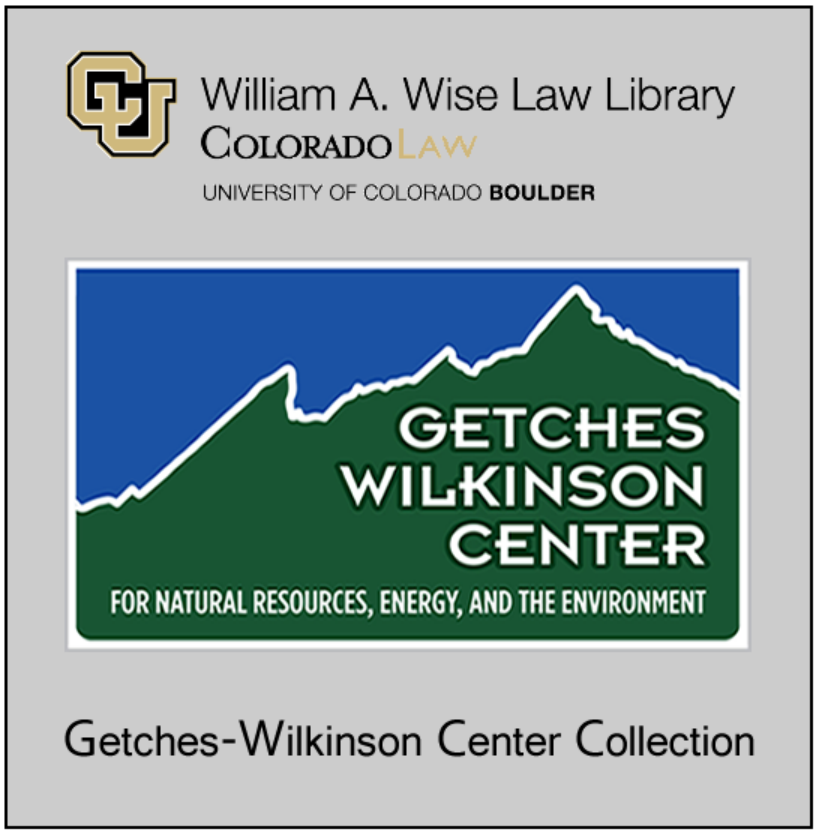
6-10-1986

Natural Resources Damage Litigation [Appendix]

Michael Donovan



Michael Donovan, *Natural Resources Damage Litigation* [Appendix], *in* GETTING A HANDLE ON HAZARDOUS WASTE CONTROL (Natural Res. Law Ctr., Univ. of Colo. Sch. of Law 1986).

NATURAL RESOURCES DAMAGE LITIGATION

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Denver, Colorado

GETTING A HANDLE ON HAZARDOUS WASTE CONTROLS

A Short Course Sponsored by the
Natural Resources Law Center
University of Colorado
School of Law

June 9-10, 1986

Appendix

Comprehensive Environmental Response, Compensation and Liability Act ("CERCLA") 42 U.S.C. 9601 et seq. (1980).

§101
§107
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National Contingency Plan, 40 C.F.R. part 440, 50 Fed. Reg. No. 224, Part III (November 20, 1985).

§300.72
§300.73
§300.74

Natural Resource Damage Assessments - Proposed Rule, Department of Interior, 43 C.F.R. Part 11, 50 Fed. Reg. No. 245, Part IV (December 20, 1985).

SUBCHAPTER III—MISCELLANEOUS PROVISIONS

Sec.

SUBCHAPTER I—HAZARDOUS SUBSTANCES RELEASES, LIABILITY, COMPENSATION

§ 9601. Definitions

For purpose of this subchapter, the term—

(1) "act of God" means an unanticipated grave natural disaster or other natural phenomenon of an exceptional, inevitable, and irresistible character, the effects of which could not have been prevented or avoided by the exercise of due care or foresight;

(2) "Administrator" means the Administrator of the United States Environmental Protection Agency;

(3) "barrel" means forty-two United States gallons at sixty degrees Fahrenheit;

(4) "claim" means a demand in writing for a sum certain;

(5) "claimant" means any person who presents a claim for compensation under this chapter;

(6) "damages" means damages for injury or loss of natural resources as set forth in section 9607(a) or 9611(b) of this title;

(7) "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 Safe Drinking Water Act [42 U.S.C.A. § 300f et seq.]) or as drinking water by one or more individuals;

(8) "environment" means (A) the navigable waters, the waters of the contiguous zone, and the ocean waters of which the natural resources are under the exclusive management authority of the United States under the Magnuson Fishery Conservation and Management Act [16 U.S.C.A. § 1801 et seq.], and (B) any other surface water, ground water, drinking water supply, land surface or subsurface strata, or ambient air within the United States or under the jurisdiction of the United States;

(9) "facility" means (A) any building, structure, installation, equipment, pipe or pipeline (including any pipe into a sewer or publicly owned treatment works), well, pit, pond, lagoon, impoundment, ditch, landfill, storage container, motor vehicle, rolling stock, or aircraft, or (B) any site or area where a hazardous substance has been deposited, stored, disposed of, or placed, or otherwise come to be located; but does not include any consumer product in consumer use or any vessel;

(10) "federally permitted release" means (A) discharges in compliance with a permit under section 1342 of Title 33, (B) discharges resulting from circumstances identified and reviewed and made part of the public record with respect to a permit issued or modified under section 1342 of Title 33 and subject to a condition of such permit, (C) continuous or anticipated intermittent discharges from a point source, identified in a permit or permit application under section 1342 of Title 33, which are caused by events occurring within the scope of relevant operating or treatment systems, (D) discharges in compliance with a legally enforceable permit under section 1344 of Title 33, (E) releases in compliance with a legally enforceable final permit issued pursuant to section 3005(a) through (d) of the Solid Waste Disposal Act [42 U.S.C.A § 6925(a) to (d)] from a hazardous waste treatment, storage, or disposal facility when such permit specifically identifies the hazardous substances and makes such substances subject to a standard of practice, control procedure or bioassay limitation or condition, or other control on the hazardous substances in such releases, (F) any release in compliance with a legally enforceable permit issued under section 1412 of Title 33 of[1] section 1413 of Title 33, (G) any injection of fluids authorized under Federal underground injection control programs or State programs submitted for Federal approval (and not disapproved by the Administrator of the Environmental Protection Agency) pursuant to part C of the Safe Drinking Water Act [42 U.S.C.A. § 300h et seq.], (H) any emission into the air subject to a permit or control regulation under section 111 [42 U.S.C.A. § 7411], section 112 [42 U.S.C.A. § 7412], Title I part C [42 U.S.C.A. § 7470 et seq.], Title I part D [42

U.S.C.A. § 7501 et seq.], or State implementation plans submitted in accordance with section 110 of the Clean Air Act [42 U.S.C.A. § 7410] (and not disapproved by the Administrator of the Environmental Protection Agency), including any schedule or waiver granted, promulgated, or approved under these sections, (I) any injection of fluids or other materials authorized under applicable State law (i) for the purpose of stimulating or treating wells for the production of crude oil, natural gas, or water, (ii) for the purpose of secondary, tertiary, or other enhanced recovery of crude oil or natural gas, or (iii) which are brought to the surface in conjunction with the production of crude oil or natural gas and which are reinjected, (J) the introduction of any pollutant into a publicly owned treatment works when such pollutant is specified in and in compliance with applicable pretreatment standards of section 1317(b) or (c) of Title 33 and enforceable requirements in a pretreatment program submitted by a State or municipality for Federal approval under section 1342 of Title 33, and (K) any release of source, special nuclear, or byproduct material, as those terms are defined in the Atomic Energy Act of 1954 [42 U.S.C.A. § 2011 et seq.], in compliance with a legally enforceable license, permit, regulation, or order issued pursuant to the Atomic Energy Act of 1954;

(11) "Fund" or "Trust Fund" means the Hazardous Substance Response Fund established by section 9631 of this title or, in the case of a hazardous waste disposal facility for which liability has been transferred under section 9607(k) of this title, the Post-closure Liability Fund established by section 9641 of this title;

(12) "ground water" means water in a saturated zone or stratum beneath the surface of land or water;

(13) "guarantor" means any person, other than the owner or operator, who provides evidence of financial responsibility for an owner or operator under this chapter;

(14) "hazardous substance" means (A) any substance designated pursuant to section 1321(b)(2)(A) of Title 33, (B) any element, compound, mixture, solution, or substance designated pursuant to section 9602 of this title, (C) any hazardous waste having the characteristics identified under or listed pursuant to section 3001 of the Solid Waste Disposal Act [42 U.S.C.A. § 6921] (but not including any waste the regulation of which under the Solid Waste Disposal Act [42 U.S.C.A. § 6901 et seq.] has been suspended by Act of Congress), (D) any toxic pollutant listed under section 1317 (a) of Title 33, (E) any hazardous air pollutant listed under section 112 of the Clean Air Act [42 U.S.C.A. § 7412], and (F) any imminently hazardous chemical substance or mixture with respect to which the Administrator has taken action pursuant to section 2606 of Title 15. The term does not include petroleum, including crude oil or any fraction thereof which is not otherwise specifically listed or designated as a hazardous substance under subparagraphs (A) through (F) of this paragraph, and the term does not include natural gas, natural gas liquids, liquefied natural gas, or synthetic gas usable for fuel (or mixtures of natural gas and such synthetic gas);

(15) "navigable waters" or "navigable waters of the United States" means the waters of the United States, including the territorial seas;

(16) "natural 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 [16 U.S.C.A. § 1801 et seq.]) any State or local government, or any foreign government;

(17) "offshore facility" means any facility of any kind located in, on, or under, any of the navigable waters of the United States, and any facility of any kind which is subject to the jurisdiction of the United States and is located in, on, or under any other waters, other than a vessel or a public vessel;

(18) "onshore facility" means any facility (including, but not limited to, motor vehicles and rolling stock) of any kind located in, on, or under, any land or nonnavigable waters within the United States;

(19) "otherwise subject to the jurisdiction of the United States" means subject to the jurisdiction of the United States by virtue of United States citizenship, United States vessel documentation or numbering, or as provided by international agreement to which the United States is a party;

(20)(A) "owner or operator" means (i) in the case of a vessel, any person owning, operating, or chartering by demise, such vessel, (ii) in the case of an onshore facility or an offshore facility, any person owning or operating such facility, and (iii) in the case of any abandoned facility, any person who owned, operated, or otherwise controlled activities at such facility immediately prior to such abandonment. Such term does not include a person, who, without participating in the management of a vessel or facility, holds indicia of ownership primarily to protect his security interest in the vessel or facility;

(B) in the case of a hazardous substance which has been accepted for transportation by a common or contract carrier and except as provided in section 9607(a)(3) or (4) of this title, (i) the term "owner or operator" shall mean such common carrier or other bona fide for hire carrier acting as an independent contractor during such transportation, (ii) the shipper of such hazardous substance shall not be considered to have caused or contributed to any release during such transportation which resulted solely from circumstances or conditions beyond his control;

(C) in the case of a hazardous substance which has been delivered by a common or contract carrier to a disposal or treatment facility and except as provided in section 9607(a)(3) or (4) of this title (i) the term "owner or operator" shall not include such common or contract carrier, and (ii) such common or contract carrier shall not be considered to have caused or contributed to any release at such disposal or treatment facility resulting from circumstances or conditions beyond its control;

(21) "person" means an individual, firm, corporation, association, partnership, consortium, joint venture, commercial entity, United States Government, State, municipality, commission, political subdivision of a State, or any interstate body;

(22) "release" means any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment, but excludes (A) any release which results in exposure to persons soley within a workplace, with respect to a claim which such persons may assert against the employer of such persons, (B) emissions from the engine exhaust of a motor vehicle, rolling stock, aircraft, vessel, or pipeline pumping station engine, (C) release of source, byproduct, or special nuclear material from a nuclear incident, as those terms are defined in the Atomic Energy Act of 1954 [42 U.S.C.A. § 2011 et seq.], if such release is subject to requirements with respect to financial protection established by the Nuclear Regulatory Commission under section 170 of such Act [42 U.S.C.A. § 2210], or, for the purposes of section 9604 of this title or any other response action, any release of source byproduct, or special nuclear material from any processing site designated under section 7912(a)(1) or 7942(a) of this title, and (D) the normal application of fertilizer;

(23) "remove" or "removal" means the cleanup or removal of released hazardous substances from the environment, such actions as may be necessary[2] taken in the event of the threat of release of hazardous substances into the environment, such actions as may be necessary to monitor, assess, and evaluate the release or threat of release of hazardous substances, the disposal of removed material, or the taking of such other actions as may be necessary to prevent, minimize, or mitigate damage to the public health or welfare or to the environment, which may otherwise result from a release or threat of release. The term includes, in addition, without being limited to, security fencing or other measures to limit access, provision of alternative water supplies, temporary evacuation and housing of threatened individuals not otherwise provided for, action taken under section 9604(b) of this title, and any emergency assistance which may be provided under the Disaster Relief Act of 1974 [42 U.S.C.A. § 5121 et seq.];

(24) "remedy" or "remedial action" means those actions consistent with permanent remedy taken instead of or in addition to removal actions in the event of a release or threatened release of a hazardous substance into the environment, to prevent or minimize the release of hazardous substances so that they do not migrate to cause substantial danger to present or future public health or welfare or the environment. The term includes, but is not limited to, such actions at the location of the release as storage, confinement, perimeter protection using dikes, trenches, or ditches, clay cover, neutralization, cleanup of released hazardous substances or contaminated materials, recycling or reuse, diversion, destruction, segregation of reactive wastes, dredging or excavations, repair or replacement of leaking containers, collection of leachate and runoff, onsite treatment or incineration, provision of alternative

water supplies, and any monitoring reasonably required to assure that such actions protect the public health and welfare and the environment. The term includes the costs of permanent relocation of residents and businesses and community facilities where the President determines that, alone or in combination with other measures, such relocation is more cost-effective than and environmentally preferable to the transportation, storage, treatment, destruction, or secure disposition offsite of hazardous substances, or may otherwise be necessary to protect the public health or welfare. The term does not include offsite transport of hazardous substances, or the storage, treatment, destruction, or secure disposition offsite of such hazardous substances or contaminated materials unless the President determines that such actions (A) are more cost-effective than other remedial actions, (B) will create new capacity to manage, in compliance with subtitle C of the Solid Waste Disposal Act [42 U.S.C.A. § 6921 et seq.], hazardous substances in addition to those located at the affected facility, or (C) are necessary to protect public health or welfare or the environment from a present or potential risk which may be created by further exposure to the continued presence of such substances or materials;

(25) "respond" or "response" means remove, removal, remedy, and remedial action;

(26) "transport" or "transportation" means the movement of a hazardous substance by any mode, including pipeline (as defined in the Pipeline Safety Act), and in the case of a hazardous substance which has been accepted for transportation by a common or contract carrier, the term "transport" or "transportation" shall include any stoppage in transit which is temporary, incidental to the transportation movement, and at the ordinary operating convenience of a common or contract carrier, and any such stoppage shall be considered as a continuity of movement and not as the storage of a hazardous substance;

(27) "United States" and "State" include the several States of the United States, the District of Columbia, the Commonwealth of Puerto Rico, Guam, American Samoa, the United States Virgin Islands, the Commonwealth of the Northern Marianas, and any other territory or possession over which the United States has jurisdiction;

(28) "vessel" means every description of watercraft or other artificial contrivance used, or capable of being used, as a means of transportation on water;

(29) "disposal", "hazardous waste", and "treatment" shall have the meaning provided in section 1004 of the Solid Waste Disposal Act [42 U.S.C.A. § 6903];

(30) "territorial sea" and "contiguous zone" shall have the meaning provided in section 1362 of Title 33.[3]

(31) "national contingency plan" means the national contingency plan published under section 1321(c) of Title 33 or revised pursuant to section 9605 of this title; and

(32) "liable" or "liability" under this subchapter shall be construed to be the standard of liability which obtains under section 1321 of Title 33.

(Pub.L. 96–510, Title I, § 101, Dec. 11, 1980, 94 Stat. 2767; Pub.L. 96–561, Title II, § 238(b), Dec. 22, 1980, 94 Stat. 3300.)

[1] So in original. Probably should be "or".

[2] So in original. Probably should be "necessarily".

[3] So in original. Period probably should be a comma.

Historical Note

References in Text. This chapter, referred to in pars. (5) and (13), was in the original, "this Act", meaning Pub.L. 96–510, Dec. 11, 1980, 94 Stat. 2767, known as the Comprehensive Environmental Response, Compensation, and Liability Act of 1980. For complete classification of this Act to the Code, see Short Title note below and Tables volume.

The Safe Drinking Water Act, referred to in pars. (7) and (10), is Pub.L. 93–523, Dec. 16, 1974, 88 Stat. 1660, as amended, which is classified principally to subchapter XII (section 300f et seq.) of chapter 6A of this title. Part C of the Safe Drinking Water Act is classified generally to part C (section 300h et seq.) of subchapter XII of chapter 6A of this title. For complete classification of this Act to the Code, see Short Title of 1974 Amendments note set out under section 201 of this title and Tables volume.

The Magnuson Fishery Conservation and Management Act, referred to in pars. (8) and (16), is Pub.L. 94–265, Apr. 13, 1976, 90 Stat. 331, as amended, which is classified generally to chapter 38 (section 1801 et seq.) of Title 16, Conservation. For complete classification of this Act to the Code, see Short Title note set out under section 1801 of Title 16 and Tables volume.

The Clean Air Act, referred to in par. (10), is Act July 14, 1955, c. 360, as amended generally by Pub.L. 88–206, Dec. 17, 1963, 77 Stat. 392, and later by Pub.L. 95–95, Aug. 7, 1977, 91 Stat. 685. The Clean Air Act was originally classified to chapter 15B (section 1857 et seq.) of this title. On enactment of Pub.L. 95–95, the Act was reclassified to chapter 85 (section 7401 et seq.) of this title. Parts C and D of Title I of the Clean Air Act are classified generally to parts C (section 7470 et seq.) and D (section 7501 et seq.), respectively, of subchapter I of chapter 85 of this title. For complete classification of this Act to the Code, see Short Title note set out under section 7401 of this title and Tables volume.

The Atomic Energy Act of 1954, referred to in pars. (10) and (22), is Act Aug. 30, 1954, c. 1073, § 1, 68 Stat. 921, as amended, which is classified principally to chapter 23 (section 2011 et seq.) of this title. For complete classification of this Act to the Code, see Short Title note set out under section 2011 of this title and Tables volume.

The Solid Waste Disposal Act, referred to in pars. (14) and (24), is Title II of Pub.L. 89–272, Oct. 20, 1965, 79 Stat. 997, as amended generally by Pub.L. 94–580, § 2, Oct. 21, 1976, 90 Stat. 2795, which is classified generally to chapter 82 (section 6901 et seq.) of this title. Subtitle C of the Solid Waste Disposal Act is classified generally to subchapter III (section 6921 et seq.) of chapter 82 of this title. For complete classification of this Act to the Code, see Short Title note set out under section 6901 of this title and Tables volume.

The Disaster Relief Act of 1974, referred to in par. (23), is Pub.L. 93–288, May 22, 1974, 88 Stat. 143, as amended, which is classified principally to chapter 68 (section 5121 et seq.) of this title. For complete classification of this Act to the Code, see Short Title note set out under section 5121 of this title and Tables volume.

The Pipeline Safety Act, referred to in par. (26), probably means the Pipeline Safety Act of 1979, Pub.L. 96–129, Nov. 30, 1979, 93 Stat. 989. For complete classification of this Act to the Code, see Short Title of 1979 Amendment note set out under section 1671 of Title 49, Transportation, and Tables volume.

1980 Amendment. Pars. (8), (16). Pub.L. 96–561 substituted "Magnuson Fishery Conservation and Management Act" for "Fishery Conservation and Management Act of 1976".

Effective Date of 1980 Amendment. Amendment by Pub.L. 96–561 effective 15 days after Dec. 22, 1980, see section 238 of Pub.L. 96–561, set out as a Short Title note under section 1801 of Title 16, Conservation.

West's Federal Forms

Actions by United States or officers thereof, see §§ 1069 to 1072.
Fine, see § 7535.
Jurisdiction and venue in district courts, matters pertaining to, see § 1000 et seq.

Library References

Health and Environment ⇐25.5(5, 10), 25.6(3, 9), 25.7(3, 24).

C.J.S. Health and Environment §§ 91 et seq., 103 to 116, 131, 139, 140 et seq., 150 et seq.

Notes of Decisions

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1. Construction with Executive Order

Section 3(b) of Executive Order, set out as a note under section 9615 of this title, delegating to Administrator of Environmental Protection Agency functions vested in President by this section, providing that President's authority under this chapter to require Attorney General to commence litigation is retained by President, does not require specific presidential authorization to commence litigation under this section but merely defines roles of Administrator and Attorney General in bringing litigation. U. S. v. Reilly Tar & Chemical Corp., D.C.Minn.1982, 546 F.Supp. 1100.

2. Crossing of state lines

This section is not limited to application only when hazardous wastes cross state lines; Congress did not intend this section to incorporate element of interstate effect required in federal common law nuisance actions. U. S. v. Reilly Tar & Chemical Corp., D.C.Minn. 1982, 546 F.Supp. 1100.

3. Persons liable

This section can, in appropriate circumstances, be invoked against prior owner of disposal site. U. S. v. Reilly Tar & Chemical Corp., D.C.Minn.1982, 546 F.Supp. 1100.

This section conferring upon Environmental Protection Agency the authority to seek emergency injunctive relief when presented with evidence of an imminent and substantial endangerment to the public health could not be used to confer liability on nonnegligent past off-site generators of hazardous wastes. U. S. v. Wade, D.C.Pa.1982, 546 F.Supp. 785.

4. Complaint—Generally

Complaints alleging that many of chemicals found in wastes disposed of by allegedly offending party were carcinogens and toxic, that such wastes were spilled, leaked and discharged directly into ground, that they there entered and continued to enter groundwater, that six wells had already been closed, and that contaminants would continue to move into drinking water for metropolitan area unless preventative measures were taken were sufficient to establish imminent and substantial endangerment to public health, welfare or environment so as to state claim under this section. U. S. v. Reilly Tar & Chemical Corp., D.C.Minn.1982, 546 F.Supp. 1100.

5. —— Necessary allegations

Claim under this section need not contain allegation of specific presidential authorization for suit. U. S. v. Reilly Tar & Chemical Corp., D.C.Minn.1982, 546 F.Supp. 1100.

§ 9607. Liability

(a) Covered persons; scope

Notwithstanding any other provision or rule of law, and subject only to the defenses set forth in subsection (b) of this section—

(1) the owner and operator of a vessel (otherwise subject to the jurisdiction of the United States) or a facility,

(2) any person who at the time of disposal of any hazardous substance owned or operated any facility at which such hazardous substances were disposed of,

(3) any person who by contract, agreement, or otherwise arranged for disposal or treatment, or arranged with a transporter for transport for disposal or treatment, of hazardous substances owned or possessed by such person, by any other party or entity, at any facility owned or operated by another party or entity and containing such hazardous substances, and

(4) any person who accepts or accepted any hazardous substances for transport to disposal or treatment facilities or sites selected by such person, from which there is a release, or a threatened release which causes the incurrence of response costs, of a hazardous substance, shall be liable for—

(A) all costs of removal or remedial action incurred by the United States Government or a State not inconsistent with the national contingency plan;

(B) any other necessary costs of response incurred by any other person consistent with the national contingency plan; and

(C) damages for injury to, destruction of, or loss of natural resources, including the reasonable costs of assessing such injury, destruction, or loss resulting from such a release.

(b) Defenses

There shall be no liability under subsection (a) of this section for a person otherwise liable who can establish by a preponderance of the evidence that the release or threat of release of a hazardous substance and the damages resulting therefrom were caused solely by—

(1) an act of God;

(2) an act of war;

(3) an act or omission of a third party other than an employee or agent of the defendant, or than one whose act or omission occurs in connection with a contractual relationship, existing directly or indirectly, with the defendant (except where the sole contractual arrangement arises from a published tariff and acceptance for carriage by a common carrier by rail), if the defendant establishes by a preponderance of the evidence that (a) he exercised due care with respect to the hazardous substance concerned, taking into consideration the characteristics of such hazardous substance, in light of all relevant facts and circumstances, and (b) he took precautions against foreseeable acts or omissions of any such third party and the consequences that could foreseeably result from such acts or omissions; or

(4) any combination of the foregoing paragraphs.

(c) Determination of amounts

(1) Except as provided in paragraph (2) of this subsection, the liability under this section of an owner or operator or other responsible person for each release of a hazardous substance or incident involving release of a hazardous substance shall not exceed—

(A) for any vessel which carries any hazardous substance as cargo or residue, $300 per gross ton, or $5,000,000, whichever is greater;

(B) for any other vessel, $300 per gross ton, or $500,000, whichever is greater;

(C) for any motor vehicle, aircraft, pipeline (as defined in the Hazardous Liquid Pipeline Safety Act of 1979 [49 U.S.C.A. § 2001 et seq.]), or rolling stock, $50,000,000 or such lesser amount as the President shall establish by regulation, but in no event less than $5,000,000 (or, for releases of hazardous substances as defined in section 9601(14)(A) of this title into the navigable waters, $8,000,000). Such regulations shall take into account the size, type, location, storage, and handling capacity and other matters relating to the likelihood of release in each such class and to the economic impact of such limits on each such class; or

(D) for any facility other than those specified in subparagraph (C) of this paragraph, the total of all costs of response plus $50,000,000 for any damages under this subchapter.

(2) Notwithstanding the limitations in paragraph (1) of this subsection, the liability of an owner or operator or other responsible person under this section shall be the full and total costs of response and damages, if (A)(i) the release or threat of release of a hazardous substance was the result of willful misconduct or willful negligence within the privity or knowledge of such person, or (ii) the primary cause of the release was a violation (within the privity or knowledge of such person) of applicable safety, construction, or operating standards or regulations; or (B) such person fails or refuses to provide all reasonable cooperation and assistance requested by a responsible public official in connection with response activities under the national contingency plan with respect to regulated carriers subject to the provisions of Title 49 or vessels subject to the provisions of Title 33 or 46, subparagraph (A)(ii) of this paragraph shall be deemed to refer to Federal standards or regulations.

(3) If any person who is liable for a release or threat of release of a hazardous substance fails without sufficient cause to properly provide removal or remedial action upon order of the President pursuant to section 9604 or 9606 of this title, such person may be liable to the United States for punitive damages in an amount at least equal to, and not more than three times, the amount of any costs incurred by the Fund as a result of such failure to take proper action. The President is authorized to commence a civil action against any such person to recover the punitive damages, which shall be in addition to any costs recovered from such person pursuant to section

9612(c) of this title. Any moneys received by the United States pursuant to this subsection shall be deposited in the Fund.

(d) Activities pursuant to national contingency plan

No person shall be liable under this subchapter for damages as a result of actions taken or omitted in the course of rendering care, assistance, or advice in accordance with the national contingency plan or at the direction of an onscene coordinator appointed under such plan, with respect to an incident creating a danger to public health or welfare or the environment as a result of any release of a hazardous substance or the threat thereof. This subsection shall not preclude liability for damages as the result of gross negligence or intentional misconduct on the part of such person. For the purposes of the preceding sentence, reckless, willful, or wanton misconduct shall constitute gross negligence.

(e) Indemnification, hold harmless, etc., agreements or conveyances; subrogation rights

(1) No indemnification, hold harmless, or similar agreement or conveyance shall be effective to transfer from the owner or operator of any vessel or facility or from any person who may be liable for a release or threat of release under this section, to any other person the liability imposed under this section. Nothing in this subsection shall bar any agreement to insure, hold harmless, or indemnify a party to such agreement for any liability under this section.

(2) Nothing in this subchapter, including the provisions of paragraph (1) of this subsection, shall bar a cause of action that an owner or operator or any other person subject to liability under this section, or a guarantor, has or would have, by reason of subrogation or otherwise against any person.

(f) Actions involving natural resources; maintenance, scope, etc.

