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Limitations of Conventional Solid Waste Management on Indian Reservations

In 1836, the Menominees ceded, through the Treaty of the Cedars, some 3 million acres of the land. Governor Dodge of Wisconsin was a party to the negotiations. And after the negotiations, after the treaty, he gave to Chief Oshkosh a top hat and formal coat. Chief Oshkosh would wear that coat and hat over his long hair and buckskins and his wampum. And he would say to his friends "Don't I look silly? This is the way white man's laws fit Indian people" As we look at RCRA, we may take into consideration Chief Oshkosh's comments. Now, I have done my solid waste management work with Indian people in remote rural areas. I question whether or not RCRA, as it is currently configured, makes any sense at all...

-Mervyn Tano, Council of Energy Resource Tribes¹

Conventional solid waste management (CSWM) engineering, as described in Chapter 2, is the prevalent theory and practice of waste handling applied in the U.S., and many other countries. CSWM is based fundamentally on several inherent assumptions about the "conventional community" to which it is applied. Namely, the community must have typical western-industrialized community characteristics that, in turn, affect the availability, logistics, and performance of SWM strategies. For example, successful operation of a MRF requires processing equipment, adequate roads and workable transfer system (or a mobile public), and skilled personnel and infrastructure to carry it out. The community must also have conventional governmental authority and influence to implement and oversee fully SWM regulations and activities. As examined in detail in later chapters, Indian tribes do not fit such a description, so employment of CSWM can be inappropriate in a variety of situations.

To examine the general status of SWM on Indian Reservations, and introduce ways in which application of CSWM engineering can be limited, the following sections are included.

- (1) Application of CSWM on Indian Reservations
- (2) Pervasiveness of Unsound SWD Problems on Indian Reservations
- (3) Limitations in CSWM Approach
- (4) Chapter Conclusions

3.1 APPLICATION OF CSWM ON INDIAN LANDS

CSWM is broadly applied on Indian reservations for several reasons. First, Indian tribes are subject to the Resource, Conservation and Recovery Act (RCRA)², as well as all other major federal environmental laws³. RCRA recommendations and requirements, such as SWM program capabilities, are based on, or call for, CSWM provisions. Second, available SWM documentation and training is based on, and hence, promotes CSWM. With few exceptions⁴, literature and training targeted to

tribes based on tribal SWM situations is not available⁵, largely because the SWD situation on Indian Reservations has not been studied⁶, and populations are small relative to conventional communities⁷. Neither is there a significant volume of work on SWM in rural regions in general, where the vast bulk of tribes reside⁸. As a result, educational and training materials distributed to tribes are based on conventional urban demographics, resources, and economic capabilities⁹. Last, professional consultants and governmental agencies, as well as many, if not most tribal SWM personnel, are prone to use CSWM strategies because they are trained using CSWM principles and procedures.

3.2 PERVASIVENESS OF SWD PROBLEMS IN INDIAN COUNTRY

From Chapter 2, successful SWM programs require operation of a sound waste disposal alternative and control of community wastes to that end. Likewise, poor disposal facilities and unsound community disposal practices are an indication of poor SWM programs. As described below, such problems are widespread on Indian Reservations. It is the contention in this study that the very pervasiveness, persistence, and severity of such problems on Indian Reservations point to limitations in using the CSWM engineering approach.

Poor Condition of SWD Facilities and Technology

Solid waste disposal facilities and technology status on Indian Lands are, by most estimates, 20 to 40 years behind where the surrounding non-Indian communities are at today¹⁰. In 1991, out of approximately 1,162 identified municipal solid waste sites on Indian Reservations, only two facilities were in compliance with 1991 RCRA standards¹¹. While the exact number is unknown, an estimated two to five tribes out of 545 federally recognized tribes have constructed landfills in the past three years in compliance with current federal regulations¹².

As a measure of the extent of the problem, \$121 million in 1997 dollars would be needed to develop SWM plans, close the sites, and construct transfer stations¹³. But due to a higher priority placed on the substantial number of inadequate water and wastewater facilities¹⁴, IHS expenditures for the years 1991 through 1997 for construction of new solid waste facilities, and closure of open dumps, averaged only 4 to 5 million¹⁵. And, IHS sanitation facility construction is backlogged still by \$1.8 billion in 1997 dollars¹⁶. Further, the estimated cost for the open dump projects is significantly low because it excludes the setting up of program and resource infrastructure, technical training, and startup or subsidization costs, viewed essential by tribes to run effective SWM programs and offer practical alternative disposal options¹⁷.

Unsanctioned Open Dumping Problems

In my judgment, the bigger problem is not that we have the waste industry beating a path to our door. Our bigger problem is we already have unauthorized and illegal dumping going on the reservation. That is a much greater concern in most communities than the prospect of a commercial facility.

-Kevin Gover, Campo Band Of Mission Indians¹⁸

Like most Indian reservations, we have innumerable open dump sites that do not comply with Federal regulations. In fact, there is not one single compliant solid waste disposal facility of landfill within the [17.5 million acre] Navaho Nation. We hesitate to call them landfills, so we call them open dumps.

