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Title: BIOLOGICAL ASSESSMENT FOR THE EFFLUENT REDUCTION PROGRAM LOS ALAMOS NATIONAL LABORATORY, LOS ALAMOS, NEW MEXICO

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BIOLOGICAL ASSESSMENT FOR THE EFFLUENT REDUCTION PROGRAM, LOS ALAMOS NATIONAL LABORATORY, LOS ALAMOS, NEW MEXICO

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Biology Team, ESH-20
August 1996
Prepared for Department of Energy, Los Alamos Area Office

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BIOLOGICAL ASSESSMENT FOR THE EFFLUENT REDUCTION PROGRAM, LOS ALAMOS NATIONAL LABORATORY, LOS ALAMOS, NEW MEXICO

by

Saul P. Cross

1. ENVIRONMENTAL SETTING

The Effluent Reduction Program (ERP) is proposed to occur within the boundaries of Los Alamos National Laboratory (LANL) in Los Alamos, New Mexico. LANL is located in north-central New Mexico approximately 105 km (65 mi) north of Albuquerque and 48 km (30 mi) northwest of Santa Fe (Fig. 1).

The dominant physical feature in the LANL area is the Pajarito Plateau, an apron of volcanic rock stretching 32 – 40 km (20 – 25 mi) north-south and 8 – 16 km (5 – 10 mi) east-west. The 2380-m-(7800-ft-) high plateau slopes gently eastward toward the Rio Grande from the edge of the Jemez Mountains. At 1890 m (6200 ft), the Plateau has been cut into a series of cliffs extending to the Rio Grande at 1646 m (5400 ft). Intermittent streams flowing southeastward dissect the Plateau into a number of finger-like, narrow mesas separated by deep canyons.

The plateau bedrock is of Bandelier Tuff, a formation deposited during volcanic eruptions in the Jemez Mountains approximately 1.1 to 1.4 million years ago. The tuff overlays other volcanic materials that are underlain by the conglomerate of the Puye Formation. This conglomerate intermixes with Chino Mesa basalts along the Rio Grande.

The area has a semiarid, temperate, montane climate. Summer temperatures typically range from 10°C – 27°C (50°F – 80°F) during a 24-hour period (Bowen 1990). Winter temperatures generally range from about -9°C – 10°C (15°F – 50°F) during a 24-hour period. The annual precipitation in the vicinity ranges from 33 – 46 cm (13 – 18 in.), much of it falling during summer rain showers in July and August.

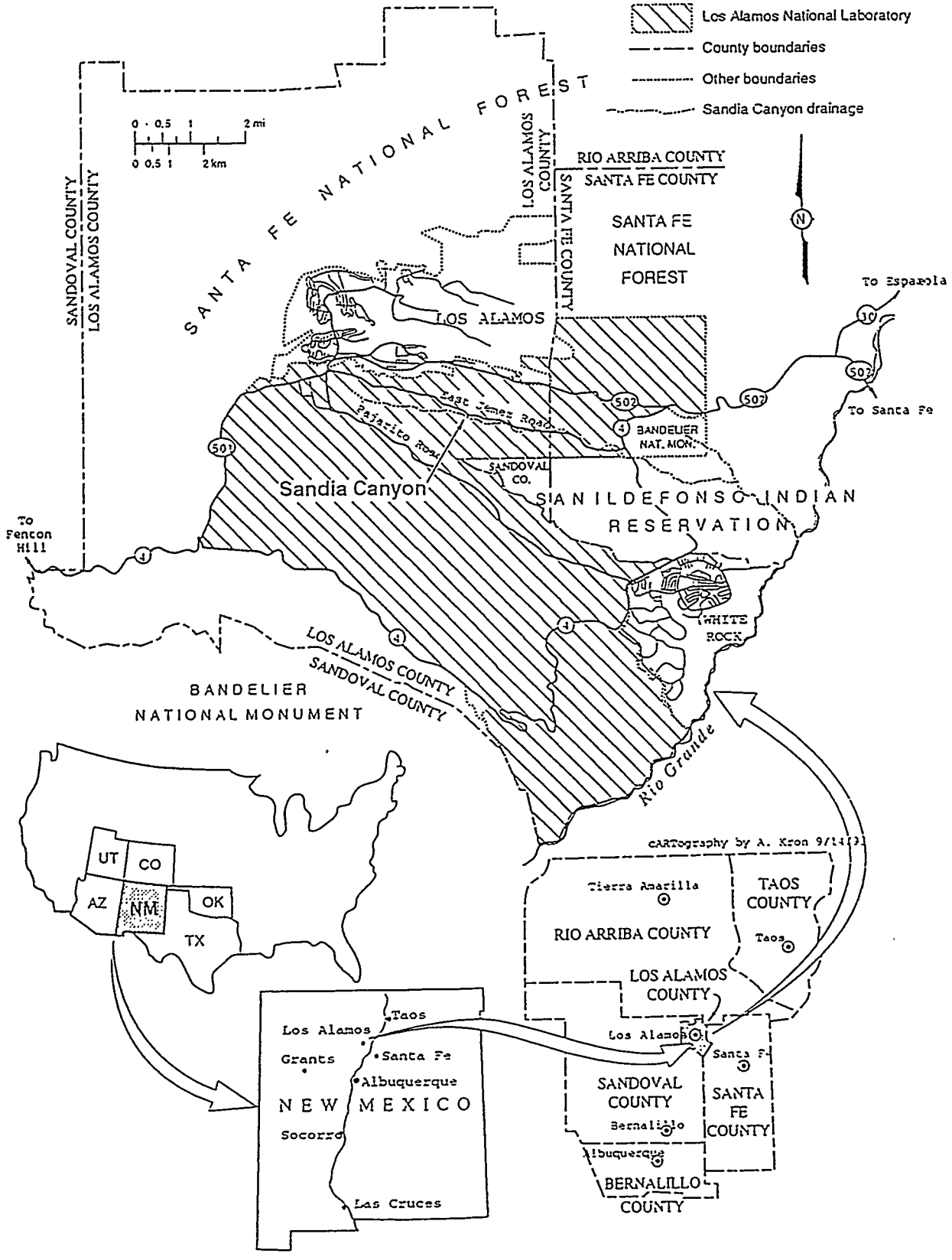

Fig. 1. Location of Los Alamos National Laboratory.

2. PROJECT DESCRIPTION

LANL proposes to eliminate or reduce wastewater effluent discharges at 27 outfalls currently permitted under the National Pollutant Discharge Elimination System (NPDES). The wastewater would be rerouted to the Sanitary Waste Systems Consolidation (SWSC) plant although diversions would continue to discharge stormwater through many outfalls. The affected outfalls are of various types and occur in different Technical Areas (TAs) of

Table 1. Outfalls in the Proposed Action: Number, Type, and Location.

Outfall Number in this BA	Outfall Number	Outfall Type	TA-Building
1	02A007	Boiler blowdown	16-540
2	03A021	Treated cooling water	3-29
3	03A022	Treated cooling water	3-127
4	03A028	Treated cooling water	15-185 15-202
5	03A034	Treated cooling water	21-166
6	03A038	Treated cooling water	33-114
7	03A040	Treated cooling water	43-1
8	03A042	Treated cooling water	46-1
9	03A045	Treated cooling water	48-1
10	03A047	Treated cooling water	53-60
11	03A113	Treated cooling water	53-293 53-94 53-365 53-1032
12	03A148	Treated cooling water	3-1499
13	03A181	Treated cooling water	55-6
14	04A016	Noncontact cooling water	48-1
15	04A083	Noncontact cooling water	16-202
16	04A094	Noncontact cooling water	3-170
17	04A115	Noncontact cooling water	8-70
18	04A127	Noncontact cooling water	35-213
19	04A153	Noncontact cooling water	48-1
20	04A157	Noncontact cooling water	16-460
21	06A073	Photographic rinse water	16-222
22	06A074	Photographic rinse water	8-22
23	06A075	Photographic rinse water	8-21
24	06A123	Photographic rinse water	15-183
25	06A132	Photographic rinse water	35-87
26	None	Unknown	3-1698
27	None	Steam condensate	3-22

LANL (Table 1; Appendix A).

The Waste Streams Correction Project was initiated as a result of an Administrative Order issued to LANL by the U.S. Environmental Protection Agency (EPA) to correct waste stream deficiencies by September 30, 1996. Correction of waste stream deficiencies is required to bring LANL into compliance with the Clean Water Act and NPDES Permit requirements. The Outfall Reduction Program was developed to prevent recurrent permit exceedances at certain outfalls by rerouting their industrial discharges to an appropriate centralized treatment system or by installing a recirculation system at the source. The ERP includes outfalls addressed under both the Waste Streams Correction Project and the Outfall Reduction Program.

The outfalls considered in this document are proposed for effluent reduction and have an associated wetland area, which may be supported, at least in part, by wastewater discharges. Four outfalls (051051 at the Radioactive Liquid Waste Treatment Facility, 01A001 at the TA-3 Steam Power Plant, 05A055 at the High Explosives Wastewater Treatment Facility, and 13s at the SWSC plant) not included in the ERP would continue to discharge wastewater at their current or increased volumes. Effluent from outfalls 01A001 and 13S contribute to the wetland in upper Sandia Canyon.

The U. S. Environmental Protection Agency (Federal Register 1980) and the Corps of Engineers (Federal Register 1982) jointly define a wetlands as: "Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" (Wetlands Training Institute 1995). Thus, a jurisdictional wetlands is defined by three characteristics: hydrology, vegetation, and soils. Many of the riparian areas mentioned in this report are not jurisdictional wetlands, in that they do not satisfy the requisite soils and/or hydrology criteria.

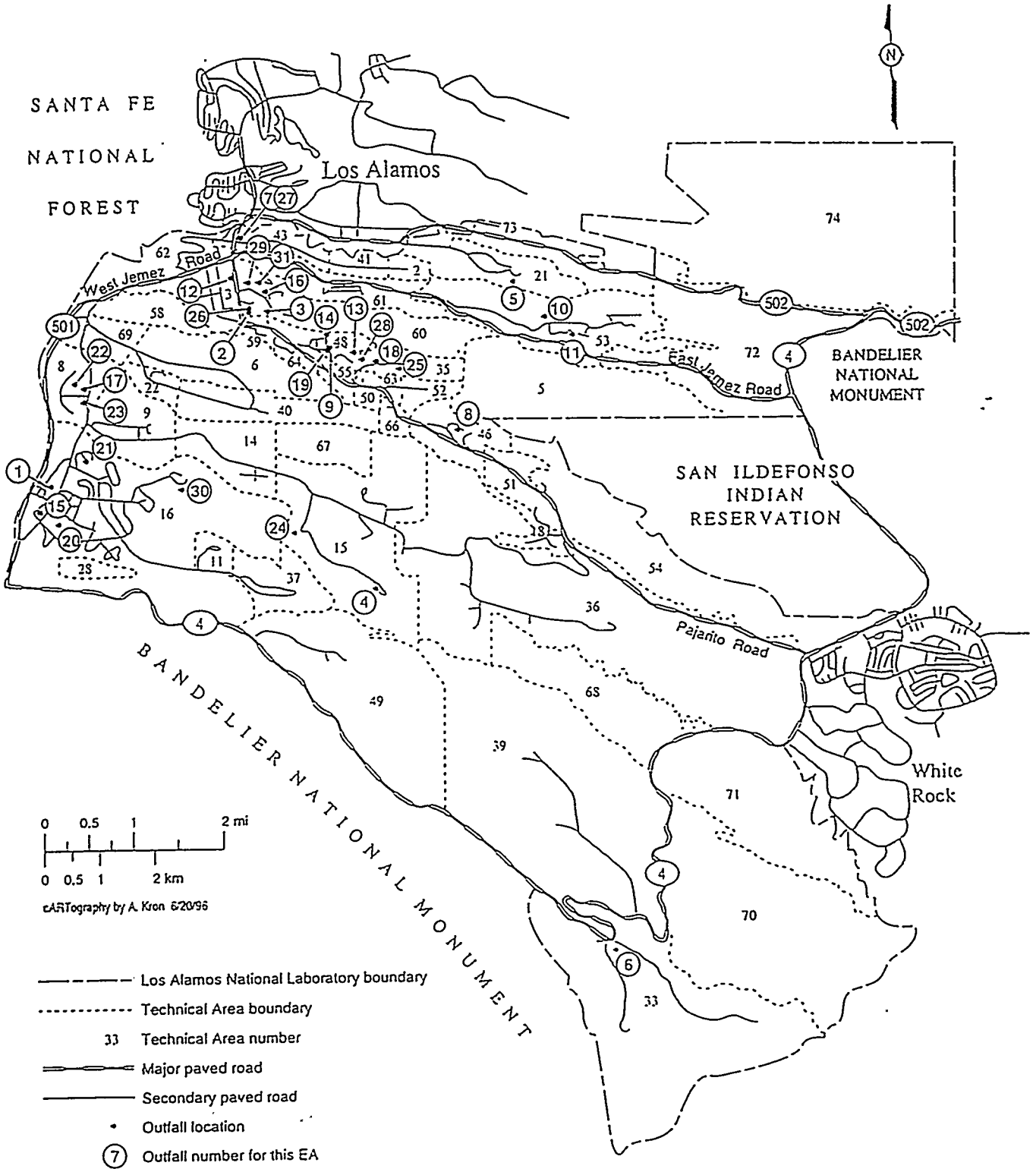

Fig. 2. Location of ERP Outfalls within LANL Technical Areas.

The purpose of the ERP is to prevent potential violations of LANL's NPDES permit and to reduce the discharge of pollutants to the environment by rerouting wastewater discharges from 27 outfalls. Most of these effluent reductions will involve such non-intrusive activities as administrative shut-offs; the removal of process flows; re-piping wastewater to the correct wastewater system; installing recirculating systems; plugging floordrains; and modifying, removing or replacing equipment.

3. AFFECTED ENVIRONMENT

Two general categories of water sources occur on LANL property: natural and artificial. Natural sources include springs, ephemeral streams, short stretches of perennial streams, and small palustrine wetlands (National Wetlands Inventory 1990). Artificial water sources usually result from effluent discharges at NPDES-permitted outfalls; and these discharges include sanitary wastewater, power plant discharge, boiler blowdown, treated cooling water, noncontact cooling water, high-explosive wastewater, photographic rinsewater, and treated industrial wastewater. Several outfalls produce a constant water source, but most discharge intermittently. Most outfalls normally discharge into otherwise dry arroyos (LANL 1995) and some may provide beneficial water resources to wildlife in an otherwise dry environment (Foxx and Blea-Edeskuty 1995).

The cumulative effects of water reduction resulting from the ERP discussed in this report, and other recent eliminations are discussed in the Environmental Assessment (EA). The EA also addresses floodplain/wetlands concerns associated with the ERP.

The Biology Team of ESH-20 surveyed all affected outfalls with associated wetland areas of 0.05 hectare (0.1 acre or 4356ft^2) or greater. A description of the wetland area, its surrounding environment, the condition of the wetland, and detailed location maps are contained in Appendix A. Table 2 lists the size of the wetland below each affected outfall. These areas were determined by surveying the extent of riparian vegetation, not by a formal delineation of wetlands boundaries. The largest wetland (below Outfall 02A007) occupies 4.424 acres (17,906 m^2 or 192,749 ft^2). The total wetlands area affected by the

Table 2. Size of Wetlands Associated with Affected Outfalls and Receiving Canyon.

NPDES Outfall Number (EA Number)	Size of Associated Wetland in Acres	Size of Associated Wetland in Square Meters (Square Feet)	Canyon Outfall Discharges Into
02A007 (1)	4.424	17,906 (192,749)	Cañon de Valle
03A021 (2)	0.059	237 (2,557)	Mortandad
03A022 (3)	0.115	465 (5,001)	Mortandad
03A028 (4)	0.011	45 (480)	Water
03A034 (5)	0.010	41 (442)	Los Alamos
03A038 (6)	0.004	18 (196)	Chaquehui
03A040 (7)	0.030	122 (1309)	Los Alamos
03A042 (8)	0.001	6 (63)	Mortandad
03A045 (9)	0.289	1,169 (12,584)	Mortandad
03A047 (10)	0.074	299 (3,221)	Los Alamos
03A113 (11)	0.032	128 (1,376)	Sandia
03A148 (12)	0.003	12 (134)	Sandia
03A181 (13)	0.915	3,704 (39,876)	Mortandad
04A016 (14)	1.262	5,108 (54,991)	Mortandad
04A083 (15)	0.363	1,470 (15,822)	Water
04A094 (16)	0.031	124 (1,340)	Sandia
04A115 (17)	0.090	364 (3,920)	Three-Mile
04A127 (18)	0.044	177 (1,910)	Mortandad
04A153 (19)	0.289	1,169 (12,584)	Mortandad
04A157 (20)	0.365	1,478 (15,907)	Water
06A073 (21)	0.025	101 (1,086)	Cañon de Valle
06A074 (22)	0.023	94 (1,010)	Three-Mile
06A075 (23)	0.191	773 (8,325)	Three-Mile
06A123 (24)	0.040	162 (1,745)	Cañon de Valle
06A132 (25)	0.143	577 (6,212)	Cañada del Buey
None (26)	0.059	238 (2,557)	Mortandad
None (27)	0.030	122 (1,309)	Los Alamos

outfall closures is less than the sum of the individual areas (8.603 acres, 34,818 m^2, or 374,813 ft^2) because some outfalls discharge into the same wetlands and portions of some wetlands are supported by other water sources as they occur upstream from the outfall's point of discharge.