In the case of an injury to, destruction of, or loss of natural resources under subparagraph (C) of subsection (a) of this section liability shall be to the United States Government and to any State for natural resources within the State or belonging to, managed by, controlled by, or appertaining to such State: *Provided, however,* That no liability to the United States or State shall be imposed under subparagraph (C) of subsection (a) of this section, where the party sought to be charged has demonstrated that the damages to natural resources complained of were specifically identified as an irreversible and irretrievable commitment of natural resources in an environmental impact statement, or other comparable environment analysis, and the decision to grant a permit or license authorizes such commitment of natural resources, and the facility or project was otherwise operating within the terms of its permit or license. The President, or the authorized representative of any State, shall act on behalf of the public as trustee of such natural resources to recover for such damages. Sums recovered shall be available for use to restore, rehabilitate, or acquire the equivalent of such natural resources by the appropriate agencies of the Federal Government or the State government, but the measure of such damages shall not be limited by the sums which can be used to restore or replace such resources. There shall be

no recovery under the authority of subparagraph (C) of subsection (a) of this section where such damages and the release of a hazardous substance from which such damages resulted have occurred wholly before December 11, 1980.

(g) Applicability to Federal Government branches

Each department, agency, or instrumentality of the executive, legislative, and judicial branches of the Federal Government shall be subject to, and comply with, this chapter in the same manner and to the same extent, both procedurally and substantively, as any nongovernmental entity, including liability under this section.

(h) Owner or operator of vessel

The owner or operator of a vessel shall be liable in accordance with this section and as provided under section 9614 of this title notwithstanding any provision of the Act of March 3, 1851 (46 U.S.C. 183ff).

(i) Application of registered pesticide product

No person (including the United States or any State) may recover under the authority of this section for any response costs or damages resulting from the application of a pesticide product registered under the Federal Insecticide, Fungicide, and Rodenticide Act [7 U.S.C.A. § 136 et seq.]. Nothing in this paragraph shall affect or modify in any way the obligations or liability of any person under any other provision of State or Federal law, including common law, for damages, injury, or loss resulting from a release of any hazardous substance or for removal or remedial action or the costs of removal or remedial action of such hazardous substance.

(j) Obligations or liability pursuant to federally permitted release

Recovery by any person (including the United States or any State) for response costs or damages resulting from a federally permitted release shall be pursuant to existing law in lieu of this section. Nothing in this paragraph shall affect or modify in any way the obligations or liability of any person under any other provision of State or Federal law, including common law, for damages, injury, or loss resulting from a release of any hazardous substance or for removal or remedial action or the costs of removal or remedial action of such hazardous substance. In addition, costs of response incurred by the Federal Government in connection with a discharge specified in section 9601(10)(B) or (C) of this title shall be recoverable in an action brought under section 1319(b) of Title 33.

(k) Transfer to, and assumption by, Post-closure Liability Fund of liability of owner or operator of hazardous waste disposal facility in receipt of permit under applicable solid waste disposal law; time, criteria applicable, procedures, etc.; monitoring costs; reports

(1) The liability established by this section or any other law for the owner or operator of a hazardous waste disposal facility which has received a permit under subtitle C of the Solid Waste Disposal Act [42 U.S.C.A. § 6921

et seq.], shall be transferred to and assumed by the Post-closure Liability Fund established by section 9641 of this title when—

(A) such facility and the owner and operator thereof has complied with the requirements of subtitle C of the Solid Waste Disposal Act [42 U.S.C.A. § 6921 et seq.] and regulations issued thereunder, which may affect the performance of such facility after closure; and

(B) such facility has been closed in accordance with such regulations and the conditions of such permit, and such facility and the surrounding area have been monitored as required by such regulations and permit conditions for a period not to exceed five years after closure to demonstrate that there is no substantial likelihood that any migration offsite or release from confinement of any hazardous substance or other risk to public health or welfare will occur.

(2) Such transfer of liability shall be effective ninety days after the owner or operator of such facility notifies the Administrator of the Environmental Protection Agency (and the State where it has an authorized program under section 3006(b) of the Solid Waste Disposal Act [42 U.S.C.A. § 6926(b)]) that the conditions imposed by this subsection have been satisfied. If within such ninety-day period the Administrator of the Environmental Protection Agency or such State determines that any such facility has not complied with all the conditions imposed by this subsection or that insufficient information has been provided to demonstrate such compliance, the Administrator or such State shall so notify the owner and operator of such facility and the administrator of the Fund established by section 9641 of this title, and the owner and operator of such facility shall continue to be liable with respect to such facility under this section and other law until such time as the Administrator and such State determines that such facility has complied with all conditions imposed by this subsection. A determination by the Administrator or such State that a facility has not complied with all conditions imposed by this subsection or that insufficient information has been supplied to demonstrate compliance, shall be a final administrative action for purposes of judicial review. A request for additional information shall state in specific terms the data required.

(3) In addition to the assumption of liability of owners and operators under paragraph (1) of this subsection, the Post-closure Liability Fund established by section 9641 of this title may be used to pay costs of monitoring and care and maintenance of a site incurred by other persons after the period of monitoring required by regulations under subtitle C of the Solid Waste Disposal Act [42 U.S.C.A. § 6921 et seq.] for hazardous waste disposal facilities meeting the conditions of paragraph (1) of this subsection.

(4)(A) Not later than one year after December 11, 1980, the Secretary of the Treasury shall conduct a study and shall submit a report thereon to the Congress on the feasibility of establishing or qualifying an optional system of private insurance for postclosure financial responsibility for hazardous waste disposal facilities to which this subsection applies. Such study shall include a specification of adequate and realistic minimum standards to assure that any such privately placed insurance will carry out the purposes of this subsection in a reliable, enforceable, and practical manner. Such a

study shall include an examination of the public and private incentives, programs, and actions necessary to make privately placed insurance a practical and effective option to the financing system for the Post-closure Liability Fund provided in subchapter II of this chapter.

(B) Not later than eighteen months after December 11, 1980, and after a public hearing, the President shall by rule determine whether or not it is feasible to establish or qualify an optional system of private insurance for postclosure financial responsibility for hazardous waste disposal facilities to which this subsection applies. If the President determines the establishment or qualification of such a system would be infeasible, he shall promptly publish an explanation of the reasons for such a determination. If the President determines the establishment or qualification of such a system would be feasible, he shall promptly publish notice of such determination. Not later than six months after an affirmative determination under the preceding sentence and after a public hearing, the President shall by rule promulgate adequate and realistic minimum standards which must be met by any such privately placed insurance, taking into account the purposes of this chapter and this subsection. Such rules shall also specify reasonably expeditious procedures by which privately placed insurance plans can qualify as meeting such minimum standards.

(C) In the event any privately placed insurance plan qualifies under subparagraph (B), any person enrolled in, and complying with the terms of, such plan shall be excluded from the provisions of paragraphs (1), (2), and (3) of this subsection and exempt from the requirements to pay any tax or fee to the Post-closure Liability Fund under subchapter II of this chapter.

(D) The President may issue such rules and take such other actions as are necessary to effectuate the purposes of this paragraph.

(Pub.L. 96–510, Title I, § 107, Dec. 11, 1980, 94 Stat. 2781.)

Historical Note

References in Text. The Hazardous Liquid Pipeline Safety Act of 1979, referred to in subsec. (c)(1), is Title II of Pub.L. 96–129, Nov. 30, 1979, 93 Stat. 1003, which is classified principally to chapter 29 (section 2001 et seq.) of Title 49, Transportation. For complete classification of this Act to the Code, see Short Title note set out under section 2001 of Title 49 and Tables volume.

This chapter, referred to in subsecs. (g) and (k)(4)(B), was in the original, "this Act", meaning Pub.L. 96–510, Dec. 11, 1980, 94 Stat. 2767, known as the Comprehensive Environmental Response, Compensation, and Liability Act of 1980. For complete classification of this Act to the Code, see Short Title note set out under section 9601 of this title and Tables volume.

Act of March 3, 1851 (46 U.S.C. 183ff), referred to in subsec. (h), is Act Mar. 3, 1851, c. 43, 9 Stat. 635, which was incorporated into the Revised Statutes as R.S. §§ 4282 to 4287 and 4289, and is classified to sections 182, 183, and 184 to 188 of Title 46, Shipping.

The Federal Insecticide, Fungicide, and Rodenticide Act, referred to in subsec. (i), is Act June 25, 1947, c. 125, as amended generally by Pub.L. 92–516, Oct. 21, 1972, 86 Stat. 973, which is classified generally to subchapter II (section 136 et seq.) of chapter 6 of Title 7, Agriculture. For complete classification of this Act to the Code, see Short Title note set out under section 136 of Title 7 and Tables volume.

The Solid Waste Disposal Act, referred to in subsec. (k)(1) and (3), is Title II of Pub.L. 89–272, Oct. 20, 1965, 79 Stat. 997, as amended generally by Pub.L. 94–580, § 2, Oct. 21, 1976, 90 Stat. 2795. Subtitle C of the Solid Waste Disposal Act is classified generally to subchapter III (section 6921 et seq.) of chapter 82 of this title. For complete classification of this Act to the Code, see

Delegation of Functions. Functions of the President under subsec. (e) of this section delegated to the Secretary of Labor, see section 6(a) of Ex.Ord. No. 12316, Aug. 14, 1981, 46 F.R. 42239, set out as a note under section 9615 of this title.

Legislative History. For legislative history and purpose of Pub.L. 96–510, see 1980 U.S. Code Cong. and Adm.News, p. 6119.

Library References

Health and Environment ⇐25.5(5), 25.6(3), 25.7(3).

C.J.S. Health and Environment §§ 91 et seq., 106 et seq., 131.

§ 9611. Uses of Fund

(a) Authorized purposes

The President shall use the money in the Fund for the following purposes:

(1) payment of governmental response costs incurred pursuant to section 9604 of this title, including costs incurred pursuant to the Intervention on the High Seas Act [33 U.S.C.A. § 1471 et seq.];

(2) payment of any claim for necessary response costs incurred by any other person as a result of carrying out the national contingency plan established under section 1321(c) of Title 33 and amended by section 9605 of this title: *Provided, however,* That such costs must be approved under said plan and certified by the responsible Federal official;

(3) payment of any claim authorized by subsection (b) of this section and finally decided pursuant to section 9612 of this title, including those costs set out in subsection 9612(c)(3) of this title; and

(4) payment of costs specified under subsection (c) of this section.

The President shall not pay for any administrative costs or expenses out of the Fund unless such costs and expenses are reasonably necessary for and incidental to the implementation of this subchapter.

(b) Additional authorized purposes

Claims asserted and compensable but unsatisfied under provisions of section 1321 of Title 33, which are modified by section 304 of this Act may be asserted against the Fund under this subchapter; and other claims resulting from a release or threat of release of a hazardous substance from a vessel or a facility may be asserted against the Fund under this subchapter for injury to, or destruction or loss of, natural resources, including cost for damage assessment: *Provided, however,* That any such claim may be asserted only by the President, as trustee, for natural resources over which the United States has sovereign rights, or natural resources within the territory or the fishery conservation zone of the United States to the extent they are managed or protected by the United States, or by any State for natural resources within the boundary of that State belonging to, managed by, controlled by, or appertaining to the State.

(c) Peripheral matters and limitations

Uses of the Fund under subsection (a) of this section include—

(1) the costs of assessing both short-term and long-term injury to, destruction of, or loss of any natural resources resulting from a release of a hazardous substance;

(2) the costs of Federal or State efforts in the restoration, rehabilitation, or replacement or acquiring the equivalent of any natural resources injured, destroyed, or lost as a result of a release of a hazardous substance;

(3) subject to such amounts as are provided in appropriation Acts, the costs of a program to identify, investigate, and take enforcement and abatement action against releases of hazardous substances;

(4) the costs of epidemiologic studies, development and maintenance of a registry of persons exposed to hazardous substances to allow long-term health effect studies, and diagnostic services not otherwise available to determine whether persons in populations exposed to hazardous substances in connection with a release or a suspected release are suffering from long-latency diseases;

(5) subject to such amounts as are provided in appropriation Acts, the costs of providing equipment and similar overhead, related to the purposes of this chapter and section 1321 of Title 33, and needed to supplement equipment and services available through contractors or other non-Federal entities, and of establishing and maintaining damage assessment capability, for any Federal agency involved in strike forces, emergency task forces, or other response teams under the national contingency plan; and

(6) subject to such amounts as are provided in appropriation Acts, the costs of a program to protect the health and safety of employees involved in response to hazardous substance releases. Such program shall be developed jointly by the Environmental Protection Agency, the Occupational Safety and Health Administration, and the National Institute for Occupational Safety and Health and shall include, but not be limited to, measures for identifying and assessing hazards to which persons engaged in removal, remedy, or other response to hazardous substances may be exposed, methods to protect workers from such hazards, and necessary regulatory and enforcement measures to assure adequate protection of such employees.

(d) Additional limitations

(1) No money in the Fund may be used under subsection (c)(1) and (2) of this section, nor for the payment of any claim under subsection (b) of this section, where the injury, destruction, or loss of natural resources and the release of a hazardous substance from which such damages resulted have occurred wholly before December 11, 1980.

(2) No money in the Fund may be used for the payment of any claim under subsection (b) of this section where such expenses are associated with

injury or loss resulting from long-term exposure to ambient concentrations of air pollutants from multiple or diffuse sources.

(e) Funding requirements respecting moneys in Fund

(1) Claims against or presented to the Fund shall not be valid or paid in excess of the total money in the Fund at any one time. Such claims become valid only when additional money is collected, appropriated, or otherwise added to the Fund. Should the total claims outstanding at any time exceed the current balance of the Fund, the President shall pay such claims, to the extent authorized under this section, in full in the order in which they were finally determined.

(2) In any fiscal year, 85 percent of the money credited to the Fund under subchapter II of this chapter shall be available only for the purposes specified in paragraphs (1), (2), and (4) of subsection (a) of this section.

(3) No money in the Fund shall be available for remedial action, other than actions specified in subsection (c) of this section, with respect to federally owned facilities.

(4) Paragraphs (1) and (4) of subsection (a) of this section shall in the aggregate be subject to such amounts as are provided in appropriation Acts.

(f) Obligation of moneys by Federal officials; obligation of moneys or settlement of claims by State officials

The President is authorized to promulgate regulations designating one or more Federal officials who may obligate money in the Fund in accordance with this section or portions thereof. The President is also authorized to delegate authority to obligate money in the Fund or to settle claims to officials of a State operating under a contract or cooperative agreement with the Federal Government pursuant to section 9604(d) of this title.

(g) Notice to potential injured parties by owner and operator of vessel or facility causing release of substance; rules and regulations

The President shall provide for the promulgation of rules and regulations with respect to the notice to be provided to potential injured parties by an owner and operator of any vessel, or facility from which a hazardous substance has been released. Such rules and regulations shall consider the scope and form of the notice which would be appropriate to carry out the purposes of this subchapter. Upon promulgation of such rules and regulations, the owner and operator of any vessel or facility from which a hazardous substance has been released shall provide notice in accordance with such rules and regulations. With respect to releases from public vessels, the President shall provide such notification as is appropriate to potential injured parties. Until the promulgation of such rules and regulations, the owner and operator of any vessel or facility from which a hazardous substance has been released shall provide reasonable notice to potential injured parties by publication in local newspapers serving the affected area.

(h) Assessment of damages for injury, etc., to natural resources from release of substances; determination, etc.

(1) In accordance with regulations promulgated under section 9651(c) of this title, damages for injury to, destruction of, or loss of natural resources resulting from a release of a hazardous substance, for the purposes of this chapter and section 1321(f)(4) and (5) of Title 33, shall be assessed by Federal officials designated by the President under the national contingency plan published under section 9605 of this title, and such officials shall act for the President as trustee under this section and section 1321(f)(5) of Title 33.

(2) Any determination or assessment of damages for injury to, destruction of, or loss of natural resources for the purposes of this chapter and section 1321(f)(4) and (5) of Title 33 shall have the force and effect of a rebuttable presumption on behalf of any claimant (including a trustee under section 9607 of this title or a Federal agency) in any judicial or adjudicatory administrative proceeding under this chapter or section 1321 of Title 33.

(i) Restoration, etc., of natural resources

Except in a situation requiring action to avoid an irreversible loss of natural resources or to prevent or reduce any continuing danger to natural resources or similar need for emergency action, funds may not be used under this chapter for the restoration, rehabilitation, or replacement or acquisition of the equivalent of any natural resources until a plan for the use of such funds for such purposes has been developed and adopted by affected Federal agencies and the Governor or Governors of any State having sustained damage to natural resources within its borders, belonging to, managed by or appertaining to such State, after adequate public notice and opportunity for hearing and consideration of all public comment.

(j) Use of Post-closure Liability Fund

The President shall use the money in the Post-closure Liability Fund for any of the purposes specified in subsection (a) of this section with respect to a hazardous waste disposal facility for which liability has transferred to such fund under section 9607(k) of this title, and, in addition, for payment of any claim or appropriate request for costs of response, damages, or other compensation for injury or loss under section 9607 of this title or any other State or Federal law, resulting from a release of a hazardous substance from such a facility.

(k) Audit review, etc., by Inspector General of Federal department or agency delegated with responsibility to obligate moneys

The Inspector General of each department or agency to which responsibility to obligate money in the Fund is delegated shall provide an audit review team to audit all payments, obligations, reimbursements, or other uses of the Fund, to assure that the Fund is being properly administered and that claims are being appropriately and expeditiously considered. Each such Inspector General shall submit to the Congress an interim report one year after the establishment of the Fund and a final report two years after the

establishment of the Fund. Each such Inspector General shall thereafter provide such auditing of the Fund as is appropriate. Each Federal agency shall cooperate with the Inspector General in carrying out this subsection.

(*l*) Foreign claimants

To the extent that the provisions of this chapter permit, a foreign claimant may assert a claim to the same extent that a United States claimant may assert a claim if—

(1) the release of a hazardous substance occurred (A) in the navigable waters or (B) in or on the territorial sea or adjacent shoreline of a foreign country of which the claimant is a resident;

(2) the claimant is not otherwise compensated for his loss;

(3) the hazardous substance was released from a facility or from a vessel located adjacent to or within the navigable waters or was discharged in connection with activities conducted under the Outer Continental Shelf Lands Act, as amended (43 U.S.C. 1331 et seq.) or the Deepwater Port Act of 1974, as amended (33 U.S.C. 1501 et seq.); and

(4) recovery is authorized by a treaty or an executive agreement between the United States and foreign country involved, or if the Secretary of State, in consultation with the Attorney General and other appropriate officials, certifies that such country provides a comparable remedy for United States claimants.

(Pub.L. 96-510, Title I, § 111, Dec. 11, 1980, 94 Stat. 2788.)

Historical Note

References in Text. The Intervention on the High Seas Act, referred to in subsec. (a)(1), is Pub.L. 93-248, Feb. 5, 1974, 88 Stat. 8, as amended, which is classified generally to chapter 28 (section 1471 et seq.) of Title 33, Navigation and Navigable Waters. For complete classification of this Act to the Code, see Short Title note set out under section 1471 of Title 33 and Tables volume.

Section 304 of this Act, referred to in subsec. (b), is section 304 of Pub.L. 96-510, Title III, Dec. 11, 1980, 94 Stat. 2809, which enacted section 9654 of this title and amended section 1364 of Title 33.

This chapter, referred to in subsecs. (c)(5), (h), (i), and introductory text of (*l*), was in the original, "this Act", meaning Pub.L. 96-510, Dec. 11, 1980, 94 Stat. 2767, known as the Comprehensive Environmental Response, Compensation, and Liability Act of 1980. For complete classification of this Act to the Code, see Short Title note set out under section 9601 of this title and Tables volume.

Subchapter II of this chapter, referred to in subsec. (e)(2), was in the original, "Title II of this Act", meaning Title II of Pub.L. 96-510, Dec. 11, 1980, 94 Stat. 2796, known as the Hazardous Substance Response Revenue Act of 1980, which enacted subchapter II of this chapter and sections 4611, 4612, 4661, 4662, 4681, and 4682 of Title 26, Internal Revenue Code. For complete classification of Title II to the Code, see Short Title of 1980 Amendment note set out under section 1 of Title 26 and Tables volume.

The Outer Continental Shelf Lands Act as amended referred to in subsec. (*l*)(3), is Act Aug. 7, 1953, c. 345, 67 Stat. 462, as amended, which is classified generally to subchapter III (section 1331 et seq.) of chapter 29 of Title 43, Public Lands. For complete classification of this Act to the Code, see Short Title note set out under section 1331 of Title 43 and Tables volume.

The Deepwater Port Act of 1974, as amended, referred to in subsec. (*l*)(3), is Pub. L. 93-627, Jan. 3, 1975, 88 Stat. 2126, as amended, which is classified generally to chapter 29 (section 1501 et seq.) of Title 33, Navigation and Navigable Waters. For complete classification of this Act to the Code, see Short Title note set out under section 1501 of Title 33 and Tables volume.

(b) Jurisdiction; venue

Except as provided in subsection (a) of this section, the United States district courts shall have exclusive original jurisdiction over all controversies arising under this chapter, without regard to the citizenship of the parties or the amount in controversy. Venue shall lie in any district in which the release or damages occurred, or in which the defendant resides, may be found, or has his principal office. For the purposes of this section, the Fund shall reside in the District of Columbia.

(c) Controversies or other matters resulting from tax collection or tax regulation review

The provisions of subsections (a) and (b) of this section shall not apply to any controversy or other matter resulting from the assessment of collection of any tax, as provided by subchapter II of this chapter, or to the review of any regulation promulgated under Title 26.

(d) Litigation commenced prior to December 11, 1980

No provision of this chapter shall be deemed or held to moot any litigation concerning any release of any hazardous substance, or any damages associated therewith, commenced prior to December 11, 1980.

(Pub.L. 96–510, Title I, § 113, Dec. 11, 1980, 94 Stat. 2795.)

Historical Note

References in Text. This chapter, referred to in subsecs. (a), (b), and (d), was in the original, "this Act", meaning Pub.L. 96–510, Dec. 11, 1980, 94 Stat. 2767, known as the Comprehensive Environmental Response, Compensation, and Liability Act of 1980. For complete classification of this Act to the Code, see Short Title note set out under section 9601 of this title and Tables volume.

Subchapter II of this chapter, referred to in subsec. (c), was in the original, "Title II of this Act", meaning Title II of Pub.L. 96–510, Dec. 11, 1980, 94 Stat. 2796, known as the Hazardous Substance Response Revenue Act of 1980, which enacted subchapter II of this chapter and sections 4611, 4612, 4661, 4662, 4681, and 4682 of Title 26, Internal Revenue Code. For complete classification of Title II to the Code, see Short Title of 1980 Amendment note set out under section 1 of Title 26 and Tables volume.

Legislative History. For legislative history and purpose of Pub.L. 96–510, see 1980 U.S. Code Cong. and Adm.News, p. 6119.

West's Federal Forms

Enforcement and review of decisions and orders of administrative agencies, see § 851 et seq.
Jurisdiction and venue in district courts, matters pertaining to, see § 1000 et seq.

Library References

Health and Environment ⇨25.5(5), 25.6(3), 25.7(3).

C.J.S. Health and Environment §§ 91 et seq., 106 et seq., 131.

§ 9614. Relationship to other law

(a) Additional State liability or requirements with respect to release of substances within State

Nothing in this chapter shall be construed or interpreted as preempting any State from imposing any additional liability or requirements with respect to the release of hazardous substances within such State.

(b) Recovery under other State or Federal law of compensation for removal costs or damages, or payment of claims

Any person who receives compensation for removal costs or damages or claims pursuant to this chapter shall be precluded from recovering compensation for the same removal costs or damages or claims pursuant to any other State or Federal law. Any person who receives compensation for removal costs or damages or claims pursuant to any other Federal or State law shall be precluded from receiving compensation for the same removal costs or damages or claims as provided in this chapter.

(c) Contributions to other funds; limitations, etc.

Except as provided in this chapter, no person may be required to contribute to any fund, the purpose of which is to pay compensation for claims for any costs of response or damages or claims which may be compensated under this subchapter. Nothing in this section shall preclude any State from using general revenues for such a fund, or from imposing a tax or fee upon any person or upon any substance in order to finance the purchase or prepositioning of hazardous substance response equipment or other preparations for the response to a release of hazardous substances which affects such State.

(d) Financial responsibility of owner or operator of vessel or facility under State or local law, rule, or regulation

Except as provided in this subchapter, no owner or operator of a vessel or facility who establishes and maintains evidence of financial responsibility in accordance with this subchapter shall be required under any State or local law, rule, or regulation to establish or maintain any other evidence of financial responsibility in connection with liability for the release of a hazardous substance from such vessel or facility. Evidence of compliance with the financial responsibility requirements of this subchapter shall be accepted by a State in lieu of any other requirement of financial responsibility imposed by such State in connection with liability for the release of a hazardous substance from such vessel or facility.

(Pub.L. 96–510, Title I, § 114, Dec. 11, 1980, 94 Stat. 2795.)

Historical Note

References in Text. This chapter, referred to in subsecs. (a), (b), and (c), was in the original, "this Act", meaning Pub.L. 96–510, Dec. 11, 1980, 94 Stat. 2767, known as the Comprehensive Environmental Response, Compensation, and Liability Act of 1980. For complete classification of this Act to the Code, see Short Title note set out under section 9601 of this title and Tables volume.

Legislative History. For legislative history and purpose of Pub.L. 96–510, see 1980 U.S. Code Cong. and Adm.News, p. 6119.

Library References

Health and Environment ⇐25.5(5), 25.6(3), 25.7(3).

C.J.S. Health and Environment §§ 91 et seq., 106 et seq., 131.

(b) Expenditures from Post-closure Liability Trust Fund

Amounts in the Post-closure Liability Trust Fund shall be available only for the purposes described in sections 9607(k) and 9611(j) of this title (as in effect on December 11, 1980).

(c) Administrative provisions

The provisions of sections 9632 and 9633 of this title shall apply with respect to the Trust Fund established under this section, except that the amount of any repayable advances outstanding at any one time shall not exceed $200,000,000.

(Pub.L. 96–510, Title II, § 232, Dec. 11, 1980, 94 Stat. 2804.)

Historical Note

Legislative History. For legislative history and purpose of Pub.L. 96–510, see 1980 U.S. Code Cong. and Adm.News, p. 6119.

Library References

Health and Environment ⇨25.7(23). C.J.S. Health and Environment §§ 113, 150.

SUBCHAPTER III—MISCELLANEOUS PROVISIONS

§ 9651. Reports and studies

(a) Implementation experiences; identification and disposal of waste

(1) The President shall submit to the Congress, within four years after December 11, 1980, a comprehensive report on experience with the implementation of this chapter including, but not limited to—

(A) the extent to which the chapter and Fund are effective in enabling Government to respond to and mitigate the effects of releases of hazardous substances;

(B) a summary of past receipts and disbursements from the Fund;

(C) a projection of any future funding needs remaining after the expiration of authority to collect taxes, and of the threat to public health, welfare, and the environment posed by the projected releases which create any such needs;

(D) the record and experience of the Fund in recovering Fund disbursements from liable parties;

(E) the record of State participation in the system of response, liability, and compensation established by this chapter;

(F) the impact of the taxes imposed by subchapter II of this chapter on the Nation's balance of trade with other countries;

(G) an assessment of the feasibility and desirability of a schedule of taxes which would take into account one or more of the following: the likelihood of a release of a hazardous substance, the degree of hazard and risk of harm to public health, welfare, and the environment result-

ing from any such release, incentives to proper handling, recycling, incineration, and neutralization of hazardous wastes, and disincentives to improper or illegal handling or disposal of hazardous materials, administrative and reporting burdens on Government and industry, and the extent to which the tax burden falls on the substances and parties which create the problems addressed by this chapter. In preparing the report, the President shall consult with appropriate Federal, State, and local agencies, affected industries and claimants, and such other interested parties as he may find useful. Based upon the analyses and consultation required by this subsection, the President shall also include in the report any recommendations for legislative changes he may deem necessary for the better effectuation of the purposes of this chapter, including but not limited to recommendations concerning authorization levels, taxes, State participation, liability and liability limits, and financial responsibility provisions for the Response Trust Fund and the Post-closure Liability Trust Fund;

(H) an exemption from or an increase in the substances or the amount of taxes imposed by section 4661 of Title 26 for copper, lead, and zinc oxide, and for feedstocks when used in the manufacture and production of fertilizers, based upon the expenditure experience of the Response Trust Fund;

(I) the economic impact of taxing coal-derived substances and recycled metals.

