*1*) General availability of resident organisms in the assessment area;

(*2*) Potential for exposure to the oil or hazardous substance through ingestion, assimilation, or inhalation;

(*3*) Occurrence of the substance in a chemical form that can be assimilated by the organism;

(*4*) Capacity of the organism to assimilate, bioconcentrate, bioaccumulate, and/or biomagnify the substance;

(*5*) Capacity of the organism to metabolize the substance to a form that cannot be detected through available chemical analytical procedures; and

(*6*) Extent to which the organism is representative of the food chain of concern.

(B) Collection of the indicator species should be limited to the number necessary to define the areal dispersion and to provide sufficient sample volume for chemical analysis.

(C) When in situ procedures are used, indicator species that behave comparably to organisms existing under free-ranging conditions shall be collected. The indicator species used in this procedure shall be obtained either from a control area selected consistent with provisions of §11.72 of this part or obtained from a suitable supply of wild-strain organisms reared in a laboratory setting. Appropriate chemical analysis shall be performed on a representative subsample of the indicator species before in situ placement.

(iii) In situ placement procedures shall be used where the collection of samples would be inconsistent with the provisions of §11.17(b) of this part.

(5) Sampling sites and the number of replicate samples to be collected at the sampling sites shall be consistent with the quality assurance provisions of the Assessment Plan.

(6) Chemical analysis of biological resource samples collected for the purpose of this section shall be conducted in accordance with the quality assurance provisions of the Assessment Plan.

§ 11.64 Injury determination phase—testing and sampling methods.

(a) *General.* (1) The guidance provided in this section shall be followed for selecting methodologies for the Injury Determination phase.

(2) Before selecting methodologies, the objectives to be achieved by testing and sampling shall be defined. These objectives shall be listed in the Assessment Plan. In developing these objectives, the availability of information from response actions relating to the discharge or release, the resource exposed, the characteristics of the oil or hazardous substance, potential physical, chemical, or biological reactions initiated by the discharge or release, the potential injury, the pathway of exposure, and the potential for injury resulting from that pathway should be considered.

(3) When selecting testing and sampling methods, only those methodologies shall be selected:

(i) For which performance under conditions similar to those anticipated at the assessment area has been demonstrated;

(ii) That ensure testing and sampling performance will be cost-effective;

(iii) That will produce data that were previously unavailable and that are needed to make the determinations; and

(iv) That will provide data consistent with the data requirements of the Quantification phase.

(4) Specific factors that should be considered when selecting testing and sampling methodologies to meet the requirements in paragraph (a)(3) of this section include:

(i) Physical state of the discharged or released substance;

(ii) The duration, frequency, season, and time of the discharge or release;

(iii) The range of concentrations of chemical compounds to be analyzed in different media;

(iv) Detection limits, accuracy, precision, interferences, and time required to perform alternative methods;

(v) Potential safety hazards to obtain and test samples;

(vi) Costs of alternative methods; and

(vii) Specific guidance provided in paragraphs (b), (c), (d), (e), and (f) of this section.

(b) *Surface water resources.* (1) Testing and sampling for injury to surface water resources shall be performed using methodologies described in the Assessment Plan.

(2) Chemical analyses performed to meet the requirements of the Injury Determination phase for surface water resources shall be conducted in accordance with methods that are generally accepted or have been scientifically verified and documented.

(3) The term ''water sample'' shall denote a volume of water collected and preserved to represent the bulk water and any dissolved or suspended materials or microorganisms occurring in the surface water resource.

(4) Sampling of water and sediments from surface water resources shall be conducted according to generally accepted methods.

(5) Measurement of the hydrologic properties of the resource shall be conducted according to generally accepted methods.

(6)(i) Interpretation of surface-water flow or estimation of transport of oil or hazardous substance in surface water through the use of models shall be based on hydrologic literature and current practice.

(ii) The applicability of models used during the assessment should be demonstrated, including citation or description of the following:

(A) Physical, chemical, and biological processes simulated by the model;

(B) Mathematical or statistical methods used in the model; and

(C) Model computer code (if any), test cases proving the code works, and any alteration of previously documented code made to adapt the model to the assessment area.

(iii) The validity of models used during the assessment should be established, including a description of the following:

(A) Hydraulic geometry, physiographic features, and flow characteristics of modeled reaches or areas;

(B) Sources of hydrological, chemical, biological, and meteorological data used in the model;

(C) Lists or maps of data used to describe initial conditions;

(D) Time increments or time periods modeled;

(E) Comparison of predicted fluxes of water and solutes with measured fluxes;

(F) Calibration-verification procedures and results; and

(G) Types and results of sensitivity analyses made.

(c) *Ground water resources.* (1) Testing and sampling for injury to ground water resources shall be performed using methodologies described in the Assessment Plan.

(2) Chemical analyses performed to meet the requirements of the Injury Determination phase for ground water resources shall be conducted in accordance with methods that are generally accepted or have been scientifically verified and documented.

(3)(i) The term ''water sample'' shall denote a volume of water collected and preserved to represent the bulk water and any dissolved or suspended materials or microorganisms occurring in the ground water resource.

(ii) The source of ground water samples may be from natural springs, in seeps, or from wells constructed according to generally accepted methods.

(4) Sampling of ground water or of geologic materials through which the ground water migrates shall be conducted according to generally accepted methods.

(5) Measurement of the geohydrologic properties of the resource shall be conducted according to generally accepted practice.

(6) Description of lithologies, minerals, cements, or other sedimentary characteristics of the ground water resource should follow generally accepted methods.

(7) Interpretation of the geohydrological setting, including identifying geologic layers comprising aquifers and any confining units, shall be based on geohydrologic and geologic literature and generally accepted practice.

(8)(i) Interpretation of ground-water flow systems or estimation of transport of oil or hazardous substances in ground water through the use of models shall be based on geohydrologic literature and current practice.

(ii) The applicability of models used during the assessment should be demonstrated, including citation or description of the following.

(A) Physical, chemical, and biological processes simulated by the model;

(B) Mathematical or statistical methods used in the model; and

(C) Model computer code (if any), test cases proving the code works, and any alteration of previously documented code made to adapt the model to the assessment area.

(iii) The validity of models used during the assessment should be established, including a description of the following:

(A) Model boundary conditions and stresses simulated;

(B) How the model approximates the geohydrological framework of the assessment area;

(C) Grid size and geometry;

(D) Sources of geohydrological, chemical, and biological data used in the model;

(E) Lists or maps of data used to describe initial conditions;

(F) Time increments or time periods modeled;

(G) Comparison of predicted fluxes of water and solutes with measured fluxes;

(H) Calibration-verification procedures and results; and

(I) Type and results of sensitivity analyses made.

(d) *Air resources.* (1) Testing and sampling for injury to air resources shall be performed using methodologies that meet the selection and documentation requirements in this paragraph. Methods identified in this section and methods meeting the selection requirements identified in this section shall be used to detect, identify, and determine the presence and source of emissions of oil

or a hazardous substance, and the duration, frequency, period of exposure (day, night, seasonal, etc.), and levels of exposure.

(2) The sampling and analysis methods identified in this paragraph are the primary methods to be used for determining injury to the air resource. Air modeling methods may be used for injury determination only when air sampling and analysis methods are not available or the discharge or release occurred with no opportunity to monitor or sample the emissions.

(3)(i) Methods developed, evaluated, approved, and published by the U.S. Environmental Protection Agency may be used for sampling and analysis to determine injury to the air resource.

(ii) Methods selected for air sampling and analysis may include those methods that have been formally reviewed, evaluated, and published by the following government and professional organizations: the National Institute for Occupational Safety and Health, the American Society for Testing and Materials, and the American Public Health Association.

(iii) Methods selected for air sampling and analysis shall be methods that are documented for each of the following:

(A) The range of field conditions for which the methods are applicable;

(B) Quality assurance and quality control requirements necessary to achieve the data quality the methods are capable of producing;

(C) Operational costs of conducting the methods; and

(D) Time required to conduct the methods.

(iv) The determination of concentrations in excess of emission standards for hazardous air pollutants established under section 112 of the Clean Air Act, 42 U.S.C. 7412, shall be conducted in accordance with the primary methods or alternative methods as required in ''National Emission Standards for Hazardous Air Pollutants: Source Test and Analytical Methods,'' 40 CFR 61.14, and as may be applicable to the determination of injury to air resources.

(4) In selecting methods for testing and sampling for injury to air resources, the following performance factors of the sampling and analysis methods and the influencing characteristics of the assessment area and the general vicinity shall be considered:

(i) Method detection limits, accuracy, precision, specificity, interferences, and analysis of time and cost;

(ii) Sampling area locations and frequency, duration of sampling, and chemical stability of emissions; and

(iii) Meteorological parameters that influence the transport of emissions and the spatial and temporal variation in concentration.

(e) *Geologic resources.* (1) Testing and sampling for injury to geologic resources shall be performed using methodologies described in this paragraph.

(2) Testing pH level in soils shall be performed using standard pH measurement techniques, taking into account the nature and type of organic and inorganic constituents that contribute to soil acidity; the soil/solution ratio; salt or electrolytic content; the carbon dioxide content; and errors associated with equipment standardization and liquid junction potentials.

(3) Salinity shall be tested by measuring the electrical conductivity of the saturation extraction of the soil.

(4) Soil microbial respiration shall be tested by measuring uptake of oxygen or release of carbon dioxide by bacterial, fungal, algal, and protozoan cells in the soil. These tests may be made in the laboratory or in situ.

(5) Microbial populations shall be tested using microscopic counting, soil fumigation, glucose response, or adenylate enegry charge.

(6) Phytotoxicity shall be tested by conducting tests of seed germination, seedling growth, root elongation, plant uptake, or soil-core microcosms.

(7) Injury to mineral resources shall be determined by describing restrictions on access, development, or use of the resource as a result of the oil or hazardous substance. Any appropriate health and safety considerations that led to the restrictions should be documented.

(f) *Biological resources.* (1) Testing and sampling for injury to biological resources shall be performed using methodologies provided for in this paragraph.

(2)(i) Testing may be performed for biological responses that have satisfied the acceptance criteria of §11.62(f)(2) of this part.

(ii) Testing methodologies that have been documented and are applicable to the biological response being tested may be used.

(3) Injury to biological resources, as such injury is defined in §11.62(f)(1)(ii) of this part, may be determined by using methods acceptable to or used by the Food and Drug Administration or the appropriate State health agency in determining the levels defined in that paragraph.

§11.70 Quantification phase—general.

(a) *Requirement.* (1) Upon completing the Injury Determination phase, the authorized official shall quantify for each resource determined to be injured and for which damages will be sought, the effect of the discharge or release in terms of the reduction from the baseline condition in the quantity and quality of services, as the phrase is used in this part, provided by the injured resource using the guidance provided in the Quantification phase of this part.

(2) The Quantification phase consists of §11.70—general; §11.71—service reduction quantification; §11.72—baseline services determination; and §11.73—resource recoverability analysis, of this part.

(b) *Purpose.* The purpose of the Quantification phase is to quantify the effects of the discharge or release on the injured natural resources for use in determining the appropriate amount of compensation.

(c) *Steps in the Quantification phase.* In the Quantification phase, the extent of the injury shall be measured, the baseline condition of the injured resource shall be estimated, the baseline services shall be identified, the recoverability of the injured resource shall be determined, and the reduction in services that resulted from the discharge or release shall be estimated.

(d) *Completion of Quantification phase.* Upon completing the Quantification phase, the authorized official shall make a determination as to the reduction in services that resulted from the discharge or release. This Quantification Determination shall be used in the Damage Determination phase and shall be maintained as part of the Report of Assessment described in §11.90 of this part.

§11.71 Quantification phase—service reduction quantification.

(a) *Requirements.* (1) The authorized official shall quantify the effects of a discharge of oil or release of a hazardous substance by determining the extent to which natural resource services have been reduced as a result of the injuries determined in the Injury Determination phase of the assessment.

(2) This determination of the reduction in services will be used in the Damage Determination phase of the assessment.