A survey of plants found within the area of riparian vegetation was conducted at each ERP outfall, and any plant having a cover of greater than 10 percent was recorded. Table 3 lists the dominant plants (any having at least 20% cover) found in each riparian area by the associated outfall number.

The Corps of Engineers uses five categories of plants when determining the status of hydrophytic (riparian) vegetation:

- Obligate wetland plants (OBL) – plants that almost always occur (estimated probability 99%) in wetlands under natural conditions,
- Facultative wetland plants (FACW) – plants that usually occur (estimated probability 67% to 99%) in wetlands,
- Facultative plants (FAC) – plants with a similar likelihood (estimated probability 33% to 67%) of occurring in both wetlands and nonwetlands,
- Facultative upland plants (FACU) – plants that occur sometimes (estimated probability 1% to 33%) in wetlands, and
- Obligate upland plants (UPL) – plants that occur rarely (estimated probability 1%) in wetlands.

With a reduced water supply, plant replacement would be expected to occur first among obligate plants, followed by facultative wet plants, then facultative plants, and finally facultative upland plants. The extent of replacement is dependent upon the amount of water available from other sources and the degree of current vegetation establishment. Deep-rooted hydrophytic plants would be expected to persist in a drying environment longer than those with shallow roots.

Most of the wetlands surveyed below outfalls have vegetation characteristic of natural riparian areas. In many cases, the outfall discharges are supplemented by water from natural drainages and runoff from nearby parking lots and buildings. In the report on the condition of LANL's wetlands (Newling 1995), it is postulated that riparian vegetation

Table 3. Dominant Plants in Wetlands Associated with Affected Outfalls.

Outfall Number (EA Number)	Primary Plants		
	Percent Cover	Scientific Name	Common Name (Hydrophytic category)*
02A007 (1) - Western portion	60	*Elymus elymoides* (Raf.) Swezey syn. *Sitanion hysterix*	Bottlebrush squirreltail (UPL)
	20	*Agrostis alba* auct. non L.	Redtop (FACW)
02A007 (1) - Eastern portion	40	*Juncus balticus* Willd.	Wire rush (OBL)
	30	*Agrostis alba* auct. non L.	Redtop (FACW)
03A021 (2)	50	*Agrostis alba* auct. non L.	Redtop (FACW)
	30	*Typha latifolia* L.	Cattail (OBL)
03A022 (3)	60	*Typha latifolia* L.	Cattail (OBL)
	20	*Agrostis alba* auct. non L.	Redtop (FACW)
03A028 (4)	80	*Poa fendleriana* (Steud.) Vasey	Muttongrass (UPL)
03A034 (5)	65	*Agrostis alba* auct. non L.	Redtop (FACW)
	35	*Typha latifolia* L.	Cattail (OBL)
03A038 (6)	90	*Agrostis alba* auct. non L.	Redtop (FACW)
03A040 (7)	70	*Bromus sp.*	Brome
03A042 (8)	70	*Agrostis alba* auct. non L.	Redtop (FACW)
	20	*Phleum pratensis* L.	Timothy (FACU)
03A045 (9)	50	*Typha latifolia* L.	Cattail (OBL)
	30	*Agrostis alba* auct. non L.	Redtop (FACW)
03A047 (10)	40	*Typha latifolia* L.	Cattail (OBL)
	35	*Carex sp.*	Sedge
	20	*Agrostis alba* auct. non L.	Retop (FACW)
03A113 (11)	80	*Dactylis glomerata* L.	Orchard grass (FACU)
03A148 (12)	80	*Bromus sp.*	Brome
	20	*Agrostis alba* auct. non L.	Redtop (FACW)

Table 3. (cont.)

Outfall Number	Dominant Plants		
	Percentage Cover	Scientific Name	Common Name (Hydrophytic category)*
03A181 (13)	60 25	*Typha latifolia* L. *Juncus* sp.	Cattail (OBL) Rush
04A016 (14)	50 25	*Juncus* sp. *Typha latifolia* L.	Rush Cattail (OBL)
04A083 (15)	70 20	*Agrostis alba* auct. non L. *Bromus anomalous*	Redtop (FACW) Nodding brome (UPL)
04A094 (16)	60 25	*Typha latifolia* L. *Juncus* sp.	Cattail (OBL) Sedge
04A115 (17)	55 35	*Sporobolus* sp. *Juncus* sp.	Dropseed Rush
04A127 (18)	85	*Salix irrorata* Anderss.	Blue-stem willow (FACW)
04A153 (19)	50 30	*Typha latifolia* L. *Agrostis alba* auct. non L.	Cattail (OBL) Redtop (FACW)
04A157 (20)	70	*Agrostis alba* auct. non L.	Redtop (FACW)
06A073 (21)	90	*Poa fendleriana* (Steud.) Vasey	Muttongrass (UPL)
06A074 (22)	60 35	*Agrostis alba* auct. non L. *Sporobolus* sp.	Redtop (FACW) Dropseed
06A075 (23)	60 30	*Typha latifolia* L. *Agrostis alba* auct. non L.	Cattail (OBL) Redtop (FACW)
06A123 (24)	95	*Poa fendleriana* (Steud.) Vasey	Muttongrass (UPL)
06A132 (25) - Overstory	80	*Salix exigua* Nutt.	Coyote willow (OBL)
06A132 (25) - Understory	75	*Agrostis alba* auct. non L.	Redtop (FACW)
None (26)	50 30	*Agrostis alba* auct. non L. *Typha latifolia* L.	Redtop (FACW) Cattail (OBL)
None (27)	70	*Bromus* sp.	Brome

* Hydrophytic category is for New Mexico Plants (Reed 1988)

will probably persist indefinitely in some of the outfall areas augmented by other sources of water.

Local wildlife may rely on an outfall's discharges as a source of drinking water. Personnel from the State of New Mexico's Environment Department refer to such outfalls as "attractive nuisances" because the water may be of poor quality and not beneficial to animal populations in the long term. Larger animals, as deer and elk, are expected to locate other sources of water easily; while smaller, less transient animals, as mice and voles, may undergo local population declines if dependable water sources are suddenly reduced.

4. THREATENED AND ENDANGERED SPECIES

The U. S. Fish and Wildlife Service lists 3 threatened species and 4 endangered species as occurring or potentially occurring within Los Alamos County (Table 4). Each of these species is discussed in terms of its

- status, habitat requirements, and endangerment factors;
- presence in the project area; and
- evaluation of effects.

A listing of relevant references and other sources is also included with the discussion of each species. None of the listed species and no potential habitat for listed species are expected to be affected by the outfall eliminations.

4.1 Black-Footed Ferret

4.1.1 Status, Habitat Requirements, and Endangerment Factors

The black-footed ferret (*Mustela nigripes*) is a Federal endangered species that is almost invariably found in association with prairie dogs (Bailey 1971). The prairie dogs must be in extensive towns of at least 150 acres to support a population of black-footed ferrets. Populations of these large weasels have dramatically declined as prairie dog towns have been poisoned and abandoned due to urbanization. Future loss of large dog towns will further endanger black-footed ferrets and their chances of recovery.

Table 4. USFWS Species List for Los Alamos County, March 1996.

Common Name	Scientific Name	Status *	Habitat Description	Potential Effects to Species or Habitat
Black-footed ferret	*Mustela nigripes*	E	Prairies, usually in prairie dog towns.	None.
American peregrine falcon	*Falco peregrinus anatum*	E	Ponderosa and piñon; nests in cliffs and rock outcrops on cliffs, known to breed locally.	None.
Arctic peregrine falcon	*Falco peregrinus tundruius*	T (S/A)	Nests in Alaska and northern Canada, migrates along coasts to southern U.S. and Mexico	None.
Bald Eagle	*Haliaeetus leucocephalus*	T	Riparian areas, wetlands, and open water for wintering and migrating eagles.	None.
Mexican spotted owl	*Strix occidentalis lucida*	T w/CH	Mixed conifer in uneven-aged and multi-storied forests with closed canopies, mountains and canyons; known to breed locally.	None.

Table 4. (cont.)

Common Name	Scientific Name	Status *	Habitat Description	Potential Effects to Species or Habitat
Southwestern willow flycatcher	*Empidonax traillii extimus*	E w/PCH	Nesting habitat includes shrubs and trees in willow thickets, shrubby mountain meadows, and deciduous woodlands along streams, lakes, and bogs.	None.
Whooping crane	*Grus americana*	E	Nests in Canada, winters along Rio Grande where it roosts near water.	None.

* Status Index

E	=	Endangered
E w/PCH	=	Endangered with Proposed Critical Habitat
PE	=	Proposed Endangered
T	=	Threatened
PT	=	Proposed Threatened
PT w/CH	=	Proposed Threatened with critical habitat
SC	=	Species of Concern
S/A	=	Similarity of Appearance

4.1.2 Presence in the Project Area

The black-footed ferret has not been recorded in Los Alamos County. LANL has one known prairie dog town to the south of Pajarito Road west of TA-66. This prairie dog town is judged to be far too small to support black-footed ferrets. Black-footed ferrets have never been observed on LANL property. The area affected by the ERP does not contain prairie dog towns or suitable habitat for black-footed ferrets.

4.1.3 Evaluation of Effects

The ERP will not directly, indirectly, or cumulatively affect the black-footed ferret because there is no potential habitat for the black-footed ferret within the ERP action area.

4.1.4 References

V. Bailey, *Mammals of the Southwestern United States with Special Reference to New Mexico*, Dover Publications, Inc., New York, New York, 1971.

4.2 American Peregrine Falcon

4.2.1 Status, Habitat Requirements, and Endangerment Factors

The American peregrine falcon (*Falco peregrinus anatum*) is a Federal endangered species. This crow-sized falcon is rare and localized in the American West (National Geographic Society 1987). Peregrines may migrate from northern Canada to wintering grounds in the United States, while others nest within the continental United States. Populations of peregrines declined drastically with the spread of DDT as an insecticide (Hickey and Anderson 1968). Habitat alteration or destruction, disturbance, and takings have also made inroads on the species in New Mexico (NM Department of Game and Fish 1988).

The breeding habitat of peregrine falcons consists of nesting and foraging areas on steep cliffs in wooded or forested habitats. Topography is the primary determining factor in characterizing peregrine breeding habitat (Johnson 1985). Peregrines nest where they can

establish breeding territories with areas suitable for both nesting and foraging. Optimal habitat includes breeding territories near cliffs within areas of ponderosa and piñon pines and large nearby gulfs of air that permit peregrines to attack their prey from above. Peregrine foraging areas may extend to 32 km (20 mi) from a nest site, but an estimated 90% of foraging occurs within a radius of 16 km (10 mi).

4.2.2 Presence in the Project Area

In Los Alamos County, Terrell Johnson (1992) identified one primary nesting area for peregrine falcons north of LANL. No sites on LANL property have been identified as supporting peregrines. Johnson (1985) included two potential secondary-use areas in Los Alamos Canyon as suitable nesting sites while assessing potential impacts of a now existing firing range on peregrine falcons. Additionally, he identified Pueblo Canyon as providing high quality, suitable nesting sites, and also stated that peregrine falcons had been observed nesting in Pueblo Canyon and foraging in Los Alamos Canyon. No sites on Laboratory property have been identified as supporting peregrine falcons.

A pair of peregrine falcons was sighted in Pueblo Canyon in March 1996 (personal communication, David Keller) and these falcons may be establishing a nest. This nesting area has been very productive in the past, and LANL requires strict adherence to protective measures designed to ensure that foraging or nesting peregrines in Pueblo Canyon will not be disturbed.

4.2.3 Evaluation of Effects

The ERP will not directly, indirectly, or cumulatively affect the American peregrine falcon because there is no potential habitat for the American peregrine falcon within the ERP action area.

4.2.4 References

T. H. Johnson, "Responses of Breeding Peregrine Falcons to Human Stimuli," Southwest Raptor Management Symposium and Workshop, no date.

T. H. Johnson, "Biological Assessment of the Effects of the Proposed Firing Range in Los Alamos Canyon on the Peregrine Falcon", LANL unpublished report, 1985.

T. H. Johnson, "R-30 Peregrine Falcon Habitat Management Plan," Report to the US Department of Energy, 1992.

J. J. Hickey and D. W. Anderson, "The Birds of North and Middle America", Part 11, U.S. Natural History Museum Bulletin 50:650-660, 1968.

National Geographic Society, *Field Guide to the Birds of North America*, 2nd ed., S. L. Scott, ed., Washington, D.C., 1987.

New Mexico Department of Game and Fish, Handbook of Species Endangered in New Mexico, Santa Fe, New Mexico, 1988.

4.3 Arctic Peregrine Falcon

4.3.1 Status, Habitat Requirements, and Endangerment Factors

The Arctic peregrine falcon (*Falco peregrinus tundrius*) is a Federal threatened species due to similarity of appearance with the American peregrine falcon. This subspecies nests in Alaska and northern Canada, migrates primarily along coastal shores, and winters south of the United States (National Geographic Society 1987).

4.3.2 Presence in the Project Area

The Arctic peregrine falcon has never been sighted in Los Alamos County. It is not expected to occur near the ERP action area as a resident or a migrant.

4.3.3 Evaluation of Effects

The ERP will not directly, indirectly, or cumulatively affect the Arctic peregrine falcon because there is no potential habitat for the Arctic peregrine falcon within the ERP action area.

4.3.4 References

National Geographic Society, *Field Guide to the Birds of North America*, 2nd ed., S. L. Scott, ed., Washington, D.C., 1987.

4.4 Bald Eagle

4.4.1 Status, Habitat Requirements, and Endangerment Factors

The bald eagle (*Haliaeetus leucocephalus*) is a Federal threatened species. It occurs along open bodies of water from Alaska and Canada to the southern United States. New Mexico is within the bald eagle's winter range (Peterson 1990). Factors that negatively affect the bald eagle include habitat destruction and alteration, killing, excessive collecting, and lowered prey densities due to the introduction of exotic species (New Mexico Department of Game and Fish 1988).

4.4.2 Presence in the Project Area

The northern bald eagle is a winter resident along the Rio Grande and Cochiti Reservoir, south of LANL property (Hubbard et al. 1988). Here, it feeds primarily on fish, waterfowl, small mammals, and carrion (Johnson memo 1991) and roosts in canyons of the Jemez Mountains. Bald eagles are not expected to occur near the ERP action area.

4.4.3 Evaluation of Effects

The ERP will not directly, indirectly, or cumulatively affect the bald eagle because there is no potential habitat for the bald eagle within the ERP action area.

4.4.4 References

J. P. Hubbard, W. H. Baltosser, and C. G. Schmidt, "Mid-winter Aerial Surveys of Bald Eagles in New Mexico", pp 289-293 in *Proceedings of the Southwest Raptor Management Symposium and Workshop*, R. L. Glinski, et al., eds., National Wildlife Federation, Washington, D.C., 1988.

T. E. Johnson, memorandum to T. Foxx of ESH-20, "White Rock Canon Eagle Habitat Management", 4 pp., December 1991.

New Mexico Department of Game and Fish, Handbook of Species Endangered in New Mexico, Santa Fe, New Mexico, 1988.

R. T. Peterson, *Western Birds*, a Peterson Field Guide, Houghton Mifflin Co., Boston, Mass., 1990.

4.5 Mexican Spotted Owl

4.5.1 Status, Habitat Requirements, and Endangerment Factors

The Mexican spotted owl (*Strix occidentalis lucida*) is a Federal threatened species with critical habitat. In the mountains and canyons of the southwestern United States and northern Mexico, these owls inhabit mixed-conifer and ponderosa-Gambel oak forests with the following characteristics (USFWS 1993):

- high canopy closure,
- high stand diversity,
- multilayered canopy resulting from an uneven age stand,
- large and mature trees,
- downed logs,
- snags, and
- stand decadence as indicated by the presence of mistletoe.

In addition, spotted owls favor narrow, steep canyons with cool temperatures and little light penetration. Therefore, spotted owls tend to prefer north-facing slopes (Ligon 1926; Erlich et al. 1988), where they nest in trees, crevices, or small caves (Travis 1992).

Spotted owls are threatened by habitat alteration, such as the reduction of the number of large trees and of multi-storied canopy during logging operations. During mating and breeding season (February through August), noise from heavy equipment and other human activity occurring within 0.4 km (0.25 mi) of a nest could disturb mating and/or nesting owls, possibly resulting in nest abandonment.

4.5.2 Presence in the Project Area

A pair of Mexican spotted owls was discovered in the TA-16 area during 1995 and in 1996. This pair nested successfully both years, and may return to the same general area in future years. David Keller, a LANL ornithologist and trained spotted owl specialist, will continue to conduct species-specific surveys for the Mexican spotted owl within the areas of best available LANL habitat as determined by Terrell Johnson (recognized state authority on the Mexican spotted owl). Outfall 06A123 lies within 0.4 km (0.25 mile) of a known Mexican spotted owl nest that was reproductively successful in the summer of 1996.