(2) The Administrator of the Environmental Protection Agency (in consultation with the Secretary of the Treasury) shall submit to the Congress (i) within four years after December 11, 1980, a report identifying additional wastes designated by rule as hazardous after the effective date of this chapter and pursuant to section 3001 of the Solid Waste Disposal Act [42 U.S. C.A. § 6921] and recommendations on appropriate tax rates for such wastes for the Post-closure Liability Trust Fund. The report shall, in addition, recommend a tax rate, considering the quantity and potential danger to human health and the environment posed by the disposal of any wastes which the Administrator, pursuant to subsection 3001(b)(2)(B) and subsection 3001(b)(3)(A) of the Solid Waste Disposal Act of 1980 [42 U.S.C.A. §§ 6921(b)(2)(B) and 6921(b)(3)(A)], has determined should be subject to regulation under subtitle C of such Act [42 U.S.C.A. § 6921 et seq.], (ii) within three years after December 11, 1980, a report on the necessity for and the adequacy of the revenue raised, in relation to estimated future requirements, of the Post-closure Liability Trust Fund.

(b) Private insurance protection

The President shall conduct a study to determine (1) whether adequate private insurance protection is available on reasonable terms and conditions to the owners and operators of vessels and facilities subject to liability under section 9607 of this title, and (2) whether the market for such insurance is sufficiently competitive to assure purchasers of features such as a reasonable range of deductibles, coinsurance provisions, and exclusions. The President shall submit the results of his study, together with his recommendations,

within two years of December 11, 1980, and shall submit an interim report on his study within one year of December 11, 1980.

(c) Regulations respecting assessment of damages to natural resources

(1) The President, acting through Federal officials designated by the National Contingency Plan published under section 9605 of this title, shall study and, not later than two years after December 11, 1980, shall promulgate regulations for the assessment of damages for injury to, destruction of, or loss of natural resources resulting from a release of oil or a hazardous substance for the purposes of this chapter and section 1321(f)(4) and (5) of Title 33.

(2) Such regulations shall specify (A) standard procedures for simplified assessments requiring minimal field observation, including establishing measures of damages based on units of discharge or release or units of affected area, and (B) alternative protocols for conducting assessments in individual cases to determine the type and extent of short- and long-term injury, destruction, or loss. Such regulations shall identify the best available procedures to determine such damages, including both direct and indirect injury, destruction, or loss and shall take into consideration factors including, but not limited to, replacement value, use value, and ability of the ecosystem or resource to recover.

(3) Such regulations shall be reviewed and revised as appropriate every two years.

(d) Issues, alternatives, and policy considerations involving selection of location for waste treatment, storage, and disposal facilities

The Administrator of the Environmental Protection Agency shall, in consultation with other Federal agencies and appropriate representatives of State and local governments and nongovernmental agencies, conduct a study and report to the Congress within two years of December 11, 1980, on the issues, alternatives, and policy considerations involved in the selection of locations for hazardous waste treatment, storage, and disposal facilities. This study shall include—

(A) an assessment of current and projected treatment, storage, and disposal capacity needs and shortfalls for hazardous waste by management category on a State-by-State basis;

(B) an evaluation of the appropriateness of a regional approach to siting and designing hazardous waste management facilities and the identification of hazardous waste management regions, interstate or intrastate, or both, with similar hazardous waste management needs;

(C) solicitation and analysis of proposals for the construction and operation of hazardous waste management facilities by nongovernmental entities, except that no proposal solicited under terms of this subsection shall be analyzed if it involves cost to the United States Government or fails to comply with the requirements of subtitle C of the Solid Waste Disposal Act [42 U.S.C.A. § 6921 et seq.] and other applicable provisions of law;

(D) recommendations on the appropriate balance between public and private sector involvement in the siting, design, and operation of new hazardous waste management facilities;

(E) documentation of the major reasons for public opposition to new hazardous waste management facilities; and

(F) an evaluation of the various options for overcoming obstacles to siting new facilities, including needed legislation for implementing the most suitable option or options.

(e) Adequacy of existing common law and statutory remedies

(1) In order to determine the adequacy of existing common law and statutory remedies in providing legal redress for harm to man and the environment caused by the release of hazardous substances into the environment, there shall be submitted to the Congress a study within twelve months of December 11, 1980.

(2) This study shall be conducted with the assistance of the American Bar Association, the American Law Institute, the Association of American Trial Lawyers, and the National Association of State Attorneys General with the President of each entity selecting three members from each organization to conduct the study. The study chairman and one reporter shall be elected from among the twelve members of the study group.

(3) As part of their review of the adequacy of existing common law and statutory remedies, the study group shall evaluate the following:

(A) the nature, adequacy, and availability of existing remedies under present law in compensating for harm to man from the release of hazardous substances;

(B) the nature of barriers to recovery (particularly with respect to burdens of going forward and of proof and relevancy) and the role such barriers play in the legal system;

(C) the scope of the evidentiary burdens placed on the plaintiff in proving harm from the release of hazardous substances, particularly in light of the scientific uncertainty over causation with respect to—

(i) carcinogens, mutagens, and teratogens, and

(ii) the human health effects of exposure to low doses of hazardous substances over long periods of time;

(D) the nature and adequacy of existing remedies under present law in providing compensation for damages to natural resources from the release of hazardous substances;

(E) the scope of liability under existing law and the consequences, particularly with respect to obtaining insurance, of any changes in such liability;

(F) barriers to recovery posed by existing statutes of limitations.

(4) The report shall be submitted to the Congress with appropriate recommendations. Such recommendations shall explicitly address—

(A) the need for revisions in existing statutory or common law, and

(B) whether such revisions should take the form of Federal statutes or the development of a model code which is recommended for adoption by the States.

(5) The Fund shall pay administrative expenses incurred for the study. No expenses shall be available to pay compensation, except expenses on a per diem basis for the one reporter, but in no case shall the total expenses of the study exceed $300,000.

(f) Modification of national contingency plan

The President, acting through the Administrator of the Environmental Protection Agency, the Secretary of Transportation, the Administrator of the Occupational Safety and Health Administration, and the Director of the National Institute for Occupational Safety and Health shall study and, not later than two years after December 11, 1980, shall modify the national contingency plan to provide for the protection of the health and safety of employees involved in response actions.

(Pub.L. 96–510, Title III, § 301, Dec. 11, 1980, 94 Stat. 2805.)

Historical Note

References in Text. This chapter, referred to in subsecs. (a)(1) and (c)(1), was in the original, "this Act", meaning Pub.L. 96–510, Dec. 11, 1980, 94 Stat. 2767, known as the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, which enacted this chapter, section 6911a of this title, and sections 4611, 4612, 4661, 4662, 4681, and 4682 of Title 26, Internal Revenue Code, amended section 6911 of this title, section 1364 of Title 33, Navigation and Navigable Waters and section 11901 of Title 49, Transportation, and enacted provisions set out as notes under section 6911 of this title and sections 1 and 4611 of Title 26. For complete classification of this Act to the Code, see Short Title note set out under section 9601 of this title and Tables volume.

Subchapter II of this chapter, referred to in subsec. (a)(1)(F), was in the original, "Title II of this Act", meaning Title II of Pub.L. 96–510, Dec. 11, 1980, 94 Stat. 2796, known as the Hazardous Substance Response Revenue Act of 1980, which enacted subchapter II of this chapter and sections 4611, 4612, 4661, 4662, 4681, and 4682 of Title 26, Internal Revenue Code. For complete classification of Title II to the Code, see Short Title of 1980 Amendment note set out under section 1 of Title 26 and Tables volume.

For effective date of this chapter, referred to in subsec. (a)(2), see section 9652 of this title.

Subsection 3001(b)(2)(B) and subsection 3001(b)(3)(A) of the Solid Waste Disposal Act of 1980, referred to in subsec. (a)(2), probably mean section 3001(b)(2)(B) and (3)(A) of the Solid Waste Disposal Act, as amended by the Solid Waste Disposal Act Amendments of 1980, which enacted section 6921(b)(2)(B) and (3)(A) of this title.

The Solid Waste Disposal Act, referred to in subsecs. (a)(2) and (d)(C), is Title II of Pub.L. 89–272, Oct. 20, 1965, 79 Stat. 997, as amended generally by Pub.L. 94–580, § 2, Oct. 21, 1976, 90 Stat. 2795, Subtitle C of the Solid Waste Disposal Act is classified generally to subchapter III (section 6921 et seq.) of chapter 82 of this title. For complete classification of this Act to the Code, see Short Title note set out under section 6901 of this title and Tables volume.

Delegation of Functions. Functions of the President under subsec. (a) of this section delegated to the Administrator of the Environmental Protection Agency in consultation with the Secretary of the Treasury, see section 8(c)(1) of Ex.Ord. No. 12316, Aug. 14, 1981, 46 F.R. 42240, set out as a note under section 9615 of this title.

Functions of the President under subsec. (b) of this section delegated to the Secretary of the Treasury, see section 8(c)(2) of Ex.Ord. No. 12316, set out as a note under section 9615 of this title.

Functions of the President under subsec. (c) of this section delegated to the Secretary of the Interior, see section 8(c)(3) of Ex.Ord. No. 12316, set out as a note under section 9615 of this title.

Functions of the President under subsec. (f) of this section delegated to the Administrator of the Environmental Protection Agency, see section 8(c)(4) of Ex.Ord. No. 12316, set out as a note under section 9615 of this title.

Management of Common Law and Statutory Remedies Study. For provision directing the Attorney General to manage and coordinate the common law and statutory remedies study required by subsec. (e) of this section, see section 8(d) of Ex.Ord. No. 12316, Aug. 14, 1981, 46 F.R. 42240, set out as a note under section 9615 of this title.

Legislative History. For legislative history and purpose of Pub.L. 96–510, see 1980 U.S. Code Cong. and Adm.News, p. 6119.

Library References

Health and Environment ⇐25.5.

C.J.S. Health and Environment §§ 61 to 66, 69, 71 to 73, 78 to 80, 82 to 86, 88 to 90, 94, 104, 110, 115 to 126, 128, 129, 132, 133, 135, 137 to 140, 142, 144 to 153.

§ 9652. Effective dates; savings provisions

(a) Unless otherwise provided, all provisions of this chapter shall be effective on December 11, 1980.

(b) Any regulation issued pursuant to any provisions of section 1321 of Title 33 which is repealed or superseded by this chapter and which is in effect on the date immediately preceding the effective date of this chapter shall be deemed to be a regulation issued pursuant to the authority of this chapter and shall remain in full force and effect unless or until superseded by new regulations issued thereunder.

(c) Any regulation—

(1) respecting financial responsibility,

(2) issued pursuant to any provision of law repealed or superseded by this chapter, and

(3) in effect on the date immediately preceding the effective date of this chapter shall be deemed to be a regulation issued pursuant to the authority of this chapter and shall remain in full force and effect unless or until superseded by new regulations issued thereunder.

(d) Nothing in this chapter shall affect or modify in any way the obligations or liabilities of any person under other Federal or State law, including common law, with respect to releases of hazardous substances or other pollutants or contaminants. The provisions of this chapter shall not be considered, interpreted, or construed in any way as reflecting a determination, in part or whole, of policy regarding the inapplicability of strict liability, or strict liability doctrines, to activities relating to hazardous substances, pollutants, or contaminants or other such activities.

(Pub.L. 96–510, Title III, § 302, Dec. 11, 1980, 94 Stat. 2808.)

(5) conducting the RI/FS in ordance with this Plan;

) evaluating and recommending ppropriate remedies to the lead agency;

(7) implementing and overseeing response actions;

(8) obtaining assurances for continued site maintenance from responsible parties; and/or

(9) recommending sites for deletion after completion of all appropriate response action.

(c) *Certification.* Organizations may be certified to conduct site response actions. Certification is not necessary for, but may facilitate, Fund preauthorization under § 300.25(d) and lead agency evaluation of the adequacy of proposed response actions.

(1) An organization may request certification by submitting a written request to the Administrator or his designee establishing that the requesting organization has engineering, scientific, or other technical expertise necessary to assist or conduct site response by carrying out any or all of the functions listed in paragraph (b) of this section.

(2) For each specific release being addressed, the certified organization must:

(i) Meet the requirements of 00.25(d) and 40 CFR 307 if requesting eauthorization; and

(ii) Have established procedures to recuse members of the organization that may have a conflict of interest with a party potentially responsible for the release.

(3) The Administrator will respond to a request for certification within 180 days of receipt of the request. The Administrator may grant certification, request further information relating to the requested certification, or deny certification.

(4) Certification is effective for two years from the date of latest certification. If certification is not renewed at that time, it automatically expires.

(5) Certification is not to be construed as approval by the lead agency of response actions undertaken by that organization. Certification does not authorize that organization to act on behalf of, or as an agent for, the lead agency.

(6) Certification may be revoked at the discretion of the Administrator for failure to comply with this Plan or the requirements of CERCLA.

(d) *Releases from Liability.* mplementation of response measures by responsible parties, certified organizations, or other persons does not release those parties from liability.

Subpart G—Trustees for Natural Resources

§ 300.72 Designation of Federal trustees.

When natural resources are lost or damaged as a result of a discharge of oil or a release of a hazardous substance, the following officials are designated to act as Federal trustees pursuant to section 111(h)(1) of CERCLA and section 311(f)(5) of the Clean Water Act for purposes of sections 111(h)(1), 111(b), and 107(f) of CERCLA and section 311(f)(5) of the Clean Water Act:

(a)(1) *Natural Resource Loss.* Damage to resources of any kind located on, over, or under land subject to the management or protection of a Federal land managing agency, other than land or resources in or under United States waters that are navigable by deep draft vessels, including waters of the contiguous zone and parts of the high seas to which the National Contingency Plan is applicable and other waters subject to tidal influence.

(2) *Trustee.* The head of the Federal land managing agency, or the head of any other single entity designated by it to act as trustee for a specific resource.

(b)(1) *Natural Resource Loss.* Damage to fixed or non-fixed resources subject to the management or protection of a Federal agency, other than land or resources in or under United States waters that are navigable by deep draft vessels, including waters of the contiguous zone and parts of the high seas to which the National Contingency Plan is applicable and other waters subject to tidal influence.

(2) *Trustee.* The head of the Federal agency authorized to manage or protect these resources by statute, or the head of any other single entity designated by it to act as trustee for a specific resource.

(c)(1) *Natural Resource Loss.* Damage to a resource of any kind subject to the management or protection of a Federal agency and lying in or under United States waters that are navigable by deep draft vessels, including waters of the contiguous zone and parts of the high seas to which the National Contingency Plan is applicable and other waters subject to tidal influence, and upland areas serving as habitat for marine mammals and other species subject to the protective jurisdiction of NOAA.

(2) *Trustee.* The Secretary of Commerce or the head of any other single Federal entity designated by it to act as trustee for a specific resource; provided, however, that where resources are subject to the statutory authorities and jurisdictions of the Secretaries of the Departments of Commerce or the Interior, they shall act as co-trustees.

(d)(1) *Natural Resource Loss.* Damages to natural resources protected by treaty (or other authority pertaining to Native American tribes) or located on lands held by the United States in trust for Native American communities or individuals.

(2) *Trustee.* The Secretary of the Department of the Interior, or the head of any other single Federal entity designated by it to act as trustee for specific resources.

§ 300.73 State trustees.

States may act as trustee for natural resources within the boundary of a State or belonging to, managed by, controlled by, or appertaining to such State as provided by CERCLA.

§ 300.74 Responsibilities of trustees.

(a) The Federal trustees for natural resources shall be responsible for assessing damages to the resource in accordance with regulations promulgated under section 301(c) of CERCLA, seeking recovery for the costs of assessment and for the losses from the person responsible or from the Fund, and devising and carrying out a plan for restoration, rehabilitation, or replacement or acquisition of equivalent natural resources pursuant to CERCLA.

(b) The trustee may, upon notification, take the following actions as appropriate:

(1) request that the lead agency issue an administrative order or pursue judicial relief against parties responsible for the release, as authorized by CERCLA section 106;

(2) request that the lead agency remove or arrange for the removal or provide for remedial action with respect to any hazardous substance from a contaminated medium, as authorized by CERCLA section 104;

(3) initiate actions against responsible parties under CERCLA section 107(a); or

(4) pursue a claim against the Fund for injury, destruction, or loss of a natural resource, as authorized by CERCLA section 111. (When this option is selected, a plan for restoration, rehabilitation, or replacement or acquisition of equivalent natural resources must be adopted pursuant to section 111(i) of CERCLA.)

(c) Where there are multiple trustees because of co-existing or contiguous natural resources or concurrent jurisdictions, they shall coordinate and cooperate in carrying out these responsibilities.

federal register

Friday
December 20, 1985

Part IV

Department of the Interior

Office of the Secretary

43 CFR Part 11

Natural Resource Damage Assessments; Proposed Rule

DEPARTMENT OF THE INTERIOR

Office of the Secretary

43 CFR Part 11

Natural Resource Damage Assessments

AGENCY: Department of the Interior.

ACTION: Proposed rulemaking.

SUMMARY: The proposed rule establishes procedures for assessing damages to natural resources from a discharge of oil or a release of a hazardous substance and compensable under either the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), 42 U.S.C. 9601 *et seq.*, or under the Clear Water Act (CWA), 33 U.S.C. 1251 *et seq.* (also known as the Federal Water Pollution Control Act). Responsibility for preparation of this proposed rule was delegated by the President to the Department of the Interior in Executive Order 12316, August 14, 1981, 46 FR 42237.

The proposed rule is for the use of authorized Federal and State officials referred to in CERCLA as "trustees" for natural resources. Federal trustees are those managemnt agencies designated in subpart G of the National Oil and Hazardous Substances Contingency Plan 40 CFR Part 300, and State trustees are authorized representatives of States who may bring claims under sections 107 and 111 of CERCLA. The procedures in the proposed rule will enable authorized officials to perform damage assessments that when performed by Federal officials will be given the weight of a rebuttable presumption pursuant to section 111(h) of CERCLA in court actions or administrative proceedings when seeking compensation for injuries to natural resources. Section 301(c) of CERCLA requires the promulgation of two types of regulations, simplified "type A" procedures and alternative "type B" procedures to be used in individual cases. This proposed rule consists of the alternative methodologies referred to as the "type B" procedures. This proposed rule does not provide guidance for simplified assessments referred to as the "type A" procedures. The "type A" procedures will be proposed in a future Notice of Proposed Rulemaking on or before April 4, 1986.

The proposed rule does not include procedures for the filing of claims for natural resource damages against the Hazardous Substances Response Trust Fund (Superfund). Rules for that purpose have been promulgated by the Environmental Protection Agency (EPA) on November 30, 1985, to be codified at 40 CFR Part 306.

DATE: Comments should be submitted by February 3, 1986. Comments received on or before the above date will be considered in the decisionmaking process on the final rulemaking. The short comment period is required because of the court ordered deadline that requires publication of the final rule by April 22, 1986.

ADDRESS: Comments should be sent to: Keith Eastin, Associate Solicitor, CERCLA 301 Project Director, Room 4354, Department of the Interior, 1801 "C" St. NW, Washington, DC 20240.

Comments will be available for public review at the above address during regular business hours (7:45 a.m. to 4:15 p.m.), Monday through Friday.

FOR FURTHER INFORMATION CONTACT:
Keith Eastin, (202) 343–5757;
Sheryl Katz, (202) 343–1301;
Alison Ling, (202) 343–1301.

SUPPLEMENTARY INFORMATION:

I. Background

A. Statutory Background

Section 301(c) of CERCLA requires the promulgation of rules for the assessment of damages for injury to, destruction of, or loss of natural resources resulting from a discharge of oil or a release of a hazardous substance for the purposes of CERCLA and of section 311(f) (4) and (5) of the CWA. Section 301(c) states:

> (c)(1) The President, acting through Federal officials designated by the National Contingency Plan published under section 105 of this Act, shall study and, not later than two years after the enactment of this Act, shall promulgate regulations for the assessment of damages for injury to, destruction of, or loss of natural resources resulting from a release of oil or a hazardous substance for the purpose of this Act and section 311(f)(4) and (5) of the Federal Water Pollution Control Act.
>
> (2) Such regulations shall specify (A) standard procedures for simplified assessments requiring minimal field observation, including establishing measures of damages based on units of discharge or release or units of affected area, and (b) alternative protocols for conducting assessments in individual cases to determine the type and extent of short-and long-term injury, destruction, or loss. Such regulations shall identify the best available procedures to determine such damages, including both direct and indirect injury, destruction, or loss and shall take into consideration factors including, but not limited to, replacement value, use value, and ability of the ecosystem or resource to recover.
>
> (3) Such regulations shall be reviewed and revised as appropriate every two years.

The proposed rule will be used by Federal and State authorized officials acting as trustees of natural resources to assess damages to natural resources for purposes of sections 107(a) and 111 (a) and (d) of CERCLA and section 311 (f) (4) and (5) of the CWA. when injuries occur to natural resources resulting from a discharge of oil or release of a hazardous substance, the authorized officials of the Federal or State agency acting in its role of trustee may seek damages for those injuries either by legal actions against the parties responsible or, in the case of hazardous substances, by seeking restoration costs from the Hazardous Substance Response Trust Fund.

Section 107 (a) establishes liability for "damages for, injury to, destruction of, or loss of natural resources, including the reasonable costs of assessing such injury, destruction, or loss resulting from such a release." This language is the basis for seeking damages from responsible parties. Section 107(f) describes the role of a trustee and authorizes Federal and State agencies to assume that role. Sections 111 (a) and (b) permit the payment of claims asserted for injury, destruction, or loss of natural resources, including the cost for damage assessment from the Superfund. Section 311(f)(4) of the CWA establishes responsible party liability for costs incurred by the Federal or State governments in the restoration or replacement of natural resources damaged or destroyed as a result of a discharge of oil or hazardous substances.

Section 301(c) of CERCLA specifies two types of procedures to be developed. The type A procedures are to be standard procedures for simplified assessments requiring minimal field observation. The type B procedures are to include alternative methodologies for conducting assessments in individual cases.

B. Regulatory Background

The proposed rule is being developed under a court imposed deadline. Section 301(c) of CERCLA required tis promulgation by December 11, 1982. By Executive Order 12316, August 14, 1981, 46 FR 42237, responsibility for preparation of the proposed rule was delegated to the Department of the Interior. On January 10, 1983, 48 FR 1084, the Department issued an Advance Notice of Proposed Rulemaking (ANPRM) seeking comment from the public concerning how to approach the development of the regulations. A second Advance Notice of Proposed Rulemaking, 48 FR 34768, appeared on August 1, 1983, summarizing the comments received from the January

notice. In December 1983, the State of Montana filed suit against the Department of the Interior for failure to promulgate the regulations. That suit was voluntarily withdrawn, but was followed by two new cases, one brought by the State of New Jersey and the New Jersey Department of Environmental Protection, and the other brought by the New Mexico Health and Environment Department, the State of Louisiana, Public Citizen, the National Wildlife Federation, and the Environmental Defense Fund. The court ruled on December 12, 1984, in *State of New Jersey et al. v. Ruckelshaus et al.*, Cir. No. 84–1668 (D.C.N.J.), that the Secretary had failed to promulgate the assessment regulations in timely fashion. In a consent order entered on February 5, 1985, the Secretary agreed to undertake action to adopt the assessment regulations as expeditiously as possible. The Secretary agreed to the following:

(1) To publish a notice of proposed rulemaking for the "A regulations" on or before April 4, 1986, and to promulgate final "A regulations" on or before August 7, 1986.

(2) To publish a notice of proposed rulemaking for the "B regulations" on or before December 20, 1985, and to promulgate final "B regulations" on or before April 22, 1986.

In order to complete the proposed rule expeditiously, an intra-Departmental team was assigned the responsibility for organizing the project, coordinating governmental expertise, and drafting the proposed rule. The team was comprised of professionals from the U.S. Fish and Wildlife Service, the Bureau of Land Management, the U.S. Geological Survey, the Office of Policy Analysis, and the Office of the Solicitor, The team was selected and organized in October 1984 and began full-time work on the project in November 1984.

The team was responsible for determining the scope of the regulations and defining the key issues. Experts from within and outside government were contacted to provide additional information and analysis. Outside contractors were used on a limited basis to conduct studies and gather data not otherwise available. Emphasis was placed on the use of existing research, procedures, and methodologies whenever possible.

To seek similar information from the public, the Department published a **Federal Register** notice on January 11, 1985, inviting updated public comment and suggesting meetings between interested members of the public and representatives of the Department involved in the preparation of the regulations. Comments received in response to this notice and the earlier ANPRMs are discussed later in this preamble.

Two groups within the Federal government reviewed a preliminary working draft of the proposed rule. The existing Department of the Interior Superfund Task Force was used for internal Department review and comment. A second group composed of those Federal agencies represented on the National Response Team was also invited to review and comment. Members of the project team then met with the reviewing agencies to discuss their comments on the working draft.

C. "Type A" Regulations

The proposed rule includes only the type B procedures described in section 301(c)(2)(B) of CERCLA. The type A procedures will be included in a Notice of Proposed Rulemaking on or before April 4, 1986. No guidance is provided in this proposed rule for choosing between a type A and a type B assessment; that guidance will be provided in the proposed rule for the type A procedures. Until type A procedures are available, all assessments performed under CERCLA or the CWA will use the type B procedures. It is comptemplated that the initial type A procedures will provide assessment methodologies only for discharges of oil and releases of hazardous substances in coastal environments. The type A procedures require more time to develop than the type B procedures. Developing the concepts applicable generally to damage assessments and developing the basic methodologies are steps that precede development of a simplified procedure. The type A procedures will require data collected on principals similar to the principles used in the type B assessments. This data collection performed as part of a type B assessment will have to be performed as part of the regulatory development for the type A procedure. This process will ensure that the type A procedure will yield results that are compensatory and not be a mere penalty table.

D. Concepts Embodied in the Proposed Rule

1. Rebuttable Presumption

CERCLA provides for the recovery of damages to natural resources, but it does not establish the measure of those damages. Instead, it requires the President, acting through designated Federal officials, to develop regulations for the assessment of damages. Pursuant to CERCLA section 111(h), the dollar figure representing the measure of damages is determined through an assessment performed using the procedures specified in the proposed rule. This figure, when supported by the Report of Assessment and based on an assessment performed by a Federal official, is entitled to a rebuttable presumption in a court action or administrative proceeding to determine the measure of damages recoverable under the statute. Applying traditional rules of civil procedures, the submission of the damage amount and the Report of Assessment to the court should be sufficient to meet the plaintiff's burden of going forward. The burden of going forward is the requirement of the authorized Federal or State official, as plaintiff, to present an affirmative case supported by evidence. The dollar figure determined by a Federal agency through the process in this proposed rule would be presumed to be correct. It could be rebutted by evidence presented by a responsible party, but a court or administrative agency would have to find that the evidence presented by the responsible party was demonstrated by a preponderance of the evidence to be correct.

The rebuttable presumption provides a significant benefit. Accordingly, the methodologies and criteria adopted in the proposed rule have been carefully selected.

State agencies acting as trustees should notc that while the rebuttable presumption currently attaches only to assessments performed by Federal officials, all CERCLA reauthorization bills currently before Congress would allow a rebuttable presumption for States as well as Federal agencies conducting assessments under this proposed rule.

2. Compensatory, Not Punitive

The proposed rule takes into consideration existing common law rules for developing a theory of natural resource damages. A fundamental principle of the theory developed in the proposed rule is that natural resource damages will be compensatory, not punitive. CERCLA itself calls for compensatory rather than punitive damages. This principle is consistent with the common law, which disfavors punitive damages. It is basic to the theory underlying the common law of damages, which is that money can be used to provide substitutionary relief. In other words, that which was lost cannot be replaced, but money can be awarded in compensation.