(3) Quantification will be done only for resources for which damages will be sought.

(b) *Steps.* Except as provided in §11.71(f) of this part, the following steps are necessary to quantify the effects:

(1) Measure the extent to which the injury demonstrated in the Injury Determination phase has occurred in the assessment area;

(2) Measure the extent to which the injured resource differs from baseline conditions, as described in §11.72 of this part, to determine the change attributable to the discharge or release;

(3) Determine the services normally produced by the injured resource, which are considered the baseline services or the without-a-discharge-or-release condition as described in §11.72 of this part;

(4) Identify interdependent services to avoid double counting in the Damage Determination phase and to discover significant secondary services that may have been disrupted by the injury; and

(5) Measure the disruption of services resulting from the discharge or release, which is considered the change in services or the with-a-discharge-or-release condition.

(c) *Contents of the quantification.* The following factors should be included in the quantification of the effects of the discharge or release on the injured resource:

(1) Total area, volume, or numbers affected of the resource in question;

(2) Degree to which the resource is affected, including consideration of subunits or subareas of the resource, as appropriate;

(3) Ability of the resource to recover, expressed as the time required for restoration of baseline services as described in §11.73 of this part;

(4) Proportion of the available resource affected in the area;

(5) Services normally provided by the resource that have been reduced as a result of the discharge or release; and

(6) Factors identified in the specific guidance in paragraphs (h), (i), (j), (k), and (l) of this section dealing with the different kinds of natural resources.

(d) *Selection of resources, services, and methodologies.* Specific resources or services to quantify and the methodology for doing so should be selected based upon the following factors:

(1) Degree to which a particular resource or service is affected by the discharge or release;

(2) Degree to which a given resource or service can be used to represent a broad range of related resources or services;

(3) Consistency of the measurement with the requirements of the economic methodology to be used;

(4) Technical feasibility, as that phrase is used in this part, of quantifying changes in a given resource or service at reasonable cost; and

(5) Preliminary estimates of services at the assessment area and control area based on resource inventory techniques.

(e) *Services.* In quantifying changes in natural resource services, the functions provided in the cases of both with- and without-a-discharge-or-release shall be compared. For the purposes of this part, services include provision of habitat, food and other needs of biological resources, recreation, other products or services used by humans, flood control, ground water recharge, waste assimilation, and other such functions that may be provided by natural resources.

(f) *Direct quantification of services.* The effects of a discharge or release on a resource may be quantified by directly measuring changes in services provided by vhe resource, instead of quantifying the changes in the resource itself, when it is determined that all of the following conditions are met:

(1) The change in the services from baseline can be demonstrated to have resulted from the injury to the natural resource;

(2) The extent of change in the services resulting from the injury can be measured without also calculating the extent of change in the resource; and

(3) The services to be measured are anticipated to provide a better indication of damages caused by the injury than would direct quantification of the injury itself.

(g) *Statutory exclusions.* In quantifying the effects of the injury, the following statutory exclusions shall be considered, as provided in sections 107 (f), (i), and (j) and 114(c) of CERCLA, that exclude compensation for damages to natural resources that were a result of:

(1) An irreversible and irretrievable commitment of natural resources identified in an environmental impact statement or other comparable environmental analysis, and the decision to grant the permit or license authorizes such a commitment, and the facility was otherwise operating within the terms of its permit or license, so long as, in the case of damages to an Indian tribe occurring pursuant to a Federal permit or license, the issuance of that license or permit was not inconsistent with the fiduciary duty of the United States with respect to such Indian tribe; or

(2) The damages and the release of a hazardous substance from which such damages resulted have occurred wholly before the enactment of CERCLA; or

(3) The application of a pesticide product registered under the Federal Insecticide, Fungicide, and Rodenticide Act, 7 U.S.C. 135–135k; or

(4) Any other federally permitted release, as defined in section 101(10) of CERCLA; or

(5) Resulting from the release or threatened release of recycled oil from a service station dealer as described in section 107(a) (3) or (4) of CERCLA if such recycled oil is not mixed with any other hazardous substance and is

stored, treated, transported or otherwise managed in compliance with regulations or standards promulgated pursuant to section 3014 of the Solid Waste Disposal Act and other applicable authorities.

(h) *Surface water resources.* (1) The area where the injured surface water resource differs from baseline shall be determined by determining the areal extent of oil or hazardous substances in the water or on the sediments.

(2)(i) Areal variation in concentrations of the discharged or released substances dissolved in or floating on water, adhering to suspended sediments, or adhering to bed, bank, or shoreline sediments from exposed areas should be determined in sufficient detail to approximately map the boundary separating areas with concentrations above baseline from areas with concentrations equal to or less than baseline.

(ii) The size, shape, and location of the plume may be estimated using time of travel and dispersion data obtained under §11.63 of this part, since plumes of dissolved or floating substances may be rapidly transported and dispersed in surface water.

(3) Water and sediment samples may be collected and chemically analyzed and stage, water discharge, or tidal flux measurements made, as appropriate, to collect new data required by this section.

(4)(i) Within the area determined in paragraph (h)(2) of this section to be above baseline, the services provided by the surface water or sediments that are affected should be determined. This determination may include computation of volumes of water or sediments affected, total areas of water or sediment affected, volume of water used from the affected surface water resource, or other appropriate measures.

(ii) The services should be determined with consideration of potential effects on downstream or downcurrent resources during the recovery period, as determined in §11.73 of this part, resulting from transport of dissolved substances and of substances adhering to sediments.

(i) *Ground water resources.* (1) The area where the injured ground water resource differs from baseline should be determined by determining the areal extent of oil or hazardous substances in water or geologic materials in the unsaturated zone and identified geohydrological units, which are aquifers or confining layers, within the assessment area.

(2)(i) The lateral and vertical extent of discharged or released substances in the unsaturated zone, if it is known to be exposed, should be determined.

(ii) The lateral and vertical extent of plumes within geohydrologic units known to be exposed should be determined. Concentrations of substances within and adjacent to each plume should be determined in sufficient detail to approximately locate the boundary separating areas with concentrations above baseline from areas with concentrations equal to or less than baseline.

(3) Water or geologic materials may be sampled and chemically analyzed, or surface-geophysical techniques may be used for collecting new data required by this section. General verification of the plume boundaries by chemical analysis of selected water samples should be done if boundary locations are initially determined by surface-geophysical measurements.

(4)(i) Within the area determined in paragraph (i)(2)(ii) of this section to be above baseline, the services provided by the ground water that is affected should be determined. This determination may include computation of the volume of water affected, volume of affected ground water pumped from wells, volume of affected ground water discharged to streams or lakes, or other appropriate measures.

(ii) The services should be determined with consideration of potential enlargement of the plume during the recovery period, as determined in §11.73 of this part, resulting from ground water transport of the substances.

(iii) The effects on the ground water resource during the recovery period resulting from potential remobilization of discharged or released substances that may be adhering, coating, or otherwise bonding to geologic materials should be considered.

(j) *Air resources.* The area where the injured air resource differs from baseline should be determined by determining the geographical area affected, the degree of impairment of services, and the period of time impairment occurred.

(k) *Geologic resources.* The area where the injured geologic resource differs from baseline should be determined by determining:

(1) The surface area of soil with reduced ability to sustain the growth of vegetation from the baseline level;

(2) The surface area or volume of soil with reduced suitability as habitat for biota from the baseline level;

(3) The volume of geologic resources that may act as a source of toxic leachate;

(4) The tonnage of mineral resources whose access, development, or use is restricted as a result of the discharge or release.

(l) *Biological resources.* (1) The extent to which the injured biological resource differs from baseline should be determined by analysis of the population or the habitat or ecosystem levels. Although it may be necessary to measure populations to determine changes in the habitats or ecosystems, and vice versa, the final result should be expressed as either a population change or a habitat or ecosystem change in order to prevent double counting in the economic analysis. This separation may be ignored only for resources that do not interact significantly and where it can be demonstrated that double counting is being avoided.

(2) Analysis of population changes or habitat or ecosystem changes should be based upon species, habitats, or ecosystems that have been selected from one or more of the following categories:

(i) Species or habitats that can represent broad components of the ecosystem, either as representatives of a particular ecological type, of a particular food chain, or of a particular service;

(ii) Species, habitats, or ecosystems that are especially sensitive to the oil or hazardous substance and the recovery of which will provide a useful indicator of successful restoration; or

(iii) Species, habitats, or ecosystems that provide especially significant services.

(3) Analysis of populations, habitats, or ecosystems shall be limited to those populations, habitats, or ecosystems for which injury has been determined in the Injury Determination phase or those that can be linked directly through services to resources for which injury has been so determined. Documentation of the service link to the injured resource must be provided in the latter case.

(4) Population, habitat, or ecosystem measurement methods that provide data that can be interpreted in terms of services must be selected. To meet this requirement, a method should:

(i) Provide numerical data that will allow comparison between the assessment area data and the control area or baseline data;

(ii) Provide data that will be useful in planning efforts for restoration, rehabilitation, replacement, and/or acquisition of equivalent resources, and in later measuring the success of those efforts, and, where relevant, will allow calculation of compensable value; and

(iii) Allow correction, as applicable, for factors such as dispersal of organisms in or out of the assessment area, differential susceptibility of different age classes of organisms to the analysis methods and other potential systematic biases in the data collection.

(5) When estimating population differences of animals, standard and widely accepted techniques, such as census, mark-recapture, density, and index methods, and other estimation techniques appropriate to the species and habitat shall be used. Frequencies of injury observed in the population shall be measured as applicable.

(i) In general, methods used for estimates of wildlife populations should follow standard and widely accepted techniques such as those recommendations provided in the ''Wildlife Management Techniques Manual'' (4th edition, Wildlife Society, 1980, available from the Wildlife Society, 5410 Grosvenor Lane, Bethesda, MD 20814), including references cited and recommended in that manual. The specific technique used need not be cited in that manual, but should meet its recommendations

for producing reliable estimates or indices.

(ii) Measurement of age structures, life table statistics, or age structure models generally will not provide satisfactory measurement of changes due to a discharge of oil or release of a hazardous substance unless there is clear evidence that the oil or hazardous substance has differentially affected different age classes and there are reliable baseline age structure data available for the population being assessed.

(iii) Mortality from single incidents may be used to estimate changes in populations only when there are available baseline population data for the area, so that the proportion lost can be estimated, and when corrections can be made for potential sampling biases, such as natural mortality and factors influencing distribution of carcasses and ability of investigators to find them. Specific techniques for measuring mortality include the following:

(A) Fish mortality in freshwater areas may be estimated from counts of carcasses, using methods and guidelines for estimating numbers of fish killed contained in Part II (Fish-Kill Counting Guidelines) of the ''Monetary Values of Freshwater Fish and Fish-Kill Counting Guidelines,'' American Fisheries Society Special Publication Number 13, 1982 (incorporation by reference, see §11.18), including use of appropriate random sampling methods and tagged carcasses as identified and discussed in Part II of that publication.

(B) The authorized official may adapt the techniques discussed in paragraph (l) (5) (iii) (A) of this section for counting dead aquatic birds or for counting marine or estuarine fish or birds. Such adaptation will require the documentation of the methods used to avoid sampling biases.

(C) Fish mortality may also be estimated by use of an in situ bioassay technique that is similar to that identified in §11.62(f)(4)(i)(C) of this part, if the oil or hazardous substance is still present at levels that resulted in injury and if appropriate instream controls can be maintained at control areas.

(6) Plant populations may be measured using standard techniques, such as population density, species composition, diversity, dispersion, and cover,

(7) Forest and range resources may be estimated by standard forestry and range management evaluation techniques.

(8) Habitat quality may be measured using techniques such as the Habitat Evaluation Procedures (HEP) developed and used by the U.S. Fish and Wildlife Service.

[51 FR 27725, Aug. 1, 1986, as amended at 53 FR 5175, Feb. 22, 1988; 59 FR 14283, Mar. 25, 1994]

§ 11.72 Quantification phase—baseline services determination.