4.5.3 Evaluation of Effects

According to restrictions followed throughout LANL's Mexican spotted owl restrictive zone, no trenching or other work involving heavy machinery will be allowed to proceed during the nesting and fledgling seasons (February through August) if the location falls within 0.4 km (0.25 mile) of an established Mexican spotted owl nest. Outfall 06A123 lies within 0.4 km (0.25 mile) of a known Mexican spotted owl nest that was reproductively successful in the summer of 1996. The flow at this outfall averages only 3 gpm, although it previously has discharged larger volumes of effluent. The drainage currently extends for only 9 m (30 ft) with little riparian vegetation present. At present, Outfall 06A123 does not provide good habitat for peromyscid mice or voles that might supplement the Mexican spotted owl's varied diet (USDI 1995). Therefore, the ERP is not expected to have any direct, indirect, or cumulative effects on the Mexican spotted owl.

4.5.4 References

P. R. Ehrlich, D.S. Dobkin, and D. Wheye, *The Birder's Handbook* (Simon and Schuster, Inc., New York, New York, 1988.

J. S. Ligon, "Habitats of the Spotted Owl", *Auk*, **43**, 421-429, 1926.

J. R. Travis, *Atlas of the Breeding Birds of Los Alamos County, New Mexico*, LANL report LA-12206, 1992.

U.S. Fish and Wildlife Service, "Endangered and Threatened Wildlife and Plants: Rule to List the Mexican Spotted Owl as a Threatened Species", USFWS, Federal Register 58 FR 14248, 1993.

4.6 Southwestern Willow Flycatcher

4.6.1 Status, Habitat Requirements, and Endangerment Factors

The southwestern willow flycatcher (*Empidonax traillii extimus*) is a Federal endangered species with proposed critical habitat. This species was formerly included with the alder flycatcher (*Empidonax alnorum*) as Traill's flycatcher. Willow flycatchers winter from southern Mexico to Panama and migrate throughout New Mexico in summer. In New Mexico, they are found regularly in the San Juan, Chama, Rio Grande, San Francisco, and Gila valleys and in the San Juan Mountains. Willow flycatchers have been recorded in the Jemez Mountains during the breeding season, but breeding there has not been confirmed. Willow flycatchers are present in New Mexico from early May to mid-September and breed from late May to late July (Verner and Boss 1984). Their elevational range of breeding in the state is 1147 to 2759 m (3700 ft to 8900 ft), but breeding over 2157 m (6958 ft) is only known to occur in the north.

In the breeding season, willow flycatchers typically inhabit swamps and thickets dominated by willow (Ehrlich et al. 1988) and riparian woodlands dominated by cottonwoods (Hubbard 1978). They spend most of their time in an understory canopy of small trees or tall shrubs, especially willows or salt cedar near areas of surface waters in the Rio Grande

Valley (New Mexico Department of Game and Fish 1988). Willow flycatchers require at least 20% shrub cover for suitable habitat.

The primary impact to the willow flycatcher is damage or destruction of riparian habitat. Removal of large areas of understory, shrubs, or overstory can decrease available habitat for nesting and foraging, and this may result in decreased use of the area by the willow flycatcher. During the breeding and nesting season (May to July), human activity and mechanical disturbance within a riparian area may cause nest abandonment. The invasion of tamarisk (*Tamarix* sp.) also decreases preferred willow flycatcher habitat (Tibbitts et al. 1994).

4.6.2 Presence in the Project Area

This species has not been recorded in Los Alamos County to date. No suitable habitat to support this species exists within the ERP action area. Small stands of willow occur near Outfalls 051051 and 06A132, but these stands are situated above the points of discharge, are supported by runoff water, and will not be affected by elimination of these outfalls.

4.6.3 Evaluation of Effects

The ERP will not directly, indirectly, or cumulatively affect the southwestern willow flycatcher because there is no potential habitat for the southwestern willow flycatcher within the ERP action area.

4.6.4 References

P. R. Ehrlich, D. S. Dobkin, and D. Wheye, *The Birder's Handbook: A Field Guide to the Natural History of North American Birds*, Simon & Schuster, Inc., 1988.

J. P. Hubbard, "Revised Checklist of the Birds of New Mexico", New Mexico Ornithological Society Publication No. 6, 1978.

New Mexico Department of Game and Fish, "Handbook of Species Endangered in New Mexico", NMDGF report F-378:1-2, 1988.

New Mexico Department of Game and Fish, "Endangered and Threatened Wildlife and Plants: Proposal to list the Southwestern Willow Flycatcher as Endangered with Critical Habitat," NMDGF, Federal Register 58 FR, 1993.

T. J. Tibbitts, M. K Sogge, and S. J. Sferra, "A Survey Protocol for the Southwestern Willow Flycatcher (*Empidonax traillii extimus*)," Colorado Plateau Research Station, Northern Arizona University, Flagstaff, Arizona, Technical Report NPS/NAUCPRS/NRTR-94/04, April 1994.

J. Verner and A.S. Boss, "California Wildlife and Their Habitats: Western Sierra Nevada", U.S. Forest Service General Technical report PSW-37 (1984).

4.7 Whooping Crane

4.7.1 Status, Habitat Requirements, and Endangerment Factors

The whooping crane (*Grus americana*) is a Federal endangered species. These large birds are usually found near large bodies of water. In New Mexico, whooping cranes are associated with sandhill cranes. Foraging areas are generally agricultural fields and valley pastures, particularly where there is waste grain or sprouting crops. The causes for the overall decline of this species are varied, but the major one is habitat loss and alteration. Once populations were reduced, other factors became more important, including killing or disturbance by humans, predation, disease, and collision with objects (New Mexico Department of Game and Fish 1988).

4.7.2 Presence in the Project Area

The whooping crane is a seasonal migrant (Stahlecker 1992) through the Rio Grande valley in the vicinity of LANL. They form an introduced population that nest in southeast Idaho and winter at the Bosque Del Apache Refuge in New Mexico (National Geographic Society 1987). During migration, they may stop at sand bars along the Rio Grande in the area of its confluence with Sandia Canyon.

4.7.3 Evaluation of Effects

The ERP will not directly, indirectly, or cumulatively affect the whooping crane because there is no potential habitat for the whooping cranes within the ERP action area.

4.7.4 References

National Geographic Society, *Field Guide to the Birds of North America*, 2nd ed., S. L. Scott, ed., Washington, D.C., 1987.

New Mexico Department of Game and Fish, Handbook of Species Endangered in New Mexico, Santa Fe, New Mexico, 1988.

D. W. Stahlecker, "Crane Migration in Northern New Mexico", *Proceedings of the 1988 Crane Workshop,* pp. 1-12, 1992.

5. BEST MANAGEMENT PRACTICES

Best management practices must be strictly adhered to at all outfalls involving outside construction work. All such work must follow standard erosion control practices, including the use of straw bales and sedimentation fences where necessary to prevent soil movement or loss. Work cannot occur within a wetland without the proper authorization, including notification in the Federal Register. Workers must minimize damage to the existing riparian vegetation. Vehicles should not cross drainages and channels except on existing roads. Tree and shrub removals must be kept to a minimum, and a member of the Biology Team must approve the removal of any tree having a diameter at breast height of 20 cm (8 inches) or greater. Soil disturbance must be kept to an absolute minimum, and all disturbed areas must be replanted with an appropriate seed mix once work is completed.

6. SUMMARY

LANL proposes to eliminate effluent discharges at 27 outfalls under the Effluent Reduction Program. These actions will occur primarily as administrative shut offs and indoor modifications, such as drain closures. No federally listed biota are expected to be affected by these actions. Vegetation within wetlands areas below the outfalls would be

affected, but these areas do not include potential habitat for any federally listed biota. The vegetative effects of eliminating effluent will depend in large part upon the amount of contributions from other water sources, such as natural drainages and runoff from nearby buildings and parking lots to the wetlands. Best management practices must be strictly followed at all outfalls involving outside construction work.

7. CITATIONS

B. M. Bowen, "Los Alamos Climatology," LANL report LA-11735-MS, 1990.

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T. Foxx and B. Blea-Edeskuty, "Wildlife Use of NPDES Outfalls at Los Alamos National Laboratories", LANL report LA-13009-MS, September 1995.

LANL, *Environmental Surveillance at Los Alamos during 1993*, Environmental Protection Group, LANL report LA-12973-ENV, October 1995.

National Wetlands Inventory Maps, U.S. Fish and Wildlife Service, prepared for LANL, 1990.

C. J. Newling, "Report on Survey of Selected Los Alamos National Laboratory Wetlands Conducted June 14–16, 1995 under Purchase Order No. 837140015-EL," unpublished LANL report, July 1995.

P. B. Reed, Jr., "National List of Plant Species that Occur in Wetlands: 1988 New Mexico," for National Wetlands Inventory, U. S. Fish and Wildlife Service report NERC-88/18.31, May 1988.

USDI Fish and Wildlife Service, "Recovery Plan for the Mexican Spotted Owl: Vol. 1," Albuquerque, NM, 1995.

APPENDIX A
INDIVIDUAL OUTFALLS

Assumptions and methodology for the information in this Appendix are presented in the following paragraphs.

Specific actions for outfalls in the WSC Program are based on information in the Waste Stream Characterization reports and on recent updates from Santa Fe Engineering (Diamond 1996). LANL personnel involved in NPDES outfall sampling provided additional information from their personal observations in the field.

Average effluent flows are derived from estimates made by LANL personnel during regularly scheduled NPDES field sampling or from readings of continuous discharge records. All estimates were made on the amount of effluent flowing through the end of the discharge pipe. Average flows were calculated from a number of estimates taken at different seasons throughout 1995. Additional comments, such as the duration of flow, based upon field observations of past flows, are also included as an additional source of relevant narrative information.

Descriptions of each outfall and its associated wetland were compiled from field notes taken by LANL biologists when visiting each outfall specifically for issues raised by the proposed Effluent Reduction project. These descriptions are intended to facilitate visualization of each outfall and include information on dominant overstory vegetation of the surrounding area, sources other than the outfall that may contribute to the establishment and maintenance of riparian vegetation, and a narrative of the outfall's drainage and associated wetlands. Approximations of length, width, and depth were made by pacing off the respective distances, and these rough estimates are not definitive measurements.

The total area of riparian vegetation associated with each outfall was computed by pacing off the perimeter of each area with a hand-held Global Positioning System (GPS) instrument. These areas were not determined by formal wetlands delineations, which assess vegetation, soils, and hydrology. In some cases, the GPS areas had decreased appreciably by the time that LANL biologists revisited the sites for species determination in autumn of 1995 and spring of 1996. These determinations were confined to areas of riparian vegetation and excluded adjacent areas dominated by upland species. An attempt was made to identify all riparian plants to species, but some locations were surveyed during seasons when only genus-level identifications were possible due to the absence of conclusive distinguishing characteristics.

Information on animal use of wetlands associated with outfalls was based on field observations and several published accounts. Much of the medium and large animal use information was taken from a report on wildlife use of outfalls (Foxx and Blea-Edeskuty 1995). Most of the small mammal use information was taken from reports comparing outfalls, streams, and dry canyons at LANL (Raymer and Biggs 1994). Aquatic invertebrate information was based on reports documenting wildlife use of outfalls (Foxx and Blea-Edeskuty 1995), and aquatic invertebrates in Sandia Canyon (Cross 1995a), and aquatic invertebrates in Operable Unit 1082 (Cross 1995b).

Information on exceedances of NPDES permit limits were taken from LANL records of permit exceedances. These records and reports were searched from January 1991 to March 1996 to provide current and comprehensive information relative to water quality of discharged effluents. Table 3-2 displays which parameters are measured and the discharge limitations by outfall category.

Expectations of the effects of effluent eliminations at specific outfalls are based on several sources of information. Many wetlands associated with outfalls receive water from additional sources, including precipitation runoff and snowmelt from nearby roads, buildings, parking lots, and storm drains;

precipitation runoff and snowmelt from natural drainage patterns; discharges from other outfalls whose effluent flows are also proposed for reduction; and perched aquifers which contribute to surface flow. Thus, elimination of an outfall's industrial effluent does not imply that its associated wetland will consequently disappear.

Wetland vegetation is discussed in terms of which species are expected to be replaced by more drought-tolerant species once outfall discharges have ceased. Species designated as OBL or FACW have the highest water requirements and would be most significantly affected by decreasing water availability. Many species designated as FAC, FACU, or UPL may persist indefinitely after effluent elimination, depending upon local conditions.

Changes in wildlife use following effluent elimination are more uncertain than vegetational replacements. Information on expected use patterns at each outfall is presented in terms of aquatic invertebrate and small, medium, and large mammal populations. Less data are available on specific outfall use by amphibians, reptiles, and birds.

Detailed maps of the affected environment near each outfall, including the associated wetland, contour lines, springs, and NWI wetlands are presented in Figure A-3 through Figure A-7. Figure A-1 and Figure A-2 are an index and a legend, respectively, for these maps.

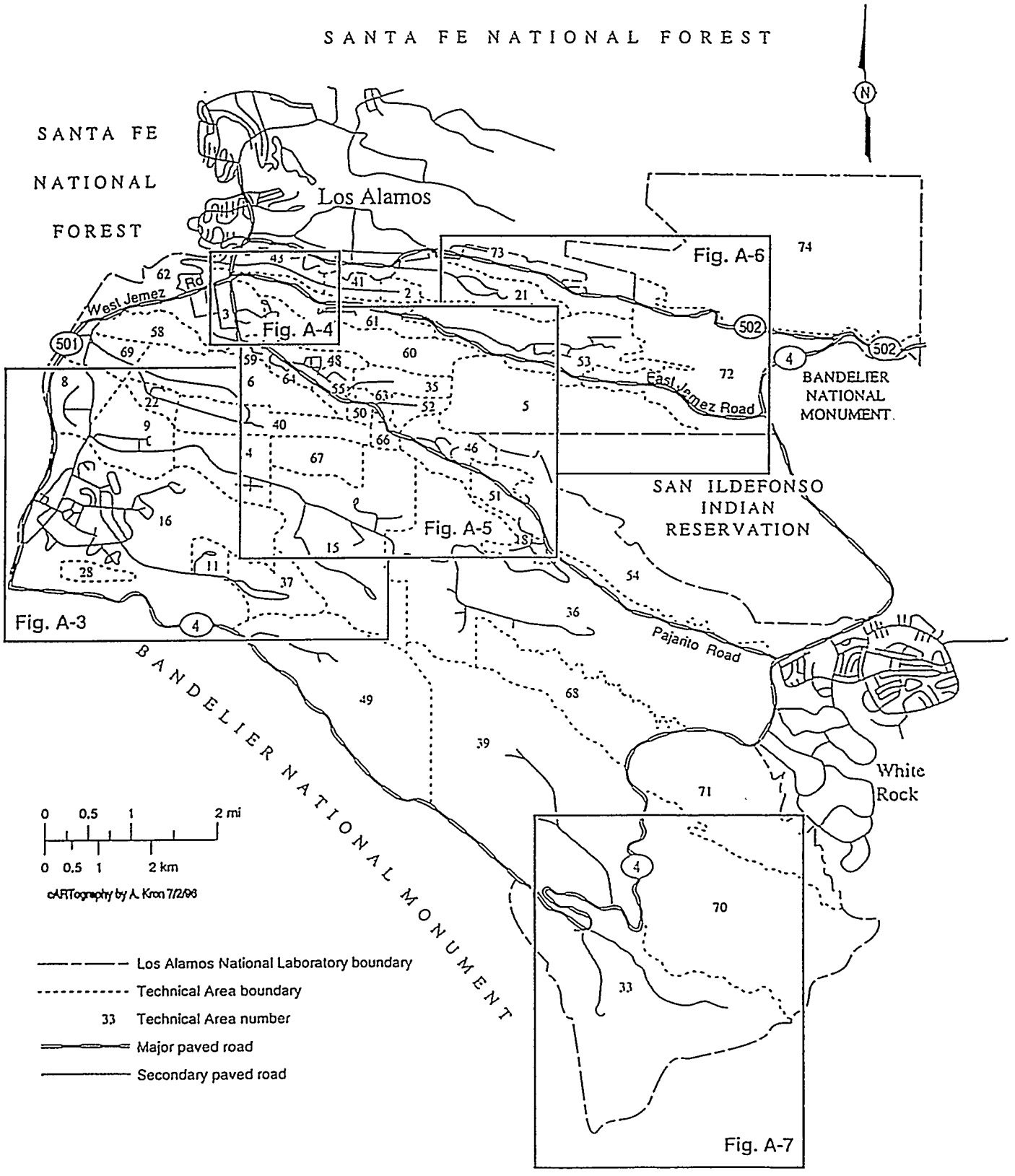

Figure A-1. Index to detailed outfall maps.