The money awarded as compensation using common law principles represents a rough measure that approximately represents the value of the thing that is

lost. Rules have been developed by the courts for the measurement of damages so that cases can be resolved, and perhaps more importantly, settled in accordance with common law principles. Settlements become possible because the range of outcomes given a particular set of facts is predictable.

The mandate to establish regulations for the assessment of damages to natural resources included a mandate to develop methodologies that are based on the best available procedures. This directive implies that compensatory damages were intended. The expensive and complex process of studying existing injury measurement and economic compensation techniques would have been unnecessary if punitive damages were intended. The procedures for determining punitive damages could have involved the simple publication of penalty fee tables.

Finally, it should be noted that a variety of criminal or other punitive statutes may apply to actions for which natural resource damages may be sought. Through those statutes penalties may be sought where appropriate.

3. Relationship to Response Actions

An action for the recovery of damages to natural resources is part of the larger statutory scheme of CERCLA and the CWA. Under those Acts discharges of oil and releases of hazardous substances are responded to by EPA and the U.S. Coast Guard in accordance with procedures set forth in the National Contingency Plan (NCP). In some cases responses are also made by States or other Federal agencies. The primary purpose of response actions is to protect human health. This rule supplements the procedures in the NCP. It does not replace response actions, but adds an additional means of addressing problems resulting from discharges of oil and releases of hazardous substances. In addition to taking removal and remedial actions, compensation may be sought and resources restored by use of the procedures in this rule.

Injuries to natural resources should also be considered in the planning of a response by the Environmental Protection Agency (EPA) or the U.S. Coast Guard. In particular, natural resource concerns should be included in the planning process for remedial action. However, in many cases, not all natural resource concerns will be resolved by that process alone. In some cases certain restoration actions, such as habitat management or acquisition of an equivalent resource, will be beyond the scope of the response action. This proposed rule provides that natural resource damages are injuries residual to those injuries that may be ameliorated in the response action and includes the loss of use from the time of the discharge or release until such injuries are ameliorated. This concept of natural resource damages as a residual should prevent the development of two separate actions to ameliorate the same situation, encourage the inclusion of natural resource concerns in the development of remedial plans, and preserve the priority order of remedial actions intended by the creation of the National Priorities List.

In some instances it may be necessary to anticipate an eventual remedial action in planning a natural resource damage assessment. Ideally the natural resource damage assessment would be performed concurrently with the remedial investigation/feasibility study (RI/FS). When the statute of limitations will not allow adequate time to complete and coordinate the necessary procedures, the proposed rule does not preclude filing of a natural resource damage claim against a responsible party before completion of the assessment.

4. Involvement of the Public and Potentially Responsible Parties

The proposed rule uses an administrative process as its decisionmaking method. Various methods exist for doing a damage assessment. No single answer can be given for the various questions that arise in the process. Every resource and affected area has distinctive characteristics, and is managed by different agencies for different purposes. Accordingly, the flexibility of an administrative process is desirable and fair, giving the public and responsible parties protection against arbitrary requirements. The proposed rule requires that an Assessment Plan be prepared before an assessment is initiated. After the plan is prepared there is a thirty day period during which the public and any potentially responsible parties are to be given an opportunity to review and comment on the plan. If a Restoration Methodology Plan is prepared, comment and review by the potentially responsible party and the public are also required for thirty days. All comments on both the Assessment Plan and the Restoration Methodology Plan are included in the Report of Assessment which is part of the administrative record. Therefore, the views of the public and any potentially responsible parties on the key elements of the assessment will be available in any subsequent litigation.

Public involvement and participation by the potentially responsible party will aid the authorized official seeking natural resource damages in a number of ways. First, it will ensure that important resource concerns are not omitted from the assessment. Second, it will help ensure that the methodologies are given an independent review and that the appropriate methodologies are chosen for the Assessment Plan. Third, it will help ensure that the costs of assessment are reasonable. Fourth, it will encourage involvement of the potentially responsible party early in the process, thereby minimizing the need for or the complexity of subsequent litigation.

Early involvement of the potentially responsible party is intended to facilitate fair and speedy resolution of damage actions. Just as the NCP process encourages responsible parties to undertake remedial actions and avoid litigation, this process is intended to encourage responsible parties to undertake natural resource damage assessments and restorations. If the responsible party is aware of the proposed assessment efforts, it may be encouraged to take the actions necessary to do the assessment and restoration. However, the Federal or State authorized official is the ultimate decisionmaker regarding the content of the Assessment Plan and the restoration actions. Public participation and responsible party participation should be used for guidance. The public participation requirement parallels the process used by EPA for remedial actions.

5. Cost-Effectiveness and Reasonable Costs

Cost-effectiveness is defined in the proposed rule as achieving an objective with the least expenditure of financial or other resources. Thus, in order to achieve cost-effectiveness, a well-defined objective must be specified. For example, the objective of restoration or replacement is the return to the baseline level of services provided by the resource. Once an objective is defined, cost-effectiveness means that the authorized official must choose the least expensive management actions that achieve the objective.

The Department recognizes that in many instances limited information may be available to prepare an Assessment Plan. This plan should be modified during the assessment as new information is obtained. What may have been cost-effective under the previous set of circumstances may not be cost-effective when new information is obtained. The proposed rule is flexible enough to allow for revision of the

Assessment Plan. In this context the test of cost-effectiveness may require consideration of new management actions as objectives become clearer and more specific.

Section 107(a)(4)(C) of CERCLA states that a responsible party is liable for the "reasonable costs of assessing" injury. The concept of reasonable cost implies cost-effectiveness, but the term reasonable cost is broader in scope. Cost-effectiveness means that whenever the same benefit can be obtained in several ways, the least costly means of obtaining that benefit is selected. The concept of reasonable cost, while incorporating cost-effectiveness, also allows comparisions to be made across choices of procedures involving different levels of benfits. A cost-effectiveness criterion cannot be used as a measure to select between alternatives that provides different levels of benefits at different costs. A reasonable cost criterion should be used for this purpose.

The Department has defined the term "reasonable cost," for the purposes of this proposed rule, to mean: (1) That the Injury, Quantification, and the Damage Determination phases of the Assessment Plan have a well-defined relationship; and (2) that the extra potential benefits obtained by using a more expensive methodology for injury, quantification, or damage determination outweigh the extra potential costs of the more expensive procedure.

In order to achieve the objective of deriving a dollar figure to be used as the amount of damage claimed, a three-phased assessment must be performed to (1) document the occurrence of an injury, (2) quantify the effects of the injury, (3) determine damages. In almost all cases, the achievement of reasonable costs will require that these three phases be planned concurrently. Since these three phases will form the basis of a damage claim, all analyses conducted under this rule should be directed toward the goal of obtaining a dollar value for the injury to the resource. The minimum amount of information required to move from one phase to another should be collected. During an assessment, studies of injury or damage that do not directly contribute to the determination of a dollar value for the injured resource should not be part of the damage claim. However, nothing in this proposed rule precludes agencies from performing general or related studies with their own funds.

6. Emergencies

In accordance with section 111(i) of CERCLA, the proposed rule permits an emergency restoration prior to development of an Assessment Plan where genuine emergency circumstances exist. Some limited situations may require immediate action in order to avoid irreversible loss or to prevent or reduce any continuing danger to natural resources (e.g., where a continuing discharge or release must be abated in order to avoid the complete destruction of a resource or where continuing degradation threatens more and more of the resource). Such emergency actions would typically consist of the erection of non-permanent barriers to prevent or reduce the migration of the oil or hazardous substance onto or into the resource. The authorized official may undertake only those actions necessary to abate the emergency. Any additional actions other than those necessary may be performed only upon following normal assessment procedures.

Emergency actions may only be taken on land over which the authorized official has administrative jurisdiction. This provision is not an authorization to undertake response actions on private lands nor is it meant as a substitute for response actions. For example, if the discharge or the release occurs in an area not under the administrative jurisdiction of a Federal or State agency, emergency restoration actions are limited to those actions that would prevent or reduce the migration of the oil or hazardous substance onto or into the resource.

However, if the discharge or release occurs in an area under the administrative jurisdiction of a Federal or State agency, the authorized official should first consider using existing authority to undertake response actions to abate the emergency. The cost of such response actions would be recoverable under section 107 (a) or (b) of CERCLA, rather than as natural resource damages. The burden of proof, based upon information available at the time, that irreversible harm would have resulted if the emergency restoration were not undertaken and that costs associated with the emergency actions were reasonable and necessary will rest with the Federal or State agency.

II. Overview of the Proposed Rule

A. Introduction

The proposed rule provides a process for determining proper compensation to the public for injury to natural resources. It stresses the need for a planned approach to natural resource damage assessments with active involvement of the public and potentially responsible parties throughout but with final authority for assessment decisions resting with the authorized official. Finally, it seeks a balance between controlling the potential costs of assessments and the need for flexibility in designing the assessments. The proposed rule also specifies the procedural steps to be taken in a natural resource damage assessment process. It provides objectives and acceptance criteria for selecting methodologies for injury and damage determinations. It does not provide specific procedures for implementing these methodologies. A flexible rule is necessary because of the multitude of resources, ecosystems, and oils and hazardous substances, as well as the need to enable the use of evolving scientific and economic methodologies. An evaluation of currently available techniques applicable to the various phases of a damage assessment are included in accompanying technical information documents currently being prepared. These technical information documents cover:

- Procedures for analyzing injuries to fish and wildlife resources, including testing and sampling methodologies;
- Procedures for modeling transport of oil and hazardous substances via the air pathway;
- Methods for using the U.S. Fish and Wildlife Service's Habitat Evaluation Procedures to estimate the effect of oil and hazardous substances on wildlife habitats;
- Information on determining and quantifying injury to soil; and
- Economic methodologies pertinent to natural resource damage assessments. These technical information documents are being prepared to ensure that the steps and objectives outlined in the proposed rule are feasible and to provide more specific information to those performing assessments, interested members of the public, and potentially responsible parties. They are not being prepared as additional regulatory guidance nor are they required to be followed to obtain the rebuttable presumption. Availability of these information documents will be the subject of a future notice in the **Federal Register**.

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Chart I

Natural Resource Damage Assessment Process

Subpart B - PREASSESSMENT

Initiation of process (§ 11.20: Notification and detection)

Potential Injury to Resource, Suspected CERCLA or CWA Source

Notification

Decision on whether emergency exists (§ 11.21: Emergency restorations)

Emergency — Yes

No

Determination of whether to proceed with a damage assessment (§§ 11.23-11.25: Preassessment screen)

Preassessment Screen

No

End

Yes

Subpart C - ASSESSMENT PLAN

Planning for the assessment (§§ 11.30-11.32: Assessment Plan)

Assessment Plan

Decision on A or B (§ 11.33: Deciding between a Type A or Type B assessment)

Type A or Type B

Type A (Subpart D)

Confirm presence in resource (Type B only) (§ 11.34: Confirmation of exposure)

Not Confirmed

Confirmation of Exposure

End

Restoration costs or use value (Type B only) (§ 11.35: Economic Methodology Determination)

Economic Methodology Determination

Type B

(continued)

Chart I (continued)

(from previous page)

Subpart E - TYPE B ASSESSMENT

Determine whether an injury has occurred that is linked to CERCLA or CWA release
(§ 11.61: General)
(§ 11.62: Injury definition)
(§ 11.63: Pathway determination)
(§ 11.64: Testing and sampling methods)

Injury Determination

Review of planned methodologies, especially Economic Methodology Determination, in light of results of Injury Determination phase
(§ 11.32(f): Assessment Plan)

Review Assessment Plan

CERCLA or CWA Injury Not Confirmed

End

Quantification of effects of discharge or release (§ 11.70: General)

(§ 11.71: Service reduction quantification)
(§ 11.72: Baseline services determination)
(§ 11.73: Resource recoverability analysis)

Quantification

Estimate of diminution of value or restoration or replacement costs
(§ 11.80: General)
(§ 11.81: Restoration methodology)
(§ 11.82: Restoration Methodology Plan)
(§ 11.83: Use value methodologies)
(§ 11.84: Implementation guidance)

Damage Determination

Subpart F - POST-ASSESSMENT

(§ 11.90: Report of Assessment)
(§ 11.91: Demand)
(§ 11.92: Restoration fund)
(§ 11.93: Restoration Plan)

Report of Assessment

Post-assessment

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B. The Natural Resource Damage Assessment Process

Chart I provides an overview of the natural resource damage assessment process embodied in the proposed rule. This section will briefly discuss the major steps in the process. A more detailed discussion of the major issues pertaining to this process follows in the next section.

Initiation of Process—A natural resource damage assessment begins with the process set forth in the NCP. Sections 300.52(d) and 300.62(d) of the NCP provide for notification by the lead agency to Federal or State agencies authorized to act as trustees when a potential natural resource injury may exist. In instances where a Federal or State official first identifies a possible injury to a resource for which a Federal or State agency may act as a trustee under CERCLA, and suspects a CERCLA or CWA covered discharge or release as the source, the official is directed to the procedures in the NCP for reporting the discharge or release.

Emergency Restorations—Section 111(i) of CERCLA provides authority for emergency restorations. The proposed rule (1) defines an emergency, (2) requires that the emergency be reported to the National Response Center, (3) allows for certain actions to be taken in the event the Coast Guard or EPA do not take sufficient action, and (4) upon completion of the emergency restoration, returns the authorized official to the natural resource damage assessment process.

Preassessment Screen—Any assessment actions, other than emergency actions, begin with a preassessment screen to determine whether the discharge or release justifies a natural resource damage assessment. This screen is viewed as a "desk top" review of existing data with a minimal amount of field work and should be capable of being completed in a matter of days.

A determination is required for this screen. The decision to proceed beyond this screen must be based upon a preliminary finding that (1) the discharge or release was covered by CERCLA or the CWA, (2) it could have resulted in some injury to the resource, and (3) the resource and the extent of potential injury were of sufficient concern to the authorized official that the authorized official has reason to believe that the potential benefits outweigh the costs of performing an assessment.

The preassessment screen proceeds in steps from preliminary identification of the substance discharged or released and its source, to initial estimates of the pathway for purposes of identifying any resources that may be impacted, to identifying important resources that may justify further assessment. This preassessment screen should complement rather than duplicate any equivalent procedure that may already be used by Federal and State agencies to screen for potential resource damages. It should not duplicate or repeat information gathered by the lead agency or by other parties as part of the response action. Existing and previously gathered information is sufficient so long as it is adequate to make the appropriate decisions. Moreover, in conduicting assessment activity pursuant to this rule, all activities of the authorized official should be closely coordinated with the lead agency undertaking response work. If the preassessment screen results in a determination that a natural resource damage assessment is appropriate, the next phase is to prepare an Assessment Plan.

Assessment Plan—All decisions on the selection of the methodologies provided in subparts D or E must be documented. This documentation must be set out in an Assessment Plan. The Assessment Plan should ensure that only reasonable costs of assessment will be expended. The authorized official should refer to the definitions stated in the proposed rule for "reasonable costs" and "cost-effectiveness" when preparing the Assessment Plan.

The proposed rule contains several requirements that must be fulfilled in developing the Assessment Plan. These requirements relate to the involvement of multiple agencies, potentially responsible parties, and the public in the assessment.

The authorized official should ensure that other possibly affected agencies have been contacted. The selection of a lead authorized official is required in all instances when multiple agencies are conducting a joint assessment. Allowances are made for assessments which can be divided and conducted separately. Divisions of responsibility among agencies jointly conducting an assessment should be documented in the Assessment Plan. The proposed rule provides a division of responsibility in instances where consensus cannot be reached. Agencies should be aware of additional requirements concerning designation of lead trustees in claims against the CERCLA Fund contained in 40 CFR 306.20(b). In claims against the CERCLA Fund, § 306.20(b) states, "Should the trustees fail to agree on a lead trustee, EPA in its sole discretion shall appoint a lead trustee for the purposes of asserting a claim against the Fund on behalf of all trustees."

The potentially responsible parties should be identified at this phase. The proposed rule provides for a Notice of Intent to Perform an Assessment to be sent to any identified potentially responsible parties.

The proposed rule provides for public involvement in the Assessment Plan with a 30-day review and comment period before implementing the Plan or making major modifications. The proposed rule also requires that comments and responses be maintained as part of the administrative process.

The proposed rule provides for a mandatory review of the Assessment Plan at the end of the Injury Determination phase of the type B assessment. The purpose of this review is to ensure that the selection of methodologies for the last two phases of the type B assessment is compatible with the findings of the Injury Determination Phase.

In the Assessment Plan phase, there are several additional requirements specific to a type B assessment. These include the confirmation of exposure, the Economic Methodology Determination, Quality Assurance Plan, and the objectives of testing and sampling for injury or pathways. Guidance for the first two of these requirements is provided in this portion of the proposed rule. The Quality Assurance Plan should be prepared following the same requirements that apply to other response actions taken under the NCP. The testing and sampling objectives are discussed in the testing and sampling section of the proposed rule (§ 11.64). The confirmation of exposure is the second screen in the assessment process. It is intended to ensure that before initiating an expensive type B assessment the authorized official has confirmed that the oil or hazardous substance has actually come into contact with the resource.

The Economic Methodology Determination is where the authorized official must make a choice between using (1) restoration or replacement costs or (2) the diminution of use values as the measure of damages. The decision will affect the choice of methodologies to be selected in the Quantification phase and to a lesser extent in the Injury Determination phase. Therefore, the proposed rule requires the decision at an early stage, but provides that the decision may be deferred or modified after the Injury Determiniation phase is completed. Using "off-the shelf" data, the Economic

Methodology Determination requires an "order of magnitude" estimate of the relative costs and benefits or restoration or replacement versus the diminution of use. The guidance on performing this determination is described within the proposed rule.

The selection of (1) restoration or replacement costs or (2) the diminution of use values only affects the method of damage determination. It does not imply any decisions concerning whether the resources will be restored. In fact, the proposed rule requires that all funds, regardless of whether the basis of calculating the damage was restoration costs or diminution of use, be used for restoration, rehabilitation, replacement, or acquisition of the equivalent.

The proposed rule allows the recovery of the lesser of (1) restoration or replacement costs or (2) the diminution of use values, except in the case of special resources. The proposed rule defines special resources and suggests for those resources that restoration or replacement be the measure of damages, whenever restoration or replacement is technically feasible and whenever the costs of restoration or replacement are not grossly disproportionate to the benefits. In restoration or replacement, the costs include the diminution of use values until the resource is restored or replaced.

Type B Assessment—A type B damage assessment involves three major steps: (1) establishing that an injury has occurred and that the injury resulted from the discharge or release; (2) quantifying the effects of the discharge or release on the services provided by the injured resource; and (3) determining the damage.

Injury Determination—This phase of the type B assessment acts as the third screen of the natural resource damage assessment. To assert a natural resource damage claim, the authorized official must establish that an injury occurred and must link that injury to the discharge or release.

To perform this phase, injury to one or more natural resources must first be established. The proposed rule provides a general definition of injury as a measurable adverse change in the chemical or physical quality or viability of a natural resource. For example, an organism need not die before that organism is considered to have been injured by the oil or hazardous substance. Conversely, the mere presence of oil or a hazardous substance in the organism may not necessarily constitute an injury. All of the natural resources specified by CERCLA have been placed into one of five groups: surface water, ground water, air, geologic, and biological resources. Specific definitions of injury are provided for each of these resources. These specific definitions focus on inherent physical, chemical, or biological properties of the resource that enable it to provide one or more specific services, such as habitat for aquatic species or a water supply.

In addition to satisfying the injury definition, the pathway of the discharged or released substance from the source to the resource must be demonstrated. Each of the five groups of resources may also act as a component of the pathway through which the oil or hazardous substance may travel. For example, biological resources can carry the substance away from the site by either direct physical contact or by exposing other organisms through the food chain. Oil or hazardous substances contained in ground water resources may move to a lake or stream thereby exposing biological resources. The use of transport and fate modeling in media such as air or water may be useful in many situations. In other situations, sampling may be required.

The proposed rule also provides guidance on selecting testing and sampling methodologies to determine that an injury to the resource has occurred and for pathway determinations.

Review of the Assessment Plan—Upon completion of the Injury Determination phase, the authorized official must review the methodologies selected in the Assessment Plan. If an injury, as defined in the proposed rule, cannot be determined or cannot be linked to the discharge or release, further assessment efforts should be terminated and documentation presented on the results of the Injury Determination phase. If an injury determination has been made, methodologies for the next two phases must be selected that are consistent with the findings of the Injury Determination. If the decision was not previously made, the authorized official must decide whether (1) restoration or replacement costs or (2) a diminution of use values will form the basis of the damage determination.

Quantification—Having established that the resource was injured by the discharge or release, the next step in the type B procedure is to quantify the effects on the injured resource.

Because the purpose of the natural resource damage assessment is to determine compensation for injuries rather than a decision on the level of cleanup, this phase requires ascertaining the baseline level for the uninjured resource The baseline level is compared to the level existing or anticipated upon the completion of any response actions to determine the residual change resulting from the discharge or release. The baseline level will include consideration of the resource's natural cyclical changes. The proposed rule provides that quantification of the change in the resource be expressed in terms of the change in the level of services that the resource provides. These services include such ecological services as flood and erosion control, habitat, and food chains as well as such human uses as recreation. Therefore, it is at this stage in the assessment that the selection is made of services that in a later phase will be determined to have a restoration or replacement cost or use value. The selection of the services to be assessed may vary based upon the economic methodology selected. For restoration or replacement, the authorized official should select services for which restoration or replacement is necessary. For a diminution of use value, the authorized official should select services for which clear relationships to human uses exist and for which dollar values can be assigned.

Damage Determination Phase—The next part of the process is applying the method of estimating the damage, using either the costs of restoration or replacement or the diminution of use values, which was determined in the Assessment Plan.

If restoration or replacement costs are to be the measure of damages, a plan for the restoration or replacement, referred to as the Restoration Methodology Plan, must be developed in the Damage Determination phase. This plan must be in sufficient detail to ensure that all major elements of costs are included and that these costs represent the most cost-effective means of restoring or replacing the services lost. This plan will also serve as the foundation for the final restoration plan that must be developed after the award.

Using the diminution in use values as the method for determining damages will require that the authorized official identify the human uses of the services that were lost as a result of the discharge or release. For an assessment based upon the diminution in use values, the lost uses being valued are the committed uses supplied by the injured resources. Committed uses must be current uses or uses financially, legally, or administratively documented by a body or organization with sufficient authority to do so.

The losses compensable to a Federal or State agency acting as a trustee under CERCLA are for the uses of the resource

by members of the public at large. They do not include any direct losses suffered by private users of public resources. Direct private losses appropriately are not recovered by a public body acting for the public at large.

The proposed rule provides guidance on performing a damage determination using either the restoration or replacement cost method or the diminution of use value method. A final section in this portion of the rule provides guidance, such as selecting a discount rate, that is applicable to either method.

Report of Assessment—At the conclusion of either a type A or a type B assessment, the authorized official must document the results of the major steps of the process. This documentation includes the Preassessment Screen Determination and the Assessment Plan, with all comments and responses, for either the type A or type B assessments. The results of the assessment should be included for the type A assessment. For the type B assessment, the Injury Determination, the Quantification Determination, and the Damage Determination, including the Restoration Methodology Plan if appropriate, should be included. The document must be filed as the Report of Assessment with a court or an administrative body should the agency seek a rebuttable presumption.

Post Assessment—CERCLA requires that funds recovered for damages as a result of the assessment process provided in the proposed rule must be available for restoration, rehabilitation, replacement, or the acquisition of the equivalent of the injured resource. To accomplish this objective, the proposed rule requires the establishment of a trust fund into which all funds awarded by a court pursuant to Section 107 of CERCLA for compensation for damages must be placed. Reimbursements of assessment, administrative, and litigative cost are not placed in this trust fund. Similarly, monies awarded from the Hazardous Substance Responses Trust Fund as reimbursement for assessment or restoration costs pursuant to the natural resource claims provision of CERCLA need not be placed in a post-assessment trust fund because they are by definition reimbursements of costs incurred. These reimbursements must be returned to the Federal or State general treasury which incurred the costs.

In the event damages are awarded pursuant to section 107(a)(4)(C) of CERCLA, the Federal or State agency acting as trustee shall prepare a Restoration Plan. This plan shall be based upon the decisions made in the Restoration Methodology Plan, if one has been prepared, modified to the extent necessary to accommodate new information, including the amount of the award. Where the measure of damages is determined using a use value methodology, the Restoration Plan shall describe those management actions designed to restore, replace, rehabilitate, or acquire the equivalent resources which can be undertaken consistent with the level of the damage award. The trust fund is to be used to pay for the implementation of this Restoration Plan.

In recognition of the fact that restoration of some injured resources is technically infeasible, replacement and acquisition of the equivalent are defined to include acquisition of resources that provide similar services to the injured resource. However, there is a limitation on use of the fund. Where the Restoration Plan would involve acquisition of land for Federal management, the award must be paid to the general treasury. The appropriations process must be used where private land is being acquired that would expand the total Federal landholdings.

III. Resource Related Issues

A. Injury Determination—General

The definition of injury adopted in this proposed rule is fundamental to the assessment process. Without injury to one or more natural resources there is no damage to recover. A general definition of injury is provided in § 11.14(v). The proposed rule clearly distinguishes between the concepts of "damage" and "injury." Following the statutory division in use of the words, "damage" is the amount of money sought in compensation for an "injury." Injury is the "injury to," "destruction of," or "lost of" the resource.

The injury definition has two parts. First, there must be a measurable adverse change in the resource. That is, there must be a change, for the worse, in the resource that is detectable by observation or scientific methods. Specific definitions of injury are provided for each resource in § 11.62. The criteria for what constitutes a measurable injury are set fairly strictly. This stringency reflects the advantage gained by the agency from the rebuttable presumption for the assessment results. Scientific evidence may be admitted in court if it is relevant and probative, but not all evidence is of equal value. Since this proposed rule is used for the purpose of giving weight to evidence, not just considering it, the reliability of the evidence is important. By establishing acceptance criteria for the measurement methodologies for the injuries to the resources, the proposed rule requires that the authorized official use only quality evidence in measuring the adverse change in a resource.

Second, the adverse change must be to the chemical or physical quality or in the viability of a resource. Since only biological resources involve the aspect of viability, specific criteria for measuring such injury is based on a measurable biological response of the resource. Water and air, for instance, are commonly evaluated in terms of established water quality or air quality standards. Such standards have not been established for biological resources to determine when exposure to a specific contaminent level has reduced the viability of the different organisms. Further, no standards have been established for biological resources adversely impacted by residues of specific contaminants resulting from such exposure.

Finally, to be compensable under CERCLA or the CWA, the injury must result from a discharge of oil or release of a hazardous substance, or from a product of reactions resulting from the discharge of oil or release of a hazardous substance. This result is established by the demonstration of a link between the discharge or release and the injured resources, called the pathways determination as provided in § 11.63. Consistent with CERCLA generally, the pathways determination does not require a showing of strict causation. It is not necessary to show that company A's release caused the injury, only that company A released the substance and that exposure to the substance could have resulted in the injury.

B. Injury Determination for Specific Resources

1. Surface Water

The presence of oil or hazardous substances in surface waters may adversely affect the quality of the resource, especially its ability to provide essential life-supporting services. The definitions of injury to the surface water resource rely primarily upon established water standards and criteria, recognizing the extensive research performed to develop the standards and criteria. The injury definitions include concentrations of substances adhering to sediments in contact with the surface water, because these sediments provide services to aquatic life much as soils provide on land. The injury definitions do not differentiate between freshwater and seawater, except as may be provided by the specific standards and

criteria used, because the CWA and CERCLA broadly define the "waters of the United States" to include both fresh and marine surface waters.

2. Ground Water

The presence of oil or hazardous substances in ground water may adversely affect the quality of the resource, especially its services to humans. The definitions of injury to the ground water resource therefore rely upon established water standards and criteria. The term "ground water" is defined in both CERCLA and CWA, and the definitions do not include water or other materials in the unsaturated zone. Therefore, measures of adverse change in the ground water resource resulting directly from the occurrence of oil or hazardous substances in the unsaturated zone are not established. This type of injury is in the subsection on geologic resources. Although many of the standards and criteria used are only applicable to fresh ground water, injury to brackish or saline ground water may occur if the resource contains released substances that have caused injury to other resources.