(a) *Requirements.* The authorized official shall determine the physical, chemical, and biological baseline conditions and the associated baseline services for injured resources at the assessment area to compare that baseline with conditions found in §11.71 of this part.

(b) *General guidelines.* Baseline data shall be selected according to the following general guidelines:

(1) Baseline data should reflect conditions that would have been expected at the assessment area had the discharge of oil or release of hazardous substances not occurred, taking into account both natural processes and those that are the result of human activities.

(2) Baseline data should include the normal range of physical, chemical, or biological conditions for the assessment area or injured resource, as appropriate for use in the analysis in §11.71 of this part, with statistical descriptions of that variability. Causes of extreme or unusual value in baseline data should be identified and described.

(3) Baseline data should be as accurate, precise, complete, and representative of the resource as the data used or obtained in §11.71 of this part. Data used for both the baseline and services reduction determinations must be collected by comparable methods. When the same method is not used, comparability of the data collection methods must be demonstrated.

(4) Baseline data collection shall be restricted to those data necessary for conducting the assessment at a reasonable cost. In particular, data collected should focus on parameters that are directly related to the injuries quantified

in §11.71 of this part and to data appropriate and necessary for the Damage Determination phase.

(5) The authorized official may use or authorize for use baseline data that are not expected to represent fully the baseline conditions, subject to the following requirements:

(i) The authorized official shall document how the requirements of this paragraph are met:

(ii) These substitute baseline data shall not cause the difference between baseline and the conditions in the assessment area to exceed the difference that would be expected if the baseline were completely measured; and

(iii) The authorized official has determined that it is either not technically feasible or not cost-effective, as those phrases are used in this part, to measure the baseline conditions fully and that these baseline data are as close to the actual baseline conditions as can be obtained subject to these limitations.

(c) *Historical data.* If available and applicable, historical data for the assessment area or injured resource should be used to establish the baseline. If a significant length of time has elapsed since the discharge or release first occurred, adjustments should be made to historical data to account for changes that have occurred as a result of causes other than the discharge or release. In addition to specialized sources identified in paragraphs (g) through (k) of this section, one or more of the following general sources of historical baseline data may be used:

(1) Environmental Impact Statements or Environmental Assessments previously prepared for purposes of the National Environmental Policy Act (NEPA), 42 U.S.C. 4321–4361, similar documents prepared under other Federal and State laws, and background studies done for any of these documents;

(2) Standard scientific and management literature sources appropriate to the resource;

(3) Computerized data bases for the resource in question;

(4) Public or private landholders in the assessment area or in neighboring areas;

(5) Studies conducted or sponsored by natural resource trustees for the resource in question;

(6) Federally sponsored research identified by the National Technical Information Service;

(7) Studies carried out by educational institutions; and

(8) Other similar sources of data.

(d) *Control areas.* Where historical data are not available for the assessment area or injured resource, or do not meet the requirements of this section, baseline data should be collected from control areas. Historical data for a control area should be used if available and if they meet the guidelines of this section. Otherwise, the baseline shall be defined by field data from the control area. Control areas shall be selected according to the following guidelines, and both field and historical data for those areas should also conform to these guidelines:

(1) One or more control areas shall be selected based upon their similarity to the assessment area and lack of exposure to the discharge or release;

(2) Where the discharge or release occurs in a medium flowing in a single direction, such as a river or stream, at least one control area upstream or upcurrent of the assessment area shall be included, unless local conditions indicate such an area is inapplicable as a control area;

(3) The comparability of each control area to the assessment area shall be demonstrated, to the extent technically feasible, as that phrase is used in this part;

(4) Data shall be collected from the control area over a period sufficient to estimate normal variability in the characteristics being measured and should represent at least one full cycle normally expected in that resource;

(5) Methods used to collect data at the control area shall be comparable to those used at the assessment area, and shall be subject to the quality assurance provisions of the Assessment Plan;

(6) Data collected at the control area should be compared to values reported in the scientific or management literature for similar resources to demonstrate that the data represent a normal range of conditions; and

(7) A control area may be used for determining the baseline for more than one kind of resource, if sampling and data collection for each resource do not interfere with sampling and data collection for the other resources.

(e) *Baseline services.* The baseline services associated with the physical, chemical, or biological baseline data shall be determined.

(f) *Other requirements.* The methodologies in paragraphs (g) through (k) of this section shall be used for determining baseline conditions for specific resources in addition to following the general guidelines identified in paragraphs (a) through (e) of this section. If a particular resource is not being assessed for the purpose of the Damage Determination phase, and data on that resource are not needed for the assessment of other resources, baseline data for the resource shall not be collected.

(g) *Surface water resources.* (1) This paragraph provides additional guidance on determining baseline services for surface water resources. The general guidance provided in paragraphs (a) through (f) of this section should be followed before beginning any work described in this paragraph.

(2) Applicable and available historical data shall be gathered to determine baseline conditions for the surface water resource at the assessment area. If deemed inadequate for determining baseline conditions, such data shall be used to the extent technically feasible, as that phrase is used in this part, in designating the control areas described in paragraph (g)(3) of this section for the surface water resource determined to be injured.

(3) Control areas shall be selected for the surface water resource subject to the general criteria in paragraph (d) of this section and additional criteria as follows:

(i) For each injured stream or river reach, a control area shall be designated consisting of a stream or river reach of similar size, that is as near to the assessment area as practical and, if practical, that is upstream or upcurrent from the injured resource, such that the channel characteristics, sediment characteristics, and streamflow characteristics are similar to the injured resource and the water and sediments of the control area, because of location, have not been exposed to the discharge or release.

(ii) For each injured standing water body, such as a marsh, pond, lake, bay, or estuary, a control area shall be designated consisting of a standing water body of similar size that is as near to the assessment area as practical, such that the sediment characteristics and inflow-outflow characteristics of the control area are similar to the injured resource and the water and sediments of the control area, because of location, have not been exposed to the discharge or release.

(4)(i) Within the control area locations shall be designated for obtaining samples of water and sediments.

(ii) The water discharge, stage, or tidal flux shall be measured and representative water and sediments collected as follows:

(A) Measure stage, water discharge, and tidal flux as appropriate at the same time that water and sediment samples are collected; and

(B) Obtain comparable samples and measurements at both the control and assessment areas under similar hydraulic conditions.

(iii) Measurement and samples shall be obtained as described in this paragraph in numbers sufficient to determine:

(A) The approximate range of concentration of the substances in water and sediments;

(B) The variability of concentration of the substances in water and sediments during different conditions of stage, water discharge, or tidal flux; and

(C) The variability of physical and chemical conditions during different conditions of stage, water discharge, or tidal flux relating to the transport or storage of the substances in water and sediments.

(5) Samples should be analyzed from the control area to determine the physical properties of the water and sediments, suspended sediment concentrations in the water, and concentrations of oil or hazardous substances in water or in the sediments. Additional chemical, physical, or biological tests may

be made, if necessary, to obtain otherwise unavailable data for the characteristics of the resource and comparison with the injured resource at the assessment area.

(6) In order to establish that differences between surface water conditions of the control and assessment areas are statistically significant, the median and interquartile range of the available data or the test results should be compared using the Mann-Whitney and ranked squares tests, respectively.

(7) Additional tests may be made of samples from the control area, if necessary, to provide otherwise unavailable information about physical, chemical, or biochemical processes occurring in the water or sediments relating to the ability of the injured surface water resource to recover naturally.

(h) *Ground water resources.* (1) This paragraph provides additional guidance on determining baseline services for ground water resources. The general guidance provided in paragraphs (a) through (f) of this section should be followed before beginning any work described in this paragraph.

(2) Applicable and available historical data shall be gathered to determine baseline conditions for the ground water resource at the assessment area. If deemed inadequate for determining baseline conditions, such data shall be used to the extent technically feasible, as that phrase is used in this part, in designating the control areas described in paragraph (h)(3) of this section for the ground water resource determined to be injured.

(3) A control area shall be designated subject to the general criteria in paragraph (d) of this section and as near to the assessment area as practical, such that, within the control area, geological materials, geohydrological units, and hydrologic conditions are similar to the assessment area, and ground water resources are not exposed to substances from the discharge or release.

(4) Within the control area, wells shall be identified or drilled, designated as control wells, to obtain representative ground water samples for analysis. The location, depth, and number of control wells and the number of ground water samples collected should be sufficient to estimate the vertical and lateral variation in concentration of the substances in both the unsaturated zone and in ground water from geohydrologic units similar to units tested in the assessment area.

(i) Representative water samples from each control well shall be collected and analyzed. The analyses should determine the physical and chemical properties of the ground water relating to the occurrence of oil or hazardous substances.

(ii) If the oil or hazardous substances are commonly more concentrated on geologic materials than in ground water, representative samples of geologic materials from aquifers and the unsaturated zone as appropriate should be obtained and chemically analyzed. The location, depth, and number of these samples should be sufficient to determine the vertical and lateral variation in concentration of the oil or hazardous substances absorbing or otherwise coating geologic materials in the control area. These samples may also be analyzed to determine porosity, mineralogy, and lithology of geologic materials if these tests will provide otherwise unavailable information on storage or mobility of the oil or hazardous substances in the ground water resource.

(5) In order to establish that differences between ground water conditions of the control and assessment areas are statistically significant, the median and interquartile range of available data or the test results from similar geohydrologic units should be compared using the Mann-Whitney and ranked squares test, respectively.

(6) Additional tests may be made of samples from the control area, if necessary, to provide otherwise unavailable information about chemical, geochemical, or biological processes occurring in the ground relating to the ability of the injured ground water resource to recover naturally.

(i) *Air resources.* (1) This paragraph provides additional guidance on determining baseline services for air resources. The general guidance provided in paragraphs (a) through (f) of this section should be followed before beginning any work described in this paragraph.

(2) Applicable and available historical data shall be gathered on ambient air quality and source emissions to determine baseline conditions for the air resource. These historical data may be used to determine baseline conditions if the data satisfy the general guidelines in paragraph (d) of this section and if all the following criteria are met:

(i) The methodology used to obtain these historical data would detect the oil or hazardous substance at levels appropriate for comparison to the concentrations measured in §11.71 of this part;

(ii) The effect of known or likely emission sources near the assessment area other than the source of the discharge or release can be identified or accounted for in the historical data; and

(iii) The historical data show that normal concentrations of the oil or hazardous substance are sufficiently predictable that changes as a result of the discharge or release are likely to be detectable.

(3) If historical data appropriate to determine baseline conditions at the assessment area are lacking, one or more control areas, as needed, shall be designated subject to the general criteria of paragraph (d) of this section and the following additional factors, which shall also be considered in establishing a monitoring schedule;

(i) Applicable and available historical data shall be used to the extent technically feasible, as that phrase is used in this part, in designating control areas or, lacking historical data, the factors in paragraph (i)(3)(iii) of this section shall be considered;

(ii) Control areas shall be spatially representative of the range of air quality and meteorological conditions likely to have occurred at the assessment area during the discharge or release into the atmosphere; and

(iii) The following additional factors shall be considered:

(A) The nature of the discharge or release and of potential alternative sources of the oil or hazardous substance, including such factors as existing sources, new sources, intermittent sources, mobile sources, exceptional events, trends, cycles, and the nature of the material discharged or released;

(B) Environmental conditions affecting transport, such as wind speed and direction, atmospheric stability, temperature, humidity, solar radiation intensity, and cloud cover; and

(C) Other factors, such as timing of the discharge or release, use patterns of the affected area, and the nature of the injury resulting from the discharge or release.

(4)(i) The preferred measurement method is to measure air concentrations of the oil or hazardous substance directly using the same methodology employed in §11.71 of this part.

(ii) Nonspecific or chemical compound class methodologies may be used to determine baseline generically only in situations where it can be demonstrated that measuring indicator substances will adequately represent air concentrations of other components in a complex mixture.

(j) *Geologic resources.* (1) This paragraph provides additional guidance on determining baseline services for geologic resources. The general guidance provided in paragraphs (a) through (f) of this section should be followed before beginning any work described in this paragraph.