LEGEND

Building or structure with associated outfall

33-114 Building/structure number

Outfall

(15) Outfall number in this report

Major paved road

Secondary paved road

Unimproved road

Elevation contour (feet)

Laboratory boundary

Intermittent stream

Spring

Wetland areas:

Wetlands associated with LANL outfalls:

Primarily linear wetland (note: no NWI designators)

Area wetland

Primarily local wetland in vicinity of outfall

Wetlands identified by National Wetland Inventory:

Primarily linear wetland (see designators below)

Area wetland (see designators below)

Primarily upland, man-made wetland

National Wetland Inventory designators:

PSS1A	Palustrine, shrub-scrub, broadleaf deciduous, temporarily flooded
PUSCh	Palustrine, unconsolidated shore, seasonally flooded, diked/empounded
R4SBA	Riverine, intermittant, streambed, temporarily flooded
R4SBH	Riverine, intermittant, streambed, permanently flooded
R4SBJ	Riverine, intermittant, streambed, intermittently flooded
R4SBKC	Riverine, intermittant, streambed, artificially and seasonally flooded
R2USA	Riverine, lower perennial, unconsolidated shore, temporarily flooded
R2USC	Riverine, lower perennial, unconsolidated shore, seasonally flooded
R2UBH	Riverine, lower perennial, unconsolidated bottom, permanently flooded
PEM1KF	Palustrine, emergent, persistent, artifically and semipermanently flooded
PEM1KFx	Palustrine, emergent, persistent, artifically and semipermanently flooded, excavated
PFO1A	Palustrine, forested, broad-leaved deciduous, temporarily flooded
PUBKHx	Palustrine, unconsolidated bottom, artificially and permanently flooded, excavated

Figure A-2. Legend for detailed outfall maps.

Figure A-3. Detailed map showing locations of outfalls 1, 4, 15, 17, 20, 21, 22, 23, 24, and 30.

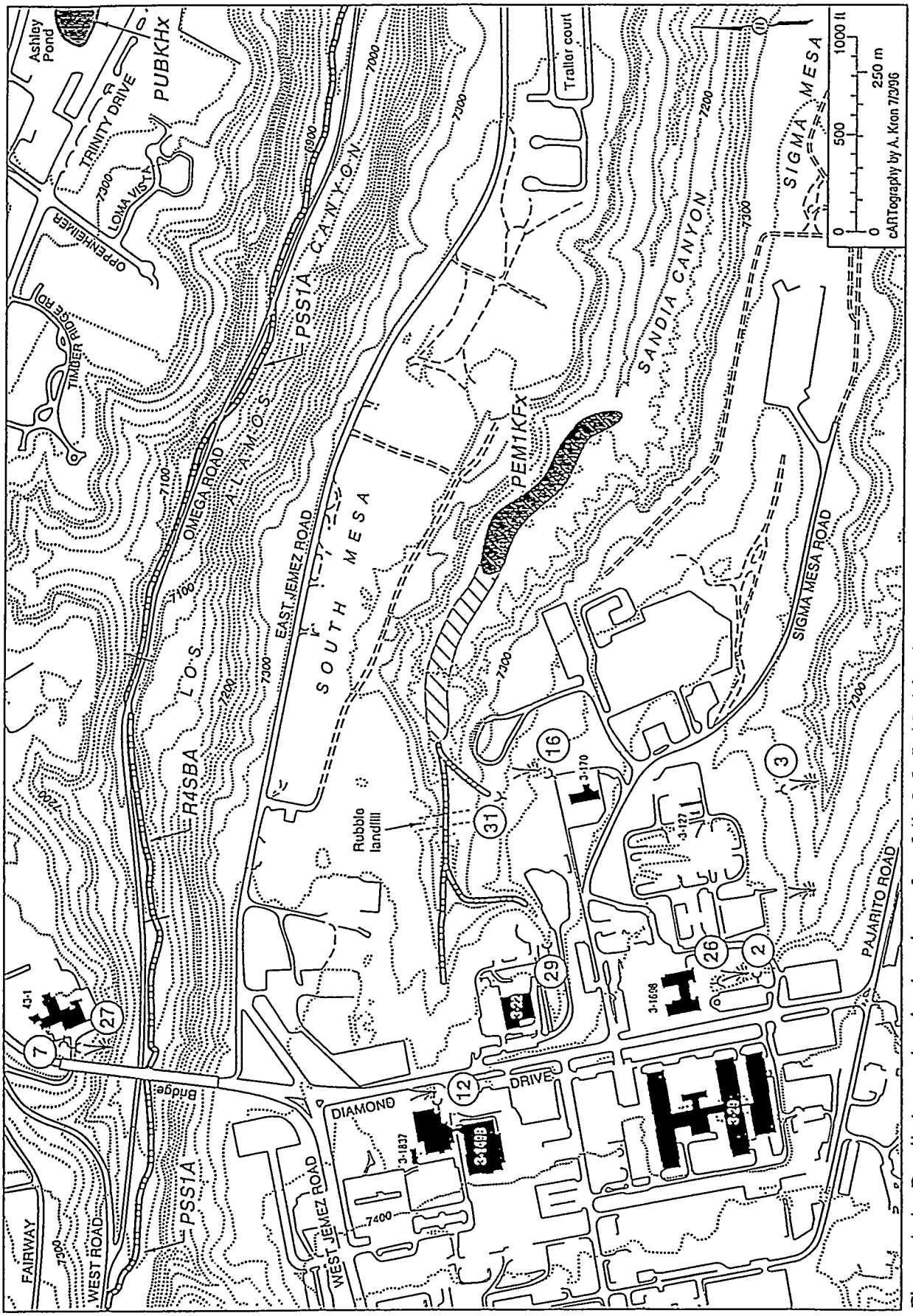

Figure A-4. Detailed map showing locations of outfalls 2, 3, 7, 12, 16, 26, 27, 29, and 31.

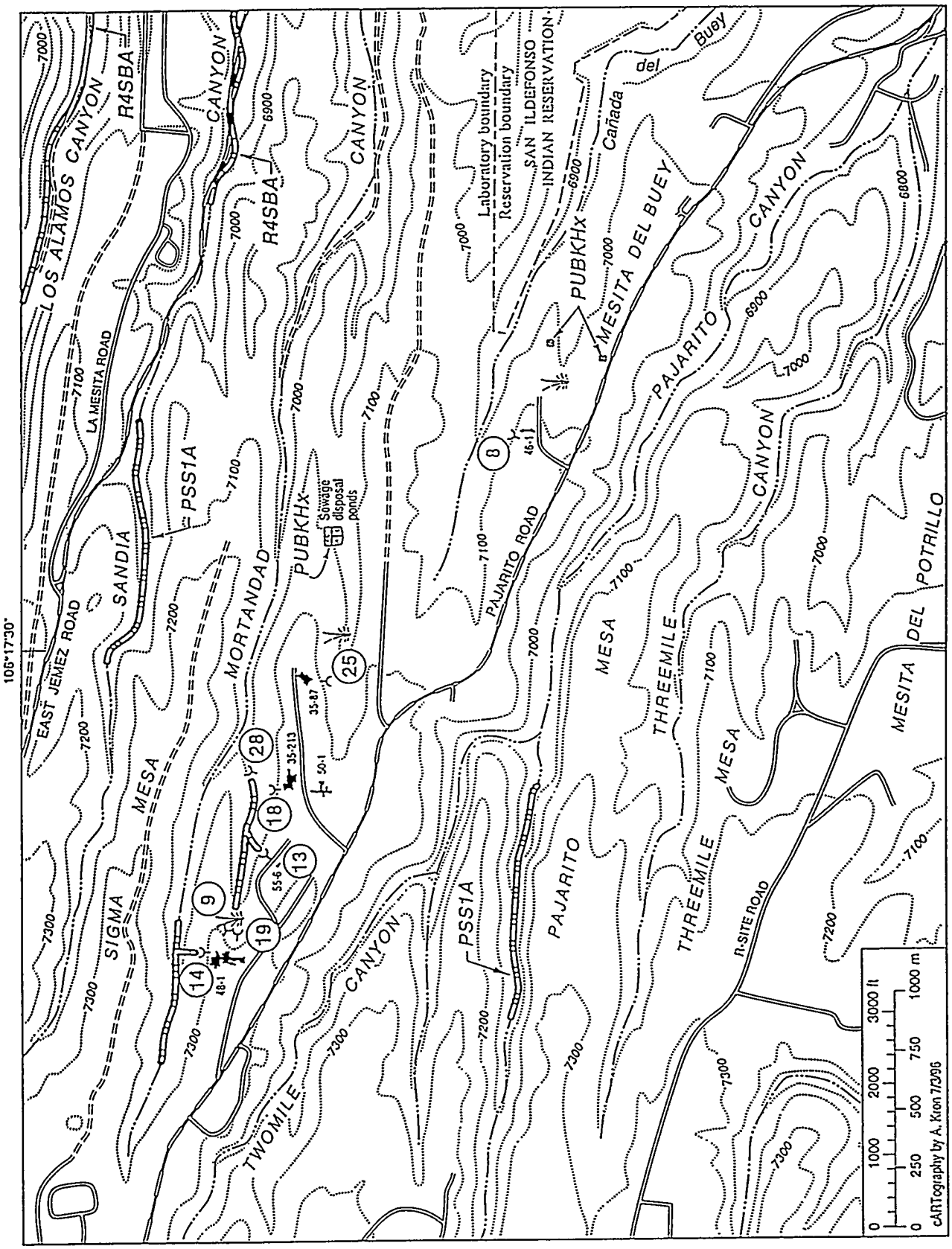

Figure A-5. Detailed map showing locations of outfalls 8, 9, 13, 14, 18, 19, 25, and 28.

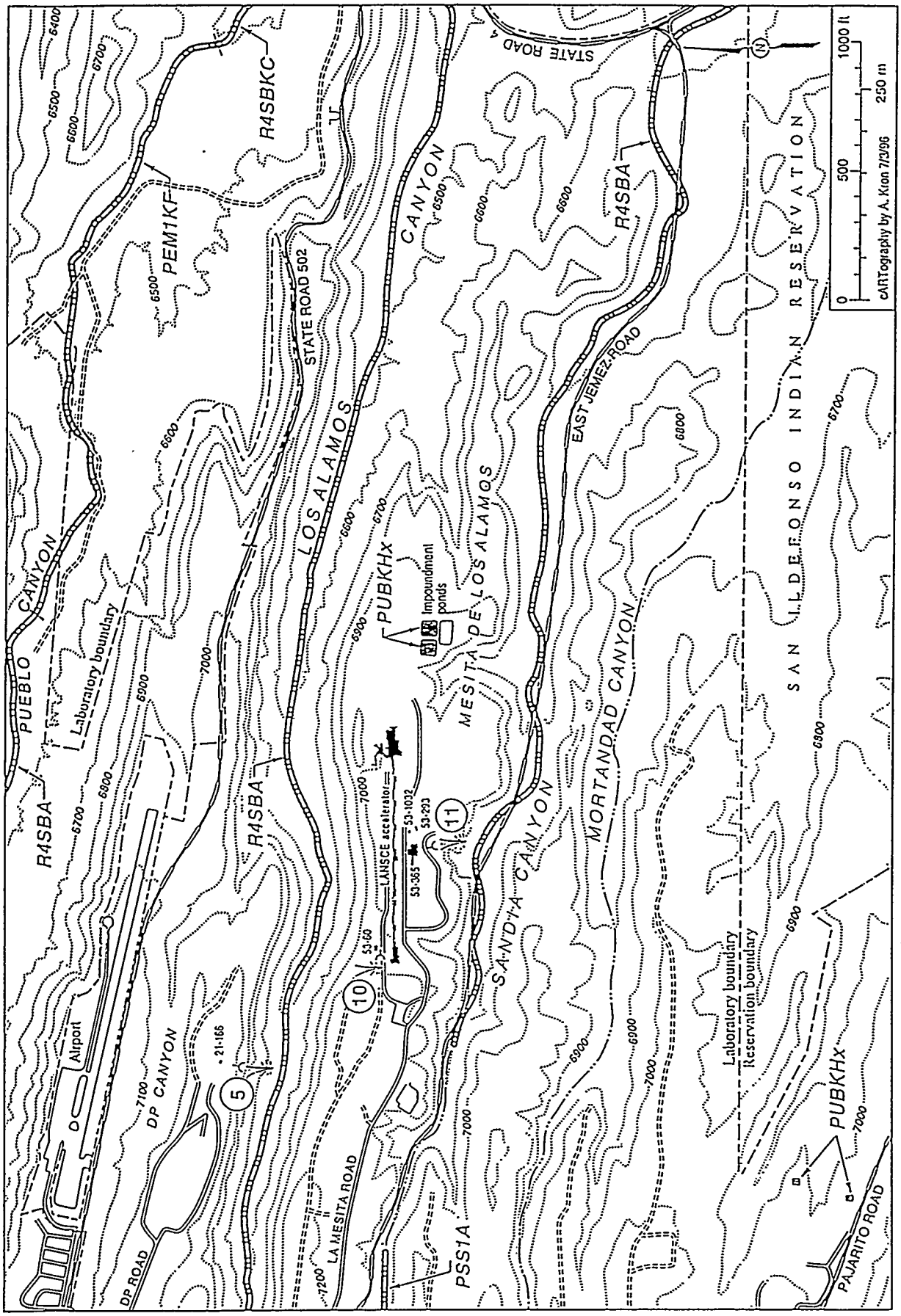

Figure A-6. Detailed map showing locations of outfalls 5, 10, and 11.

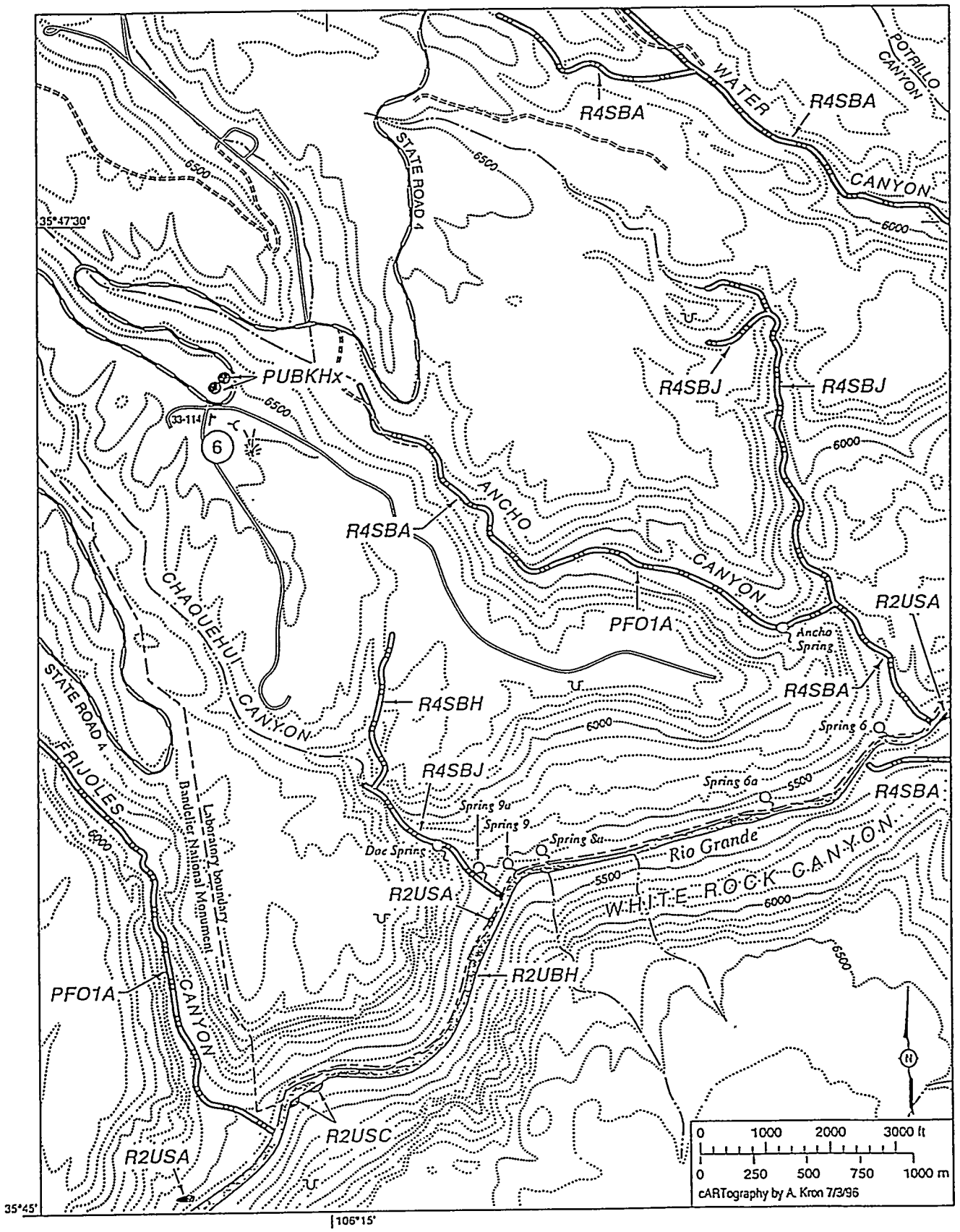

Figure A-7. Detailed map showing location of outfall 6.

OUTFALL No. 1, EPA 02A007

Specific Action

The S-Site Steam Plant, TA-16, Building 540, discharges heated boiler blowdown and steam condensate through Outfall 02A007 (Figure A-3). A roof drain also discharges through this outfall. While the Steam Plant is operating, its wastewater is treated before discharge with commercial chemicals to prevent corrosion and scaling and to remove dissolved oxygen. The Steam Plant is being replaced with smaller distributed (satellite) steam plants. When the replacement plants become operational in late 1996, the centralized Steam Plant will cease operations and the permitted effluent from this outfall could be eliminated. In the interim, waterflow sufficient to support the existing wetland will be maintained with potable water. The Proposed Action would discontinue this potable waterflow.