3. Air

Injury to air is defined in two basic ways. The first relies upon air quality standards set by EPA and upon related standards set by individual States. Those standards includs within them ways of determining whether they have been violated, including duration and appropriate testing procedures. As a result, crtieria are not repeated here in the proposed rule. Secondly, the number of substances for which air quality standards have been set is relatively small, so air may also be considered injured if an airborne oil or hazardous substance injuries other resources. (Note that the definition of "oil" is broad and includes gaseous or vaporized oil products and components.)

4. Geologic resources

Geologic resources include that portion of the Earth's crust not otherwise included in ground and surface water, and includes such elements as soil, sediments, rocks, and minerals. The quality of geologic resources is defined by physical and chemical characteristcs that pertain to the major services provided by the resource. Soil quality is frequently measured by its ability to support plants and other organisms. Thus, injury to soil is defined directly by chemical and physical criteria and through its ability to continue to support biological organisms. Development potential is especially important for mineral resources, so if a discharge or release reduces that potential, the minerals are considered injured. The unsaturated zone is included within geologic resources. However, its major effect is on ground water. Therefore, injury to the unsaturated zone also can be based upon its effect on that resource.

Finally, as with all of the other resources, provision is made for considering the geologic resource injured if concentrations sufficient to cause injury to other resources are found. This provision allows for cases where previouly established standards may not anticipate effects of oil or a hazardous substance on these resources.

Additional information helpful for assessing injury to soil will be available in the "Type B Technical Information Document: Approaches to the Assessment of Injury to Soil Arising from Discharges of Hazardous Substances and Oil," which is being prepared in conjunction with the proposed rule.

5. Biological Resources

This section provides criteria for demonstrating when injury has occurred to organisms when their viability is adversely impacted by oil or a hazardous substance, as well as a limited use of established standards for edibility. Because specific criteria have not been developed previously for this purpose, more detail is provided than for other resources. Additional technical information is being developed in the "Type B Technical Information Document: Injury to Fish and Wildlife Specifies," which is being prepared in conjunction with the proposed rule.

In general, injury will have occurred to a biological resource when a biological response, as defied in the proposed rule, has resulted from exposure to the oil or hazards substance. The proposed rule provides acceptance criteria for determining which biological responses may be used in such a demonstration, provideis a list of certain responses in fish and widlife species that have been determined acceptable according to those criteria, and also provides acceptable measures for those identified responses.

Except for the use of edibility action or tolerence levels set by the Food and Drug Administration and by States, the mere presence of a substance in an organism does not constitute injury to the organism. Many organisms, including man, can carry low levels of foreign chemicals in their tissues with few or no known measurable effects from those chemicals. Injury determination in this proposed rule is based on a demonstrable adverse biological response from the oil or hazardous substance. For example, DDT and related chemicals are ubiquitous in small amounts in almost every warm-blooded animal, but this fact alone does not show injury. DDT, however, can cause eggshell thining. This biological response has been an important factor in causing population declines of certain fish-eating and raptoral birds. Demonstration of significant levels of eggshell thinning in the presence of DDT does demonstrate injury. Many similar biological responses are described in the proposed rule.

Acceptance criteria in the proposed rule provide the means for evaluating whether a particular response will demonstrate injury in a specific case. The criteria set are stringent because of the rebuttable presumption given to assessments that follow this rule. On the other hand, many assessments done in the past have relied extensively on body counts of dead organisms as the primary or sole evidence of injury to those organisms. These criteria broaden past practice by allowing use of and compensation for other kinds of biological responses.

The criteria can be summarized as requiring that the response is unlikely to be due to factors other than the exposure to the oil or hazardous substance, that it has been demonstrated in both the laboratory and the field, and that testing for it is practical and reliable. Both laboratory and field demonstrations are required because these two conditions can rarely provide the same information. Laboratory experiments can be carefully controlled to prevent effects from factors other than the substance under test, but may use concentrations, exposure systems, and other conditions unrelated to those found in the field. Controlled laboratory experiments cannot duplicate the variety of foods, activities, potential substance degradation, and othe factors found in the field. Field experiments or observations often rely on correlations, and cause-and-effect can rarely be documented as well as it can be in the laboratory. There are numerous instances where either laboratory or field experiments have failed to confirm conclusions drawn from the other.

Categories of such responses are provided in the proposed rule, and certain responses within these categories have been identified as having met the acceptance criteria. These specific responses are identified based upon a review contained in the type B technical information document cited above, and pertain to fish and

wildlife. The acceptance criteria are intended to be applied to responses in all biological resources, including plants, shellfish, and other organisms. The authorized official may rely upon other responses in addition to the specific responses identified in the proposed rule, so long as the other responses relief upon can meet the acceptance criteria. There has been considerable work on responses in other organisms, especially plants, therefore, other responses should meet the acceptance criteria. On the other hand, if extensive new research work is required to meet the acceptance criteria, the costs of such research would be outside the assessement costs attributable to a particular assessment for purposes of a damage claim.

C. Pathways

For injury to have occurred, the oil or hazardous substance must have traveled from the source of the discharge or release to the injured resource. In some cases demonstration of this fact is straightforward, but in others further work must be done. In general, two ways may be used: demonstration of sufficient concentrations in the pathway for it to have carried the substance to the injured resource, or use of modeling that supports that pathway determination. In each case, a given resource may act as a pathway, be injured, or both. Pathways can and often do include more than one resource.

For the physical resources, including water, air, and the geologic resources, the proposed rule identifies important factors and appropriate ways to use standard procedures for those resources that will be appropriate to making a pathway determination.

Biological resources may act as a pathway both by direct physical contact or by assimilation through a food chain. Physical contact usually includes material on the skin, fur, feathers or other surface covering. Food chain transfers may include bioaccumulation and bioconcentration, so that an organism higher on a food chain may contain the highest concentrations of the substances.

Food chains may be analyzed by testing free-ranging organisms or by placing test organisms in situ to discover whether they will take up the substance. The use of appropriate indicator species is recommended. Further discussion of the use of indicator species may be found in the "Field Operations Handbook for Resource Contaminant Assessment—Field Methods and Materials," being developed by the Division of Resource Contaminants Assessment, U.S. Fish and Wildlife Service.

Careful selection of indicator species will consider the potential for that species to have taken up or contacted the discharge or release. Plants often can exclude or selectively screen out non-essential substances present in their environment, especially many organic compounds with large molecules. Other substances, such as small inorganic ions, may be taken up in the plant tissues and passed on to other organisms. Animals, because of their mobility and different physiology, are often more likely to serve as pathways, especially over greater distances.

D. Testing and Sampling

This section provides guidance on selecting procedures and techniques to be used by the authorized official in making injury and pathway determinations. For the most part, the guidance refers to techniques that are standard for each discipline, and their identification here primarily provides special considerations that may be needed in using these otherwise standard techniques for damage assessment purposes.

1. Surface Water and Ground Water

Some techniques for testing and sampling of water resources are currently under development and are not described by the reference cited in § 11.64 of the proposed rule. The authorized official may need to apply these methods during an assessment and therefore should be guided by the discussion and procedures given in the follwoing references:

Barcelona, M.J., L.P. Gibb, and R.A. Miller, "A Guide to the Selection of Materials for Monitoring Well Construction and Ground-Water Sampling," Illinois State Water Survey, Champaign, IL, SWS Report No. 327, 1983.

Benson, R.C., R.A. Glaccum, and M.R. Noel, "Geophysical Techniques for Sensing Buried Wastes and Waste Migration," U.S. Environmental Protection Agency Environmental Monitoring Systems Laboratory, Las Vegas, NV, EPA Contract No. 68–03–3050, 1983.

Claassen, H.C., "Guidelines and Techniques for Obtaining Water Samples that Accurately Represent the Water Chemistry of an Aquifer," U.S. Geological Survey, Lakewood, CO, Open-File Report No. 82–1024, 1982.

Gillham, R.W., M.J.L. Robin, J.F. Barker, and J.A. Cherry, "Groundwater Monitoring and Sample Bias," American Petroleum Institute, Washington, DC, API Publication No. 4367, 1983.

U.S. Environmental Protection Agency, "Guidance on Remedial Investigations under CERCLA," Office of Solid Waste and Emergency Response, Washington, DC, EPA/540/G–85/002, 1985.

2. Air

Testing and sampling may include methods or modeling. Modeling should only be performed if testing and sampling methods are inappropriate. Testing and sampling for air may be complex because of the wide range of conditions that may be encountered, including conditions such as: a massive short-term emission, as might occur from a tank car accident; episodic or intermittent releases, as might be created by varying wind conditions that distribute particulates from a tailing pile; and long-term low-level release that may come from an open disposal pond.

The proposed rule lists factors to identify in setting up a sampling plan, including an appropriate sampling schedule. Objectives based upon the requirements of the testing and sampling need to be set, and the sampling plan designed to meet those objectives.

The authorized official may use air testing methods not listed below but that have been accepted following formal review and evaluation by the U.S. Environmental Protection Agency, the National Institute for Occupational Safety and Health, and American Society for Testing and Materials, and the American Public Health Association. Some examples of these are the following documents:

U.S. Environmental Protection Agency, "Annotated Bibliography of Anlytical Methods for CERCLA Hazardous Substances," Volumes 1, 2, and 3, Environmental Monitoring Systems Laboratory, Las Vegas, NV.

U.S. Environmental Protection Agency, "Atmospheric Measurements of Selected Hazardous Organic Chemicals," Washington, DC, EPA–600/53–81–031, 1980.

U.S. Environmental Protection Agency, "Characterization of Hazardous Waste Sites—A Methods Manual: Volume II, Available Sampling Methods, Second Edition," Environmental Monitoring Services Laboratory, Las Vegas, NV, EPA–600/4–84–076, December 1984.

U.S. Environmental Protection Agency, "Characterization of Hazardous Waste Sites—A Methods Manual: Volume III, Available Laboratory Analytical Methods," Environmental Monitoring Systems Laboratory, Las Vegas, NV, prepared by Lockheed Engineering Management Services Company, under EPA contract No. 68–03–3050, n.d.

U.S. Environmental Protection Agency, "Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air," Washington, DC, EPA–600/4–84–041, April 1984.

U.S. Environmental Protection Agency, "DIGEST of Ambient Particulate Analysis and Assessment Methods," Washington, DC, EPA 450/3–78–113, September 1978.

U.S. Environmental Protection Agency, "Network Design and Site Exposure Criteria for Selected Noncriteria Air Pollutants," Washington, DC, EPA–450/485–022, September 1984.

For information on air modeling, the "Type B Technical Information Document: Application of Air Models to Natural Resource Injury Assessment" is being prepared in conjunction with the proposed rule. Its availability will be announced in the Federal Register.

3. Geological Resources

Methodologies for testing and sampling for injuries to soil and other geologic resources are provided in the proposed rule. Specific procedures for implementing the soil methodologies, the largest portion of this resource group, are discussed in the "Type B Technical Information Document: Approaches to the Assessment of Injury to Soil Arising from Discharges of Hazardous Substances and Oil."

The first three methodologies for testing and sampling for injury to soil, those involving pH, cation exchange, and salinity, involve standard chemical analyses. Some useful references for performing these chemical analyses are provided in:

U.S. Environmental Protection Agency, "Characterization of Hazardous Waste Site—A Methods Manual: Volume II. Available Sampling Methods, Second Edition," Environmental Monitoring Systems Laboratory, Las Vegas, NV, EPA–600/4–84–076, 1984.

U.S. Environmental Protection Agency, "Soil Sampling Quality Assurance User's Guide," Environmental Monitoring Systems Laboratory, Las Vegas, NV, EPA–600/4–84–043, 1984.

U.S. Environmental Protection Agency, "Guidance on Remedial Investigations Under CERCLA," Office of Solid Waste and Emergency Response, Washington, DC, EPA–540/G–85/002, 1985.

U.S. Environmental Protection Agency, "Preparation of Soil Sampling Protocol: Techniques and Strategies," Environmental Monitoring Systems Laboratory, Las Vegas, NV, EPA–600/4–83–020, 1983.

U.S. Environmental Protection Agency, "Test Methods for Evaluating Solid Waste, Physical and Chemical Methods," Office of Solid Waste and Emergency Response, Washington, DC, SW–846, Available from NTIS, Springfield, VA, PB–82–172–156.

The fourth method of verifying an injury to soil is by changes to soil microbial respiration. Among the available procedures are those found in:

Anderson, J. P. E., "Soil Respiration," in A.L. Page (ed.), *Methods of Soil Analysis, Part 2: Chemical and Microbial Properties, 2nd Edition*, American Society of Agronomy, Madison, WI, 1982.

Tabatabai, M. A., "Soil Enzymes," in A.L. Page (ed.), *Methods of Soil Analysis, Part 2: Chemical and Microbial Properties, 2nd Edition, American Society of Agronomy, Madison, WI, 1982.*

To verify an injury to soil by testing for changes to microbial populations, the procedures provided in the documents listed below may be useful:

Anderson, J. P. E. and K. M. Pousch, "A Physiological Method for the Quantitative Measurement of Microbial Biomass in Soils," *Soil Biology and Biochemistry*, 8:209–213, 1976.

Jenrinson, P. S. and P. S. Powlson, "The Effects of Biocidal Treatments on Metabolism in Soil-V: A Method for Measuring Soil Biomass," *Soil Biology and Biochemistry*, 8:209–213, 1976.

Karnak, R. E. and J. L. Hamelink, "A Standardized Method for Determining the Acute Toxicity of Chemicals to Earthworms," *Ecotoxicology and Environmental Safety*, 6:216–222, 1982.

To test for an injury to soil that resulted from phytotoxicity, the proposed rule requires either seed germination, seedling growth, root elongation, plant uptake, or soil core microcosm tests. Among the procedures currently available are:

U.S. Environmental Protection Agency, "The Seed Germination/Root Elongation Toxicity Test," in *Environmental Effects Test Guidelines*, Section EG12, Office of Pesticides and Toxic Substance, Washington, DC, EPA–560/6–82–002, 1982. Available from NTIS, Springfield, VA, PB–82–232992.

U.S. Environmental Protection Agency, "The Early Seedling Growth Toxicity Test," in *Environmental Effects Test Guidelines*, Section EG13, Office of Pesticides and Toxic Substances, Washington, DC, EPA–560/6–82–002, 1982. Available from NTIS, Springfield, VA PB–82–232992.

U.S. Environmental Protection Agency, "The Plant Uptake and Translocation Test," in *Environmental Effects Test Guideline* Section EG14, Office of Pesticides and Toxic Substances, Washington, DC, EPA 560/6–82–002, 1982. Available from NTIS, Springfield, VA, PB–82–232992.

Van Voris, P., "Experimental Terrestrial Soil-Core Microcosm Test Protocol," Prepared by Pacific Northwest Laboratory for the U.S. Environmental Protection Agency, Corvallis, OR, EPA–600/3–85–047, 1985. Available from NTIS, Springfield, VA, PB85–213338.

4. Biological Resources

Appropriate tests for biological resources are largely identified in the injury definition section. These are discussed in more detail in the document cited in that discussion, "Type B Technical Information Document: Injury to Fish and Wildlife Species." Specific methodologies may vary depending upon the organism, type of response being studied, oil or hazardous substance involved, and statistical confidence required. Methodologies may be used that technical literature show are appropriate to the response being tested. In general, for purposes of a damage claim, the authorized officials would only use techniques that have been tested previously for the kind of situation being examined and that have been documented in the technical literature.

E. Quantification

1. General

The proposed rule in §§ 11.70–11.73 provides guidance on methods for quantifying the effects of injuries resulting from discharges of oil or releases of hazardous substances. This guidance makes the link between injuries to resources and the methods used to determine compensation for those injuries.

Several steps are necessary to convert natural resource injuries to damages, that is, to assign a dollar amount for the injuries. The Injury Determination phase demonstrated that an injury has in fact occurred as a result of the discharge or release. The Quantification phase must determine how much of the resource has been injured, and how "badly," and also must determine what effect the injury has had on services provided by the resource. Determining the effect on services is critical to coverting physical and biological changes to dollar amounts, and is explained in more detail below.

Throughout the Quantification phase, conditions following the discharge or release are compared to baseline conditions, which are the conditions that would have existed in the absence of the discharge or release. Baseline conditions include physical and biological conditions as well as services.

The final critical dimension in determining "how much" the resouce and associated services have been affected is time, which is referred to here as the "recovery period." Injuries that will recover over a long time period have greater effects on services than those that will recover quickly, especially if that recovery requires little or no intervention ("restoration"). The final section of the Quantification phase, § 11.73, provides guidance on determining recovery periods for various alternatives, including different restoration alternatives and the situation where no actions beyond the removal or remedial actions are carried out.

2. Services Reduction Quantification

In order to quantify services reduction, the authorized official must first determine the extent of the effects

of the injury, or, in other words, how much of the resource has been injured, as provided in § 11.71. In general terms, this reduction might mean the volume of water no longer usable for a specified purpose, the size of a fish population lost, the acres of wildlife habitat changed, or any other physical or biological changes resulting from the discharge or release.

To help make these changes useful for the analyses in the Damage Determination phase they must be converted into "services." Broadly speaking, a service refers to any function that one resource performs for another or for humans. Within the non-human part of an ecosystem, plants provide habitat and food for animals, one animal may provide or serve as food for another, or water may be used by fish for support, respiration, and many other functions. This list could be expanded to describe almost any interaction between species or between physical and biological levels. Amony these services are the uses that humans make of natural resources. These services would include such things as use of water for drinking, agriculture, and industry, the use of fish or wildlife for food, and the use of many components of the environment for recreation.

An important distinction between services and the physical, chemical, or biological conditions existing in a resource is that the services represent interactions between resources, or between resources and humans. Traditionally humans have valued natural resources in monetary terms on the basis of services provided by the resources. This method logically may be extended to valuing damages to an injured resource on the basis of changes in services provided to humans or to other resources. The proposed rule establishes the link between measured adverse changes in the condition of the resource, the injury, and the damages through the measurement of changes in the services provided by the injured resource. This method of determining damages is in accord with traditional measures of the value of natural resources.

Using the proposed rule, damages to an injured pond might be estimated by changes in services the pond provided as fish habitat. The measure of change in services might be numbers of fish, varieties of fish, or the services the fish provide to another resource, such as food for other animals. If the pond had also served as a source of drinking water, the measure of change in services might be the volume of water formerly used for that supply. In either case damages would be estimated on the basis of lost use of the services or of change in the level of more than one service, and changes in all services may be counted when estimating damages.

The methodology to be used in the Damage Determination phase is critical in determining which services to measure in the Quantification phase. Close coordination is required between economists and natural resource specialists in planning and carring out this phase of the assessment. The authorized official must decide whether to determine damages based (1) the diminution of use values or (2) restoration or replacement costs (§ 11.35). These two approaches require different kinds of results from the Quantification phase.

If diminution of use values is chosen, results must be expressed as changes in the uses of the services provided to humans. In this case, the measurements of services not used primarily by humans are useful mainly as intermediate results, although they may be critical in determining changed human use.

On the other hand, if restoration or replacement costs is to be the measure of damages, the non-human services may be equally critical, because the determination of restoration or replacement costs is based on the restoration or replacement of services. In this case, the non-human services may be more important in measuring changes in how well a wildlife habitat or marsh is supporting wildlife, controlling floods, assimilating wastes, and providing any other services that may be important. Human uses may need to be measured for purposes of determining priorities and calculating diminution of use values during the recovery period.

Provision is made in the Quantification phase for directly quantifying the effects of injuries based upon a loss of services dependent on the injured resources, where that provides a better measure of the extent of the effect than first measuring a change in the chemical, physical, or biological parameters. An example could be where a pond or lake contains levels of oil or a hazardous substance sufficient for the water to be considered injured, but one of the most critical services normally supplied by the injured water is provision of habitat for fish that normally would be caught and eaten by man. That service is now disrupted because fish from the lake can no longer be eaten. In this case, the change in services measured could be the loss of availability of a population of edible fish, even though the water is the identified injured resource, and the fish population is viable and eventually may become edible at some time in the future, through either natural processes or restoration activities. Alternatively, the change in services measured could be the loss of available population of edible fish established directly from the presence of concentrations in the fish exceeding FDA tolerance levels.

Detailed guidance is not provided on methods for measuring changes in services, in part because the range of services that can be measured is so broad, and in part because the methods to be used depend greatly on which services are measured. Guidance is provided for certain natural resources, but most methods for measurement of services of those resources will have to be determined by the authorized official. The emphasis in the guidance for specific resources is primarily on how to choose techniques that are scientifically acceptable and that can provide useful data for measuring services.

Quantification of the effects on the physical resources (surface and ground water, air, and geologic resources) focus on determining the area, or in some cases the volume, exposed to the discharge or release. In addition, the services provided by those resources must be determined. Comparison to baseline is critical to this process.

In measurement of biological resources, the choice between habitat and population analysis is required to ensure that common units are being used and that double counting is avoided. There may be circumstances where a mixed analysis may be possible while avoiding double counting, if there is little or no interaction between the resources analysis. For example, a population analysis might be used for a terrestial resource such as deer, but a habitat analysis used for a fish resource affected by the same discharge or release. To some extent, choice of habitat analysis will be more closely related to restoration options, and population analysis to use values, but the relationship is not strict.

The types of biological measurements identified in the proposed rule are those that have generally been used in damage assessments, with the exception of the Habitat Evaluation Procedures (HEP). HEP has been used widely in analyzing impacts of proposed development projects, and considerable documentation is already available. An information document for use with damage assessments, "Type B Technical Information Document: Guidance on Use

of Habitat Evaluation Procedures and Habitat Suitability Index Models for CERCA Application," is being prepared concurrently with the proposed rule. Its availiability will be announced in a notice in the Federal Register. Interested parties are encouraged to review this document, which is intended to be made final concurrently with the proposed rule. It is intended to be a supplement to the materials and training already available for HEP from the U.S. Fish and Wildlife Service.

Life table statistics are widely used in other management and research functions, but their use here is restricted. The conditions generally considered necessary for their valid use are expected to occur rarely in damage assessments. The reference in the proposed rule to the American Fisheries Society publication does not address or refer to the dollar values assigned to fish species in that publication, but is restricted to the section in that publication providing guidance on methods for conducting valid counts of dead fish.

3. Baseline Services Determination

The measure of effect in the Quantification phase is a comparison of the conditions found following the discharge or release with a baseline condition both for services and for biological or physical changes. This baseline will most often represent conditions occurring just prior to the discharge or release, although the definition given in the regulation is broader. The broader definition in the regulations allows for longer-term situations where, even in the absence of the specific discharge or release, significant changes would have occurred in the resource or service being measured. For example, an area might have been primarily a farming community when a dump was first established, but land use changed during the period of hazardous waste dumping, and much of the area might have been converted to industrial use. These land use changes need to be considered in establishing baseline; it may be unreasonable to assess damages based in this case upon lost use as wildlife habitat. In addition to human-caused changes, consideration may have to be given to natural changes, such as ecological succession. This method of defining baseline reflects the principle that a natural resource damage claim should be limited to the damages caused by the injury resulting from actions of the party determined responsible.

The issue of from which point the calculation of change should be performed frequently has been erroneously related to the question often faced by EPA in determining what level of "cleanup" is appropriate in response actions under the NCP. The objectives of EPA under the NCP and the damage assessment process differ and, as such, different calculation points are inevitable.

EPA is not always concerned with returning the site to its baseline condition when it determines a cleanup level. Rather, the goal of most response actions is to remove and/or remediate the hazardous substances at a site until they no longer represent an actual or potential threat to public health, welfare, or the environment. The particular cleanup level is driven by the application of applicable or relevant and appropriate environmental standards and other site-specific consideration.

When performing a damage assessment, the objective is to determine the value of the loss. Standards may be used to determine that an injury has occurred, but the extent of effects for which the responsible party may be found liable may differ significantly from the standard. In some instances, the baseline condition was cleaner than the standard where in others the standard was exceeded before the discharge or release. Therefore, in many situations the level of cleanup will be different from the baseline. The proposed rule follows the common law principle that the injured party should be made whole again. Thus, quantification of injury and estimates of damages are based upon the change from baseline, rather than on standards.

The proposed rule also requires that the baseline reflect normal variation in the resource and service. For almost any parameter being measured, variability is expected, whether that parameter is a physical measurement, such as concentration of an ion in ground water, or a biological measure, such as population levels of an animal species. Some of those parameters may be relatively constant, or vary on an annual cycle; others can be expected to vary cyclically and dramatically, such as "four-year cycles" of lemmings or "ten-year cycles" of lynx, where populations may vary from nearly zero to many thousands in a given area over the course of a fairly regular cycle. Other parameters may change gradually in one direction, as do population changes of many species during ecological succession, or show random and unpredictable changes. Included in the last category are extreme changes that might fall outside of "normal" variation, but still be due to natural causes. An example of extreme change is destruction of a coastal marsh by hurricane winds and seas.

A baseline should allow for comparison with the normal range of variation, rather than being constrained to a single measurement. For example, a discharge or release may occur or be studied at a time when a population is normally absent or low, but may affect the ability of the affected area to support the population at times when it would normally be high. A chemical change in air or water may be mitigated by dilution at certain times of year, but the same quantity of material may reach deleterious concentration at other times because of low water flow or different wind conditions. A further constraint is that data for the baseline and for the assessment area should be collected using comparable methods. Unless identical or very similar methodologies are used, different data may simply reflect a difference in the methodologies rather than in the condition being measured.

The preferred method for establishing baseline is to use historical data taken from the assessment area before the discharge or release. In many cases, such historical data for an assessment area may be missing or inadequate, so the proposed rule establishes an alternative means for estimating baseline. In most cases, estimating baseline requires data for similar areas ("control areas") near the assessment area. Preferably, the authorized official will use historical data for the control area if available, after ensuring the control and assessment areas are similar except for the discharge or release. If historical data are unavailable for both the assessment and control areas, then field data must be collected for the control area following the guidance provided.

The same materials used for literature searches in performing research are sources for locating baseline data. These materials include general bibliographic references as well as computer data bases and specialized data bases that contain compilations of resource-specific data from many sources. In addition, many parts of the United States have been studied in Environmental Impact Statements (EIS's) or related documents, for various kinds of projects. these EIS's many contain baseline data (or references to sources) for the subject area. The Digest of Environmental Impact Statements is published by Cambridge Scientific Abstracts, 5161 River Road, Bethesda, MD 20816. It summarizes all EIS's. The company sells microfiche and paper

copies of these documents. A number of State and Federal laws require other planning documents that may be useful. The Federal Government carries out or sponsors research nationwide on natural resources; the National Technical Information Service (NTIS), in Springfield, Virginia, has a computer searchable data base for locating reports on this research, and also can supply microfiche or paper copies. Local information may be available through State agencies (e.g., water resources, air quality control, fish and game, public health, etc.). If the discharge or release occurred on publicly-held land, the agency managing that land may have data available, and private land owners may have similar data. Nearby universities and colleges may have data from studies done by students or faculty members.

If historical data for both assessment and control areas are inadequate, field data must be collected from control areas. Although each resource will require techniques and procedures specific to that resource, and local conditions will require tailoring procedures to the specific location, the proposed rule provides general guidelines that apply to selection and use of control areas. The general guidelines are to be used together with the specific guidelines for each resource, and are designed to balance the needs for flexibility and rigor.

Because of the importance of water as a resource, extensive data on water quality have been collected by many local, State, and Federal agencies. Most of those historical data deal with traditional water quality measures such as inorganic ions and microbial content, and only rarely include tests for man-made organic contaminants. A computerized data base that provides access directly to certain large data collections, such as EPA's STORET water quality data base, or other data bases, is available through the National Water Data Exchange (NAWDEX), headquartered at the U.S. Geological Survey (USGS) in Reston, Virginia, and also available through local assistance centers. In addition, the Survey's own water data are available from the National Water Data Storage and Retrieval System (WATSTORE); inquiries may be sent to Reston or to USGS offices in each State. When determining baseline for ground water, control wells may have to be selected or drilled. Historical data should be available to determine the extent of the aquifers being studied or to determine hydrologic characteristics other than the concentration of oil or hazardous substances. Tests done on the water and matrix from control wells should parallel those done during the Injury Determination phase, as for other baseline procedures.