(2) Applicable and available historical data shall be gathered to determine baseline conditions for the geologic resource at the assessment area. If deemed inadequate for determining baseline conditions, such data shall be used to the extent technically feasible, as that phrase is used in this part, in designating the control areas described in paragraph (j)(3) of this section for the geologic resource determined to be injured.

(3) Control areas shall be selected for geologic resources subject to the general criteria in paragraph (d) of this section and additional criteria as follows:

(i) Similarity of exposed soil or geologic material in the assessment area with the geologic resource in the control area should be the primary factor in selecting the control area. Other factors, including climate, depth of ground water, vegetation type and area covered, land slope and land area, and

hydraulic gradients and spatial relation to source should be comparable to the assessment area.

(ii) The control area shall be selected such that the geologic resource in the control area is not exposed to the discharge or release.

(4)(i) A sufficient number of samples from unbiased, randomly selected locations in the control area shall be obtained in order to characterize the areal variability of the parameters measured. Each sample should be analyzed to determine the physical and chemical properties of the geologic materials relating to the occurrence of the oil or hazardous substance. Additional chemical, physical, or biological tests may be made, if necessary, to obtain otherwise unavailable data for the characterization and comparison with the injured resource at the assessment area.

(ii) The mean and standard deviation of each parameter measured shall be used as the basis of comparison between the assessment and control areas.

(k) *Biological resources.* (1) This paragraph provides additional guidance on determining baseline services for biological resources. The general guidance provided in paragraphs (a) through (f) of this section should be followed before beginning any work described in this paragraph.

(2) Applicable and available historical data shall be gathered to determine baseline conditions for the biological resource at the assessment area and should include both population and habitat data if available. These data may be derived from the data sources identified in paragraph (c) of this section, as well as from the following:

(i) Aerial photographs or maps showing distribution and extent of habitat types or other biological resources before the discharge or release;

(ii) Biological specimens in systematic museum or herbarium collections and associated records, including labels and collectors' field notes; and

(iii) Photographs showing the nature of the habitat before the discharge or release when the location and date are well documented.

(3)(i) Control areas shall be selected for biological resources subject to the general criteria in paragraph (d) of this section and additional criteria as follows:

(A) The control area shall be comparable to the habitat or ecosystem at the assessment area in terms of distribution, type, species composition, plant cover, vegetative types, quantity, and relationship to other habitats;

(B) Physical characteristics of the control and assessment areas shall be similar; and

(C) If more than one habitat or ecosystem type is to be assessed, comparable control areas should be established for each, or a control area should be selected containing those habitat types in a comparable distribution.

(ii) To the extent they are available, historical data should be gathered and used for the control area. Lacking adequate historical data for both the control and assessment areas, the control areas shall be used for the following purposes, as appropriate to the quantification:

(A) To measure baseline biota population levels or habitat or ecosystem quality, as discussed in §11.71(l) of this part; and

(B) To measure the natural frequency, if any, of the injury being assessed in unaffected populations or to demonstrate the lack of that injury in unaffected populations if these have not been done for purposes of the Injury Determination, and if needed for purposes of the Quantification.

(4) In addition, a control area should be used to collect control specimens, as needed, for the Injury Determination procedures.

(5) The identity of species for which Damage Determinations will be made or that play an important role in the assessment shall be confirmed except in the case where collecting the specimens of a species is likely to compromise the restoration of the species. One or more of the following methods shall be used:

(i) Specimens of the species shall be provided to an independent taxonomist or systematic biologist, who has access to a major systematic biology collection for that taxon, and who shall provide written confirmation of their identity to the species level;

(ii) A reference collection of specimens of the species, prepared and preserved in a way standard for systematic collections for that taxon, shall be maintained at least through final resolution of the damage action at which time it should be transferred to a major systematic biology collection; or

(iii) In the case of a species where collecting specimens is likely to compromise the recovery or restoration of that species population, the authorized official shall determine and use an alternative method for confirming species identity that will be consistent with established management goals for that species.

[51 FR 27725, Aug. 1, 1986, as amended at 53 FR 5175, Feb. 22, 1988; 59 FR 14283, Mar. 25, 1994]

§ 11.73 Quantification phase—resource recoverability analysis.

(a) *Requirement*. The time needed for the injured resources to recover to the state that the authorized official determines services are restored, rehabilitated, replaced, and/or the equivalent have been acquired to baseline levels shall be estimated. The time estimated for recovery or any lesser period of time as determined in the Assessment Plan must be used as the recovery period for purposes of § 11.38 and the Damage Determination phase, §§ 11.80 through 11.84.

(1) In all cases, the amount of time needed for recovery if no restoration, rehabilitation, replacement, and/or acquisition of equivalent resources efforts are undertaken beyond response actions performed or anticipated shall be estimated. This time period shall be used as the ''No Action-Natural Recovery'' period for purposes of § 11.82 and § 11.84(g)(2)(ii) of this part.

(2) The estimated time for recovery shall be included in possible alternatives for restoration, rehabilitation, replacement, and/or acquisition of equivalent resources, as developed in § 11.82 of this part, and the data and process by which these recovery times were estimated shall be documented.

(b) *Restoration not feasible*. If the authorized official determines that restoration will not be technically feasible, as that phrase is used in this part, the reasoning and data on which this decision is based shall be documented as part of the justification for any replacement alternatives that may be considered or proposed.

(c) *Estimating recovery time*. (1) The time estimates required in paragraph (a) of this section shall be based on the best available information and where appropriate may be based on cost-effective models. Information gathered may come from one or more of the following sources, as applicable:

(i) Published studies on the same or similar resources;

(ii) Other data sources identified in § 11.72 of this part;

(iii) Experience of managers or resource specialists with the injured resource;

(iv) Experience of managers or resource specialists who have dealt with restoration for similar discharges or releases elsewhere; and

(v) Field and laboratory data from assessment and control areas as necessary.

(2) The following factors should be considered when estimating recovery times:

(i) Ecological succession patterns in the area;

(ii) Growth or reproductive patterns, life cycles, and ecological requirements of biological species involved, including their reaction or tolerance to the oil or hazardous substance involved;

(iii) Bioaccumulation and extent of oil or hazardous substances in the food chain;

(iv) Chemical, physical, and biological removal rates of the oil or hazardous substance from the media involved, especially as related to the local conditions, as well as the nature of any potential degradation or decomposition products from the process including:

(A) Dispersion, dilution, and volatilization rates in air, sediments, water, or geologic materials;

(B) Transport rates in air, soil, water, and sediments;

(C) Biological degradation, depuration, or decomposition rates and residence times in living materials;

(D) Soil or sediment properties and adsorption-desorption rates between soil or sediment components and water or air;

(E) Soil surface runoff, leaching, and weathering processes; and

(F) Local weather or climatological conditions that may affect recovery rates.

[51 FR 27725, Aug. 1, 1986, as amended at 59 FR 14283, Mar. 25, 1994; 61 FR 20612, May 7, 1996]

§ 11.80 Damage determination phase—general.

(a) *Requirement.* (1) The authorized official shall make his damage determination by estimating the monetary damages resulting from the discharge of oil or release of a hazardous substance based upon the information provided in the Quantification phase and the guidance provided in this Damage Determination phase.

(2) The Damage Determination phase consists of §11.80—general; §11.81—Restoration and Compensation Determination Plan; §11.82—alternatives for restoration, rehabilitation, replacement, and/or acquisition of equivalent resources; §11.83—cost estimating and valuation methodologies; and §11.84—implementation guidance, of this part.

(b) *Purpose.* The purpose of the Damage Determination phase is to establish the amount of money to be sought in compensation for injuries to natural resources resulting from a discharge of oil or release of a hazardous substance. The measure of damages is the cost of (i) restoration or rehabilitation of the injured natural resources to a condition where they can provide the level of services available at baseline, or (ii) the replacement and/or acquisition of equivalent natural resources capable of providing such services. Damages may also include, at the discretion of the authorized official, the compensable value of all or a portion of the services lost to the public for the time period from the discharge or release until the attainment of the restoration, rehabilitation, replacement, and/or acquisition of equivalent of baseline.

(c) *Steps in the Damage Determination phase.* The authorized official shall develop a Restoration and Compensation Determination Plan, described in §11.81 of this part. To prepare this Restoration and Compensation Determination Plan, the authorized official shall develop a reasonable number of possible alternatives for restoration, rehabilitation, replacement, and/or acquisition of equivalent resources and select, pursuant to the guidance of §11.82 of this part, the most appropriate of those alternatives; and identify the cost estimating and valuation methodologies, described in §11.83 of this part, that will be used to calculate damages. The guidance provided in §11.84 of this part shall be followed in implementing the cost estimating and valuation methodologies. After public review of the Restoration and Compensation Determination Plan, the authorized official shall implement the Restoration and Compensation Determination Plan.

(d) *Completion of the Damage Determination phase.* Upon completion of the Damage Determination phase, the type B assessment is completed. The results of the Damage Determination phase shall be documented in the Report of Assessment described in §11.90 of this part.

[59 FR 14283, Mar. 25, 1994, as amended at 73 FR 75266, Oct. 2, 2008]

§ 11.81 Damage determination phase—restoration and compensation determination plan.

(a) *Requirement.* (1) The authorized official shall develop a Restoration and Compensation Determination Plan that will list a reasonable number of possible alternatives for (i) the restoration or rehabilitation of the injured natural resources to a condition where they can provide the level of services available at baseline, or (ii) the replacement and/or acquisition of equivalent natural resources capable of providing such services, and, where relevant, the compensable value; select one of the alternatives and the actions required to implement that alternative; give the rationale for selecting that alternative; and identify the methodologies that will be used to determine the costs of the selected alternative and, at the discretion of the authorized official, the compensable value of the services lost to the public associated with the selected alternative.

(2) The Restoration and Compensation Determination Plan shall be of

sufficient detail to evaluate the possible alternatives for the purpose of selecting the appropriate alternative to use in determining the cost of baseline restoration, rehabilitation, replacement, and/or acquisition of equivalent resources, and, where relevant, the compensable value.

(b) The authorized official shall use the guidance in §§ 11.82, 11.83, and 11.84 of this part to develop the Restoration and Compensation Determination Plan.

(c) The authorized official shall list the methodologies he expects to use to determine the costs of all actions considered within the selected alternative and, where relevant, the compensable value of the lost services through the recovery period associated with the selected alternative. The methodologies to use in determining costs and compensable value are described in § 11.83 of this part.

(d)(1) The Restoration and Compensation Determination Plan shall be part of the Assessment Plan developed in subpart B of this part. If existing data are not sufficient to develop the Restoration and Compensation Determination Plan at the time that the overall Assessment Plan is made available for public review and comment, the Restoration and Compensation Determination Plan may be developed later, after the completion of the Injury Determination or Quantification phases.

(2) If the Restoration and Compensation Determination Plan is prepared later than the Assessment Plan, it shall be made available separately for public review by any identified potentially responsible party, other natural resource trustees, other affected Federal or State agencies or Indian tribes, and any other interested members of the public for a period of no less than 30 calendar days. Reasonable extensions may be granted as appropriate.

(3) Comments received from any identified potentially responsible party, other natural resource trustees, other affected Federal or State agencies or Indian tribes, or any other interested members of the public, together with responses to those comments, shall be included as part of the Report of Assessment, described in § 11.90 of this part.

(4) Appropriate public review of the plan must be completed before the authorized official performs the methodologies listed in the Restoration and Compensation Determination Plan.

(e) The Restoration and Compensation Determination Plan may be expanded to incorporate requirements from procedures required under other portions of CERCLA or the CWA or from other Federal, State, or tribal laws applicable to restoration, rehabilitation, replacement, and/or acquisition of the equivalent of the injured resources or may be combined with other plans for related purposes, so long as the requirements of this section are fulfilled.

[59 FR 14283, Mar. 25, 1994, as amended at 73 FR 57266, Oct. 2, 2008]

§ 11.82 Damage determination phase—alternatives for restoration, rehabilitation, replacement, and/or acquisition of equivalent resources.