Current Condition

Outfall 02A007 has a consistent flow of 5–6 gallons per minute (gpm), with an average flow of 20 gpm. The upper drainage is a winding stream channel, which is 0.9 m (3 ft) deep. The stream runs through a small Gambel oak (*Quercus gambelii* Nutt.) grove and then a large open meadow. Below the oak, the drainage is deeply channelized (1.2 m or 4 ft) with many raw areas on the sides that support upland vegetation including several members of the Cruciferae family (mustards), blue grama grass (*Bouteloua gracilis* [Willd. ex Kunth] Lag. ex Griffiths), and false tarragon (*Artemisia dracunulus* L.) . The effluent pools in the meadow area and has a muddy substrate west of Anchor Ranch Road.

To the east of Anchor Ranch Road, the drainage passes through an open meadow surrounded by ponderosa pine (*Pinus ponderosa* P. & C. Lawson). The stream runs through the meadow for 200 m (650 ft) and spreads out to form a swamp, 18 m (60 ft) at its maximum width. An additional 45 m (150 ft) of stream channel is more channelized and is shaded by ponderosa pine.

The total area of riparian vegetation associated with Outfall 02A007 is about 4.400 acres (17,907 m^2). The riparian area below the outfall was split for convenience into western and eastern sections with Anchor Ranch Road as the dividing line. In 1995, the riparian vegetation in the western portion consisted of 60 percent bottlebrush squirreltail (*Elymus elymoides* [(Raf.] Swezey syn. *Sitanion hystrix*), 20 percent redtop (*Agrostis alba* auct. non L.), 10 percent Canada wild rye (*Elymus canadensis* L.), and 10 percent a combination of other grasses and a species of aster. The riparian vegetation in the eastern portion consisted of 40 percent wire rush (*Juncus balticus* Willd.), 30 percent redtop, 15 percent Kentucky bluegrass (*Poa pratensis* L.), 10 percent barnyard grass (*Echinochloa crus-galli* L. Beauv.), and 5 percent a combination of other grasses.

Elk (*Cervus elaphus nelsoni*), mule deer (*Odocoileus hemionus*), black bear (*Ursus americanus*), and gophers (*Thomomys talpoides*) or their sign (tracks, scat, fur, and/or bedding) have been previously seen near the outfall. A fence on the west side of Anchor Ranch Road restricts elk movements. The eastern meadow has been heavily used for elk bedding. Aquatic invertebrate sampling conducted here collected only two genera, both fly larvae. This lack of resident invertebrates is possibly due to the heated water and/or the chemical variability of the discharged water (see below).

Since January of 1991, Outfall 02A007 has exceeded the limits of its NPDES permit numerous times during regularly scheduled inspections (Table A-1). These exceedances and the high temperature of the released water suggest that discharges from this outfall are of questionable quality for wildlife watering usage.

Table A-1. NPDES Permit Exceedances at Outfall 02A007.

Date of exceedance	Parameter exceeded	Amount measured	Permit limit
01/12/93	pH	9.2 su	6.0-9.0 su
01/12/93	TSS	270 mg/L	100 mg/L
030/1/93	TSS	441 mg/L	100 mg/L
03/09/93	TSS	526 mg/L	100 mg/L
03/17/93	TSS	416 mg/L	100 mg/L
02/03/92	pH	9.3 su	6.0-9.0 su
04/07/92	pH	9.3 su	6.0-9.0 su
04/07/92	pH	9.4 su	6.0-9.0 su
12/18/92	TSS	128 mg/L	100 mg/L
03/06/91	Foam	> trace	N/A
03/06/91	Foam	> trace	N/A
08/03/91	Floating Solids	> trace	N/A
09/05/91	Phosphorus	115 mg/L	40 mg/L
09/16/91	Phosphorus	62 mg/L	40 mg/L
10/08/91	TSS	464 mg/L	100
10/08/91	Phosphorus	384 mg/L	40 mg/L
10/16/91	TSS	1694 mg/L	100 mg/L
11/06/91	pH	9.8 su	6.0-9.0 su
11/13/91	TSS	451 mg/L	100 mg/L

Environmental Consequences of Proposed Action

Discharges from Outfall 02A007 flow along a stream channel then through a lower meadow that are both natural drainages. These areas receive precipitation runoff, snowmelt, and runoff from the surrounding landscape, nearby buildings, and parking lots. Storm water runoff from roof drains also discharges through the outfall. These additional water sources will continue to provide some moisture to the established riparian vegetation, especially in the lower portions of the drainage. In the western portion, the bottlebrush squirreltail and Canada wild rye would be expected to persist, while the redtop may die-off and be replaced by more drought resistant vegetation. In the eastern portion, some of the wire rush and redtop may be replaced, but patches of these and the other vegetation present would be expected to persist despite the reduction in available moisture. Wildlife watering usage and bedding would be expected to decline with the decrease in available surface water, and this might result in the displacement of resident elk.

OUTFALL No. 2, EPA 03A021

Specific Action

Outfall 03A021 is permitted for several large air washers (blowdown) located in mechanical rooms in the Chemistry and Metallurgy Research (CMR) building, TA-3, Building 29 (Figure A-4). The outfall receives this permitted effluent plus stormwater from five roof drains and numerous de minimus flows from illicit connections. The WSCP identified a need to separate the air wash effluent from the

OUTFALL No. 3, EPA 03A022

Specific Action

Outfall 03A022 is permitted to discharge cooling water from TA-3, Building 127, a cooling tower that services the Sigma Building (TA-3, Building 66). Figure A-4 shows where Outfall 03A022 is in relation to the other outfalls in TA-3 and the natural environment. The Proposed Action is to replace the current system with a mechanical refrigeration unit or a recirculation system. The waste generated would be less than 10 m^3 (350 ft^3) of piping, plumbing hardware, and construction rubble.

Current Condition

Outfall 03A022 receives treated cooling water and has a fairly consistent discharge of approximately 8 gpm. The outfall also receives stormwater from nine roof drains located on the south wing of TA-3, Building 66. The discharged water flows into a natural drainage in an area of ponderosa pine with several Russian olive (*Elaeagnus angustifolia* L.) growing beside the small stream. This channel runs for 23 m (75 ft), passes through a culvert underneath a dirt road, and continues for an additional 46 m (150 ft). It ends in a precipitous 9 m (30 ft) drop-off leading to a steep section of Mortandad Canyon but may resurface somewhere downstream in the canyon.

The total area of riparian vegetation associated with Outfall 03A022 is about 0.11 acre (465 m^2). In 1995, the riparian vegetation below this outfall consisted of 60 percent cattail, 20 percent redtop, 10 percent wire rush, 5 percent coyote willow (*Salix exigua* Nutt.), and 5 percent a combination of other grasses and herbaceous plants. Elk, mule deer, and squirrels (*Spermophilus* sp.) or their sign have been previously seen near the outfall.

Since January of 1991, Outfall 03A022 has exceeded the limits of its NPDES permit three times: twice on March 16, 1991 for total suspended solids (2,072 mg/L and 818 mg/L measured when permit allowed a maximum of 100 mg/L) and on October 19, 1993 for free chlorine (0.55 mg/L measured when permit allowed a maximum of 0.50 mg/L).

Environmental Consequences of Proposed Action

The stream channel below Outfall 03A022 is supplemented by stormwater runoff from buildings above the point of discharge, and it follows a natural drainage, which receives precipitation runoff from the hillside. Stormwater runoff is also piped to discharge at the outfall's point of discharge. Some of the riparian vegetation, especially trees and other deep-rooted plants, would be expected to persist if the outfall's effluent discharges are eliminated. The cattails, redtop, and wire rush would probably die out and be replaced with upland grasses and herbaceous plants. Wildlife watering usage would be expected to decline with the elimination of year-round available surface water.

OUTFALL No. 4, EPA 03A028

Specific Action

Blowdown water from the cooling tower at TA-15, Building 202 goes to a basement floor drain (BFD17) in Building 185 and from there to Outfall 03A028 (Figure A-3). The Proposed Action is to reroute the blowdown to the sanitary system or to replace the cooling system with a mechanical refrigeration system or a recirculation system. In addition, BFD17 would be modified to exclude floor washings. The waste generated by the Proposed Action would be about 10m³ (350 ft³) of piping, plumbing hardware, and construction rubble.

Current Condition

Outfall 03A028 receives treated cooling water intermittently, averaging 15–20 gpm. An illicit source discharges through the pipe, but contributes less than 1 gpm. In the early 1990's, more substantial discharges maintained a much larger cattail area, which has declined with reductions in flow.

The surrounding area supports an overstory of ponderosa pine and one-seed juniper (*Juniperus monosperma* [Engelm.] Sarg.). A 0.9-m- (3-ft-) wide drainage channel below the outfall has been trenched to 0.5 m-(1.5 ft-) deep for 15 m (50 ft) and is bordered by grasses and several types of herbaceous plants. The drainage extends for 107 m (352 ft) before entering an unvegetated, rocky section leading into Cañon de Valle. The upper channel flows through an area of bare soil, and small berms have been placed along this portion of the channel.

The total area of riparian vegetation is about 0.011 acre (45 m²). In 1996, the riparian vegetation consisted of 80 percent muttongrass (*Poa fendleriana* [Steud.] Vasey), 10 percent an unknown grass, and 10 percent a combination of cattail, nodding brome (*Bromus anomalus* Rupr. ex. Fourn), Canada wild rye, thistle (*Circium* sp.), western wheatgrass (*Elymus smithii* [Rydb.] Gould, syn. *Agropynon* Rydb.), rush. (*Juncus* sp), and an unknown herbaceous plant.

Elk appear to heavily utilize the vicinity of Outfall 03A028. Since January of 1991, Outfall 03A028 has exceeded its NPDES permit limits three times during regularly scheduled inspections. All three exceedances were for arsenic (permit limit 0.04 mg/L): 0.28 mg/L on November, 29 1994, 0.07 mg/L on December 15, 1994, and 0.12 mg/L again on December 15, 1994. In addition, the daily average limit (0.04 mg/L) was exceeded for the monitoring period of November 1, 1994 through January 1, 1995 with an arsenic concentration of 0.12 mg/L.

Environmental Consequences of Proposed Action

Effluent discharges are currently supplemented by an illicit waste stream and natural precipitation and snowmelt runoff. Higher effluent discharges once supported a cattail marsh along the drainage, but this has been replaced by more drought tolerant vegetation. This die-off and replacement would be expected to continue if effluent discharges through Outfall 03A028 are eliminated. Elk heavily use the outfall area, but other animals have not been sighted in the immediate vicinity.

OUTFALL No. 5, EPA 03A034

Specific Action

Outfall 03A034 is permitted for air washer blowdown at TA-21, Building 166 (Figure A-6), but the air washer may have been removed in recent years. The outfall receives effluent from four floor drains, one area drain, and one sump pump. The Proposed Action is to eliminate the known non-permitted sources and locate any other sources that may be contributing to the observable flow from this outfall. Rerouting the nonpermitted sources to the sanitary sewer system would require outdoor excavation of an area about 3.0 m x 6.1 m (10 ft x 20 ft) to a depth of 1.8 m (6 ft). One exterior wall penetration would be required. The waste generated by the Proposed Action would be about 21 m (70 ft) of 1 1/2 in. diameter pipe and up to 10 m^3 (350 ft^3) of soil and construction debris.

Current Condition

Outfall 03A034 has a continuous flow averaging 0.5 gpm. This continuous flow is probably not from the permitted cooling tower because that discharge should be seasonal and intermittent. Flows due to the cooling tower blowdown may be as high as 10–20 gpm, but last for only a few minutes at a time.

The surrounding overstory consists of scattered oak, one-seed juniper, and pinyon pine (*Pinus edulis* Engelm.). Outfall 03A034 discharges on a fairly open slope near the northern rim of Los Alamos Canyon. A 7-m^2- (80-ft^2-) wide clump of redtop and cattails is supported directly below the point of discharge, and riparian vegetation continues for another 6 m (20 ft) to the edge of a precipitous drop-off into the canyon. Two tamarisk (*Tamarix pentandra* Pallas) and two Russian olive trees grow below the drop-off, and these possibly established themselves during periods of greater water availability. A nearby mature peach tree was probably deliberately planted, and the other exotic trees may have been planted as well.

The total area of riparian vegetation associated with Outfall 03A034 is about 0.010 acre (41 m^2). The riparian understory vegetation consists of 65 percent redtop and 35 percent cattail.

The immediate vicinity of Outfall 03A034 receives little wildlife usage, probably due to the narrowness of the strip of land between the steep canyon rim and a chain-link fence surrounding TA-21. The lack of cover and presence of a dirt road paralleling the fence would also make the area unattractive to large animals.

Since January 1991, Outfall 03A034 has exceeded its NPDES permit limits only once during regularly scheduled inspections: on 17 June 1993, free chlorine was measured at 0.52 mg/L (permit limit 0.5 mg/L).

Environmental Consequences of Proposed Action

Stormwater runoff is piped to discharge at the outfall's point of discharge, but only small amounts enter the drainage due to direct precipitation. Elimination of Outfall 03A034's effluent discharges would probably cause the small area of riparian understory to die-off and be replaced by upland vegetation. This area does not appear to have been used as a source of water by large animals, and no significant animal displacements would be expected to result from eliminating effluent at the outfall.

OUTFALL No. 6, EPA 03A038

Specific Action

Outfall 03A038 is permitted for the blowdown from a single, small air washer in the basement of TA-33, Building 114 (Figure A-7). The blowdown discharges to one of two basement floor drains which connect to an existing sump pump. The sump pump discharges the accumulated effluent to the permitted outfall via the building storm drainage system. The Proposed Action is to repipe the basement sump pump from the permitted outfall to the sanitary sewer line, rerouting effluent of less than 50 gallons per day. The air washer may be replaced with a mechanical refrigeration device to eliminate the treated cooling water discharge. The Proposed Action would generate solid waste of about 3 m (10 ft) of 1 in. diameter cast iron pipe.

Building 114 is in transition between the former operating group and possible new occupants. The air washer was in operation during part of the summer of 1995 for building cooling. The new occupants may require the use of the cooling tower.

Current Condition

Outfall 03A038 receives treated cooling water intermittently and seasonally (5–7 months), averaging 11 gpm. The outfall discharges in an area of rabbitbrush (*Chrysothamnus nauseosus* [Pallas ex Pursh] Britt.) and mountain mahogany (*Cercocarpus montanus* Raf.), with some one-seed juniper and pinyon pine. The drainage is a poorly defined channel with an upper clump of dead cattails and sickly redtop. The 18-m-(60-ft-)long channel is lined with grasses and expands to a maximum width of 4.5 m (15 ft) near the end of the drainage. The entire drainage is within a fenced enclosure.

The total area of riparian vegetation associated with Outfall 03A038 is about 0.004 acre (18 m^2). In 1996, this riparian vegetation consisted of 90 percent redtop and 10 percent a combination of cattails, Kentucky bluegrass, bottlebrush squirreltail, thicket creeper (*Parthenocissus vitacea* [Kerner] Fritsch), and mullein (*Verbascum thapsus* L.).

Coyote (*Canis latrans*) and rabbit (*Sylvilagus* sp.) have been sighted near the wetlands associated with Outfall 03A038.

Outfall 03A038 has never exceeded its NPDES permit limits during regularly scheduled inspections.

Environmental Consequences of Proposed Action

Although stormwater is piped to discharge at the Outfall 03A038's point of discharge, riparian vegetation below the outfall has declined in recent years, probably due to a lack of available water. If effluent discharges are eliminated, the redtop would continue to be replaced by more drought resistant species. Effluent elimination would probably only minimally affect medium- and large-sized mammals because fences surround the entire wetlands, greatly restricting animal access.

OUTFALL No. 7, EPA 03A040

Specific Action

Although Outfall 03A040 is permitted for treated cooling water (03A), the effluent source at this time is once-through cooling water (04A) from six lasers at TA-43, Building 1 (Figure A-4). This building has an existing recirculation system and the Proposed Action is to tie-in the laser cooling water to this recirculation system by installing a new heat exchanger, a new circulation pump, and new copper pipe. If all six lasers are running at once (a rare event), the effluent can be as much as 36 gallons per minute. The waste generated by the Proposed Action would be about 46 m (150 ft) of 1/2 in.-3/4 in. copper and/or rubber tubing.

Current Condition

Outfall 03A040 receives non-contact cooling water from laser operations. The sporadic flows occur only when lasers are in use and averaged 5 gpm. The only nearby trees are Siberian elm (*Ulmus pumila* L.) and ponderosa pine. A narrow trench carries runoff water for 17 m (55 ft) towards the outfall drainage. The small outfall channel runs for 9 m (30 ft) before being joined by a steam condensate discharge (unpermitted outfall No. 29) at a culvert passing under a paved road. The lower stream channel runs for 17 m (55 ft) before dropping into Los Alamos Canyon at an angle of about 40°. This section of the drainage once received intermittent flows from Outfall 03A180 whose effluent is currently discharged to the sanitary system.