Establishing baseline for surface water resources includes consideration of effects due to low and high water conditions. At high flow or stage conditions, samples will provide information on material washed from the land surface or tidally-transported while low water conditions will reflect the potentially most concentrated condition of the surface waters. The range of normal concentrations should be determined over the range of water flows or stages, rather than depending strictly on seasonal or annual cycles as might be needed for biological resources. Sediments in the water bodies may represent the major concentration of many contaminants, may provide potential for future releases, and may serve as a potential source of injury for biological resources via food chains. Establishing baseline for marine and estuarine waters may require procedures to account for tidal and current effects on movement of substances.

Concentrations of materials in air can change due to changing wind conditions, diffusion, varying volatility of the materials, and changes in release rates. Thus, establishing baseline conditions for air presents problems for baselines that differ from the other resources. The guideline contained in the proposed rule impose limitations on use of historical data for an air resource baseline. These limitations, in summary, require that pervious testing would have detected the oil or hazardous substance, and that the previous testing indicates that historical levels have been sufficiently predictable to be useful. Detectable concentrations of oil or hazardous substances are normally extremely rare in air, so these requirements are less restrictive than they may seem. Otherwise, monitoring at control sites will have to be conducted by the authorized official with consideration given to siting and to sampling schedules that ensure comparability to the assessment area and conditions and that avoid interference from other potential sources.

Guidelines on baseline data for geologic resources primarily reflect factors important in determining comparability between the assessment and control areas and the need for appropriate sampling from the control areas.

Because quantification of injury to biological resources will involve habitats and populations, the sources of historical information provided emphasize these types of information. Included among the appropriate habitat maps would be the Wetland Inventory maps prepared by the U.S. Fish and Wildlife Service and by individual States showing locations of specific habitats and ecosystems. Many other kinds of habitat and ecosystem maps are available. The U.S. Geological Survey maintains indices to and has available series of aerial photographs for most areas of the country, including not only topographic photography, but also photographs for studying agricultural and other land uses. With professional interpretation, these materials can indicate trends in habitat. Museum collections also provide records of species occurrence that may avoid duplication of collection efforts; specimens often are accompanied by field notes that provide habitat information. Both Federal and State agencies maintain biological data bases that often include distribution and habitat data. Among these are data bases for endangered species, Natural Heritage data bases maintained by many States, systematic data bases often maintained by museums and herbaria, and data bases for numerous fish and game species maintaind by management agencies.

The requirement for species identification is not intended to be a major task. A comprehensive collection of all or most species present is not desirable. The authorized official instead should confirm the identification of species that figure most prominently in the injury assessment and in the selected restoration alternatives. For species that should not be collected for normal taxonomic studies because of low populations or other reasons, modern techniques that require only small blood or other tissue samples from live-trapped animals may be used, as may other techniques that will not create problems for species restoration. These confirmed identities may prove important in subsequent judicial or administrative processes or in later evaluating the success or failure of restoration programs.

4. Resource Recoverability Analysis

Section 301(c)(2)(B) of CERCLA requires consideration of the "ability of the ecosystem or resource to recover." This consideration is provided for in § 11.73 of the proposed rule. To satisfy this requirement, the authorized offical must estimate the time necessary for recovery, both without restoration efforts beyond the removal or remedial

action and with proposed alternative restoration plans. No single formula can be designated for determining the recovery plans. Recovery will be considered complete upon determination that natural resource services have been effectively restored. This determination does not require that the recovered ecosystem or other resource necessarily be identical to the one lost, but merely that all important and measurable functions of the lost resource have been restored. Once that point is reached, restoration or replacement is considered complete. The authorized offical is given the option of using a shorter period because the costs of efforts expended in estimating very long recovery periods may not provide sufficient benefits when subjected to economic analysis.

The major source of information for the authorized official to use in determining recovery times is the experience that has been gained during other recoveries of similar resources. Journals and published symposia on oil and hazardous substance response, as well as references found in these sources, contain numerous case studies that can be used as the basis for calculating recovery times. EPA has summarized some of these data in Appendix D of their "Technical Support Document for Water Quality-Based Toxics Control," Office of Water Enforcement and Permits and Office of Water Regulations and Standards, September 1985. Knowledge of local conditions, including information on ecosystems, organisms, and climate, can be critical in adjusting the results of published studies to particular situations. Modeling may be useful for air, water, and geologic resources, and knowledge of degradation and natural removal processes for the oil or hazardous substance will be central to all time determinations.

IV. Economic Issues

A. Economic Methodology Determination

The method for determining damages is described in section 301(c)(2) of CERCLA as considering but not limited to, "replacement value, use value and the ability of the ecosystem to recover." Replacement value (costs) and use value are concepts that have a history of application. Accordingly, common law and economics provide considerable guidance on selection of a method or methods to calculate damages. In common law, compensation is often determined by the lesser of the diminution of market value or the cost of restoration or replacement. A simple example is an automobile that has suffered a collision. The owner may recover the cost of repair or the cost of replacement, whichever is less.

In terms of economics, compensation for damages would be the lesser of the diminution of use values or the cost of cost-effective restoration or replacement. That is, if use value is higher than the cost of restoration or replacement, then it would be more rational for society to be compensated for the cost to restore or replace the lost resource than to be compensated for the lost use. Conversely, if restoration or replacement costs are higher than the value of uses foregone, it is rational for society to compensate individuals for their lost uses rather than the cost to restore or replace the injured natural resource. Thus, economics and common law agree on a principle of compensation. This proposed rule has adopted an approach parallel to the general common law and economic rules for compensation for damages. Damages are the lesser of (1) restoration or replacement costs or (2) the diminution of use values.

The only exception to this aforementioned rule occurs when special resources are involved. Congress and State legislatures have determined that certain natural resources are worthy of protection even if their use values are relatively low. If agencies were held to the strict rule of the lesser of a diminution of use values or restoration or replacement costs, some of these resources could be left unrestored or unreplaced, thereby being contrary to Congressional or a State legislature's intent. For this reason, a limited exception has been created.

The term special resources is defined in § 11.14(pp). A special resource is a resource that has been set aside and committed to a specific use by law before the discharge or release was detected. The term includes resources that were set aside primarily for the preservation of wildlife habitat or other sensitive environments. A special resource is not necessarily a "unique or important resource" as that term is used by EPA in its proposed claims regulations. Special resources are distinguished from multiple use resources that are managed for a variety of purposes. Examples of multiple use resources include public lands, National Forests, and military lands. The use of these resources is not limited to a primary purpose and these resources are kept in Federal ownership for a number of reasons other than resource preservation.

Also not included within the category of special resources are threatened and endangered species and critical habitat. These are included on administratively determined lists, and are protected by consultation requirements with the U.S. Fish and Wildlife Service or the National Oceanic and Atmospheric Administration (NOAA), which must be carried out before development can occur, and by specific civil and criminal penalties for harming the species. Since the special resources exception is a substantial departure from the common law and the underlying theory of this proposed rule, it can only be applied where the resource to be restored is, itself, set aside by a legislative body. The inclusion or exclusion of a resource from the special resource category has no implication concerning the decision to restore or replace that resource. It simply addresses the issue of the extent a responsible party should be held liable for an amount in excess of society's value for the resource. The proposed rule draws the line at decisions consciously and clearly made by elected representatives. If the injured resource is a special resource, the analysis required by § 11.35 for the Economic Methodology Determination is to be used as a guide although not a restriction on determining whether diminution of use values or restoration or replacement costs will be the measure of damages. In the case of a special resource, restoration or replacement costs may provide the basis for the analysis to be performed in the Damage Determination phase of the damage assessment even if costs outweigh benefits. The decision should be based upon (1) the statutory responsibility to manage or protect the injured resource; (2) the demonstration that the costs of restoration will not be grossly disproportionate to the benefits gained by restoration; and (3) the technical feasibility of the restoration.

When the injured resource is not a special resource, the measure of damages should be the lesser of (1) restoration or replacement costs, or (2) the diminution of use values. No matter which measure is chosen, the monies collected from the settlement or award must be used for restoration or replacement. In addition, Federal or State agencies are not precluded from supplementing damage funds with other monies to restore, replace, or enhance the injured natural resource.

Regardless of the category of the resource, the analysis required in the Economic Methodology Determination, § 11.35, may be only a rough approximation of the values derived

after the conclusion of the Damage Determination phase. Original research projects should not be conducted at this early phase of the assessment. Existing studies to approximate use values foregone resulting from the injury to the natural resource should be relied upon. Sources of data include journal articles, government publications, such as the documents produced by the Forest Service to implement the Resource Planning Act, and work in progress at many universities. Restoration or replacement costs should be approximated through the use of unit values for past management practices or resource acquisitions. If sufficient information is not readily available at the time of the development of the Assessment Plan, the determination of an economic methodology can be postponed until after the Injury Determination phase of the assessment.

One crucial issue in any quantitative damage assessment is the selection of a discount rate. The discount rate is used to translate monetary amounts of costs and benefits occurring in different time periods into a common present value amount. The discount rate used in this proposed rule is given by OMB's "Circular A–94 Revised." The current discount rate listed in this circular is a real rate of 10%.

B. Restoration or Replacement Methodology

The restoration methodology is described in § 11.81. In the Quantification phase, the authorized official quantifies the effects of the injury in terms of lost or disrupted services. In the Damage Determination phase, the authorized official determines management actions, that is, actions to restore, rehabilitate, replace, or acquire the equivalent, that will return the lost or disrupted services. Management actions are those types of activities which either physically modify the resource or administratively change the species of human use of the resources designed to achieve a specific goal normally reflected in the agency's planning documents. Examples of management actions include such resource related actions as seeding, stocking, supplying water, or hazing to discourage wildlife use of specific habitats. When performing this methodology, the authorized official should look to restore or replace the lost services in a cost-effective manner. Any specific methodology that accomplishes this is acceptable. However, the method chosen must be the result of an evaluation performed in the Restoration Methodology Plan discussed later. An example of a restoration methodology is the Habitat Evaluation Procedures (HEP). For example, the U.S. Fish and Wildlife Service has examined how the presence of oil or hazardous substances can be incorporated into HEP. This information can be found in "Type B Technical Information Document: Guidance on the Use of Habitat Evaluation Procedures and Habitat Suitability Index Models for CERCLA Applications," forthcoming from the U.S. Fish and Wildlife Service.

The U.S. Fish and Wildlife Service has also produced guidance on incorporating cost-effectiveness into HEP. This guidance can be found in "Designing Cost-Effective Habitat Management Plans Using Optimization Methods," by Adrian H. Farmer and Scott C. Matulich, forthcoming from the U.S. Fish and Wildlife Service. In addition, the U.S. Fish and Wildlife Service is preparing a microcomputer program called the "Habitat Management Evaluation Model" (HMEM). This model will provide a means of rapidly designing cost-effective management actions for use with restoration or replacement alternatives. The model is based upon the concepts in the guidance document. These procedures should be reviewed to determine if they can be of assistance in structuring cost-effective restorations or replacements.

If restoration or replacement will form the basis of compensation in the Damage Determination phase of the assessment, the Federal or State agency acting as trustee may also claim damages for the dimunition of use values over the time required to perform the restoration. The authorized official should estimate this diminution of use values in accordance with the guidance in §§ 11.83 and 11.84.

C. Restoration Methodology Plan

The selection of the cost-effective restoration or replacement measures for the Damage Determination is made in the Restoration Methodology Plan. The guidance provided in the section of the rule concerning the restoration methodology is to be followed in developing the Restoration Methodology Plan and in selecting the cost-effective alternative.

The Restoration Methodology Plan is intended to encompass the requirements of a good environmental analysis. Fundamental to the plan are the requirements for an analysis of alternative means of restoring or replacing the lost services and public review and input to the decision. An interdisciplinary analysis of both direct and indirect impacts of the alternatives also is called for in the proposed rule. Finally, in accordance with accepted procedures for environmental analysis, the Restoration Methodology Plan is required to form the basis from which the post-award Restoration Plan will be tiered.

The purpose of the Restoration Methodology Plan is to compute damages. Therefore, the plan is not viewed as being of sufficient detail to carry out a restoration, rather the level of detail is driven by the needs of the damage determination. The later post-award Restoration Plan, when the level of funding is known, is expected to focus on the selected alternative and, therefore, provide more detail on the actual restoration.

The authorized official is encouraged to combine the requirements for the Restoration Methodology Plan with other planning or analytical requirements that may apply to a specific restoration or replacement decision. Some examples of other such requirements include a restoration plan required under section 111(i) of CERCLA for claims against the Fund, Remedial Investigation/Feasibility Studies (RI/FS) required under the National Contingency Plan, analyses required under the National Environmental Policy Act of 1969 (NEPA), or land use planning documents required under the various land management statutes. The Restoration Methodology Plan is designed, in particular, to satisfy the requirements of NEPA without additional analysis at this stage.

D. Use Value Methodologies

Section 11.83 is divided into two parts—one for resources that are traded in markets and the other for resources that are not traded in markets. If the injured resource is traded in a market, the diminution of the market price should be the measure of lost use value. The diminution of the market price will not always coincide with the change in the loss in social value, but this amount is widely recognized by courts as the measure of damages when a commodity is injured.

When the injured resource is traded in the market, the authorized official must determine whether the market is "reasonably competitive" in order to use this methodology. While not defined in the proposed rulemaking, reasonably competitive means that the assumptions underlying a competitive market are fulfilled to a reasonable degree. This determination may be made on a case-by-case basis.

If the injured resource is not traded in a market, but similar or like resources are traded in a market, the authorized official should use an appraisal

technique to determine damages. To the extent possible, all appraisals should be in conformance with the "Uniform Standards for Federal Land Acquisitions" (Uniform Standards). In those instances when State statutes may be at variance with these standards, a State official should follow the applicable State's guidance on performing appraisals for damage assessments performed by a State.

The Uniform Standards cover three general appraisal approaches: (1) The cost approach; (2) the income method; and (3) the comparable sales approach. The cost approach is inappropriate in implementing the appraisal method since the restoration methodology (described in § 11.81) explains how restoration costs are to be determined. The income method in the Uniform Standards should be performed in accordance with the "Factor Income" method given in the proposed rule.

The diminution of market price and the appraisal method jointly comprise the marketed resource methodology in the proposed rule. Only when the injured resource is not traded in a market, or when that market is not reasonably competitive, and no comparable sales are available for use in an appraisal, may the authorized official use any of the nonmarketed resource methodologies listed, or any that meet the acceptance criteria.

CERCLA provides that a Federal or State agency is acting as a trustee when seeking recovery for a loss to a resource. According, it is damage to the public that may be recovered. The use values that can be claimed by a Federal or State agency are those associated with the loss to the public in general because of the discharge or release. These include: (1) Losses in recreation and other public uses; (2) fees and other payments made to the agency for the private use of the public resource and; (3) the economic rent, that is, the excess of total earnings of a producer of a good or service over the payment required to induce that producer to supply the same quantity currently being supplied, accruing to private individuals because the agency does not charge the producer a price or fee for the private use of the public resource.

Under this proposed rule, the Federal or State agency acting as trustee cannot collect for: (1) Taxes forgone, because these are transfer payments from individuals to the government; (2) wages and other income lost by private individuals, except for that portion of income that represents economic rent, because these values do not accrue to the agency and may be the subject of law suits brought by the individuals suffering the loss; or (3) any speculative losses. The costs incurred by private individuals may be considered in performing the nonmarketed resource methodologies listed in the proposed regulation, but the purpose of this use is to enable the authorized official to assign a value to the resource, not to collect that private cost.

The Federal or State agency acting as trustee can claim all the income lost, not just the economic rent, from a commercial venture when the agency is the sole or majority owner of the venture that is affected by the discharge or release. For example, if the Federal or State agency sells water and that water supply is injured, that agency can claim the change in income as damages. This procedure allows the agency to file one claim to obtain all damages associated with the discharge or release, rather than two.

Nonmarketed resource methodologies may be used to measure a diminution of use values. The methodologies listed in § 11.83 are examples of those that are permitted under this proposed rule. Discussions of these methodologies can be found in many natural resource or environmental economics textbooks. Examples include: M. Freeman III, "The Benefits or Environmental Improvement: Theory and Practice," Resources for the Future, Inc., (Baltimore, MD: Johns Hopkins University Press, 1979); and O.C. Herfindal and A.V. Kneese, "Economic Theory of Natural Resources," Resources for the Future, Inc., (Columbus, OH: Charles E. Merrill Publishing Company, 1974.)

Several of the Non-Marketed Resource Methodologies listed in § 11.84 are also listed in the "Procedures for Evaluation of National Economic Developemnt (NED) Benefits and Costs in Water Resources Planning (Level C)," (Procedures), (in *Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies,* Chapter II, Section VII, Appendices 1–3, U.S. Department of the Interior, Water Resources Council, Washington, DC 1984 DOI/WRC/84/01, available from NTIS, Springfield, VA). To the extent practicable and applicable, the authorized official should follow the guidance in this document. The discussion of Unit Day Values in the Procedures should be supplemented with other sources of existing estimates of use values, such as that in the forthcoming Final Environmental Impact Statement, "1983–2030 Resources Planning Act Program," (Appendix F, U.S. Forest Service, Department of Agriculture, Washington, DC).

Other studies may also provide the authorized official with more background. One supplemental source is W.H. Desvousages, V.K. Smith, and M.P. McGivney, "A Comparison of Alternative Approaches for Estimating Recreation and Related Benefits of Water Quality Improvement," (U.S. Environmental Protection Agency, Office of Policy Analysis, Washington, DC, EPA–230/05–83–001, March 1983). In addition, further information on the use of these nonmarketed resource methodologies is being prepared entitled "Type B Technical Information Document: Techniques to Measure Damages to Natural Resources."

The list of nonmarketed resource methodologies cannot be comprehensive. The acceptance criteria in § 11.84 were designed to insure that methodologies consistent with economic theory, yet not specifically listed in the proposed rule, are available for use in estimating damages. These acceptance criteria are that the methodology measure either willingness to pay or willingness to accept in a cost-effective manner.

Most economic techniques address willingness to pay; however, in the case of an injury to a natural resource, willingness to accept compensation may be the more technically correct measure of damages. In theory, willingness to accept can be larger than willingness to pay, and in most empirical studies this difference has been evident. However, there is no universally accepted procedure to adjust for this difference. Because of this lack of a universally accepted procedure, the authorized official is given the flexibility to choose either criterion. These concepts are discussed in greater detail in the technical information document discussed above.

V. Glossary

The following terms are defined using generally accepted definitions. These definitions were not modified in any way during the development of the proposed rule and, therefore, are not included as regulatory language. They are provided here simply for clarification.

(a) "Assimilate" means to absorb a substance into an organism's body, tissues, or cellular structure and does not refer to substances in the digestive tract or respiratory system that have not otherwise been absorbed across membranes or epithelia.

(b) "Behavioral abnormalities" means alteration of overt activities by an animal including locomotor,

reproductive; care of young, food gathering, or avoidance of predation.

(c) "Bioaccumulate" means the process whereby chemical substances enter aquatic or terrestrial organisms through both bioconcentration and uptake of chemical residues from dietary sources.

(d) "Bioconcentrate" means the process whereby either chemical substances enter aquatic organisms through gills or epithelial tissue directly from water, or chemical substances enter terrestrial organisms through respiratory or epithelial tissues directly from air; and the concentration of the chemical substances in the tissue fluids of the organism exceeds that of the air or water.

(e) "Biomagnify" means the process by which tissue concentrations of bioaccumulated chemical substances increase as they pass up the food chain through two or more trophic levels.

(f) "Cancer" means both malignant and benign neoplasia.

(g) "Constant dollar" means inflation adjusted dollars at a specified base year.

(h) "Controlled experiment" means any laboratory, pen, or field test in which an investigator regulates the exposure of the biological resource to the oil or hazardous substances and which includes comparison to organisms treated similarly except for such exposure.

(i) "Disease" means an impairment of biological resource's ability to resist or recover from an infections agent.

(j) "Existence value" means the dollar amount of the willingness to pay or willingness to accept of individuals who do not plan to utilize a resource now or in the future, but are willing to pay to know that the resource would continue to exist in a certain state of being.

(k) "Expected present value" means the dollar amount derived by the period-by-period summation of the various levels of benefits or costs associated with alternative assumptions on paramenter values, where each level is weighted by the probability of the occurrrence of the parameter value, and discounted by period, using the discount rate as determined in § 11.83 of this part.

(l) "Free-ranging" means biological resources in their natural habitat, in contrast to biological resources maintained in captivity.

(m) "Genetic mutations" means a detectable chromosomal aberration that can be correlated with a detrimental effect on the survival or reproductive success of the biological resource.

(n) "Neoplasm" means an abnormal mass of tissue, the growth of which exceeds and is uncoordinated with that of the normal tissue and persists in an excessive manner after cessation of the stimuli that evoked the change.

(o) "Net expected present value" means that costs are subtracted from benefits in the definition of expected present value.

(p) "Option value means the dollar amount of the willingness to pay or willingness to accept of individuals who are not currently using a resource, but wish to preserve their option to use that resource in a certain state of being in the future.

(q) "Physicial deformation" means cogenital or acquired alterations in shape, size, and structure of an organism or any part of an organism, including malformations.

(r) "Physiological malfunction" means alterations in biochemical and physiological processes necessary for maintenance of homeostasis and reproduction, including such processes as fluid transport, digestion, emtabolism, excretion, respiration, locomotion, and nervous and endocrine integration.

(s) "Willingness to accept" means the amount of money an individual must be given to be as well off as he was prior to the occurrence of an event.

(t) "Willingness to pay" means the amount of money an individual would be willing to pay to have avoided the occurrence of an event.

VI. Summary and Analysis of Major Issues Included in the Comments Received From the Advance Notices of Proposed Rulemaking

A. Introduction

Three Advance Notices of Proposed Rulemaking (ANPRM's) were issued by the Department during the course of the development of the proposed rule. The first of these, published on Janaury 10, 1983, contained questions and discussion points designed to solicit advice on the policies and procedures to be used both in the rulemaking and in the rule itself. Technical input and information on existing methods of assessment were also requested. The second ANPRM, dated August 1, 1983, was issued primarily to inform the public of the results of the first Notice and of the proposed Departmental response. In this second ANPRM, all comments received up to this point were summarized and addressed briefly. A large part of these comments was suggestions on ways to facilitate the rulemaking. The definition of damage to be adopted in the rule was identified as the most serious substantive issue. Other comments on the content of the rule included numerous suggestions on how the rule could best cover widely varying types of natural resources, discharges, and releases.

The Departmental response to these comments, as announced in the second ANPRM, was a proposed series of meetings with other Federal agencies, and planned visits to selected States. These meetings and visits were intended to assist the Department in its decision on the method to be used in the rulemaking. Workshops, surveys, meetings with experts, and the formation of interagency working groups were all envisioned as possible components of the process of generating the rule. Subsequent events and the imposition of a court-ordered deadline for the completion of the rule made full enactment of this proposed outreach plan inadvisable. The intent of the plan was fulfilled, however, by the use of an intra-Departmental team of specialists to complete the rulemaking, as well as by the extensive use of literature searches, consultation with outside experts, and surveys.

A third ANPRM was issued on January 11, 1985, to allow interested parties further opportunity to supply useful information or express their views. This comment period was extended through July 1, 1985.

A total of ninety-five comments was received from the three ANPRMs: eighty-four from the first two ANPRMs, and eleven from the third. Of the ninety-five, there were ten from industrial firms; fifteen from trade or industrial associations; forty-two from State governments and agencies; seven from Federal agencies; twelve from individuals, firms, companies, or institutions generally interested in the rule; five from groups interested in doing contract work for the Department; and two from law firms representing Native American tribes.

Many of the comments consisted solely of general experssions of interest and offers of assistance. A large number of studies and other documents were included with the comments. This information and assistance was used during the course of the rulemaking.

A number of comments were oriented to the development of the "type A" simplified assessments. These issues will be addressed with guidance for type A procedures is proposed.

Roughly half of the total comments contained discussions of the substantive issues covered in the remainder of this section. The comments recieved on the methods to be used in the rulemaking process were extensively responded to in the second ANPRM and are not included here.

The issues raised in the comments on the contents of the rule can be grouped into three broad categories. The first covers the role of natural resource damage assessments within the wider context of CERCLA, and the degree and nature of the involvement in the assessment process by potentially responsible parties and governmental entities. The second centers around the format that the rule should take to best address the wide variety of natural resources, discharges, and releases covered by the CWA and CERCLA. The third and most intensely addressed group of issues includes the selection of the measures of injury and damages to be used in assessments as well as related questions on restoration or replacement of affected resources.

B. Comments on the Role of Assessments in the Context of CERCLA, and on the Role in Assessments of Potentially Responsible Parties and Governmental Entities

A number of comments pointed out that response to inactive sites is the primary purpose of CERCLA, and that assessments should complement existing Federal response programs rather than complicate them. Some comments went on to note that natural resource damages are the residual damages remaining after cleanup; that in many cases response actions will fully address natural resource issues, rendering assessments unnecessary; or that assessments should only take place during the later stages of response actions or after response actions are complete. A few comments added that CERCLA was intended by Congress to be focused primarily on public health rather than natural resource concerns, and that the Department should adopt the Environmental Protection Agency's approach to the question of "how clean is clean?," as determined on a case by case basis.

The proposed rule incorporates the idea that the primary purpose of CERCLA is response to hazardous sites. It does this by defining natural resource damages as compensation for residual injuries to natural resources after accounting for the results of response actions. The proposed rule also supports the current Federal response program by stressing cooperation and coordination with the existing NCP process. Although completed or anticipated response activities must be included in the determination of damage, no set timing for assessments is specified in the proposed rule. The wide differences between sites and the statute of limitations for natural resource damages dictate that this matter be left flexible. The relationship of the response standards set by the Environmental Protection Agency to this proposed rule is discussed in part I(D)(3) of this preamble.

A large set of comments contained opinions on who should initiate and conduct an assessment. Some suggested that the On-Scene Coordinator should do a preliminary survey for all discharges or releases and decide whether an assessment is warranted. Several stated that the potentially responsible party should be able either to participate in or have total control over assessment costs and activities. Others stressed that Federal and State agencies acting as trustees are solely responsible for assessments and should be given maximum discretion and flexibility in all aspects of assessments. The relationship between Federal and State agencies acting as trustees and the need for clearly delineated lines of authority where multiple agencies are involved was emphasized. Some comments included recommendations on the proper agencies within States for doing assessments, or on ways that jurisdictional conflicts over resources between States or between the Federal Government and States might be resolved.

Federal agencies and States are designated as trustees of natural resources in CERCLA and in the NCP, and as such are responsible for initiating and conducting any assessments that are necessary. The On-Scene Coordinator and other National Response Team members are involved in notification and coordination capacities. Participation, but not control, is allowed to potentiatly responsible parties by the proposed rule. In cases of multiple agencies, the rule recommends that a lead authorized official be chosen. As a few of the comments noted, this proposed rule is not the proper vehicle to define the relationship between Federal and State agencies, or to dictate the internal division of assessment authority within States.

A small number of comments requested that funding or other types of Federal assistance be made available to States or tribes to support their assessment activities.

Section 301(c) of CERCLA grants no independent funding authority. As other comments pointed out, this proposed rule can only address the nature and scope of compensation for damages to natural resources. The disbursement of the Hazardous Substances Response Trust Fund and of other monies designated for response activities are handled under their authorities.

C. Comments on the Format of the Proposed Rule

Many comments discussed ways of handling the disparate natural resources included under CERCLA and the CWA. Some stated that certain resources, such as ground water, marinas and beaches, or anadromous fish, either had special needs that deserved separate treatment or special importance that needed priority treatment. One view held that biological resources should be dealt with primarily in terms of "important species," while another judged ecosystem, habitat, and food chain effects to be essential. The placement of generic resource types into categories, the recognition of regional differences, and the use of a matrix approach were all recommended.