(a) *Requirement.* The authorized official shall develop a reasonable number of possible alternatives for (i) the restoration or rehabilitation of the injured natural resources to a condition where they can provide the level of services available at baseline, or (ii) the replacement and/or acquisition of equivalent natural resources capable of providing such services. For each possible alternative developed, the authorized official will identify an action, or set of actions, to be taken singly or in combination by the trustee agency to achieve the baseline restoration, rehabilitation, replacement, and/or acquisition of equivalent natural resources. The authorized official shall then select from among the possible alternatives the alternative that he determines to be the most appropriate based on the guidance provided in this section.

(b) *Steps.* (1) The authorized official shall develop a reasonable number of possible alternatives that would restore, rehabilitate, replace, and/or acquire the equivalent of the injured resources. Each of the possible alternatives may, at the discretion of the authorized official, consist of actions, singly or in combination, that would achieve those purposes.

(i) Restoration or rehabilitation actions are those actions undertaken to return injured resources to their baseline condition, as measured in terms of the physical, chemical, or biological properties that the injured resources would have exhibited or the services that would have been provided by those resources had the discharge of oil or release of the hazardous substance under investigation not occurred. Such actions would be in addition to response actions completed or anticipated pursuant to the National Contingency Plan (NCP).

(ii) Replacement or acquisition of the equivalent means the substitution for injured resources with resources that provide the same or substantially similar services, when such substitutions are in addition to any substitutions made or anticipated as part of response actions and when such substitutions exceed the level of response actions determined appropriate to the site pursuant to the NCP.

(iii) Possible alternatives are limited to those actions that (i) restore or rehabilitate the injured natural resources to a condition where they can provide the level of services available at baseline, or (ii) replace and/or acquire equivalent natural resources capable of providing such services.

(2) *Services provided by the resources.* (i) In developing each of the possible alternatives, the authorized official shall list the proposed actions that would restore, rehabilitate, replace, and/or acquire the equivalent of the services provided by the injured natural resources that have been lost, and the period of time over which these services would continue to be lost.

(ii) The authorized official shall identify services previously provided by the resources in their baseline condition in accordance with §11.72 of this part and compare those services with services now provided by the injured resources, that is, the with-a-discharge-or-release condition. All estimates of the with-a-discharge-or-release condition shall incorporate consideration of the ability of the resources to recover as determined in §11.73 of this part.

(c) *Range of possible alternatives.* (1) The possible alternatives considered by the authorized official that return the injured resources to their baseline level of services could range from intensive action on the part of the authorized official to return the various resources and services provided by those resources to baseline conditions as quickly as possible, to natural recovery with minimal management actions. Possible alternatives within this range could reflect varying rates of recovery, combinations of management actions, and needs for resource replacements or acquisitions.

(2) An alternative considering natural recovery with minimal management actions, based upon the ''No Action-Natural Recovery'' determination made in §11.73(a)(1) of this part, shall be one of the possible alternatives considered.

(d) *Factors to consider when selecting the alternative to pursue.* When selecting the alternative to pursue, the authorized official shall evaluate each of the possible alternatives based on all relevant considerations, including the following factors:

(1) Technical feasibility, as that term is used in this part.

(2) The relationship of the expected costs of the proposed actions to the expected benefits from the restoration, rehabilitation, replacement, and/or acquisition of equivalent resources.

(3) Cost-effectiveness, as that term is used in this part.

(4) The results of any actual or planned response actions.

(5) Potential for additional injury resulting from the proposed actions, including long-term and indirect impacts, to the injured resources or other resources.

(6) The natural recovery period determined in §11.73(a)(1) of this part.

(7) Ability of the resources to recover with or without alternative actions.

(8) Potential effects of the action on human health and safety.

(9) Consistency with relevant Federal, State, and tribal policies.

(10) Compliance with applicable Federal, State, and tribal laws.

(e) A Federal authorized official shall not select an alternative that requires

acquisition of land for Federal management unless the Federal authorized official determines that restoration, rehabilitation, and/or other replacement of the injured resources is not possible.

[59 FR 14284, Mar. 25, 1994, as amended at 73 FR 57266, Oct. 2, 2008; 73 FR 65274, Nov. 3, 2008]

§ 11.83 Damage determination phase—use value methodologies.

(a) *General.* (1) This section contains guidance and methodologies for determining: The costs of the selected alternative for (i) the restoration or rehabilitation of the injured natural resources to a condition where they can provide the level of services available at baseline, or (ii) the replacement and/or acquisition of equivalent natural resources capable of providing such services; and the compensable value of the services lost to the public through the completion of the baseline restoration, rehabilitation, replacement, and/or acquisition of equivalent natural resources.

(2)(i) The authorized official shall select among the cost estimating and valuation methodologies set forth in this section, or methodologies that meet the acceptance criterion of either paragraph (b)(3) or (c)(3) of this section.

(ii) The authorized official shall define the objectives to be achieved by the application of the methodologies.

(iii) The authorized official shall follow the guidance provided in this section for choosing among the methodologies that will be used in the Damage Determination phase.

(iv) The authorized official shall describe his selection of methodologies and objectives in the Restoration and Compensation Determination Plan.

(3) The authorized official shall determine that the following criteria have been met when choosing among the cost estimating and valuation methodologies. The authorized official shall document this determination in the Report of the Assessment. Only those methodologies shall be chosen:

(i) That are feasible and reliable for a particular incident and type of damage to be measured.

(ii) That can be performed at a reasonable cost, as that term is used in this part.

(iii) That avoid double counting or that allow any double counting to be estimated and eliminated in the final damage calculation.

(iv) That are cost-effective, as that term is used in this part.

(4) Factors that may be considered by trustees to evaluate the feasibility and reliability of methodologies can include:

(i) Is the methodology capable of providing information of use in determining the restoration cost or compensable value appropriate for a particular natural resource injury?

(ii) Does the methodology address the particular natural resource injury and associated service loss in light of the nature, degree, and spatial and temporal extent of the injury?

(iii) Has the methodology been subject to peer review, either through publication or otherwise?

(iv) Does the methodology enjoy general or widespread acceptance by experts in the field?

(v) Is the methodology subject to standards governing its application?

(vi) Are methodological inputs and assumptions supported by a clearly articulated rationale?

(vii) Are cutting edge methodologies tested or analyzed sufficiently so as to be reasonably reliable under the circumstances?

(5) All of the above factors may not be applicable to every case, and other factors may be considered to evaluate feasibility and reliability. The authorized official shall document any consideration of factors deemed applicable in the Report of Assessment.

(b) *Costs of restoration, rehabilitation, replacement, and/or acquisition of equivalent resources.* (1) Costs for restoration, rehabilitation, replacement, and/or acquisition of equivalent resources are the amount of money determined by the authorized official as necessary to complete all actions identified in the selected alternative for restoration, rehabilitation, replacement, and/or acquisition of equivalent resources, as selected in the Restoration and Compensation Determination Plan of § 11.81 of this part. Such costs shall include direct and indirect costs, consistent with the provisions of this section.

(i) Direct costs are those that are identified by the authorized official as attributed to the selected alternative. Direct costs are those charged directly to the conduct of the selected alternative including, but not limited to, the compensation of employees for the time and effort devoted to the completion of the selected alternative; cost of materials acquired, consumed, or expended specifically for the purpose of the action; equipment and other capital expenditures; and other items of expense identified by the authorized official that are expected to be incurred in the performance of the selected alternative.

(ii) Indirect costs are costs of activities or items that support the selected alternative, but that cannot practically be directly accounted for as costs of the selected alternative. The simplest example of indirect costs is traditional overhead, e.g., a portion of the lease costs of the buildings that contain the offices of trustee employees involved in work on the selected alternative may, under some circumstances, be considered as an indirect cost. In referring to costs that cannot practically be directly accounted for, this subpart means to include costs that are not readily assignable to the selected alternative without a level of effort disproportionate to the results achieved.

(iii) An indirect cost rate for overhead costs may, at the discretion of the authorized official, be applied instead of calculating indirect costs where the benefits derived from the estimation of indirect costs do not outweigh the costs of the indirect cost estimation. When an indirect cost rate is used, the authorized official shall document the assumptions from which that rate has been derived.

(2) *Cost estimating methodologies.* The authorized official may choose among the cost estimating methodologies listed in this section or may choose other methodologies that meet the acceptance criterion in paragraph (b)(3) of this section. Nothing in this section precludes the use of a combination of cost estimating methodologies so long as the authorized official does not double count or uses techniques that allow any double counting to be estimated and eliminated in the final damage calculation.

(i) *Comparison methodology.* This methodology may be used for unique or difficult design and estimating conditions. This methodology requires the construction of a simple design for which an estimate can be found and applied to the unique or difficult design.

(ii) *Unit methodology.* This methodology derives an estimate based on the cost per unit of a particular item. Many other names exist for describing the same basic approach, such as order of magnitude, lump sum, module estimating, flat rates, and involve various refinements. Data used by this methodology may be collected from technical literature or previous cost expenditures.

(iii) *Probability methodologies.* Under these methodologies, the cost estimate represents an ''average'' value. These methodologies require information which is called certain, or deterministic, to derive the expected value of the cost estimate. Expected value estimates and range estimates represent two types of probability methodologies that may be used.

(iv) *Factor methodology.* This methodology derives a cost estimate by summing the product of several items or activities. Other terms such as ratio and percentage methodologies describe the same basic approach.

(v) *Standard time data methodology.* This methodology provides for a cost estimate for labor. Standard time data are a catalogue of standard tasks typically undertaken in performing a given type of work.

(vi) *Cost- and time-estimating relationships (CERs and TERs).* CERs and TERs are statistical regression models that mathematically describe the cost of an item or activity as a function of one or more independent variables. The regression models provide statistical relationships between cost or time and physical or performance characteristics of past designs.

(3) *Other cost estimating methodologies.* Other cost estimating methodologies that are based upon standard and accepted cost estimating practices and are cost-effective are acceptable methodologies to determine the costs of restoration, rehabilitation, replacement,

and/or acquisition of equivalent resources under this part.

(c) *Compensable value.* (1) Compensable value is the amount of money required to compensate the public for the loss in services provided by the injured resources between the time of the discharge or release and the time the resources are fully returned to their baseline conditions, or until the resources are replaced and/or equivalent natural resources are acquired. The compensable value can include the economic value of lost services provided by the injured resources, including both public use and nonuse values such as existence and bequest values. Economic value can be measured by changes in consumer surplus, economic rent, and any fees or other payments collectible by a Federal or State agency or an Indian tribe for a private party's use of the natural resources; and any economic rent accruing to a private party because the Federal or State agency or Indian tribe does not charge a fee or price for the use of the resources. Alternatively, compensable value can be determined utilizing a restoration cost approach, which measures the cost of implementing a project or projects that restore, replace, or acquire the equivalent of natural resource services lost pending restoration to baseline.

(i) Use value is the economic value of the resources to the public attributable to the direct use of the services provided by the natural resources.

(ii) Nonuse value is the economic value the public derives from natural resources that is independent of any direct use of the services provided.

(iii) Restoration cost is the cost of a project or projects that restore, replace, or acquire the equivalent of natural resource services lost pending restoration to baseline.

(2) *Valuation methodologies.* The authorized official may choose among the valuation methodologies listed in this section to estimate appropriate compensation for lost services or may choose other methodologies provided that the methodology can satisfy the acceptance criterion in paragraph (c)(3) of this section. Nothing in this section precludes the use of a combination of valuation methodologies so long as the authorized official does not double count or uses techniques that allow any double counting to be estimated and eliminated in the final damage calculation.