The total area of riparian vegetation associated with Outfall 03A040 is about 0.030 acre (122 m^2). In 1995, the riparian vegetation below this outfall consisted of 70 percent smooth brome (*Bromus inermis* Leyss.), 15 percent redtop, 10 percent Canada wild rye, and 5 percent fringed brome (*Bromus ciliatus* L.). The lateness of the year prohibited a positive identification of smooth brome because the seed heads had fallen off. Garter snake (*Thamnophis elegans*) and raccoon (*Procyon lotor*) sign have previously been sighted in this drainage, but no sightings or sign of large mammals have been recorded from this wetland.

Since January 1991, Outfall 03A040 has never exceeded its NPDES permit limits during regularly scheduled inspections.

Environmental Consequences of Proposed Action

Smooth brome is an upland grass, and this species (if correctly identified) should persist along the drainage once effluent discharges at Outfall 03A040 are eliminated. The redtop may die-off and be replaced by more drought-tolerant species, but the other vegetation would probably remain in place. Stormwater runoff may be sufficient to maintain the entire vegetation community indefinitely, and stormwater runoff is also piped to discharge at the outfall's point of discharge. Animals do not appear to rely on Outfall 03A040 for drinking water, and local wildlife would probably not be significantly affected by elimination of the outfall's effluent discharges.

OUTFALL No. 8, EPA 03A042

Specific Action

Outfall 03A042 receives cooling water from TA-46, Building 1 (Figure A-5). There are some indications that the cooling tower is malfunctioning and producing blowdown too often or that there is another, unidentified source for this effluent. The Proposed Action would include actions to remedy the malfunction and re-route any unpermitted sources. If the volume of blowdown is small enough, effluent would be rerouted to the sanitary sewer system. Otherwise, the cooling tower would be replaced with a mechanical refrigeration unit or a recirculation system. The waste generated by the Proposed Action would be less than 10 m^3 (350 ft^3) of piping, plumbing hardware, and construction rubble.

Current Condition

Outfall 03A042 has an average flow of 10 gpm. The effluent is discharged directly into a rocky drainage on the south rim of Mortandad Canyon in an area of oak, one-seed juniper, mountain mahogany, and several small ponderosa pine. Flows go sub-surface in the initial steep section, and the upper stream channel supports no riparian vegetation. After 46 m (150 ft), the drainage levels and passes through an open grassy area with a maximum width of 6 m (20 ft). The drainage then crosses a dirt road before spreading over bare rock 27 m.(90 ft) from the main stream channel in the center of Mortandad Canyon.

The total area of riparian vegetation associated with Outfall 03A042 is about 0.001 acre (6 m^2). In 1996, the riparian vegetation consisted of 70 percent redtop, 20 percent timothy (*Phleum pratensis* L.), and 10 percent a combination of big bluestem (*Andropogon gerardii* Vitman), bluegrass, cattail, western wheatgrass, and coyote willow.

Elk, raccoons, squirrels, and rabbits or their sign have previously been sighted within this section of Mortandad Canyon. Aquatic invertebrate larva have been noted within the Outfall 03A042 drainage.

Since January 1991, Outfall 03A042 has never exceeded its NPDES permit limits during regularly scheduled inspections.

Environmental Consequences of Proposed Action

In addition to effluent, the drainage of Outfall 03A042 carries precipitation runoff and snowmelt. Stormwater runoff is also piped to the outfall's point of discharge. These sources of moisture may provide enough water to maintain the riparian vegetation indefinitely. Elimination of Outfall 03A042's effluent may cause some shifts in the populations of large, medium, and small mammals. If alternative water sources are unavailable, local populations of small mammals near the outfall's drainage may die-off.

OUTFALL No. 9, EPA 03A045

Specific Action

Outfall 03A045 is permitted for the blowdown discharge from a cooling tower at TA-48, Building 1 (Figure A-5). The outfall also receives stormwater from 26 roof drains. The cooling tower blowdown flows to a floor sink (BFS1). Additional effluent may come from an air washer blowdown. At one time this outfall also received non-contact cooling waste used to cool a magnet, which was a substantial contribution to the effluent volume. The Proposed Action for this outfall is to re-route the cooling tower and air washer to the sanitary sewer system, a volume of 630 gallons per day. The waste generated by the Proposed Action would be 6.1 m (20 ft) of 1-1/2 in. galvanized pipe and about 9.1 m (30 ft) of ½ in.-1 in. copper pipe.

Current Condition

Outfall 03A045 receives treated cooling water and stormwater runoff from upslope buildings and parking lots. The outfall currently has an average flow of 2 gpm, but it once carried continuous cooling water discharges that significantly contributed to the development of its associated wetland. Discharges from the outfall merge with those of Outfall 04A153 to support a thick cattail marsh, and most of the water appears to emanate from 04A153. The margins of the wetland contain scattered ponderosa pine and several dead pine occur in the center of the marsh. The vague channel runs for 30 m (100 ft) before ending in a short (6-m or 20-ft) precipitous drop-off leading to Mortandad Canyon. The marsh area is 30 m (100 ft) at its maximum width, which occurs near the drop-off. Riparian vegetation formerly occurred downstream of the drop-off when Outfall 03A045 maintained a continuous effluent discharge.

The total area of riparian vegetation associated with Outfall 03A045 is about 0.289 acre (1,169 m^2). In 1995, this vegetation consisted of 50 percent cattail, 30 percent redtop, 10 percent inland rush (*Juncus interior* Wieg.), and 10 percent a combination of Canada wild rye, mullein little bluestem, (*Androgopon scoparius*) Nash (A. S. Hitchc.), fescue (*Festuca* sp.), and sedge (*Carex* sp.).

Chipmunks (*Eutamias* sp.) and squirrels have been previously sighted near Outfall 03A045. Since January 1991, Outfall 03A045 has exceeded its NPDES permit eight times (Table A-2) during regularly scheduled inspections.

Table A-2. NPDES Permit Exceedances at Outfall 03A045.

Date of exceedance	Parameter exceeded	Amount measured	Permit limit
7/24/95	Free Cl_2	9.2 mg/L	0.5 mg/L (Max)
Average from 5/1/96 -7/31/96	Free Cl_2	4.6 mg/L	0.2 (Avg.)
10/18/94	pH	9.3 su	6.0-9.0 su
11/8/94	pH	9.5 su	6.0-9.0 su
11/15/94	pH	9.1 su	6.0-9.0 su
06/30/93	Free Cl_2	0.53 mg/L	0.5 mg/L
08/12/92	Phosphorus	5.8 mg/L	5.0 mg/L
12/23/92	Free Cl_2	0.56 mg/L	0.5 mg/L

Environmental Consequences of Proposed Action

Coupled with the previous elimination of cooling water, discontinuation of the flows to outfalls 03A045 and 04A153 would probably have a serious effect on the downstream riparian vegetation, even though stormwater runoff is also piped to discharge at the outfall's point of discharge. The two predominant riparian plant species (cattail and red top) in the associated wetlands are classified as OBL or FACW and would likely die-off and be replaced by more drought resistant vegetation if the outfalls' effluent discharges are eliminated. This area has not been significantly utilized by wildlife, and effluent eliminations will probably have minimal effects on large species of mammals.

OUTFALL No. 10, EPA 03A047

Specific Action

Outfall 03A047 is permitted for the effluent from TA-53, Building 60, the smallest of the three cooling towers that service the Los Alamos Neutron Science Center linear accelerator (Figure A-6). The Proposed Action is is replace the cooling tower with a mechnical refrigeration unit or recirculation system. The waste generated would be less than 10 m^3 (350 ft^3) of piping, plumbing hardware, and construction rubble.

Current Condition

Outfall 03A047 receives treated cooling water seasonally (5–7 months during the hotter months). This intermittent flow averages 17 gpm. The outfall occurs in an area of mature pinyon pine and one-seed juniper. The drainage below Outfall 03A047 is 1.5 m (5 ft) wide and follows a paved road for 18 m (60 ft) before entering a north-trending trench with a width of 6 m (2 ft) cut into the underlying tuff. This trench runs for 33.5 m (110 ft), passes through a 7.5-m (25-ft) culvert under a dirt road, continues for another 17 m (55 ft), finally ending at the southern rim of Los Alamos Canyon.

The total area of riparian vegetation associated with Outfall 03A047 is about 0.074 acre (299 m^2), virtually all of it occurring within and along the first 18 m (60 ft). The trench contains only isolated clumps of grasses where soil has eroded onto the rocky substrate. In 1996, the riparian vegetation consisted of 40 percent cattail, 35 percent sedge (*Carex* spp.), 20 percent redtop, and 5 percent pine dropseed (*Blepharoneuron tricholepis* [Torr.] Nash) and possibly another grass.

Mule deer or their sign have previously been sighted in the area, as have lizards. Red-winged blackbirds (*Agelaius phoeniceus*) have been observed in the marsh. Outfall 03A047 occurs in a highly developed area and is probably not used extensively by wildlife.

Since January 1991, Outfall 03A047 has exceeded its NPDES permit limits 5 times (Table A-3) during regularly scheduled inspections.

Table A-3. NPDES Exceedances at Outfall 03A047.

Date of exceedance	Parameter exceeded	Amount measured	Permit limit
11/9/94	Free Cl_2	0.6 mg/L	0.5 mg/L
Average for 11/1/94 – 1/31/95	Free Cl_2	0.3 mg/L	0.2 mg/L (avg)
8/19/92	Phosphorus	6.4 mg/L	5.0 mg/L
9/14/92	Phosphorus	6.2 mg/L	5.0 mg/L
2/28/91	Phosphorus	7.26 mg/L	5.0 mg/L

Environmental Consequences of Proposed Action

Much of the riparian vegetation associated with Outfall 03A047 would be expected to die-off and be replaced by upland species if the outfall's effluent discharges are eliminated. The drainage will continue to receive some runoff water, but probably not enough to support cattails or sedges. This drainage may occasionally provide drinking water for mule deer.

OUTFALL No. 11, EPA 03A113

Specific Action

Outfall 03A113 receives cooling water from at least three cooling towers at TA-53 (Figure A-6). The cooling tower TA-53, Building 293 services operations in Building 18. The cooling tower TA-53, Building 294 services operations in Building 19. The cooling tower TA-53, Building 1032 is for operations at TA-53, Building 365. This outfall will also receive the effluent from cooling towers associated with the LEDA, which is scheduled to phase in operations over a period of about five to seven years and cease operations after that. The Proposed Action is to replace the cooling towers that remain after the LEDA Project is over with mechnical regrigeration units or recirculation systems. The waste generated would be less than 10 m^3 (350 ft^3) of piping, plumbing hardware, and construction rubble. The outfall pipe may be removed, requiring excavation of about 180 m^2 (1,900 ft^2) to a depth of about 1.8 m (6 ft). If the pipe is removed, the additional waste generated would be about 100 m^3 (3,500 ft^3) of soil, asphalt, and other cover material.

Current Condition

Outfall 03A113 discharges treated cooling water from several towers in a nearly continuous, but varied flow. Based on NPDES samples, the average flow is 8 gpm. The effluent pipe discharges into a trench with a length of 7.5 m (25 ft) cut into the tuff with several small (diameter at breast height less than 10 cm or 4 in.) cottonwoods (*Populus* sp.) growing alongside. The drainage follows several paths down an open hillside for 14 m (45 ft), with a large willow (*Salix* sp.) growing near the top of the hill. The steep sided ravine has scattered pinyon pine, one-seed juniper, oak, and mockorange *(Philadelphus microphyllus* Grey). A natural channel carries the effluent discharges and runoff for 30.5 m (100 ft) to a 6-m (20-f t) drop-off into a side channel of Sandia Canyon. A splash pool has formed at the bottom of the drop-off, but little riparian vegetation exists below it. The drainage tapers off in a sandy wash on the north side of East Jemez Road before reaching the main stream channel of Sandia Canyon.

The total area of riparian vegetation associated with Outfall 03A113 is about 0.032 acre (128 m^2). In 1996, the riparian vegetation consisted of 80 percent orchard grass (*Dactylis glomerata* L.), and 20 percent a combination of bluegrass, Canada wild rye, and timothy.

Raccoons and a weasel (*Mustela* sp.) or their sign have been previously sighted near or within the riparian area. Most of the drainage is too steep, inaccessible, and exposed to be utilized by larger mammals.

Since January 1991, Outfall 03A113 has exceeded its NPDES permit limits only once during regularly scheduled inspections: total suspended solids were measured at 210 mg/L (permit limit of 100 mg/L) on March 25, 1993.

Environmental Consequences of Proposed Action

The drainage that Outfall 03A113 discharges into receives stormwater runoff and snowmelt from several large buildings, paved areas, and parking lots located above it. The LEDA program plans to greatly increase cooling tower discharges to this outfall, but it may ultimately be eliminated at a future date. Without the additional water from effluent discharges some of the grasses may be gradually replaced by more drought-tolerant species. The drainage may be utilized by medium-sized animals as a source of drinking water, and these animals may be displaced if Outfall 03A113 is turned off.

OUTFALL No. 12, EPA 03A148

Specific Action

Outfall 03A148 receives cooling tower blowdown associated with TA-3, Building 1498, the Laboratory Data Communications Center (Figure A-4). The cooling tower may be Building 1837, although conflicting information on this is available from different sources. The Proposed Action is to reroute the blowdown to SWSC. This may require excavation of an area up to 40 m^2 (430 ft^2) to a depth of 1.9 m (6 ft). The waste generated by the Proposed Action would be less than 10 m^3 (350 ft^3) of piping, plumbing hardware, and construction rubble.

Current Condition

Outfall 03A148 receives treated cooling water and has an intermittent average flow of 12 gpm. This outfall occurs to the west of Diamond Drive within a highly developed area. Ponderosa pine is the dominant tree, but the surrounding landscape has been greatly modified in the construction of LANL buildings, parking lots, and roads. The discharge channel is 12 m (40 ft) long and has been lined with cobbles until it enters a culvert under Diamond Drive. The drainage also receives runoff from a stormwater pipe that discharges near the culvert. The channel is routed through another culvert to the east of Diamond Drive, but no riparian vegetation occurs on this side of the roadway. Discharges from outfall 03A148 and diverted runoff may eventually reach the head of Sandia Canyon after going subsurface.

The total area of riparian vegetation associated with Outfall 03A148 is about 0.003 acre (12 m^2). In 1996, the riparian vegetation consisted of 80 percent brome (*Bromus* sp.) and 20 percent redtop.

Chain-link fences surround the immediate vicinity of Outfall 03A148, and it is unlikely that animals, other than birds, utilize the drainage as a source of drinking water.

Since January 1991, Outfall 03A148 has exceeded its NPDES permit limits only once during regularly scheduled inspections: phosphorus was measured at 7.7 mg/L (permit limit 5.0 mg/L) on November 19, 1992.

Environmental Consequences of Proposed Action

Although stormwater runoff is piped to discharge at the outfall's point of discharge, Outfall 03A148 discharges are insignificant when compared to other water sources that ultimately feed into upper Sandia Canyon. Elimination of the outfall's effluent discharges may cause the small band of grasses along the upper channel to die-off and be replaced with more drought-tolerant species. Animals would not be significantly affected by effluent elimination because the area is unutilized due to surrounding security fences, road traffic, and urbanization.

OUTFALL No. 13, EPA 03A181

Specific Action

Outfall 03A181 is permitted for cooling water and receives effluent from TA-55 (Plutonium Facility), Building 6, a cooling tower (Figure A-5). The Proposed Action is to reroute the blowdown to SWSC if the volume is small enough. If the volume is too large to be sent to SWSC, the cooling tower would be replaced with a mechnical refrigeration unit or a recirculation system. The waste generated by the Proposed Action would be less than 10 m^3 (350 ft^3) of piping, plumbing hardware, and construction rubble. The outfall pipe may be removed, requiring excavation of about 180 m^2 (1,900 ft^2) to a depth of about 1.8 m (6 ft). If the pipe is removed, the additional waste generated would be about 100 m^3 (3,500 ft^3) of soil, asphalt, and other cover material.

Current Condition

Outfall 03A181 receives treated cooling water intermittently and frequently, averaging 27 gpm. Several drainages occur behind Building 6 at TA-55 (plutonium facilities building) and may contribute to the riparian vegetation below the outfall. Effluent from Outfall 03A181 is discharged through a large culvert and then flows 3.5 m (12 ft) across a paved road, 7.5 m (25 ft) across bedrock with small clumps of hydrophytes, and through a 7.5-m (25-ft) area of clumped grasses and a single Russian olive before entering a ditch. This steep-sided ditch is 2.5 m (8 ft) deep at its maximum and runs for 16.5 m (55 ft), ending at a 18-m (60-ft) drop-off into Mortandad Canyon, where the water goes subsurface.

The drainage continues down the southern slope of Mortandad Canyon with little vegetation in the channel. The overstory consists of large Douglas-fir, mature ponderosa pine, and small Gambel oak. Once the canyon bottom is reached, the drainage rapidly expands to a 26-m- (85-ft-)wide grassy expanse when it merges with the stream channel in the center of Mortandad Canyon. The stream channel supports a narrow, but thick, growth of cattails intermixed with scattered clumps of blue-stem willow (*Salix irrorata* Anderss.) and patches of rush and redtop along its sides. This vegetative community extends for 142 m (467 ft) below and 151.5 m (497 ft) above the confluence with the Outfall 03A181 drainage.