The proposed rule adopts the definition of resources given in CERCLA and treats all resources with equal priorty with the limited exception of the special resources. The overall process gives the flexibility necessary to adequately address the special circumstances connected with each resource at any specific assessment site. Elements of both a single species approach and an ecosystem approach are incorporated into the Injury Determination and Quantification phases of the proposed rule. By focusing on services, damage determination can be accomplished using similar procedures for all resource types, as appropriate to each situation.

A number of comments requested different regulations for discharges of oil and for releases of hazardous substances. This request was based on the different characteristics of these two categories of materials, and on the fact that much more information is available on discharges of oil than on releases of hazardous substances.

The proposed rule is sufficiently flexible to accommodate differences in toxicity and other characteristics among the many types of oil and hazardous substances. The use of two separate rules for type B assessments would be repetitive and unnecessary.

Many comments addressed directly the form that the rule should take and what elements should be included in it. It was repeatedly stressed that a basic requirement of assessment regulations is the flexibility necessary for addresssing diverse resource impacts in widely varying geographical settings. Simplicity, elimination of excess paperwork choices in methods and techniques, and ease of application were mentioned as desirable characteristics of an assessment process. Cost-

effectiveness and efficiency were major concerns. Specific elements suggested for the assessment process included: preliminary screening and establishing priorities; guidance documents; provisions for mitigating irreparable damage; required use of teams of specialists; the encouragement of a sequential decision process; recommendation of only technically feasible techniques; mandated use of only low cost procedures in initial activities; permitted use of complex procedures only if necessary; limitation of assessment activities to those essential to the immediate assessment; and required correlation between the degree of damage, the depth of an assessment, and the amount of information to be gained from varying levels of efforts.

The proposed rule recognizes the importance of all of the above suggestions and incorporates most of them into the various phases of the assessment process. Cost-effectiveness, reasonable cost, and elimination of unjustified expenditures are primary factors in every phase of the proposed rule, which requires an inexpensive preassessment screen and explicit plans before major asssessment activities are undertaken. Since the type B assessment for which this proposed rule is intended are meant to address damages on a case-by-case basis, a certain amount of the simplicity obtained in a uniform approach is impossible to achieve. Nevertheless, the process delineated in the proposed rule retains a flexibility that allows its application in situations ranging from the straightforward to the complex.

Clear guidance is given on the standards to which methods and procedures used in the assessment must adhere, but choice is allowed between comparable methods. Provision is made for the use of new and emerging technologies and procedures with the inclusion in the proposed rule of acceptance criteria for selecting alternate methodologies.

D. Comment on Injury, Damages, Restoration, and Related Issues

1. Injury

Many comments on injury definition stressed that a causal link between the discharge or release and any suspected injury must be clearly established and measured by reasonably available and consistent scientific evidence. One set of responses stated that the discharge or release must be the proximate cause of injury, while another emphasized that indirect effects must not be overlooked. A few comments maintained that the effects of injuries caused by improper or negligent response activities not performed by the responsible party should not be included in damages assessed against the responsible party. Suggestions on possible indicators of injury included mortality, area lost, behavioral changes, tainting of fish, and reduced fecundity. Suggestions on methods to measure injury included multispectral and other monitoring systems, and "the painstaking collection of biological data."

The proposed rule recognizes that a discharge or release may have both direct and indirect effects on resources. Solid scientific evidence is required in both cases to establish a link between an injury and oil or a hazardous substance. Any injuries to natural resources resulting from response activities done in accordance with the NCP can be included in a damage determination, since the response activities would have been unnecessary without the discharge or release. Procedures for determining injury and methods of measuring the extent of injury provided for in the proposed rule vary as appropriate to each resource and situation, but all procedures and methods are required to meet specified standards of acceptability.

A number of comments called for the setting of *de minimus* levels for discharges or releases, with the corollary that amounts below these levels would automatically be excluded form any assessment activity. Other comments emphasized that every spill should be investigated and treated as potentially significant until it is determined that injury is minor.

The proposed rule neither sets *de minimus* levels nor requires that every discharge or release be investigated for natural resource damages. The authorized official decides whether to pursue damages on a case-by-case basis. However, the preassessment screen and the early determination of economic methodology in the Assessment Plan phase should discourage cases of minimal injury where assessment costs far outweigh the damage. Because the Federal or State agency can only obtain compensation where actual damages can be determined, and can only recoup reasonable assessment costs, it is unlikely that unnecessary assessments will be done.

2. Damage and Restoration

Comments on the proper definition of damage and on appropriate methods for determining damage were extensive. A large number of responses centered around the theme that damages should be based on actual and quantifiable economic losses rather than on losses of speculative uses or on esoteric and unmeasurable changes in resources. Opinions on what was esoteric an unmeasurable varied widely. These comments repeatedly stressed that damages should be solely compensatory rather than punitive. An opposing group of comments emphasized the theme that compensation should be as full, fair and efficient as possible, should not have cost/benefit analysis as its primary determinant, and should include consideration of all recreational, commercial, aesthetic, educational, and intrinsic values. One of the comments suggested that punitive damages might be appropriate in some cases.

There were also different interpretations of the role that restoration costs, replacement costs, and use values should take in the determination of damages. Some comments conceptualized damages as amounts to be paid in addition to restoration and replacement costs. Some indicated that restoration or replacement costs should always be awarded, in addition to an amount compensating for lost use value during the period of restoration. Other comments held that the diminution of the market value of a resource was the only fair measure of damage, unless the cost of restoration or replacement was less than this. A few comments suggested the partitioning of resources into prioritized categories for the purpose of determining levels of compensation. Various economic methodologies for establishing the value of resources were either recommended as appropriate or rejected as unsound and inappropriate. Criteria were offered for making the decision between restoration, rehabilitation, replacement, and acquiring the equivalent.

The comments went on to emphasize that CERCLA requires that natural recovery be taken into account in the determination of damages. The concern was expressed that assessments under CERCLA not duplicate awards for damages covered under other statutes or under common law. It was stated that the purpose of the rule should not be to codify private damages. A number of comments stated that compensation should be based on comparisons with pre-spill or pre-release rather than pristine conditions. Some comments advocated the use of data from control situations when no quantitative data is available for pre-damage conditions. One comment called for restoration to an "acceptable" condition, not necessarily the pre-release condition,

with consideration of the actual use of the resource, the potential for future migration of the discharge or release, and the sensitivity of the ecosystem. Resolution of the definition of damage to be used in this proposed rule is of such importance that it has already been discussed at length in the pertinent sections of this preamble. The concerns expressed in these summarized comments are incorporated, as appropriate, into the proposed rule, in an effort to delineate a compensation procedure that is fair, based on solid principles of law and economics, and in accordance with CERCLA and the CWA.

In general, the idea that just compensation should be for the lesser of restoration or forgone use value is accepted in the proposed rule, but an exception to this is made for certain categories of special resources. In accordance with CERCLA, compensatory rather than punitive damages are allowed, and the effects of natural recovery are taken into account. Compensation for lost use values during restoration is permitted. Consideration of pre-release or baseline rather than either pristine or "acceptable" conditions is required. Economic methodologies for calculating use values are provided in a hierarchy of preference, with the simplest and most widely accepted procedures always used first if they are appropriate to the situation. The choice between restoration or replacement is left to the authorized official, but reasonable cost considerations are required. The use of a number of different methodologies for different resources within the same assessment is permitted in order to promote the most feasible and efficient valuation process possible. The principle of non-compensation for private losses and the prohibition against double counting of services guards against the award of duplicate damages, as does the principle of considering natural resource damages as residual to the cost of response actions.

Several comments expressed the opinion that money received in awards should always be used for restoration or replacement. Some went on to state that no restoration should take place until a restoration plan is adopted. Others maintained that restoration should be solely at the discretion of the Federal or State agency acting as trustee, and that CERCLA 301(c) regulations were not meant to address restoration plans. Still other comments assumed that restoration plans would be discussed in full within this rule and gave suggestions on what elements a restoration plan should contain.

A Restoration Methodology Plan is required by the proposed rule when restoration or replacement costs are used in the measurement of damages. In addition, a Restoration Plan is required after the award. A general outline of what should be included in these plans is given. The use of all awards for restoration or replacement purposes after the adoption of the Restoration Plan is also required, in keeping with the emphasis in CERCLA and the CWA on restoration.

3. Related Issues

A small but appreciable number of comments expressed concern about the difficulty that companies would have in acquiring insurance if approaches using esoteric valuation methods differing from accepted common law practices were adopted in the assessment procedure. Reference was made to the possibilities for unlimited liability, and to other ambiguities and inconsistencies under CERCLA.

To the extent possible, the approach to compensation taken in the proposed rule follows common law principles and is designed to avoid excessive and unwarranted damage claims.

A final series of comments pointed out that certain elements of CERCLA need to be included in the rule, such as limitations of liability for releases that occurred wholly before CERCLA was enacted, and the exclusion from compensation for effects resulting from: federally permitted releases, previously identified and approved irretrievable commitments of natural resources, registered pesticide applications, or long-term exposure to multiple and diffuse sources of air pollution. A number of comments concerned the two-year review process stipulated in CERCLA 301(c)(3).

The proposed rule recognizes and reiterates the statutory limitations to liability as they are stated in CERCLA. Provisions for the required two-year review process are made in § 11.12 of the proposed rule.

The primary authors of this proposed rulemaking, all with the Department of the Interior, are Keith Eastin, Alison Ling, and Sheryl Katz, Office of the Solicitor, David Rosenberger and Peter Escherich, U.S. Fish and Wildlife Service, Rich Aiken and Stan Coloff, Bureau of Land Management, Willie Taylor, Office of Policy Analysis, and Craig Sprinkle, U.S. Geological Survey.

The Department of the Interior has determined that this rulemaking does not constitute a major Federal action significantly affecting the quality of the human environment and, therefore, no further analysis pursuant to section 102(2)(C) of the National Environmental Policy Act of 1969 (43 U.S.C. 4332(2)(C)) has been prepared.

The Department of the Interior has determined that this document is not a major rule under Executive Order 12291 and certifies that this document will not have significant economic effect on a substantial number of small entities under the Regulatory Flexibility Act (5 U.S.C. 601 *et seq.*).

The proposed rule provides technical and procedural guidance for the assessment of damages to natural resources. Therefore, the proposed rule does not directly impose any additional cost. In addition, estimates of per unit assessment costs times the potential numbers of assessment total well below $100 million annually.

The proposed rule applies to Federal and State agencies acting as trustees for natural resources and is thus not expected to have an effect on a substantial number of small entities.

Paperwork Reduction Act

The information collection requirements contained in 43 CFR Part 11 do not require approval by the Office of Management and Budget under 44 U.S.C. 3507, because there are fewer than 10 respondents annually.

List of Subjects in 43 CFR Part 11

Continental shelf, Endangered species, Environmental protection, Fish, Forests and forest products, Grazing land, Indian lands, Mineral resources, National forest, National parks, National wild and Scenic rivers System, Oil pollution, Public lands, Wildlife, Wildlife refuges.

Under the authority of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, Title 43, Subtitle A, is proposed to be amended by adding a new Part 11 as set forth below.

Dated: December 10, 1985.

Marian Blank Horn,

Principal Deputy Solicitor.

Authority

These regulations are issued under the authority of section 301(c) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, 42 U.S.C. 9651(c).

PART 11—NATURAL RESOURCE DAMAGE ASSESSMENTS

Subpart A—Introduction

Subpart B—Preassessment Phase

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Subpart D—Type A Assessments

Subpart E—Type B Assessments

Subpart F-Post Assessment Phase

Appendix I—Methods for Estimating the Areas of Ground Water and Surface Water Exposure During the Preassessment Screen

Authority: 42 U.S.C. 9651(c).

Subpart A—Introduction

§ 11.10 Scope and applicability.

The Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), 42 U.S.C. 9601–9657, and the Clean Water Act (CWA), 33 U.S.C. 1251–1376, provide that Federal and State agencies who are authorized to act as trustees of natural resources 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 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 Federal or State agency acting as trustee can determine compensation for injuries to natural resources that have not beren nor are expected to be addressed by response actions conducted pursuant to the NCP. This Part applies to assessments initiated after the effective date of this rule.

§ 11.11 Purpose.

The purpose of this part is to provide standardized and cost-effective procedures for assessing natural resource damages. The results of assessments performed by a Federal official according to these procedures shall be accorded the evidentiary status of a rebuttable presumption as provideed in section 111(h) CERCLA.

§ 11.12

Biennial review of regulations.

The regulations and procedures included within this Part shall be reviewed and, as appropriate, revised 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 are appropriate, necessary, and sufficient to accomplish the purposes of the assessment.

(b) *Preassesment 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, and 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 asessments.* 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 Qualification phase include methods for establishing baseline conditions, estimating recovery periods, and measuring the degree of service reduction from the injured 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 comprising the Damage Determination phase include guidance

...acceptable economic methodologies ...estimating compensation based on (i) ...costs of restoration or replacement ...(ii) a diminution of use value.

(f) *Post-assessment phase.* Subpart F ...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.

§ 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, similar, or related 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 § 300.65 and § 300.68 or 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 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 person to whom is delegated the authority to act on behalf of the Federal or State agency acting as trustee to perform a natural resource damage assessment. As used in this part, authorized official means 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 a hazardous substance 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. 9601–9657.

(h) "Committed use" means either a current use, or a planned use of a natural resource for which the Federal or State agency acting as trustee or another party has made a documented legal, administrative, budgetary, or a financial commitment 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 a hazardous substance. 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 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. 1251–1376, also referred to as the Federal Water Pollution Control Act.

(l) "Damages" means the amount of money sought by the Federal or State agency acting as 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 United States 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 Response Trust Fund established under section 221 of CERCLA.

(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 waters.

(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 an official authorized to act on behalf of all affected Federal or State agencies acting as trustees where there are multiple agencies 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) "National Contingency Plan" or "NCP" means the revisions to the National Oil and Hazardous Substances Contingency Plan promulgated by EPA in 1985, pursuant to section 105 of CERCLA and codified in 40 CFR Part 300.

(z) "Natural 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, or any foreign government.

(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 § 300.6 of the NCP.

(dd) "Pathway" mean 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 (1) the injury, quantification, and damage determination phases have a well-defined relationship to one another and are coordinated; and (2) the increment of extra benefits obtained by using a more costly injury, quantification, or damage determination methodology are greater than the costs of that methodology.

(ff) "Rebuttable presumption" means the procedural device provided by section 111(h) of CERCLA describing the evidentiary weight that a court, or EPA in a claim against the Fund, is required to give a damage assessment performed by a Federal agency acting as trustee in accordance with the regulations 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 conditions, or a lesser period of time selected by the authorized official 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, similar, or related 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 action determined appropriate to the site pursuant to § 300.65 and § 300.68 of 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 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 § 300.65 and § 300.68 of 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, released, disposed, placed, or otherwise came to be located.

(pp) "Special resources" means those natural resources that have been set aside and committed to a specific use by law before the discharge of oil or release of a hazardous substance was detected. The term includes resources that were set aside primarily to preserve wildlife habitat or other unique and sensitive environments. It does not include resources that have been set aside but are committed to multiple-use management, nor does it include resources listed on administratively determined lists for special protection, or resources protected by regulatory statutes.

(qq) "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.

(rr) "Technical feasibility" or "technically feasible" means that the technology and management skills necessary to implement an Assessment Plan or Restoration Methodology Plan are well known and that each element of the plan has a reasonable chance of successful completion in an acceptable period of time, as determined by the authorized official.

(ss) "Trustee" means any Federal natural resources management agency designated in Subpart G of the NCP and any State agency that may prosecute claims for damages under section 107(f) or 111(b) of CERCLA.

(tt) "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.

(uu) "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.

§ 11.15 Actions against the responsible party for damages.

(a) In an action filed pursuant to section 107(f) of CERCLA, a Federal or State agency acting as a trustee may recover:

(1) Damages as determined in accordance with:

(i) Subpart D; or

(ii) As determined in accordance with §§ 11.80 through 11.84 of this part and calculated based on injuries occurring from the onset of the discharge or 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; and

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

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

(i) The cost of performing the Preassessment Plan phases and the methodologies provided in Subparts D and E of this part; and

(ii) Administrative costs and expenses reasonably necessary for, and incidental to, the assessment, assessment and restoration planning, and any restoration or replacement undertaken.

(b) In a claim filed pursuant to section 311(f) (4) and (5) of the CWA, a Federal or State agency acting as trustee may only claim damages for restoration or replacement.

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

§ 11.16 Claims against the Hazardous Substance Response Trust Fund.

Claims against the Fund shall be filed in accordance with the Natural Resource Claims Procedures, promulgated by EPA at 40 CFR Part 306.

§ 11.17 Compliance with applicable laws and standards.

(a) *Worker health and safety.* All worker health and safety considerations specified in the NCP, 40 CFR 400.38, 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.

Subpart B—Preassessment Phase

§ 11.20 Notification and detection.

(a) *NCP responses.* Sections 300.52(d) and 300.64(d) of the NCP provide for the OSC or lead agency to notify the Federal or State agency acting as 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.

(b) *Previously unreported discharges or releases.* If a Federal or State agency acting as trustee identifies or is informed of apparent injuries to natural resources that appear to be a result of an unknown or previously 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 Federal or State agency acting as the trustee shall report that discharge or release to the appropriate authority as designated in the NCP, 40 CFR 300.51(b) and 300.63(b).

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

§ 11.21 Emergency restorations.

(a) *Reporting requirements and definition.* (1) In the event of a natural resource emergency, the Federal or State agency acting as 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 Federal or State agency acting as trustee determines is reasonably necessary, or if such actions are insufficient, the Federal or State agency acting as trustee should exercise any existing authority it may have to take on-site response actions. If no on-site response actions are taken, the Federal or State agency acting as trustee may undertake limited off-site restoration action to the extent necessary to prevent or reduce the immediate migration of the oil or hazardous substance onto or into the resource under the jurisdiction of the Federal or State agency acting as trustee.

(c) *Limitations on emergency actions.* The Federal or State agency acting as trustee may undertake only those actions necessary to abate the emergency situation. 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 Federal or State agency acting as trustee.

§ 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(1)(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 under the jurisdiction of the Federal or State agency acting as trustee. This review should ensure that there is a reasonable probability of making a successful claim before funds 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 under the jurisdiction of the Federal or State agency acting as trustee 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 can 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 § 300.33(b) of the NCP.

(2) Whenever, as part of a response action under the NCP, a preliminary assessment, 40 CFR 300.52 and 40 CFR 300.64, or an OSC Report, 40 CFR 300.40, 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 Federal or State agency acting as 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.

§ 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," 50 FR 13456–13522 (1958);

(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 discharge or release:

(i) Was 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; or

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

(iii) Resulted from any other federally permitted release.

(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) of CERCLA.

§ 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 under his jurisdiction 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) Natural resources potentially at risk that are special resources, as that phrase is used in this part, shall be identified.

(3) A preliminary estimate, based on information readily available from resource managers, of the services and human uses 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 Assessment Plan—general.

(a) *Assessment Plan requirement.* Before initiating any assessment methodologies provided in Subpart D for a type A assessment or in Subpart E for a type B assessments, the authorized official shall develop a plan for the assessment of natural resource damages. The Assessment Plan shall be

developed in accordance with the requirements and procedures provided in this Subpart.

(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.

§ 11.31 Assessment Plan—content.

(a) *General content and level of detail.* (1) The Assessment Plan shall identify all of the scientific and economic methodologies that will be performed during the Injury Determination, Quantification, and Damage Determination phases of the type B assessment, or the specific type A procedure 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 cost-effective, as that phrase is used in this Part. The Assessment Plan shall include descriptions of the natural resources and the geographical areas involved. In addition, for type B assessment, 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.

(b) *Decision on type A or type B assessment.* The Assessment Plan shall include documentation of the authorized official's decision as to whether to proceed with a type A or a type B assessment. This determination shall be based upon the guidance provided in § 11.33 of this Part.

(c) *Specific requirements for type B assessments.* When the Assessment Plan includes type B methodologies, the Plan shall incorporate the following, in addition to the material identified in § 11.31(a):

(1) The results of the confirmation of exposure performed in accordance with the requirements of § 11.34 of this part;

(2) The Economic Methodology Determination performed in accordance with the guidance provided in § 11.35 of this part;

(3) A Quality Assurance Plan that satisfies the requirements listed in § 300.68(k) of the NCP and applicable EPA guidance for quality control and quality assurance plans; and

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

§ 11.32 Assessment Plan—development.

(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 Federal or State agencies acting as trustees as a result of coexisting or contiguous natural resources or concurrent jurisdiction, the authorized official shall ensure that all other known affected Federal and State agencies 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 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 Federal and State agencies acting as 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 Federal or State agencies acting as 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 land or water subject to the administrative jurisdiction of a Federal agency acting as trustee, the Federal agency shall act as the lead authorized official.

(C) When the natural resources being assessed are located on land or water subject to the administrative jurisdiction of a State agency acting as trustee, the State shall act as the lead authorized official.

(D) When there is a natural resource claim against the Fund pursuant to section 1111(c)(3) of CERCLA, the lead authorized official will be designated in accordance with the natural resource claims procedures, 40 CFR Part 306.20(b).

(iii) If there is a reasonable basis for dividing the assessment, the Federal or State agencies acting as trustees may act independently and pursue separate assessments, actions, or claims. In these instances, the agencies 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.

(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, a representative of 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, including identification of any special resources considered at risk.

(B) The authorized official shall allow 30 calendar days 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 of any modifications to the Assessment Plan.

(c) *Public involvement in the Assessment Plan.* (1) The Assessment Plan shall be made available for review by any identified potentially responsible parties, other Federal or State agencies acting as trustees, other affected Federal or State agencies, and any other interested members of the public for a period of at least 30 calendar days before the performance of any methodologies contained therein.

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

(d) *Plan implementation.* At the option of any potentially responsible party, or of potentially responsible parties acting jointly, and with the concurrence of the authorized official, the potentially responsible party under the direction and guidance of the authorized official may implement all or any part of the Assessment Plan finally approved by the authorized official.

(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 Federal or State agencies acting as trustees, and any other interested members of the public for a period of at least 30 calendar days before tasks called for in the modified plan are begun.

(ii) Any modification to the Assessment Plan that the judgment of the authorized official is not significant shall be made available for review by any identified potentially responsible party, any other affected Federal or State agencies acting as trustees, 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 provide an opportunity to confirm the decisions made in the Economic Methodology Determination, or to make such determination if the determination was not completed in the plan development stage, and to ensure that the selection of methodologies for the Quantification and Damage Determination phases is consistent with the results of the Injury Determination phase.

§ 11.33 Assessment Plan—deciding between a type A or type B assessment. [Reserved]

§ 11.34 Assessment Plan—confirmation of exposure.

(a) *Requirement.* (1) In accordance with the requirements provided in this section, the authorized official shall confirm that at least one of the natural resources identified as potentially injured in the preassessment screen has in fact been exposed to the oil or hazardous substance.

(2) Type B assessment methodologies shall be included in the Assessment Plan only upon meeting the requirements of this section.

(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.

§ 11.35 Assessment Plan—Economic Methodology Determination.

(a) *Requirements.* Based upon the guidance provided in this section, the authorized official shall determine whether (1) restoration or replacement costs or (2) a diminution of use values will form the basis of the measure of damages. This determination, referred to as the Economic Methodology Determination, shall be used in developing the Assessment Plan for a type B assessment.

(b) *Determination.* (1) The Economic Methodology Determination shall be used to ascertain whether (i) restoration or replacement costs or (ii) a diminution of use values will form the basis of further economic analysis in the Damage Determination phase.

(2) Unless the injured resource is a special resource the authorized official shall select the lesser of (i) restoration or replacement costs or (ii) diminution of use values as the measure of damages.

(3) When restoration or replacement of the injured resource is not technically feasible, the diminution in use values, as determined by using the methodologies listed in § 11.83 of this Part, or other methodologies that meet the acceptance criteria in § 11.83 of this Part, shall constitute the measure of damages.

(c) *Cost and benefits.* (1) The Economic Methodology Determination shall estimate and document the costs of restoration or replacement and the benefits gained by restoration or replacement, of the resource or the resource services.

(2) The costs of restoration or replacement, as determined in paragraph (e) of this section, shall be measured by the anticipated management actions and resource acquisitions required to return the resource services lost as a result to the injury. In determining the costs of restoration or replacement, the costs of acquiring land for Federal management should be used only if this acquisition would represent the sole viable method of obtaining the lost service.

(3) The benefits of restoration or replacement, as determined in paragraph (e) of this section, shall be the restored uses associated with the anticipated management actions and resource acquisitions as determined in paragraph (c)(2) of this section.

(d) *Special resources.* (1) When the injured resource qualifies as a special resource, the authorized official may elect to seek damages based upon restoration or replacement costs.

(2) To assert a special resource restoration or replacement, the authorized official must show:

(i) The statutory obligation of the Federal or State agency acting as trustee to protect the resource;

(ii) Through the Economic Methodology Determination that restoration or replacement costs will not be grossly disproportionate to the benefits gained; and

(iii) The technical feasibility of the restoration or replacement.

(e) *Content.* (1) In performing the Economic Methodology Determination, existing data and studies should be relied upon. Significant new data collection or modeling efforts should not be performed at this stage of the assessment process to complete this determination.

(2) If existing data are insufficient to perform the Economic Methodology Determination. this analysis may be postponed until the Assessment Plan review stage at the completion of the Injury Determination phase of the assessment.

(3) Each Economic Methodology Determination should estimate the following benefits and costs:

(i) The expected present value, if possible, of anticipated restoration or replacement costs, expressed in constant dollars, and separated into capital, operating, and maintenance costs, and including the timing of the costs;

(ii) The expected present value, if possible, of anticipated use values gained through restoration or replacement, expressed in constant dollars, specified for the same base year as the cost estimate, and separated into recurring or nonrecurring benefits, including the timing of the benefit.

(4) Any estimates of costs and benefits shall make explicit all assumptions pertaining to coats and benefits and shall specify all sources of information. Any effects that cannot be expressed in monetary terms should be listed.

(5) The discount rate to be used in developing estimates of the expected present value of benefits and costs shall be that determined in accordance with the guidance in § 11.84(e) of this part.

Subpart D—Type A Assessments [Reserved]

Subpart E—Type B Assessments

§ 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.

§ 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 1) whether an injury to one or more of the natural resources has occurred, and 2) 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 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, group 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 procledures 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 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.

(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 was used or is committed to 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 release met the criteria and was used or is a committed use, as that phrase is used in this Part, as a habitat for aquatic lite, water supply, or recreation. This most stringent criterion shall apply when surface water is used or is committed to use for more than one of these purposes;

(iv) Concentrations and duration 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 paragraph (d), (e), or (f) of this section to 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:

(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.

(c) *Ground water resources.* (1) Any 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 section 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 was used or is committed to 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 was used or is committed to use as the phrase is used in this Part, as a domestic water supply; or

(iv) Concentrations of substances sufficient to have caused injury as defined in paragraph (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 a 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:

(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) 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 cause or contribute to a loss of geologic resources throug erosion by wind or surface water;

(3) 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;

(4) Concentrations of substances sufficient to yield a salt saturation value greater than 2 micromhos per centimeter in the soil or an exchangeable sodium percentage greater than 15 percent;

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

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

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

(8) 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;

(9) 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;

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

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

(12) Concentrations of substances sufficient to have cause injury as defined in paragraphs (b), (c), (d), or (f) of this section of 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 response 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 the 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 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 (f)(2) of this section. The authorized offical may, when appropriate, select from this list to determine injury to fish and wildlife resources. The biological responses are listed by the categories of injury for which they may be applied.

(i) *Category of injury—death.* Four 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 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 procedures contained in Part II of "Monetary Values of Freshwater Fish and Fish-Kill Counting Guidelines," (American Fisheries Society Special Publication Number 13, 1982; available from the American Fisheries Society, 5410 Grosvenor Lane, Suite 110, Bethesda, MD 20814).

(C) *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 his charge of oil or a release of hazardous substance and those in a control site. In situ caged or confined bioassay may be used when oil or hazardous substances are suspected to have caused death to fish species.

(D) *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. The oil or hazardous substance used in the test must be 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 two or more wildlife organisms present in the assessment area exhibit similar clinical behavioral signs that have been documented in pubished literature. If similar behavioral signs are observed at a comparable control area, then injury has occurred when a statistically significant difference can be measured in the frequency of such behavioral signs observed in population samples from the two areas. Clinical behavioral signs of toxicity are characteristic behavioral symptoms expressed by an organism in response to exposure to an oil or hazardous substance.