Type of Methodology	Description
(i) Market price	The authorized official may determine the compensable value of the injured resources using the diminution in the market price of the injured resources or the lost services. May be used only if: (A) The natural resources are traded in the market; and (B) The authorized official determines that the market for the resources, or the services provided by the resources, is reasonably competitive.
(ii) Appraisal	The measure of compensable value is the difference between the with- and without-injury appraisal value determined by the comparable sales approach as described in the Uniform Appraisal Standards. Must measure compensable value, to the extent possible, in accordance with the ''Uniform Appraisal Standards for Federal Land Acquisition,'' Interagency Land Acquisition Conference, Washington, DC, 1973 (incorporated by reference, see § 11.18).
(iii) Factor income (sometimes referred to as the ''reverse value added'' methodology).	May be used only if the injured resources are inputs to a production process, which has as an output a product with a well-defined market price. May be used to determine: (A) The economic rent associated with the use of resources in the production process; and (B) The in-place value of the resources.
(iv) Travel cost	May be used to determine a value for the use of a specific area. Uses an individual's incremental travel costs to an area to model the economic value of the services of that area. Compensable value of the area to the traveler is the difference between the value of the area with and without a discharge or release. Regional travel cost models may be used, if appropriate.
(v) Hedonic pricing	May be used to determine the value of nonmarketed resources by an analysis of private market choices. The demand for nonmarketed natural resources is thereby estimated indirectly by an analysis of commodities that are traded in a market.
(vi) Unit value/benefits transfer	Unit values are preassigned dollar values for various types of nonmarketed recreational or other experiences by the public. Where feasible, unit values in the region of the affected resources and unit values that closely resemble the recreational or other experience lost with the affected resources may be used.
(vii) Contingent valuation	Includes all techniques that set up hypothetical markets to directly elicit an individual's economic valuation of a natural resource. Can determine: (A) Use values and explicitly determine option and existence values; and (B) Lost use values of injured natural resources.

Type of Methodology	Description
(viii) Conjoint Analysis	Like contingent valuation, conjoint analysis is a stated preference method. However, instead of seeking to value natural resource service losses in strictly economic terms, conjoint analysis compares natural resource service losses that arise from injury to natural resource service gains produced by restoration projects.
(ix) Habitat Equivalency Analysis.	May be used to compare the natural resource services produced by habitat or resource-based restoration actions to natural resource service losses.
(x) Resource Equivalency Analysis.	Similar to habitat equivalency analysis. This methodology may be used to compare the effects of restoration actions on specifically identified resources that are injured or destroyed.
(xi) Random Utility Model	Can be used to: (A) Compare restoration actions on the basis of equivalent resource services provided; and (B) Calculate the monetary value of lost recreational services to the public.

(3) *Other valuation methodologies.* Other methodologies that measure compensable value in accordance with the public's willingness to pay for the lost service, or with the cost of a project that restores, replaces, or acquires services equivalent of natural resource services lost pending restoration to baseline in a cost-effective manner, are acceptable methodologies to determine compensable value under this part.

[51 FR 27725, Aug. 1, 1986, as amended at 53 FR 5175, Feb. 22, 1988; 59 FR 14285, Mar. 25, 1994; 73 FR 57266, Oct. 2, 2008]

§ 11.84 Damage determination phase—implementation guidance.

(a) *Requirement.* The authorized official should use the cost estimating and valuation methodologies in § 11.83 of this part following the appropriate guidance in this section.

(b) *Determining uses.* (1) Before estimating damages for compensable value under § 11.83 of this part, the authorized official should determine the uses made of the resource services identified in the Quantification phase.

(2) Only committed uses, as that phrase is used in this part, of the resource or services over the recovery period will be used to measure the change from the baseline resulting from injury to a resource. The baseline uses must be reasonably probable, not just in the realm of possibility. Purely speculative uses of the injured resource are precluded from consideration in the estimation of damages.

(3)(i) When resources or resource services have mutually exclusive uses, the highest-and-best use of the injured resource or services, as determined by the authorized official, shall be used as the basis of the analyses required in this part. This determination of the highest-and-best use must be consistent with the requirements of paragraph (b)(2) of this section.

(ii) If the uses of the resource or service are not necessarily mutually exclusive, the sum of damages should be determined from individual services. However, the sum of the projected damages from individual services shall consider congestion or crowding out effects, if any, from the resulting projected total use of those services.

(c) *Double counting.* (1) Double counting of damages should be avoided. Double counting means that a benefit or cost has been counted more than once in the damage assessment.

(2) Natural resource damages are the residual to be determined by incorporating the effects, or anticipated effects, of any response actions. To avoid one aspect of double counting, the effects of response actions shall be factored into the analysis of damages. If response actions will not be completed until after the assessment has been initiated, the anticipated effects of such actions should be included in the assessment.

(d) *Uncertainty.* (1) When there are significant uncertainties concerning the assumptions made in all phases of the assessment process, reasonable alternative assumptions should be examined. In such cases, uncertainty should be handled explicitly in the analysis and documented. The uncertainty should be incorporated in the estimates of benefits and costs.

(2) To incorporate this uncertainty, the authorized official should derive a range of probability estimates for the important assumptions used to determine damages. In these instances, the damage estimate will be the net expected present value of the costs of restoration, rehabilitation, replacement,

and/or acquisition of equivalent resources and, if relevant, compensable value.

(e) *Discounting.* (1) Where possible, damages should be estimated in the form of an expected present value dollar amount. In order to perform this calculation, a discount rate must be selected.

(2) The discount rate to be used is that specified in ''Office of Management and Budget (OMB) Circular A–94 Revised'' (dated March 27, 1972, available from the Executive Office of the President, Publications, 726 Jackson Place, NW., Washington, DC 20503; ph: (202) 395–7372).

(f) *Substitutability.* In calculating compensable value, the authorized official should incorporate estimates of the ability of the public to substitute resource services or uses for those of the injured resources. This substitutability should be estimated only if the potential benefits from an increase in accuracy are greater than the potential costs.

(g) *Compensable value during the restoration, rehabilitation, replacement, and/or acquisition of equivalent resources.* (1) In determining the amount of damages, the authorized official has the discretion to compute compensable value for the period of time required to achieve the restoration, rehabilitation, replacement, and/or acquisition of equivalent resources.

(2) When calculating compensable value during the period of time required to achieve restoration, rehabilitation, replacement, and/or acquisition of equivalent resources, the authorized official should follow the procedures described below. The procedures need not be followed in sequence.

(i) The ability of the injured resources to recover over the recovery period should be estimated. This estimate includes estimates of natural recovery rates as well as recovery rates that reflect management actions or resource acquisitions to achieve restoration, rehabilitation, replacement, and/or acquisition of equivalent resources.

(ii) A recovery rate should be selected for this analysis that is based upon cost-effective management actions or resource acquisitions, including a ''No Action-Natural Recovery'' alternative. After the recovery rate is estimated, compensable value should be estimated.

(iii) The rate at which the uses of the injured resources and their services will be restored through the restoration or replacement of the services should be estimated. This rate may be discontinuous, that is, no uses are restored until all, or some threshold level, of the services are restored, or continuous, that is, restoration or replacement of uses will be a function of the level and rate of restoration or replacement of the services. Where practicable, the supply of and demand for the restored services should be analyzed, rather than assuming that the services will be utilized at their full capacity at each period of time in the analysis. Compensable value should be discounted using the rate described in paragraph (e)(2) of this section. This estimate is the expected present value of uses obtained through restoration, rehabilitation, replacement, and/or acquisition of equivalent resources.

(iv) The uses of the resource that would have occurred in the absence of the discharge or release should be estimated. This estimate should be done in accordance with the procedures in §11.72 of this part. These uses should be estimated over the same time period using the same discount rate as that specified in paragraph (e)(2) of this section. This amount is the expected present value of uses forgone.

(v) Subtraction of the present value of uses obtained through restoration or replacement from the expected present value of uses forgone gives the amount of compensation that may be included, if positive, in a measure of damages.

(h) *Scope of the analysis.* (1) The authorized official must determine the scope of the analysis in order to estimate compensable value.

(2) In assessments where the scope of analysis is Federal, only the compensable value to the Nation as a whole should be counted.

(3) In assessments where the scope of analysis is at the State level, only the compensable value to the State should be counted.

(4) In assessments where the scope of analysis is at the tribal level, only the

compensable value to the tribe should be counted.

[51 FR 27725, Aug. 1, 1986, as amended at 53 FR 5176, Feb. 22, 1988; 59 FR 14286, Mar. 25, 1994]

Subpart F—Post-Assessment Phase

§ 11.90 What documentation must the authorized official prepare after completing the assessment?

(a) At the conclusion of an assessment, the authorized official must prepare a Report of Assessment that consists of the Preassessment Screen Determination, the Assessment Plan, and the information specified in paragraphs (b) and (c) of this section as applicable.

(b) When the authorized official has used a type A procedure, the Report of Assessment must include the information specified in subpart D.

(c) When the authorized official has used type B procedures, the Report of Assessment must include all documentation supporting the determinations required in the Injury Determination phase, the Quantification phase, and the Damage Determination phase, and specifically including the test results of any and all methodologies performed in these phases. The preliminary estimate of damages shall be included in the Report of Assessment. The Restoration and Compensation Determination Plan, along with comments received during the public review of that Plan and responses to those comments, shall also be included in the Report of Assessment.

[51 FR 27725, Aug. 1, 1986, as amended at 59 FR 14287, Mar. 25, 1994; 61 FR 20612, May 7, 1996]

§ 11.91 How does the authorized official seek recovery of the assessed damages from the potentially responsible party?

(a) At the conclusion of the assessment, the authorized official must present to the potentially responsible party a demand in writing for the damages determined in accordance with this part and the reasonable cost of the assessment. [See § 11.92(b) to determine how the authorized official must adjust damages if he or she plans to place recovered funds in a non-interest-bearing account.] The authorized official must deliver the demand in a manner that establishes the date of receipt. The demand shall adequately identify the Federal or State agency or Indian tribe asserting the claim, the general location and description of the injured resource, the type of discharge or release determined to have resulted in the injuries, and the damages sought from that party.

(b) *Report of assessment.* The demand letter shall include the Report of Assessment as an attachment.

(c) *Rebuttable presumption.* When performed by a Federal or State official in accordance with this part, the natural resource damage assessment and the resulting Damage Determination supported by a complete administrative record of the assessment including the Report of Assessment as described in § 11.90 of this part shall have the force and effect of a rebuttable presumption on behalf of any Federal or State claimant in any judicial or adjudicatory administrative proceeding under CERCLA, or section 311 of the CWA.

(d) *Potentially responsible party response.* The authorized official should allow at least 60 days from receipt of the demand by the potentially responsible party, with reasonable extensions granted as appropriate, for the potentially responsible party to acknowledge and respond to the demand, prior to filing suit. In cases governed by section 113(g) of CERCLA, the authorized official may include a notice of intent to file suit and must allow at least 60 days from receipt of the demand by the potentially responsible party, with reasonable extensions granted as appropriate, for the potentially responsible party to acknowledge and respond to the demand, prior to filing suit.

[53 FR 5176, Feb. 22, 1988, as amended at 59 FR 14287, Mar. 25, 1994; 61 FR 20612, May 7, 1996; 73 FR 57268, Oct. 2, 2008]

§ 11.92 Post-assessment phase—restoration account.

(a) *Disposition of recoveries.* (1) All sums (damage claim and assessment costs) recovered pursuant to section 107(f) of CERCLA or sections 311(f)(4) and (5) of the CWA by the Federal government acting as trustee shall be retained by the trustee, without further

appropriation, in a separate account in the U.S. Treasury.

(2) All sums (damage claim and assessment costs) recovered pursuant to section 107(f) of CERCLA, or sections 311(f)(4) and (5) of the CWA by a State government acting as trustee shall either:

(i) Be placed in a separate account in the State treasury; or

(ii) Be placed by the responsible party or parties in an interest bearing account payable in trust to the State agency acting as trustee.

(3) All sums (damage claim and assessment costs) recovered pursuant to section 107(f) of CERCLA or sections 311(f)(4) and (5) of the CWA by an Indian tribe shall either:

(i) Be placed in an account in the tribal treasury; or

(ii) Be placed by the responsible party or parties in an interest bearing account payable in trust to the Indian tribe.