The total area of riparian vegetation associated with Outfall 03A181 is about 0.777 acre (3,700 m^2). In 1996, the riparian vegetation consisted of 60 percent cattail, 25 percent rush, 10 percent

redtop and 5 percent a combination of muttongrass, western wheatgrass, nodding brome, and *Bromus sterilis* L. (poverty brome).

Elk, mule deer, and birds or their sign have been previously sighted near the riparian area associated with Outfall 03A181. Long-tailed vole (*Microtus longicaudus*), Mexican woodrat (*Neotoma mexicana*), brush mouse (*Peromyscus boylei*), and deer mouse (*Peromyscus maniculatus*) have been captured in this area during small mammal trapping sessions.

Since January 1991, Outfall 03A181 has never exceeded its NPDES permit limits during regularly scheduled inspections.

Environmental Consequences of Proposed Action

Elimination of effluent discharges through Outfall 03A181 may have significant effects on plants and animals in the area, especially if all effluent discharges within Mortandad Canyon are eliminated. Many of the riparian plants, including cattails, and rushes, would be expected to die-off and be replaced by more drought tolerant upland species. Medium and large mammals may be able to find alternative watering sources, but small-mammal populations would be expected to relocate within the canyon or die-off.

OUTFALL No. 14, EPA 04A016

Specific Action

Outfall 04A016 is permitted for once-through cooling water from TA-48, Building 1 (Figure A-5). Previously, this outfall received once-through cooling water from a magnet cooling loop and a laser cooling loop. The laser project ended and was removed, leaving only the magnet cooling discharge. The building has a recirculating cooling system; the Proposed Action includes connecting the magnet cooling water to the existing recirculating water loop, disconnecting the once-through cooling loop, and capping the drain to the outfall. Waste generated by the Proposed Action would be about 30 m (100 ft) of 1 in. copper pipe.

Current Condition

Outfall 04A016 discharges noncontact cooling water in a continuous flow, which averages 12 gpm. The point of discharge occurs near the southern rim of Mortandad Canyon in an area of ponderosa pine and Douglas-fir . A natural drainage carries the water down the relatively steep slope for 36.5 m (120 ft) and then flattens out in the canyon bottom. After another 27.5 m (90 ft), this side drainage joins the stream channel in the center of Mortandad Canyon.

The total area of riparian vegetation associated with Outfall 04A016 is about 1.200 acres (5,108 m^2). Most of this vegetation occurs along the main canyon stream channel, both above and below the confluence with the outfall drainage. Discontinuous clumps of cattails and willow less than 4 ft (1.2 m) tall grow along the channel that is bordered by rushes and grasses. In 1996, the riparian vegetation consisted of 50 percent rush, 25 percent cattail, 15 percent coyote willow, 5 percent redtop, and 5 percent other grasses.

Elk, raccoons, squirrels, and rabbits (*Sylvilagus* spp.) or their sign have previously been sighted within this section of Mortandad Canyon. Long-tailed vole (*Microtus longicaudus*), Mexican woodrat

(*Neotoma mexicana*), brush mouse (*Peromyscus boylei*), and deer mouse (*Peromyscus maniculatus*) have been captured in this area during small mammal trapping sessions.

Since January 1991, Outfall 04A016 has never exceeded its NPDES permit limits during regularly scheduled inspections.

Environmental Consequences of Proposed Action

Many effluent discharges from TA-48 in the same general vicinity of Mortandad Canyon as Outfall 04A016 have been eliminated, including those from Outfalls 04A126, 04A131, 04A137, and 04A152. The riparian vegetation associated with the lower drainage of Outfall 04A016 established itself and occupied its current distribution during times of greatly increased water availability. Elimination of this outfall's effluent discharges would probably accelerate the die-off and replacement of the remaining riparian community with more drought resistant species. However, runoff and snowmelt from the upper watershed would be expected to maintain pockets of riparian vegetation within Mortandad Canyon. Large- and medium-sized mammals would be displaced by effluent elimination at Outfall 04A016 and local communities of small mammals may die-off if they could not find alternative sources of water.

OUTFALL No. 15, EPA 04A083

Specific Action

The original flow to Outfall 04A083 was from a once-through cooling system for a piece of welding equipment and some vacuum pumps at TA-16, Building 202 (Figure A-3). The vacuum pumps may have been eliminated and the welder is only used sporadically so the effluent is supplemented by potable water (flow about 0.5 gpm) in order to maintain the wetland. The outfall also receives stormwater from 16 roof drains. The Proposed Action is to cease flow of the once-through cooling water, install an above floor sump pump unit, and re-route the flow to the sanitary sewer system or install a recirculation system. One interior concrete wall penetration at ceiling level would be required. The waste generated by the Proposed Action would be 6.1 m (20 ft) of 1 in. PVC pipe.

Current Condition

The permitted water source at Outfall 04A083 has not discharged for the last 2 or 3 years, but another source (presumed to be a steam condensate leak) supplied continuous water until approximately August 1995. Currently, an alternate continuous source of potable water is provided at the rate of less than 1 gpm.

The entire drainage has been trenched and is completely filled with vegetation. The first 15 m (50 ft) below Outfall 04A083's point of discharge supports a thick cluster of cattails. The channel continues for another 15 m (50 ft) between two fences and then beside a paved road for approximately 61 m (200 ft). A stand of cattails grows along the road for 23 m (75 ft). Another trench to the south runs approximately 79 m (260 ft) with intermixed redtop and smooth brome growing in the channel. The two trenches meet at a culvert under the paved road.

The total area of riparian vegetation associated with Outfall 04A083 is about 0.360 acre (1,470 m^2). In 1995, the riparian vegetation consisted of 70 percent redtop, 20 percent nodding brome,

5 percent cattail, and 5 percent a combination of timothy, coyote willow, inland rush, Canada wild rye, bluebunch wheatgrass (*Agropyron spicatum* Pursh), and meadow sedge (*Carex microptera* Mackenzie).

Mice and mule deer or their sign have been previously sighted near the wetland associated with Outfall 04A083. A resident elk herd occurs in the general vicinity, but these animals are usually found on the other side of a chain-link fence, which discourages elk from using the outfall discharges as a source of water. Potential wildlife watering usage is also limited by the nearness of the drainage to paved roads and a corresponding lack of cover.

Since January 1991, Outfall 04A083 has never exceeded its NPDES permit levels during regularly scheduled inspections.

Environmental Consequences of Proposed Action

Outfall 04A083 discharges into a low area that receives runoff and snowmelt from natural features and nearby buildings, roads, and parking lots. Stormwater runoff is also piped to discharge at the outfall's point of discharge. These additional water sources are expected to provide some moisture to the established riparian vegetation, especially in the upper grassy area. Under these conditions, the redtop (FACW) and nodding brome (UPL) may persist indefinitely. This area does not appear to have been a significant wildlife watering usage area, and effluent elimination will probably not significantly displace wildlife.

OUTFALL No. 16, EPA 04A094

Specific Action

Outfall 04A094 receives effluent from TA-3, Building 170 (Figure A-4). Sources of the effluent are reverse osmosis equipment backflush, and once-through cooling water from a compressor. The Proposed Action is to install a recirculating cooling loop, which may require one interior wall penetration. The waste generated by the Proposed Action would be less than 30 m (100 ft) of 1-1/2 in. diameter pipe.

Current Condition

Outfall 04A094 receives noncontact cooling water in a continuous flow, which averages 1 gpm. The outfall occurs within a highly disturbed area of chamisa (*Chrysothamnus nauseosus* [Pallas ex Pursh] Britt.) and scattered Russian olive. The drainage is a 9-m- (30-ft-) long stream channel filled with cattails before combining with a larger channel that carries runoff from the south. The larger stream channel was previously supported by effluent discharges from an upper outfall that has been eliminated. The combined drainage extends for 9 m (30 ft), and then enters an unvegetated trench cut into the tuff.

The total area of riparian vegetation associated with Outfall 04A094 was measured at about 0.030 acre (124 m^2), but has decreased recently due to decreased water. In 1996, the riparian vegetation consisted of 60 percent cattail, 25 percent rush, and 15 percent sedge.

In the past, aquatic invertebrates were noted within the outfall drainage. Elk have recently increased in nearby Sandia Canyon, and their sign (scat and browsed Russian olives) are found in the general vicinity.

Since January 1991, Outfall 04A094 has never exceeded its NPDES permit limits during regularly scheduled inspections.

Environmental Consequences of Proposed Action

Elimination of effluent discharges at Outfall 04A094 would cause most, if not all, of the associated riparian vegetation to die-off and be replaced with upland species. Effluent elimination would probably have minimal effects on local wildlife. Although elk are found in the general area, they do not appear to use the outfall drainage as a source of drinking water.

OUTFALL No. 17, 04A115

Specific Action

Outfall 04A115 is permitted to receive once-through cooling water from TA-8, Building 70 (Figure A-3). The Proposed Action is to replace the once-through cooling water system with a recirculation system, which may require interior wall penetrations. The waste generated by the Proposed Action would be less than 10 m^3 (350 ft^3) of piping, plumbing hardware, and construction rubble.

Current Condition

Outfall 04A115 receives treated cooling water. A small cluster of medium-sized (4.5 m or 15 ft) tall coyote willow grows near the discharge pipe, which is 4.5 m (15 ft) south of a larger channel. The wetland associated with Outfall 04A115 extends above the outfall for 52 m (170 ft). Several grasses and hydrophytes occur at the intersection with the channel that carries effluent discharges from outfall 06A074 as well as precipitation runoff and snowmelt. Clumps of rush grow along the drainage, and the riparian vegetation is 7.5 m (25 ft) wide at its maximum. Another drainage joins the channel at a culvert under west road, 36.5 m (120 ft) downstream. The narrow (0.3-m or 1-ft-wide) channel continues for an additional 122 m (440 ft) to the east of West Road, with a margin of grasses and rushes bordering it. The riparian vegetation ends in a small canyon with a substrate of rock and sand, 7.5 m (25 ft) below a firebreak.

The total area of riparian vegetation associated with Outfall 94A115 is .087 acres (353 m^2). In 1996, this vegetation consisted of 55 percent dropseed (*Sporobolus* sp.), 35 percent rush, 5 percent fescue (*Festuca* sp.), and 5 percent a combination of dandelion (*Taraxacum officinale* G. H. Weber *ex* Wiggens), heartleaf bittercress (*Cardamine cordifolia* Gray), thistle, cattail, poison ivy (*Toxicodendron radicans* [L.] Kuntze, syn. *Rhus radicans*), mountain muhly, coyote willow, and meadow rue (*Thalictrum fendleri* Engelm. ex Gray).

Abundant elk sign have ben observed near Outfall 04A115. Bear (*Ursus americanus*) scat and aquatic invertebrates have also been observed.

Since January 1991, Outfall 04A115 has not exceeded its NPDES permit limits during regularly scheduled inspections.

Environmental Consequences of Proposed Action

Outfall 04A115 carries stormwater runoff from roof drains and receives runoff and snowmelt from several smaller contributory channels. Elimination of effluent flows may cause the die-off of riparian vegetation and replacement by more drought resistant species. The outfall may be used as a wildlife watering source, and resident animals may need to relocate to other reliable water sources located in the general vicinity.

OUTFALL No. 18, EPA 04A127

Specific Action

There are four stormwater drains that discharge effluent from the roof through Outfall 04A127, which is permitted to receive once-through cooling water from TA-35, Building 213, the Target Fabrication Building (Figure A-5). One of these drains also receives overflow discharge from the cooling tower on the east side of the roof of the building. The building also has a closed-loop system that may discharge at times through this outfall. Additional investigation is needed to determine the source of the effluent for Outfall 04A127, which often appears to discharge continuously. A recirculation system may be installed under the Proposed Action. The waste generated would be about 10 m^3 (350 ft^3) of piping, plumbing hardware, and construction debris.

Current Condition

Outfall 04A127 receives treated cooling water in an intermittent flow, which averages 12 gpm. The discharge pipe is apparently buried in sediments beneath a large blue-stem willow whose litter excludes understory plants below it. A patch of smaller sickly willows occurs immediately to the west of the drainage. Outfall 04A127 occurs in an area of Douglas-fir, Gambel oak, and ponderosa pine. Discharges flow 7.5 m (25 ft) toward the southern canyon rim, and then over a precipitous 6-m (20-ft) drop-off into Mortandad Canyon. The poorly defined drainage passes over moss-covered rocks and through a patch of cliffbush (*Jamesia americana* Torr. & Grey) for 24 m (80 ft). A 4.5-m- (15-ft-) long patch of blue-stem willow occur above and along a dirt road through the canyon. The drainage dwindles out in an unvegetated 0.3-m (1-ft)-wide channel cut along the road's south side, but large flows would eventually reach a stream in the center of Mortandad Canyon.

The total area of riparian vegetation associated with Outfall 04A127 is 0.040 acre (177 m^2). In 1996, this vegetation consisted of 85 percent blue-stem willow, 10 percent muttongrass, and 5 percent a combination of cattail, dropseed, and several young grasses.

Lizards and squirrels have been seen near the point of discharge, but medium- and large-sized mammals do not appear to use it as a water source.

Since January 1991, Outfall 04A127 has not exceeded its NPDES permit limits during regularly scheduled inspections, but it did exceed the New Mexico stream standard of 1 ppm of chlorine on April 19, 1996.

Environmental Consequences of Proposed Action

Outfall 04A127 carries both effluent and stormwater runoff. Elimination of the effluent flows may cause the upper willows and cattails to die-off and be replaced by more drought tolerant upland vegetation. The lower stand of willows may persist due to the topography, which funnels diverted and natural runoff to them. The outfall does not appear to be used as a wildlife watering source, and resident animals will probably not be directly significantly affected by effluent elimination. However, effluent eliminations at other outfalls discharging into Mortandad Canyon would be expected to change watering patterns throughout the canyon.

OUTFALL No. 19, EPA 04A153

Specific Action

Outfall 04A153 was originally permitted for a boiler condensate feed tank discharge to a basement floor drain (BFS18) at TA-48, Building 1 (Figure A-5). At one time the outfall also received discharge from a small roof-mounted cooling tower. The cooling tower was disconnected and abandoned in place several years ago. Five roof drains discharge through Outfall 04A153. The Proposed Action includes rerouting the treated boiler condensate (200 gallons per day) to the sanitary sewer system and plugging floor drain BFD18. The waste generated by the Proposed Action would be 4.6 m (15 ft) of 1-1/2 in. black steel pipe. Stormwater from the roof drains would continue to be discharged through the outfall.

Current Condition

Outfall 04A153 has a continuous flow, averaging 6 gpm. After 24 m (80 ft), the discharges merge with those of Outfall 03A045 to support a thick cattail marsh, but most of the water appears to originate from 04A153. The margins of the wetland contain ponderosa pine, and several dead pine occur in the center of the marsh. The marsh area occupies 30.5 m (100 ft) at its maximum width near two precipitous 6-m (20-ft) drop-offs into Mortandad Canyon.

The total area of riparian vegetation associated with Outfall 04A153 is about 0.290 acre (1,169 m^2). In 1995, this vegetation consisted of 50 percent cattail, 30 percent redtop, 10 percent inland rush, and 10 percent a combination Canada wild rye, mullein, little bluestem, Thurber fescue, and sedge.

Mule deer, red-winged blackbirds (*Agelaius phoeniceus*), chipmunks, and squirrels have been previously sighted near Outfall 04A153.

Since January 1991, Outfall 04A153 has never exceeded any NPDES permit level during regularly scheduled inspections.

Environmental Consequences of Proposed Action

Coupled with the previous elimination of cooling water in the area, discontinuation of effluent flows to Outfalls 03A045 and 04A153 would seriously affect the downstream riparian vegetation, even though stormwater is piped to discharge at the outfall's point of discharge. The two predominant riparian plant species (cattail and red top) in the associated wetlands are classified as obligate or facultative wet species and would likely die-off and be replaced by more drought resistant vegetation if

the outfalls' effluent discharges are eliminated. This area has not been significantly utilized by wildlife and effluent eliminations would probably have minimal effects on large species.

OUTFALL No. 20, EPA 04A157

Specific Action

Outfall 04A157 is permitted for once-through cooling water from a vacuum pump in TA-16, Building 460 (Figure A-3). The outlet pipe for 04A157 is not far from the outlet pipe for 05A072, which also receives effluent from Building 460. Outfall 05A072 has not discharged effluent for several years. There is also a third outlet pipe in the same area as 04A157 and 05A072. The Proposed Action would connect the three pipes that are near each other into a common line and route the effluent (100-200 gallons per day) to a nearby sanitary sewer manhole. All work would occur outside the building. Exterior excavation in a SWMU (SWMU No. 16-026[v]) may be required. The SWMU has been sampled and is being recommended for No Further Action. The excavation site, at the south-east part of Building 460, would be approximately 74 m^2 (800 ft^2) at an approximate depth of 1.8 m (6 ft) in a previously disturbed area. The rerouting would require up to 12 m (40 ft) of 4 in. cast iron or PVC pipe and up to 24 m (80 ft) of 6 in. cast iron or PVC pipe. The existing pipes would not be removed. The waste generated by the Proposed Action would be up to 60 m^3 (2,200 ft^3) of soil and other cover material.