(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 reasonably comparable to that suspected to have caused avoidance to the natural populations of fish.

(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 acceptanace 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 a 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 control population at an uncontaminated 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 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 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 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 the 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 could have 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 of the source of discharge or release has been exposed to 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, and 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 oil to 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 water; and

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

(4)(i) Using avialable 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 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 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 paticulate 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 offical 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 ograns (such as leaves, lumgs, 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 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 must be obtained from a control area selected consistent with provisions of § 11.72 of this part, and 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 Asssessment 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), an (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 this paragraph.

(2) All chemical analyses performed to meet the requirements of the Injury Determination phase for surface water resources shall be conducted in accordance with one or more of the following methodologies:

(i) "Standard Methods for the Examination of Water and Wastewater" 16th edition, jointly published by the American Public Health Association, the American Water Works Association and the Water Pollution Control Federation, Washington, DC, 1985; available from the American Public Health Associaiton, Attn: Publications Sales, 1015 15th Street, NW., Washington, DC 20005;

(ii) "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," 2nd edition, July 1982, as amended by April 1984, Update 1, and April 1985, Update 2, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, DC, SW–846; available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402: Stock No. 55–002–81001–2;

(iii) "Guideline Establishing Test Procedures for the Analysis of Pollutants," 40 CFR Part 136;

(iv) "National Handbook of Recommended Methods for Water-Data Acquisition," U.S. Geological Survey, Office of Water Data Coordination, 1977, with updates; avaialble from the U.S. Geological Service, Office of Water Data Coordination, MS–417 National Center, Reston VA 22092;

(v) "Methods of Seawater Analysis," 2nd edition, Grasshoff, K., M. Ehrhardt, and K. Kremling, (eds.) Verlag Chemie, Weinheim, Federal Republic of Germany, 1983; available from VSH Scientific Publishers Inc., 303 N.W. 12th Ave., Deerfield, FL 33222–1705: ISN No. 089573–070–7; or

(vi) "A Practical Handbook of Seawater Analysis," 2nd ed., Strickland, J.D.H., and T.R. Parsons, jointly published by the Fisheries Research Board of Canada and Supply and Services Canada, Otawa, Canada, 1984; available from Unipub, 205 E. 42nd Street, New York, NY 10017: No. SSC70;

(3) The term "water sample" shall denote an unfiltered volume of water collected and preserved by methods in references cited in paragraph (b)(2) of this section 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 the methods in references cited in paragraph (b)(2) of this section, as appropriate.

(5) Measurement of the hydrologic properties of the resource shall be conducted according to methods in the reference cited in paragraph (b)(2)(iv) of this section.

(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 meterological data used in the model;

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

(D) Time increments or time periods model;

(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 this paragraph.

(2) All chemical analyses performed to meet the requirements of the Injury Determination phase for ground water resources shall be conducted in accordance with one or more of the following methodologies:

(i) "Standard Methods for the Examination of Water and Waste-water," 16th edition, jointly published by the American Public Health Association, the American Water Works Association and the Water Pollution Control Federation, Washington, DC, 1985; available from the American Public Health Association, Attn: Publications Sales, 1015 15th Street, NW., Washington, DC 20005;

(ii) "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," 2nd Edition, July 1982, as amended by April 1984, Update 1, and April 1985, Update 2, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, DC, SW–846; available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402: Stock No. 55–002–81001–2;

(iii) "Guidelines Establishing Test Procedures for Analysis of Pollutants," 40 CFR Part 136; or

(iv) "National Handbook of Recommended Methods for Water-Data Acquisition," U.S. Geological Survey, Office of Water Data Coordination, 1977, with updates; available from the U.S. Geological Service, Office of Water Data Coordination, MS–417 National Center, Reston, VA 22092;

(3)(i) The term "water sample" shall denote an unfiltered volume of water collected and preserved by methods described in references cited in paragraph (c)(2) of this section 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 methods described in:

(A) "Ground Water and Wells," Johnson Division, St. Paul, MN, 1985; available from Johnson Divison, P.O. Box 64118, St. Paul, MN 55164; and

(B) "Manual of Individual Water Supply Systems," U.S. Environmental Protection Agency, Office of Drinking Water, EPA–570/9–82–004, 1982; available from U.S. Environmental Protection Agency, Office of Drinking Water, WH–550, 401 M Street, SW., Washington DC 20460;

(4) Sampling of ground water or of geologic materials through which the ground water migrates shall be conducted according to the methods in references cited in paragraph (c)(2) of this section, as appropriate.

(5) Measurement of the geohydrologic properties of the resource shall be conducted according to methods in the reference cited in paragraph (c)(2)(iv) of this section.

(6) Description of lithologies, minerals, cements, or other sedimentary characteristics of the ground water resource should follow methods described in "Sample Examination Manual," R.G. Swanson, Methods and Exploration Series No. 1, American Association of Petroleum Geologists, 1981; available from the American Assocation of Petroleum Geologists, P.O. Box 979, Tulsa, OK 74101;

(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 of 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 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 energy 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 soil 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 the effect of the discharge or release in terms of the reduction from the baseline condition in the quantity of services, as that phase 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 service 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 resource 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 sevices 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, and must be consistent with the needs of the economic methodology selected in the determination required in § 11.35 of this part.

(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) Importance or significance of a specific resource or service;

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

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

(5) Technical feasibility of quantifying changes in a given resource or service at reasonable cost; and

(6) 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 that 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 CERCLA sections 107(f), (i), and (j), 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;

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

(3) Any other federally permitted release.

(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 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 volume of geologic resources eroded by water or wind as a result of the discharge or release; or

(5) 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) Analyses 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) Habitats or ecosystems that are special resources, as defined in this Part;

(iii) 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

(iv) Species, habitats, or ecosystems that provide especially significant services, even though they may not be designated as special resources.

(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 restoration or replacement efforts and in later measuring the success of those efforts, or that will allow calculation of use values; 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 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 contained in Part II of the "Monetary Values of Freshwater Fish and Fish-Kill Counting Guidelines," (American Fisheries Society Special Publication Number 13, 1982; available from the American Fisheries Society, 5410 Grosvenor Lane, Suite 110, Bethesda, MD 20814), including use of appropriate random sampling methods and tagged carcasses.

(B) Adaptation of the techniques discussed in paragraph (5)(iii)(A) of this section for counting dead aquatic birds or for counting marine or estuarine fish or birds will require the authorized official to document 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 should be measured using techniques such as the Habitat Evaluation Procedures developed and used by the U.S. Fish and Wildlife Service and following guidance and training material developed by the U.S. Fish and Wildlife Service, Western Energy and Land Use Team, 2726 Redwing Rd., Fort Collins, CO 80526–2899.

§ 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 values 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 a reasonable cost assessment. In particular, data collected should focus on parameters that are directly related to the injury quantified in § 11.71 of this part and to potential restoration or replacement of the injured resource.

(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 Federal or State agencies acting as 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 secton. 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 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;

(4) Data shall be collected from the control area over a period sufficient to estimate normal variability in the characteristics being measured and should represented 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 additon 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 that resource shall not be collected.

(g) *Surface water resources.* (1) This paragraph provides additional guidance on determining baselie 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 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 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 have exposed to the discharge of oil or release of a hazardous substance.

(ii) For each injured standing water body, such as a marsh, pond, lake, bay, or esturary, 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 of oil or release of a hazardous substance.

(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, 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 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) The median and interquartile range of the available data or the test results should be used as the basis of comparison between the assessment and control areas.

(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 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) The median and interquartile range of available data or the test results on similar geohydrologic units shall be used as the basis of comparison between the assessment area and the control area.

(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 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 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 of 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(1) 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 transfered 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.

§ 11.73 Quantification phase—resource recoverability analysis.

(a) *Requirement.* The time needed for each injured resource to recover to the state that the authorized official determines services are restored to baseline levels shall be estimated. The time estimated for recovery or any lesser period of time as determined in the Assessment Plan shall be used as the recovery period for purposes of § 11.35 and the Damage Determination phase of this part.

(1) In all cases, the amount of time needed for recovery if no restoration 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).

(2) The estimated time for recovery shall be included in any alternatives for restoration, as developed in § 11.81 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 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.

§ 11.80 Damage Determination phase—general.

(a) *Requirement.* (1) The authorized official shall estimate the damages resulting from the discharge of oil or release of a hazardous substance based upon the information provided in the Quantification Determination and the guidance provided in the Damage Determination phase.

(2) The Damage Determination phase consists of § 11.80—general; § 11.81—restoration methodology; § 11.82—Restoration Methodology Plan; § 11.83—use value methodologies; and § 11.84—implementation guidance.

(b) *Purpose.* The purpose of the Damage Determination phase is to estimate the amount of money to be sought for compensation for injury to natural resources resulting from a discharge of oil or release of a hazardous substance.

(c) *Steps in the Damage Determination phase.* Based upon the decisions arrived at in the Economic Methodology Determination prepared in § 11.35 of this part, as the part of the Assessment Plan concerning the appropriate measure of damages to be employed during the Damage Determination phase, the authorized official shall use either the restoration methodology provided in § 11.81 of this part or one of the use value methodologies provided in § 11.83 of this part to calculate damages. For assessments that use the restoration methodology, a Restoration Methodology Plan described in § 11.82 of this part shall be prepared. The guidance provided in § 11.84 of this part shall be followed in implementing either the restoration methodology or one of the use value methodologies.

(d) *Completion of the Damage Determination.* 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.

§ 11.81 Damage Determination phase—restoration methodology.

(a) *Requirement.* The guidance provided in this section shall be followed when estimating damages based upon restoration or replacement costs.

(b) *Diminution of uses.* Damages based on restoration or replacement costs may include any diminution of use values, as described in § 11.84, of this part, occurring during the recovery period as determined in § 11.73 of this part.

(c) *Measurement.* (1) Restoration or replacement measures are limited to those actions that restore or replace the resource services to no more than its baseline, that is, the without-a-discharge-or-release condition as determined in § 11.72 of this part.

(2) The resource services previously provided by the injured resource in its baseline condition shall be identified in accordance with § 11.72 of this part and compared with those services provided by the injured resource, that is, the with-a-discharge-or-release condition. All estimates of the with-a-discharge-or-release condition shall incorporate the ability of the resource to recover as determined in § 11.73 of this part.

(d) *Alternatives.* (1) Alternative methods to achieve the restoration or replacement of the resource services shall be developed. Alternative methods may range from the replacement of individual resources to modification or restoration of a habitat or other resource.

(2) Selection of the cost-effective restorationor replacement methodology shall be documented in the Restoration Methodology Plan as required in § 11.82 of this part.

(e) *Evaluation.* (1) The costs of the alternative restoration or replacement methods developed in (d) above shall be evaluated. When an alternative requires the replacement of a resource, local prices should be used when available for those resources.

(2) In determining the costs of resortation or replacement, the acquisition of land for Federal management should be used only if this acquisition would represent the sole viable method of obtaining the lost services.

(f) *Damages.* (1) The damage amount as measured by restoration or replacement is the cost to accomplish the cost-effective alternative that provides the lost services.

(2) All restoration or replacement techniques, management methods, and methodologies must be technically

feasible, as that phrase is used in this part.

§ 11.82 Damage Determination—Restoration Methodology Plan.

(a) *Requirement.* In instances where the authorized official has determined, based upon the Economic Methodology Determination in § 11.35 of this part, that restoration or replacement costs will form the basis of the measure of damages, a Restoration Methodology Plan shall be developed in accordance with the requirements of this section.

(b) *Purposes.* The purposes of the Restoration Methodology Plan are to ensure that the restoration or replacement alternative that forms the basis of the measure of damages is cost-effective and to serve as a basis for the more detailed restoration or replacement plan that shall be completed after a damage award.

(c) *Uses of the Plan.* (1) The expected present value of the costs of the restoration or replacement alternative selected shall be used as the measure of damages in any action or claim for damages under CERCLA or the CWA.

(2)(i) The Restoration Methodology Plan, updated and otherwise revised to reflect new information, shall be used as the basis of any restoration or replacement decision or plans that may be developed after the damage award has been made.

(ii) For purposes of submitting claims against the Fund, the requirements of 40 CFR 306.22 will need to be fulfilled before restoration work is authorized.

(d) *Plan content.* (1) The Restoration Methodology Plan shall describe all management actions or resource acquisitions to be taken consistent with the restoration or replacement decisions.

(2)(i) The Restoration Methodology Plan shall include a range of restoration and replacement alternatives that restore the lost services to no more than their baseline level. These alternatives shall include a "No Action-Natural Recovery" alternative and other alternatives that reflect varying rates of recovery, management actions, and resource acquisitions.

(ii) The "No Action-Natural Recovery" alternative shall be based upon the determination made in § 11.73(a)(1) of this part concerning the ability of the resource to recover without additional actions beyond those response actions taken or anticipated under the NCP.

(iii) The development of the alternatives should be consistent with the requirements of any Federal or State statue concerning the injured resource, should consider techniques currently available in the biological and physical sciences, engineering, or economic and other management sciences, and should consider the long-term and indirect impacts of the restoration or replacement on other resources.

(iv)(A) An alternative that requires the acquisition of land for Federal management shall not be developed unless in the judgement of the Federal agency acting as trustee such acquisition constitutes the only viable method of obtaining the lost services.

(B) If the acquistion of land for Federal management constitutes the only viable method of obtaining the lost services, the appropriation process must be included in the scheduling of such acquisition since funding for such acquisition will have to be obtained through appropriations.

(3)(i) The Restoration Methodology Plan shall be of sufficient detail to evaluate the alternatives for the purpose of selecting the cost-effective method of restoring or replacing the lost services.

(ii) The cost-effecitve alternative, shall be determined in accordance with the following:

(A) The description of the alternatives shall include cost and timing of expenditures;

(B) The guidance provided for discount rates in § 11.84(e) of this Part shall be used; and

(C) The guidance provided for calculating the diminution of use values over the period of time required for restoration or replacement in § 11.84(g) of this part.

(e) *Plan development.* (1) In developing the Restoration Methodology Plan, the guidance provided in § 11.81 of this part shall be followed.

(2)(i) The Restoration Methodology Plan shall be made available for review by any identified potentially responsible party, other Federal or State agencies acting as trustees, other affected Federal or State agencies, and any other interested member of the public for a period of at least 30 calendar days before the authorized official's final decision on selection of the alternative.

(ii) Comments received from any identified potentially responsible party, other Federal or State agencies acting as trustees, other affected Federal or State agencies, or any other interested members of the public, together with any responses that the agency may develop, shall be included in the Report of Assessment described in § 11.90 of this part.

(3) The Restoration Methodology Plan may be combined with other similar plans or may be expanded to incorporate requirements from procedures required under other portions of CERCLA or the CWA or from other Federal or State statutes applicable to restoration or replacement of the injured resource, so long as the requirements of this section are fulfilled.

(f) *Selection of alternative.* (1) The cost-effective alternative shall be selected as the basis for the measure of damages from among those evaluated in the Restoration Methodology Plan.

(2) The authorized official has the responsibility for the final approval of selection of the appropriate restoration or replacement alternative.

§ 11.83 Damage Determination phase—use value methodologies.

(a) *Requirement.* (1) The methodologies listed, or other methodologies that meet the acceptance criteria provided in this section, shall be used to estimate damages based on a diminution of use values.

(2) In estimating use values, either a marketed or nonmarketed resources methodology, as described in paragraphs (c) and (d) of this section shall be used.

(3) In using the nonmarketed resource methodologies in paragraph (d) of this section, the applicable guidance on the travel cost, contingent valuation, and unit value methodologies found in "National Economic Development (NED) Benefit Evaluation Procedures," (Procedures), (in *Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies,* Chapter II, Section VII, Appendices 1–3, U.S. Department of the Interior, Water Resources Council, Washington, DC, 1984, DOI/WRC/–84/01; available from National Technical Information Service (NTIS), 5285 Port Royal Road, Springfield, VA 22161: No. PB 84–199–405), and any changes hereafter issued shall be followed.

(4) Nothing in this section precludes the use of different methodologies for separate damage estimates for different resources.

(b) *Use values.* (1) For the purposes of this part, use values are the value to the public of recreational or other public uses of the resource, as measured by changes in consumer surplus, any fees or other payments collectable by the government for a private party's use of the natural resource, and any economic rent accruing to a private party because the government does not charge a fee or price for the use of the resource.

(2) In instances where the Federal or State agency acting as trustee is the majority operator or controller of a for- or not-for-profit enterprise, and the injury to the natural resource results in a loss to such an enterprise, that portion of the lost income due the agency from

this enterprise resulting directly or indirectly from the injury to the natural resource may be included as a measure of damages under this Part.

(c) *Marketed resource methodologies.* (1) A determination shall be made as to whether the market for the resource is reasonably competitve. Unless the authorized official determines that the market for the resource is not reasonable competitive, the diminution in the market price of resource shall be used to estimate the damages to the injured resource. This methodology shall be referred to as the market price methodology.

(2)(i) When the authorized official determines that the market price methodology is not appropriate, the appraisal methodology shall be used if sufficient information exists. Damages should be measured, to the extent possible, in accordance with the applicable sections of the "Uniform Appraisal Standards for Federal Land Acquisition" (Uniform Appraisal Standards), (Interagency Land Acquisition Conference, Washington, DC, 1973; available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402: Stock Number 052–059–00002–0), and any changes hereafter issued. The measure of damages under this methodology shall be the difference between the with- and without-injury appraisal value.

(ii) In conflicts between guidance provided in this Part and guidance provided in the Uniform Appraisal Standards, the guidance in this Part shall govern.

(d) *Nonmarketed natural resource methodologies.* (1) Only when the authorized official has determined that neither the market price nor the appraisal methodology is appropriate shall the methodolgies listed in this section or those that meet the acceptance criteria in paragraph (d)(7) of this section be used to estimate a diminution of use value for the purposes of this Part.

(2) If the lost resource is an input to a production process, which has as an output a product with a well-defined market price, the factor income methodology can be used. This methodology should be used to estimate the economic rent associated with the use of a resource in the production process and is sometimes referred to as the "reverse value added" method. The factor income methodology should be used to measure the in-place value of the resource.

(3) The travel cost methodology may be used to estimate a value for the use of a specific area. An individual's incremental travel costs to an area are used as a proxy for the price of the services of that area. Damages to the area are the difference between the value of the area with and without-a-discharge-or-release. When regional travel cost models exist, they should be used if appropriate.

(4) Hedonic pricing methodologies may be used to estimate the value of a resource. These methodologies can 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.

(5) The contingent valuation methodology includes all techniques that set up hypothetical markets to elicit an individual's economic valuation of a natural resource. This methology can survey consumptive, option, and existence values. The use of this method to estimate option and existence values should be used only if the authorized official determines that no other valuation technique will be feasible.

(6) Unit values are preassigned dollar values for various types of nonmarketed recreational or other experiences by the public. Where feasible, regional unit values and unit values that closely resemble the recreational or other experience lost should be used.

(7) Nonmarketed resource methodologies that measure use values in accordance with willingness to pay or willingness to accept, in a cost-effective manner, are acceptable methodologies to estimate damages under this Part.

§ 11.84 Damage Determination phase—implementation guidance.

(a) *Requirement.* The damage estimation methodologies in § 11.81 and § 11.83 of this part should be implemented following the appropriate guidance in this section and that in § 11.35 of this part.

(b) *Determining uses.* (1) Before estimating damages based on the diminution of use values under § 11.83 of this part, the uses made of the resource services identified in the Quantification phase should be determined.

(2) Only committed uses, as that phrase is used in this part, of the resource of 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 mutually exclusive, the sum of damages should be determined from individual services. However the sum of the projected damages from individual services must be consistent with 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 economic analysis.

(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 action should be included in the assessment.

(d) *Uncertainty.* (1) When there are significant uncertainties concerning the assumptions required to implement the selected damage methodology, 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, a range of probability estimates for the important assumptions used in the methodology should be determined. In these instances, the damage estimate shall be the net expected present value of (1) restoration or replacement costs, or (2) diminution of use values.

(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 OMB "Circular A–94 Revised," and any changes hereafter issued.

(f) *Substitutability.* In calculating the diminution of use values, the estimates of the ability of the public to substitute uses for those of the injured services should be incorporated. This

substitutability shall be estimated only if the potential benefits from an increase in accuracy are greater than the potential costs.

(g) *Diminution of use in restoration or replacement.* (1) If restoration or replacement is to form the basis of the measure of damages, the diminution of use values during the period of time required to obtain restoration or replacement may also be included in the measure of damages.

(2) To calculate the diminution of use values during the period of time required to obtain restoration or replacement, the procedures described below should be followed. It is not necessary that they be followed in sequence.

(i) The ability of the resource 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 acquistions to achieve restoration or replacement.

(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, the diminution is use values should be estimated.

(iii) The rate at which the uses of the injured resource 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 the services are restored, or continuous, that is, restoration of uses will be a function of the level and rate 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. These use values 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 or replacement.

(iv) The use of the resource that would have occurred in the absence of the discharge or release should be estimated. This estimated should be done in accordance with the procedures in § 11.72 of this part. These uses should be estimated over the same 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) *Incorporating natural recovery in use values.* If use values will form the measure of damages, the natural ability of the resource to recover as determined in § 11.73 of this part shall be used to estimate the diminution of use values. The same procedures as those in pararaph (g)(2) of this section should be followed to determine the diminution of use values, except that only the natural rate of recovery, as determined by the analysis required in § 11.73 of this part, and any normal management actions, shall be used.

(i) *Scope of the analysis.* (1) The authorized official must determine the scope of the analysis in order to estimate a diminution of use values.

(2) In assessments where the scope of analysis is Federal, only the diminution of use values to the Nation as a whole should be counted.

(3) In assessments where the scope of analysis is at the State level, only the diminution of use values to the State should be counted.

Subpart F—Post-Assessment Phase

§ 11.90 Post-assessment phase—Report of Assessment.

(a) *Requirement.* (1) At the conclusion of either a type A or type B assessment, the authorized official shall prepare a Report of Assessment that shall consist of the Preassessment Screen Determination, the Assessment Plan, and the requirements of paragraphs (2) or (3) of this paragraph as appropriate.

(2) For a type A assessment conducted in accordance with the guidance in Subpart D of this part, the Report of Assessment shall include the results of that assessment.

(3) For a type B assessment conducted in accordance with the guidance in Subpart E of this part, the Report of Assessment shall consist of all the 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 for the Injury Determination and the Quantification phases. Where the basis for the measure of damages is restoration or replacement costs, the Restoration Methodology Plan shall also be included in the Report of Assessment.

(b) The Report of Assessment shall constitute the administrative record of the assessment for purposes of judicial review or administrative consideration.

§ 11.91 Post-assessment phase—demand.

(a) *Requirement and content.* At the conclusion of the assessment the authorized official shall present to the responsible party a demand in writing for a sum certain, representing the damages determined in accordance with the requirements and guidance of § 11.80 and including the reasonable cost of the assessment, delivered in such a manner as will establish the date of receipt. The demand shall adequately identify the Federal or State agency asserting the claim, the general location and description of the injured resource, identification of 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 agency in accordance with this part, the assessment of damages 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 claimant in any judicial or adjudicatory administrative proceeding under CERCLA or section 311 of the CWA.

§ 11.92 Post-assessment phase—restoration fund.

(a) *Fund establishment.* Upon award of damages pursuant to section 107(a)(4)(C) of CERCLA, the responsible party or parties shall set up an interest bearing account payable in trust to the Federal or State agency acting as trustee into which the responsible party or parties shall deposit all sums awarded as damages for injury to natural resources except as provided in paragraphs (b) and (c) of this section.

(b) *Land acquisition funds.* Any funds awarded for the purpose of acquiring land for Federal management shall be deposited in the United States Treasury. Federal agencies shall acquire land for Federal management solely with funds appropriated for that purpose..

(c) *Reimbursement for costs.* Sums awarded as reimbursement for the reasonable costs of conducting the assessment shall be payable to the appropriate treasury of the Federal or State agency that incurred the costs.

(d) *Adjustments.* In establishing the account pursuant to paragraph (a) of this section, the calculation of expected present value reflected in the measure of damages shall be reviewed and adjusted

in accordance with the guidance provided in § 11.84(g)(2)(iii) of this part.

(e) *Payments from fund.* Funds 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.

§ 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, the authorized official shall prepare a Restoration Plan as described in section 111(i) of CERCLA. If the measure of damages was determined in accordance with the guidance in § 11.81 of this part, the plan shall be based upon the Restoration Methodology Plan described in § 11.82 of this part. If the measure of damages was determined using any of the methodologies described in § 11.83 of this part, the plan shall describe how the funds will be used to address natural resources, specifically what restoration, replacement, or acquisition of the equivalent resources will occur. The Restoration Plan shall be prepared in accordance with the guidance set forth in § 11.82 of this part.

(b) No restoration activities should 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 trust fund established pursuant to § 11.92(a) of this part unless such additional funds are appropriated through the normal appropriations process.

Appendix I—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.

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Table 1 -- Factors for Estimation of Areas Potentially Exposed Via the Ground Water Pathway

Aquifer Type	Porosity/Hyd. Conductivity 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	X	_____	X	_____	=	_____	LPW=0.2LPL
Sand+silt	0.5	X	_____	X	_____	=	_____	LPW=0.3LPL
Gravel	6000	X	_____	X	_____	=	_____	LPW=0.2LPL
Sandstone	0.01	X	_____	X	_____	=	_____	LPW=0.4LPL
Shale	$3x10^{-6}$	X	_____	X	_____	=	_____	LPW=0.8LPL
Karst, Limestone, or Dolomite	10	X	_____	X	_____	=	_____	LPW=0.2LPL
Limestone or Dolomite	0.01	X	_____	X	_____	=	_____	LPW=0.4LPL
Fractured Crystalline Rocks	0.3	X	_____	X	_____	=	_____	LPW=0.3LPL
Dense Crystalline Rocks	$1x10^{-5}$	X	_____	X	_____	=	_____	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 date 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:

$Cp = 25(Wi)/T^{a.7}Q)$

where Cp is the peak concentration, in milligrams/liter (mg/L),

Wi 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: $T = 1.467(L)/Vp$ where T and L are defined as above and Vp is the mean stream velocity, in feet per second.

The mean stream velocity may be estimated from discharge measurements or from estimates of channel slope S (foot drop per foot distance downstream) and estimates of discharge Q (defined above) using the following equations:

for pool and riffle reaches $Vp = 0.38(Q^{a.40})(S^{a.20}$, or

for channel-controlled reaches
$Vp = 2.69(Q^{a.260.26})(S^{a.28})$.

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: $D = 92.5 \times 10^6 Wi/(Q\ Cp)$ where D is the time estimate, in hours, and Wi, Cp, and Q are defined above.

Example 2—A release occurs and most the oil or hazardous substance enters a cr stream, or river very slowly or over a long time period (sustained input assumed). Th maximum concentration at any downstrea location, past the initial mixing distance, i estimated by: $c = C(q)/(Q+q)$ where c is t maximum downstream concentration, in L,

C is the average concentration of the relea substance during the period of release, i mg/L,

Q is the discharge rate of the release into streamflow, in cubic feet/second, and

q is the discharge rate of the streamflow ir which the contaminant flows, in cubic fe second.

For the above computations, the initial mixing distance may be estimated by: $L = (1.7 \times 10-5)v(B^2)/(d^3/^2)(s^1/^2)$ where L the initial mixing distance, in miles,

v is the mean stream velocity, in ft/s,

B is the average stream surface width, in ft

d is the mean depth of the stream, in ft, anc

s is the water-surface slope, in ft/ft.

Example 3—A release occurs and the oil hazardous substance enters a pond, lake, reservoir, or coastal body of water. The concentration of soluble released substanc in the surface water body may be estimate by: $c = C(v/V)$ where c is the estimated concentration of the released substance, in mg/L,

C is the average concentration of the releas substance during the period of the release in mg/L,

v is the total volume of substance released, volumetric units, and

V is the volume of the surface water body, i the same volumetric units used for v.

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