(b) *Adjustments.* (1) In establishing the account pursuant to paragraph (a) of this section, the calculation of the expected present value of the damage amount should be adjusted, as appropriate, whenever monies are to be placed in a non-interest bearing account. This adjustment should correct for the anticipated effects of inflation over the time estimated to complete expenditures for the restoration, rehabilitation, replacement, and/or acquisition of equivalent resources.

(2) In order to make the adjustment in paragraph (b)(1) of this section, the authorized official should adjust the damage amount by the rate payable on notes or bonds issued by the United States Treasury with a maturity date that approximates the length of time estimated to complete expenditures for the restoration, rehabilitation, replacement, and/or acquisition of equivalent resources.

(c) *Payments from the account.* Monies that constitute the damage claim amount shall be paid out of the account established pursuant to paragraph (a) of this section only for those actions described in the Restoration Plan required by § 11.93 of this part.

[53 FR 5176, Feb. 22, 1988, as amended at 59 FR 14287, Mar. 25, 1994]

§ 11.93 Post-assessment phase—restoration plan.

(a) Upon determination of the amount of the award of a natural resource damage claim as authorized by section 107(a)(4)(C) of CERCLA, or sections 311(f)(4) and 311(f)(5) of the CWA, the authorized official shall prepare a Restoration Plan as provided in section 111(i) of CERCLA. The plan shall be based upon the Restoration and Compensation Determination Plan described in §§ 11.81 of this part. The Plan shall describe how the monies will be used to address natural resources, specifically what restoration, rehabilitation, replacement, or acquisition of the equivalent resources will occur. When damages for compensable value have been awarded, the Plan shall also describe how monies will be used to address the services that are lost to the public until restoration, rehabilitation, replacement, and/or acquisition of equivalent resources is completed. The Restoration Plan shall be prepared in accordance with the guidance set forth in § 11.81 of this part.

(b) No restoration activities shall be conducted by Federal agencies that would incur ongoing expenses in excess of those that would have been incurred under baseline conditions and that cannot be funded by the amount included in the separate account established pursuant to § 11.92(a) of this part unless such additional monies are appropriated through the normal appropriations process.

(c) Modifications may be made to the Restoration Plan as become necessary as the restoration proceeds. Significant modifications shall be made available for review by any responsible party, any affected natural resource trustees, other affected Federal or State agencies or Indian tribes, and any other interested members of the public for a period of at least 30 days, with reasonable extensions granted as appropriate, before tasks called for in the modified plan are begun.

(d) If the measure of damages was determined in accordance with subpart D, the restoration plan may describe actions to be taken that are to be financed from more than one damage award, so long as the actions are intended to address the same or similar

resource injuries as those identified in each of the subpart D assessment procedures that were the basis of the awards.

[51 FR 27725, Aug. 1, 1986, as amended at 52 FR 9100, Mar. 20, 1987; 53 FR 5176, Feb. 22, 1988; 59 FR 14287, Mar. 25, 1994]

APPENDIX I TO PART 11—METHODS FOR ESTIMATING THE AREAS OF GROUND WATER AND SURFACE WATER EXPOSURE DURING THE PREASSESSMENT SCREEN

This appendix provides methods for estimating, as required in §11.25 of this part, the areas where exposure of ground water or surface water resources may have occurred or are likely to occur. These methods may be used in the absence of more complete information on the ground water or surface water resources.

Ground Water

The longitudinal path length (LPL) factors in table 1 are to be applied in estimating the area potentially exposed downgradient of the known limit of exposure or of the boundary of the site. Estimates of lateral path width (LPW) are to be used when the LPW exceeds the width of the plume as determined from available data, or when the width of the plume at the boundary of the site is estimated as less than the LPW. In the absence of data to the contrary, the largest values of LPL and LPW consistent with the geohydrologic data available shall be used to make the estimates required in the preassessment screen. An example computation using the LPL and LPW factors follows table 1.

TABLE 1—FACTORS FOR ESTIMATION OF AREAS POTENTIALLY EXPOSED VIA THE GROUND WATER PATHWAY

Aquifer type	Hyd. conductivity/porosity factor (miles/year)	Hydraulic gradient estimate (feet/mile)	Time since release began (in years)	Longitudinal path length (in feet)	Lateral path width (in feet)
Sand	50	×	×	=	LPW = 0.2LPL
Sand + silt	0.5	×	×	=	LPW = 0.3LPL
Gravel	6000	×	×	=	LPW = 0.2LPL
Sandstone	0.01	×	×	=	LPW = 0.4LPL
Shale	3×10^{-6}	×	×	=	LPW = 0.8LPL
Karst Limestone or Dolomite	10	×	×	=	LPW = 0.2LPL
Limestone or Dolomite	0.01	×	×	=	LPW = 0.4LPL
Fractured Crystalline Rocks	0.3	×	×	=	LPW = 0.3LPL
Dense Crystalline Rocks	1×10^{-5}	×	×	=	LPW = 0.8LPL

EXAMPLE OF COMPUTATION FOR ESTIMATING THE AREA POTENTIALLY EXPOSED VIA GROUND WATER PATHWAY

A release of hazardous substances occurs from a facility located in a glacial valley. Available data indicate the release may have occurred intermittently over a period of almost 1 year, although only one well about 300 feet downgradient of the facility boundary had detectable quantities of contaminants. The contaminated well is screened in the water table aquifer composed of gravelly sands. The facility boundary nearest the contaminated well is almost 3,000 feet in length, but a review of available data determined the release is probably localized along a 500-foot section of the boundary where a stream leaves the facility. Available water table data indicate hydraulic gradients in the valley range from 0.005 feet/mile up to 0.25 feet/mile near pumping wells. No pumping wells are known to be located near the release, and a mean hydraulic gradient of 0.1 feet/mile is estimated in the vicinity of the release site. Using the gravel factor from table 1, the LPL and LPW are estimated:

$6000 \times 0.1 \times 1 = 600$ feet (LPL)

and

$600 \times 0.2 = 120$ feet (LPW).

Since the estimated LPW (120 feet) is less than the plume width (500 feet) determined from other available data, the greater number is used to compute the area potentially exposed:

(1) 600 feet × 500 feet = 300,000 square feet (about 6.9 acres). The available information allows an initial determination of area potentially exposed via the ground water pathway to be estimated:

(2) 300 feet × 500 feet = 150,000 square feet (about 3.5 acres).

The total area potentially exposed is the sum of (1) and (2):

6.9 + 3.5 = 10.4 acres.

Surface Water

The area of surface water resources potentially exposed should be estimated by applying the principles included in the examples provided below.

Example 1: A release occurs and most of the oil or hazardous substance enters a creek, stream, or river instantaneously or over a short time interval (pulse input is assumed). The maximum concentration at any downstream location, past the initial mixing distance, is estimated by:

$C_p = 25(W_i)/(T^{0.7}\ Q)$

where C_p is the peak concentration, in milligrams/liter (mg/L),

W_i is the total reported (or estimated) weight of the undiluted substance released, in pounds,

Q is the discharge of the creek, stream, or river, in cubic feet/second, and

T is the time, in hours, when the peak concentration is estimated to reach a downstream location L, in miles from the entry point.

The time T may be estimated from:

$T = 1.5(L)/V_s$

where T and L are defined as above and

V_s is the mean stream velocity, in feet per second.

The mean stream velocity may be estimated from available discharge measurements or from estimates of slope of the water surface S (foot drop per foot distance downstream) and estimates of discharge Q (defined above) using the following equations:

for pool and riffle reaches $V_s = 0.38(Q^{0.40})(S^{0.20})$, or

for channel-controlled reaches $V_s = 2.69(Q^{0.26})(S^{0.28})$.

Estimates of S may be made from the slope of the channel, if necessary.

As the peak concentrations become attenuated by downstream transport, the plume containing the released substance becomes elongated. The time the plume might take to pass a particular point downstream may be estimated using the following equation:

$T_p = 9.25 \times 10^6\ W_i/(QC_p)$

where

T_p is the time estimate, in hours, and W_i, C_p, and Q are defined above.

Example 2: A release occurs and most of the oil or hazardous substance enters a creek, stream, or river very slowly or over a long time period (sustained input assumed). The maximum concentration at any downstream location, past the initial mixing distance, is estimated by:

$C_p = C(q)/(Q +$

where C_p and Q are defined above,

C is the average concentration of the released substance during the period of release, in mg/L, and

q is the discharge rate of the release into the streamflow, in cubic feet/second.

For the above computations, the initial mixing distance may be estimated by:

$L_m = (1.7 \times 10^{-5})V_s\ B^2/(D^{1.5}\ S^{0.5})$

where

L_m is the initial mixing distance, in miles,

V_s is defined above,

B is the average stream surface width, in ft,

D is the mean depth of the stream, in ft, and

S is the estimated water-surface slope, in ft/ft.

Example 3: A release occurs and the oil or hazardous substance enters a pond, lake, reservoir, or coastal body of water. The concentration of soluble released substance in the surface water body may be estimated by:

$C_p = CV_c/(V_w + V_c)$

where

C_p and C are defined above,

V_c is the estimated total volume of substance released, in volumetric units, and

V_w is the estimated volume of the surface water body, in the same volumetric units used for V_c.

[51 FR 27725, Aug. 1, 1986, as amended at 52 FR 9100, Mar. 20, 1987]

APPENDIX II TO PART 11—FORMAT FOR DATA INPUTS AND MODIFICATIONS TO THE NRDAM/CME

This appendix specifies the format for data inputs and modifications to the NRDAM/CME under §11.41. Consult the back of this appendix for definitions.

Starting Point for the NRDAM/CME

The NRDAM/CME begins its calculations at the point that the released substance entered water in an area represented by its geographic database. Any water within the geographic boundaries of the NRDAM/CME is a ''coastal or marine environment.'' The authorized official must determine all data inputs and modifications as of the time and location that the released substance entered a coastal or marine environment. In the case of a release that began in water in an area within the boundaries of the NRDAM/CME, this point will be the same as the point of the release. However, for releases that begin on land or that begin outside the boundaries of the NRDAM/CME, this point will not be the point of the release but rather the point at which the released substance migrates into a coastal or marine environment.

Required Data Inputs

Documentation of the source of the data inputs; and

Identity of Substance

For release of single substance:

Name of the substance that entered a coastal or marine environment as it appears in Table 7.1, Volume I of the NRDAM/CME technical document (incorporated by reference, see §11.18).

For releases of two or more substances or a release of a mixture of two or more substances:

Name of only one of the substances that entered a coastal or marine environment as it appears in Table 7.1, Volume I of the NRDAM/CME technical document.

Mass or Volume

For release of single substance:

Mass or volume of identified substance that entered a coastal or marine environment stated in tonnes, barrels, gallons, liters, pounds, or kilograms.

For releases of two or more substances or a release of a mixture of two or more substances:

Mass or volume of the one identified substance (rather than total mass) that entered a coastal or marine environment stated in tonnes, barrels, gallons, liters, pounds, or kilograms.

Duration

Length of time over which the identified substance entered a coastal or marine environment stated in hours.

Time

Year, month, day, and hour when the identified substance first entered a coastal or marine environment.

Location

Latitude and longitude, stated in degrees and decimal minutes, where the identified substance entered a coastal or marine environment.

Winds

At least one set of data on prevailing wind conditions for each day of the 30-day period beginning 24 hours before the identified substance entered a coastal or marine environment. Each set must include:

Wind velocity stated in knots or meters per second; and

Corresponding wind direction stated in the degree angle of the wind's origin.

[One possible source of information is the National Climatic Data Center, Asheville, NC (703) 271–4800.]

Response Actions

If removed from water surface:

A rectangular geographic area encompassing the surface water area over which the released substance was likely to have spread, stated in terms of the northern- and southern-most latitude, and the eastern- and western-most longitude;

One or more time frames for removal stated in terms of the number of days and hours after the identified substance entered a coastal or marine environment that removal began and ended; and

For each time frame, volume of the identified substance removed from the water surface (not the total volume of contaminated water or sediments removed) stated in barrels, gallons, or cubic meters.