Current Condition

Outfall 04A157 receives noncontact cooling water, but it combines with HE effluent from Outfall 05A072 at the point of discharge. (Outfall 05A072 has not discharged for the last 2 or 3 years, and its flow was sporadic prior to that.) The discharges have cut a meandering stream channel about 0.5 m (1.5 ft) deep and 1.2 m (4 ft) wide. Cattails dominate the upper shaded area, while grasses predominate in a lower open meadow. Scattered clumps of ponderosa pine occur in all sections. The channel has a sandy substrate with raw areas on its sides, and it may have been trenched at one time.

The total area of riparian vegetation associated with Outfall 04A157 is about 0.370 acre (1,477 m^2). In 1995, the riparian vegetation below this outfall consisted of 70 percent redtop, 10 percent timothy, 10 percent cattail, 5 percent inland bluegrass (*Poa interior* Rydb.), and 5 percent a combination of barnyard grass and Rocky Mountain sedge (*Carex occidentalis*? Bailey).

The lower meadow is heavily used year-round by a herd of resident elk. Elk, mule deer, coyote, gophers (*Thomomys talpoides*), and squirrels have been sighted near the wetland. Deer mouse and long-tailed vole have been captured during small mammal trapping sessions in the area. Twelve taxa of aquatic insects have been collected within the wetlands area, but all of the taxa were stress tolerant varieties.

Since January 1991, Outfall 04A157 has never exceeded its NPDES permit levels during regularly scheduled inspections.

Environmental Consequences of Proposed Action

Outfall 04A157 is the major contributor to the wetland area below it, although drainage from the open meadow contributes storm runoff and snowmelt. Elimination of effluent at Outfall 04A157 would be expected to result in the die-off and replacement of some redtop and all cattails currently found near

the drainage channel. The removal of a reliable water source for elk and other resident mammals may significantly affect the habits of these animals. Populations of small mammals may not be able to find alternative sources of water and die-off.

OUTFALL No. 21, EPA 06A073

Specific Action

Outfall 06A073 is permitted for photo rinse water from TA-16, Building 222 (Figure A-3). The Proposed Action is to reroute effluent to SWSC. Hooking up to the existing sanitary sewer pipe would require excavation of an area of less than 75 m^2 (800 ft^2) to a depth of 1.8 m (6 ft). The waste generated by the Proposed Action would be less than 60 m^3 (2,200 ft^3) of piping, plumbing hardware, and construction rubble. The outfall pipe may be removed, requiring excavation of about 120 m^2 (1,900 ft^2) to a depth of about 1.8 m (6 ft). If the pipe is removed, the additional waste generated would be about 72 m^3 (2,500 ft^3) of soil, asphalt, and other cover material.

Current Condition

Outfall 06A073 receives photographic rinse water, averaging 2 gpm. The outfall discharges continuously and an unpermitted effluent source is suspected. Surrounding overstory vegetation consists of mature ponderosa pine and some Gambel oak. The upper drainage supports a swathe of grasses to 1.8 m (6 ft) wide, but this rapidly narrows downslope. The channel is 26 m (86 ft) long and becomes 0.5 m (1.5 ft) deep and 0.9 m (3 ft) wide at its lower end.

The total area of riparian vegetation associated with Outfall 06A073 is 0.025 acre (101 m^2), although almost all vegetation is comprised of upland species. In 1996, the riparian vegetation consisted of 90 percent muttongrass, 5 percent an unknown herbaceous plant, and 5 percent a combination of thistle and rush.

Mule deer, aquatic invertebrates, and a single chorus frog (*Pseudacris triseriata*) have been seen in or near the outfall's drainage.

Since January 1991, Outfall 06A073 has never exceeded its NPDES permit limits during regularly scheduled inspections.

Environmental Consequences of Proposed Action

Outfall 06A073 receives no stormwater diversions, and the landscape does not funnel much precipitation or snowmelt runoff into the drainage. The area below the outfall has not developed vegetation characteristic of wetlands, but the grasses present would probably die back if effluents are eliminated. Mule deer use the shaded drainage area and would probably have to find alternative water sources once the outfall is shut off.

OUTFALL No. 22, EPA No. 06A074

Specific Action

Outfall 06A074 is permitted for photo rinse water, which originates from three photo processing areas in two rooms at TA-8, Building 22 (Figure A-3). The Proposed Action is to reroute an existing single, 4 in. PVC waste line (at ceiling level) to an existing duplex sump pump in the basement. Effluent from the sump pump (200–300 gallons per day) would enter the sanitary sewer system. No wall penetrations would be required. The waste generated by the Proposed Action would be about 4.6 m (15 ft) of 4 in. PVC pipe.

Current Condition

Outfall 06A074 receives photographic rinse water, and its average flow is 4 gpm. The frequency and duration of discharges are dependent on photo processing operations. The discharge pipe is currently within a grove of small Gambel's oak with surrounding ponderosa pine, but an upper trench area that supports a 1-m- (3-ft-) wide ribbon of riparian grasses was included in the vegetation survey. The channel has been trenched to 0.6 m (2 ft) deep and 1 m (3 ft) wide for 7.5 m (25 ft). The total length of the drainage is 26 m (85 ft).

The total area of riparian vegetation associated with Outfall 06A074 is about 0.020 acre (94 m^2). In 1995, the riparian vegetation consisted of 60 percent redtop, 35 percent dropseed, 10 percent muttongrass, and 5 percent a combination of mountain muhly (*Muhlenbergia montana* [Nutt.] A. S. Hitchc.), pine dropseed, Arizona three-awn (*Aristida arizonica* Vasey), and Wood's rose (*Rosa woodsii* Lindl.).

Elk or their sign have been previously sighted near the outfall and appear to heavily use the area. Aquatic insects, including damselfly adults and mosquito larvae, have been seen in or near the drainage.

Since January 1991, Outfall 06A074 has exceeded its NPDES permit limits only once during regularly scheduled inspections: on October 6, 1993, cyanide in the water was measured at 0.35 mg/L when the permit was 0.2 mg/L.

Environmental Consequences of Proposed Action

The trench above the current point of discharge may channel runoff from a small building and parking area to the drainage. Elimination of effluent discharges from this outfall may result in the die-off and replacement of riparian vegetation by upland species. Elk cross the area on well-used game trails and bed in an adjacent meadow. Outfall elimination could cause them to relocate to other areas with reliable drinking water.

OUTFALL No. 23, EPA 06A075

Specific Action

Outfall 06A075 was permitted for photo rinse waste at TA-8, Building 21 (Figure A-3), but the photo lab operations at this building have been stopped, and the laboratory has been remodeled for use as

office space. The Proposed Action is to disconnect the sources to a drain and then plug the drain. The waste generated by the Proposed Action would be 12 m (40 ft) of 3/4 in. to 1 in. pipe.

Current Condition

The discharges from Outfall 06A075 flow to the east of Anchor Ranch Road. A thick band of cattails grow in the channel for 40 m (130 ft). Several Gambel oak and ponderosa pine and small Gambel oak grow near the stream, which ends in an open meadow.

The total area of riparian vegetation associated with Outfall 06A075 is about 0.191 acre (774 m^2). In 1995, the riparian vegetation consisted of 60 percent cattail, 30 percent redtop, and 10 percent a combination of Canada wild rye, Junegrass *(Koeleria macrantha* [Ledeb.] J. A. Schultes, syn. *Koeleria macrantha* [Ledeb.] J. A. Schultes), Wood's rose), and tall wheatgrass (*Elymus elongata* [Host] Runemark, syn. *Elymus elongatus*, *Agropyron elongatus*).

Mule deer, squirrels, and coyote or their sign have been previously sighted near the wetlands area. The vicinity supports numerous resident elk, which are frequently sighted near the drainage below Outfall 06A075.

Since January 1991, Outfall 06A075 has never exceeded its NPDES permit limits during regularly scheduled inspections.

Environmental Consequences of Proposed Action

Elimination of effluent discharges through Outfall 06A075 would probably trigger the partial or complete replacement of cattails and redtop by upland species. The other grasses within the riparian are upland species and should persist if effluent discharges at this outfall are eliminated. The resident elk population may be displaced by shutting off the outfall because the associated wetland is a frequently used area.

OUTFALL No. 24, EPA 06A123

Specific Action

Outfall 06A123 is permitted for photo rinse water from TA-15, Building 183, where X-ray images from PHERMEX (Pulse High Energy Radiation Machine Emitting X-Rays) are processed. The Proposed Action is to remove two sinks. Effluents would be rerouted to SWSC. Hooking up to the existing sanitary sewer pipe would require excavation of an area of less than 75 m^2 (800 ft^2) to a depth of 1.8 m (6 ft) and may require interior wall penetrations. The waste generated by the Proposed Action would be less than 60 m^3 (2,200 ft^3) of piping, plumbing hardware, and construction rubble. The outfall pipe may be removed, requiring excavation of about 240 m^2 (2,600 ft^2) to a depth of about 1.8 m (6 ft). If the pipe is removed, the additional waste generated would be about 140 m^3 (4,900 ft^3) of soil and other cover material.

Current Condition

Outfall 06A123 receives photographic rinse water, averaging 3 gpm. The surrounding overstory consists of ponderosa pine and small Gambel oak. The drainage used to be a well-defined channel

supporting cattail, but construction activities during 1996 filled the channel with loose fill, eliminating the cattails. The drainage currently runs for only 9 m (30 ft) with a narrow surrounding band of grass. Water stagnates in several pools within a construction area and no longer reaches the rim of Cañon de Valle.

The total area of riparian vegetation associated with Outfall 06A123 was 0.040 acre (162 m^2) before construction activity and tree cutting eliminated most of it. In 1996, the remaining riparian vegetation consisted of 95 percent muttongrass and 5 percent cattails. Elk, mule deer, and coyote or their sign have been previously sighted in the area.

Since January 1991, Outfall 06A123 has exceeded its NPDES permit limits once during regularly scheduled inspections: on March 15, 1994, cyanide was measured at 0.37 mg/L when the permit limit was 0.2 mg/L.

Environmental Consequences of Proposed Action

Construction activities and tree cutting have recently altered or destroyed most of the wetland formerly associated with Outfall 06A123. Elimination of effluent discharges would probably cause some of the remaining grasses to die-off. The future extent of large mammal usage in the highly disturbed area (two new buildings near the point of discharge are undergoing construction) is unknown, but the present drainage does not provide a good watering source.

OUTFALL No. 25, EPA 06A132

Specific Action

Outfall 06A132 is permitted for photo rinse water from TA-35, Building 87 (Figure A-5). The photo lab is located in a portion of the building added on to the original structure. Three floor drains and three sink drains were tied into an existing storm drain line at the time of construction. Currently, photo rinsing operations generate approximately 4–6 gpm of rinse water during the normal 8:00 a.m. to 5:00 p.m. day. The Proposed Action is to make a floor cut of 1.9 m^2 (20 ft^2) and excavate about 0.9 m (3 ft) deep inside the building and install modifications that would decrease the amount of effluent. The waste line from the photo lab would be disconnected from the storm drain and reconnected to an adjacent sewer line. The Proposed Action would generate 3 m (10 ft) of 4 in. cast iron pipe.

Current Condition

Outfall 06A132 receives photographic rinse water, and the frequency and duration of discharges are dependent on photo processing operations. The average flow through the outfall is 9 gpm. Outfall 06A132 discharges onto a steep slope onto bare rock, broken asphalt, and discarded concrete barriers. The surrounding area has an overstory of wavyleaf oak (*Quercus undulata* Torr.), pinyon pine, and ponderosa pine. The drainage runs downslope 40.5 m (140 ft) with scattered riparian grasses growing along the channel. Once it reaches the floor of Mortandad Canyon, the channel continues for an additional 15 m (50 ft) beneath ponderosa pine and some Russian olive. The riparian vegetation ends 15 m (50 ft) before the confluence with the main channel in the center of Mortandad Canyon.

The total area of riparian vegetation associated with Outfall 06A132 is about 0.140 acre (577 m^2). In 1996, the riparian understory consisted of 65 percent muttongrass, 25 percent brome grass, 5 percent redtop, and 5 percent a combination of fescue and thistle.

A porcupine (*Erethizon dorsatum*) was seen in a nearby ponderosa pine during the 1996 vegetation survey, but few wildlife or their sign have been previously sighted near Outfall 06A132 probably due to the surrounding rugged terrain.

Since January 1991, Outfall 06A132 has exceeded its NPDES permit limits only once during regularly scheduled inspections: on December 21, 1992, cyanide in the water was measured at 0.46 mg/L when the permit level was 0.2 mg/L.

Environmental Consequences of Proposed Action

Elimination of effluent discharges through Outfall 06A132 will probably not significantly affect either local riparian plants or large animals. Stormwater runoff is also piped to discharge at the outfall's point of discharge and the natural drainage collects runoff from the surrounding hillside. The outfall supports only discontinuous patches of riparian grasses and the well-established Russian olives in the lower drainage. Discharges from Outfall 06A132 do not appear to be used by many medium- or large-sized animals for drinking water, although the lower area would seemingly provide a good source.

OUTFALL No. 26

Specific Action

Outfall No. 26 was observed to be discharging effluent but it is unpermitted. The source appears to be inside TA-3, Building 1698, the Materials Science Laboratory (Figure A-4). The Proposed Action is to identify the source of the effluent and design and implement corrective actions.

Current Condition

Outfall No. 26 discharges through a large pipe at the head of a ravine east of Diamond Drive. The source and average flow of these discharges are unknown. The ravine has an overstory of ponderosa pine and small Gambel oak. The drainage below the outfall supports a 0.9-m (3-ft) swathe of grasses for 29 m (75 ft) until flows from a large stormwater drain merge with the effluent drainage. The normally dry channel has been cut to 1.2 m (4 ft) deep and has a substrate of sand and small rocks. The drainage continues for another 26 m (85 ft) as the grassy area widens to 1.5 m (5 ft) and the ravine deepens to 6 m (20 ft). All vegetation in the bottom of the ravine abruptly ends at a rocky area located 20 m (65 ft) up-canyon from Outfall 03A021.

In 1996, the riparian vegetation consisted of 85 percent Brome grass, and 15 percent a combination of muttongrass, Orchard grass (*Dactylis glomerata* L.), western white clematis (*Clematis ligusticifolia* Nutt.), thistle, sedge, and bottlebrush squirreltail.

Environmental Consequences of Proposed Action

The drainage below Outfall No. 26 receives stormwater discharges, natural runoff and snowmelt. A true wetlands area has not developed in the upper ravine, and these additional water sources may

maintain the present vegetation, at least temporarily. Animals do not appear to use the ravine for watering, probably due to its steep sides and the surrounding developments.

OUTFALL No. 27

Specific Action

Outfall No. 27 is effluent coming from a malfunctioning valve in a pipe carrying steam condensate blowdown water servicing TA-43, Building 1, the Health Research Laboratory (Figure A-4). The steam comes from the Steam Power Plant, Building 22 in TA-3. The effluent is leaking into the environment near a road and parking lost west of TA-43, Building 1. The proposed action is to turn off the steam, excavate near the leak, replace the valve [approximate diameter 0.05 m (2 in.)], and replace the dirt and resume operations with the steam flowing through the pipe. The excavation area would be about 2 m (7 ft) x 2 m (7 ft) to a depth of 2 m (7 ft). The waste generated by the Proposed Action would be the old valve plus about 4 m^3 (140 ft^3) of soil, which would be disposed of at the Los Alamos County Landfill.

Current Condition

Outfall No. 27 receives steam condensate discharges flowing at less than 10 gpm. The only nearby trees are Siberian elm and ponderosa pine. Discharges join a small channel created by Outfall 03A040 and diverted runoff at a culvert passing under a paved road. The lower stream channel runs for 17 m (55 ft) before dropping into Los Alamos Canyon at an angle of about 40°. This section of the drainage once received intermittent flows from Outfall 03A180 whose effluent is currently discharged to the sanitary system.

The total area of riparian vegetation associated with Outfall 03A040 is about 0.030 acre (118 m^2). In 1995, the riparian vegetation below this outfall consisted of 70 percent smooth brome, 15 percent redtop, 10 percent Canada wild rye, and 5 percent fringed brome. The lateness of the year prohibited a positive identification of smooth brome because the seed heads had fallen off. A garter snake and raccoon sign have previously been sighted in this drainage, but no sightings or sign of large mammals have been recorded from this wetland.

Environmental Consequences of Proposed Action

Smooth brome is an upland grass, and this species (if correctly identified) should persist along the drainage once effluent discharges at Outfall No. 27 and Outfall 03A040 are eliminated. The redtop may die-off and be replaced by more drought-tolerant species, but the other vegetation would probably remain in place. Stormwater runoff may be sufficient to maintain the entire vegetation community indefinitely, and stormwater runoff is also piped to discharge at the Outfall 03A040's point of discharge. Animals do not appear to rely on the drainage for drinking water, and local wildlife would probably not be significantly affected by elimination of the outfall's effluent discharges.