If removed from shoreline:

A rectangular geographic area encompassing the shoreline area over which the released substance was likely to have spread, stated in terms of the northern- and southern-most latitude, and the eastern- and western-most longitude;

One or more time frames for removal stated in terms of the number of days and hours after the identified substance entered a coastal or marine environment that removal began and ended; and

For each time frame, volume of the identified substance removed (not the total volume of contaminated water or sediments removed) stated in barrels, gallons, or cubic meters.

Closures

Documentation that the closure was ordered by an appropriate agency as a result of the release;

Province(s) in which closure occurred; and

For beaches:

Whether the beach was Federal or State (including municipal or county);

Number of days of closure stated by calendar month; and

Length of shoreline closed, stated in kilometers, for each month in which closure occurred.

For fisheries and shellfish harvest areas:

Whether area closed was seaward open water, landward open water, or structured;

Number of days of closure; and

Area closed stated in square kilometers.

For furbearer hunting or trapping areas and waterfowl hunting areas:

Number of days of closure; and

Area closed stated in square kilometers.

Implicit Price Deflator

Quarterly implicit price deflator for the Gross National Product (base year 1992) for the quarter in which the identified substance entered a coastal or marine environment. [See the Survey of Current Business, published by the U.S. Department of Commerce/Bureau of Economic Analysis, 1441 L Street, NW, Washington, D.C., 20230, (202) 606–9900.]

Currents

For a rectangular geographic area encompassing the area affected by the release stated in terms of the northern- and southernmost latitude, and the eastern- and westernmost longitude:

At least one set of data concerning background (mean) current consisting of—

An east-west (U) velocity stated in centimeters per second or knots;

A north-south (V) velocity stated in centimeters per second or knots; and

Latitude and longitude of the origin of the U and V velocity components.

At least one set of data concerning tidal current at time of flood stage (i.e., rising tide) consisting of—

An east-west (U) velocity stated in centimeters per second or knots;

A north-south (V) velocity stated in centimeters per second or knots; and

Latitude and longitude of the origin of the U and V velocity components.

[Possible sources of information are: the National Ocean Service, U.S. Department of Commerce, Riverdale, MD (310) 436–6990; and the Eldridge Tide and Pilot Book, Robert Eldridge White Publisher, Boston, MA (617) 742–3045.]

Tides

Hour of high tide on the day that the identified substance entered a coastal or marine environment;

Tidal range at point that the identified substance entered a coastal or marine environment stated in meters; and

Whether the tide in the area affected by the release is diurnal (i.e., completes one full cycle every day) or semi-diurnal (i.e., completes two full cycles every day).

Modifications to the NRDAM/CME Databases (if Any)

Documentation of the source of the modification; and

For air temperature:

Air temperature, stated in degrees Celsius, assigned by the NRDAM/CME at the point that the identified substance entered a coastal or marine environment (see Table III.3.2, Volume III of the NRDAM/CME technical document); and

Substitute air temperature stated in degrees Celsius.

For water temperature at the surface:

Water temperature at the surface, stated in degrees Celsius, assigned by the NRDAM/CME at the point that the identified substance entered a coastal or marine environment (see Table III.3.3, Volume III of the NRDAM/CME technical document); and

Substitute water temperature stated in degrees Celsius.

For total suspended sediment concentration:

Total suspended sediment concentration, stated in milligrams per liter, assigned by the NRDAM/CME at the point that the identified substance entered a coastal or marine environment (see Section 3, Volume I of the NRDAM/CME technical document); and

Substitute suspended sediment concentration stated in milligrams per liter.

For mean settling velocity of suspended solids:

Mean settling velocity of suspended sediments, stated in meters per day, assigned by the NRDAM/CME at the point that the identified substance entered a coastal or marine environment (see Section 3, Volume I of the NRDAM/CME technical document); and

Substitute suspended sediment concentration stated in milligrams per liter.

For habitat type:

Latitude and longitude bounds of area for which the habitat type is being modified;

Habitat type assigned by the NRDAM/CME (see Section 3.4, Volume III of the NRDAM/CME technical document); and

Substitute habitat type.

For releases in Alaska, if the authorized official leaves the ice modeling function off, he or she must provide documentation that ice was absent at the site of the release.

Definitions

Background (mean) current—net long-term current flow (i.e., one direction only), attributable to forces such as winds, river flow, water density, and tides, that remains when all the oscillatory (tidal) components have been removed either mathematically or by measurement techniques.

Landward open water—a body of water that does not contain vegetation (e.g., wetland, seagrass, or kelp) or invertebrate reef (e.g., coral reef) and is classified as ''landward'' in Table 6.2, Volume I of the NRDAM/CME technical document.

Province—one of the geographic areas delineated in Table 6.1, Volume I of the NRDAM/CME technical document.

Seaward open water—a body of water that does not contain vegetation (e.g., wetlands, seagrass, or kelp) or invertebrate reef (e.g., coral reef) and is classified as ''seaward'' in Table 6.2, Volume I of the NRDAM/CME technical document.

Structured—in an area that contains vegetation (e.g., wetlands, seagrass, or kelp) or invertebrate reef (e.g., coral reef).

Tidal current—currents caused by alternating rise and fall of the sea level due to the gravitational forces between the earth, moon, and sun.

Tidal range—difference between the highest and lowest height of the tide.

[61 FR 20612, May 7, 1996]

APPENDIX III TO PART 11—FORMAT FOR DATA INPUTS AND MODIFICATIONS TO THE NRDAM/GLE

This appendix specifies the format for data inputs and modifications to the NRDAM/GLE under §11.41. Consult the back of this appendix for definitions.

Point of Analysis

The NRDAM/GLE begins its calculations at the point that the released substance entered water in an area represented by its geographic database. Any water within the geographic boundaries of the NRDAM/GLE is a ''Great Lakes environment.'' The authorized official must determine all data inputs and modifications as of the time and location that the released substance entered a Great Lakes environment. In the case of a release that began in water in an area within the boundaries of the NRDAM/GLE, this point will be the same as the point of the release. However, for releases that begin on land or that begin outside the boundaries of the NRDAM/GLE, this point will not be the point of the release but rather the point at which the released substance migrates into a Great Lakes environment.

Required Data Inputs

Documentation of source of data inputs; and

Identity of Substance

For release of single substance:

Name of the released substance that entered a Great Lakes environment as it appears in Table 7.1, Volume I of the NRDAM/GLE technical document (incorporated by reference, see §11.18).

For releases of two or more substances or a release of a mixture of two or more substances:

Name of only one of the released substances that entered a Great Lakes environment as it appears in Table 7.1, Volume I of the NRDAM/GLE technical document.

Mass or Volume

For releases of single substance:

Mass or volume of identified substance that entered a Great Lakes environment stated in tonnes, barrels, gallons, liters, pounds, or kilograms.

For releases of two or more substances or a release of a mixture of two or more substances:

Mass or volume of the one identified substance (rather than total mass) that entered a Great Lakes environment stated in tonnes, barrels, gallons, liters, pounds, or kilograms.

Duration

Length of time over which the identified substance entered a Great Lakes environment stated in hours.

Time

Year, month, day, and hour when the identified substance first entered a Great Lakes environment.

Location

Latitude and longitude, stated in degrees and decimal minutes, where the identified substance entered a Great Lakes environment.

Winds

At least one set of data on prevailing wind conditions for each day of the 30-day period beginning 24 hours before the identified substance entered a Great Lakes environment. Each set must include:

Wind velocity stated in knots or meters per second; and Corresponding wind direction stated in the degree angle of the wind's origin.

[One possible source of information is the National Climatic Data Center, Asheville, NC (703) 271–4800.]

Response Actions

Percentage of identified substance removed from water surface, bottom sediments, and shoreline; and

For each medium cleaned (water surface, bottom sediments, or shoreline), the number of days after the identified substance entered a Great Lakes environment that removal began and ended.

Closures

Documentation that the closure was ordered by an appropriate agency as a result of the release; and

For boating areas:

Number of weekend days of closure stated by calendar month;

Number of weekday days of closure stated by calendar month; and

Area closed stated in square kilometers.

For beaches:

Whether the beach was Federal or State (including municipal or county);

Number of days of closure stated by calendar month; and

Length of shoreline closed stated in meters.

For fisheries:

Whether area closed was an offshore, nearshore, or wetland fishery;

Number of days of closure; and

Area closed stated in square kilometers.

For furbearer hunting or trapping areas and waterfowl hunting areas:

Number of days of closure; and

Area closed stated in square kilometers.

Implicit Price Deflator

Quarterly implicit price deflator for the Gross National Product (base year 1992) for the quarter in which the identified substance entered a Great Lakes environment. [See the Survey of Current Business, published by the U.S. Department of Commerce/Bureau of Economic Analysis, 1441 L Street, NW, Washington, D.C., 20230, (202) 606–9900.]

MODIFICATIONS TO THE NRDAM/GLE DATABASES (IF ANY)

Documentation of the source of the modifications; and

For air temperature:

Air temperature, stated in degrees Celsius, assigned by the NRDAM/GLE at the point that the identified substance entered a Great Lakes environment (see Table III.6.1, Volume III of the NRDAM/GLE technical document); and

Substitute air temperature stated in degrees Celsius.

For water temperature at the surface:

Water temperature at the surface, stated in degrees Celsius, assigned by the NRDAM/GLE at the point that the identified substance entered a Great Lakes environment (see Table III.6.2.6, Volume III of the NRDAM/GLE technical document); and

Substitute water temperature stated in degrees Celsius.

For total suspended sediment concentration:

Total suspended sediment concentration, stated in milligrams per liter, assigned by the NRDAM/GLE at the point that the identified substance entered a Great Lakes environment (see Section 3, Volume I of the NRDAM/GLE technical document); and

Substitute suspended sediment concentration stated in milligrams per liter.

For mean settling velocity of suspended solids:

Mean settling velocity of suspended sediments, stated in meters per day, assigned by the NRDAM/GLE at the point that the identified substance entered a Great Lakes environment (see Section 3, Volume I of the NRDAM/GLE technical document); and

Substitute suspended sediment concentration stated in milligrams per liter.

For habitat type:

Latitude and longitude bounds of area for which the habitat type is being modified;

Habitat type assigned by the NRDAM/GLE (see Section 6.2, Volume III of the NRDAM/GLE technical document); and

Substitute habitat type.

If the authorized official turns off the ice modeling function, then he or she must provide documentation that ice was absent from the site of the release.

Definitions

Nearshore fishery—fishery in an open water area that is less than 30 feet in depth or is in a connecting channel.

Offshore fishery—fishery in an open water area that is 30 feet or more in depth.

Wetland fishery—fishery that is not in an open water area.

[61 FR 20614, May 7, 1996]

PART 12 [RESERVED]

PART 13—VENDING FACILITIES OPERATED BY BLIND PERSONS

Sec.
13.1 Authority and purpose.
13.2 Application for permit.
13.3 Cooperation in selection of facilities.
13.4 Terms of permit.
13.5 Protection from competition.
13.6 Appeals.

AUTHORITY: Sec. 4, 68 Stat. 663; 20 U.S.C. 107.

SOURCE: 22 FR 9476, Nov. 27, 1957, unless otherwise noted.

§ 13.1 Authority and purpose.

The Randolph-Sheppard Vending Stand Act of June 20, 1936, as amended by section 4 of the Act of August 3, 1954 (68 Stat. 663; 20 U.S.C. 107), directs that, insofar as practicable, preference shall be given to blind persons in the operation of vending stands and machines on any Federal property. The regulations in this part prescribe the policies and procedures to achieve and protect that preference on property, including land, owned or leased by the United States and controlled by the Department of the Interior.

§ 13.2 Application for permit.

(a) State licensing agencies designated by the Department of Health, Education, and Welfare under the Randolph-Sheppard Vending Stand Act may apply for permits to establish and maintain vending facilities, including both vending stands and machines, to be operated by blind persons licensed by the State agencies. Application for a permit shall be made, in writing, by the State licensing agency to the head of the Interior bureau or office having control of the property in question. In the regulations in this part the term ''head of the Interior bureau or office''