-Sadie Hoskins, Director Navaho Nation Environmental Protection Administration¹⁹

Perhaps a more telling manifestation of widespread SWM problems in Indian Country is the prevalent problem of open dumping at locations not sanctioned or managed by tribes²⁰. Open dumping, including burned and buried wastes, has been identified by the U.S. Senate Committee on Indian Affairs as being "among the most serious threats to public health and the environment"²¹. Open dumping is a great concern to tribes, and is a primary reason behind tribal requests for increased SWM training and funding to improve their SWM programs²².

In contrast, surveys conducted on non-Indian community SWM programs have indicated little concern over open dumping²³. While the literature on illegal dumping is extremely scarce²⁴, illegal dumping in conventional communities generally has been found to be short-term and/or manageable with increased enforcement²⁵.

Extent and Nature of Open Dumping

The problem of open dumping is not a new one. The IHS site list of 1,162 SWD sites is not a result of an in-depth survey, but of "collateral duty" of existing programs²⁶. As agencies and tribes identify more sites, the number of listed sites is expected to grow substantially in the next few years, and has almost doubled since 1994. The list is short also because several tribes have declined IHS permission to list their dump sites²⁷. Additionally, there are dozens to hundreds of smaller unlined open dumps throughout many reservations that are the result of tribally-unsanctioned dumping by both Indians and non-Indians, that are not included on the list yet²⁸. For example, 100 of the 650 sites on the IHS list are on the Navaho Nation, but a 1994 comprehensive inventory by that tribe identified at least 400 dumps, and over 1,000 when smaller ones were included²⁹. Over one hundred unauthorized dumps were identified on the Yakama Reservation in 1995³⁰. Open dumping is present on smaller reservations as well. Responses from 149 tribes to a 1994 National Tribal Environmental Council survey yielded a total count of 1,503 open dumps, not including the Navaho or Yakama Nations³¹. At a 1996 tribal SWM workshop, each of the 15 tribes possessing small land bases reported open dumping on their reservation³².

The amount of open dumping varies greatly from reservation to reservation, and depends on availability of rural dumping locations, and whether a convenient and affordable disposal alternative to open dumping exists³³. The amount of wastes discarded at unauthorized sites on reservations where feasible options exist has been observed to be equivalent to about 5 to 15 percent of the total reservation wastestreams³⁴. Unaccounted-for wastes burned and buried in household yards may be equivalent to an additional 5 to 10 percent of the wastestream³⁵. Where practical alternatives do not exist, the amount of open dumping can be much higher, nearing 100 percent of the wastestream for some tribes³⁶.

Open dump sites generally range in waste quantities from 5 or 10 yd³ to several hundred yd³, with wastes of municipal, commercial, and/or agricultural origin, including wastes from off-

reservation. The bulk of dumps are above ground, but a number of non-monitored or forgotten covered sites exist as well, often presenting greater risk to groundwater.

Hazards of Open Dumping

Open dumping presents an environmental and health threat through water and soil contamination, disease transmission, fire danger, injury to site scavengers. Smaller dumps with non-hazardous wastes present a problem because they are an incentive for future dumping of hazardous wastes. Further, open dumping is often an aesthetic nuisance, against RCRA regulations, and costly to the tribe to clean up.

Threat of Renewed or Increased Dumping Due to Site Closures

As a result of the expense of maintaining their own disposal facilities, the majority of tribes have been forced to close reservation SWD sites before the RCRA deadline or face expensive operational and groundwater monitoring requirements, as well as litigation brought on by citizen suits³⁷. Many tribes have already closed their primary SWD sites, and beginning in 1997, one hundred dumps per year are planned to be closed³⁸.

The high number of recent and pending closures provide an incentive for open dumping to continue throughout the reservations³⁹. Renewed open dumping at the closed sites, and new dumping, or increased dumping at other sites, is common⁴⁰. Further, landfill closures in the neighboring rural non-Indian communities have created higher incentives for non-Indians to dump openly on reservations⁴¹. Many tribes have reported increased open dumping, and several open dumping assessments support the trend's existence⁴². Interestingly, in an attempt to avert indiscriminate open dumping at less desirable locations elsewhere, some tribes have elected to keep their primary disposal sites open, regardless of RCRA⁴³.

Program Challenges

Open dumping indicates more than a lack of physical resources (i.e. waste facilities) within tribal SWM programs. Without sound SWM planning, even where tribal SWD sites have been closed and relatively convenient alternative sound disposal options are available, open dumping still occurs commonly⁴⁴. For example, many tribes have closed their preliminary disposal sites and opted for a transfer station, but open dumping continues throughout the reservation⁴⁵. Due to a variety of cultural, legal and organizational issues described in later chapters, tribes can lack program capability to control open dumping and operate alternative facilities effectively⁴⁶.

3.3 LIMITATIONS IN CSWM APPROACHES

As will be explored throughout this study, the inability of many tribal SWM programs to control open dumping and operate sound SWD facilities effectively is due to a variety of circumstances that distinguish the tribal SWM situation from that of a conventional community. Due to unique socio-cultural, legal, and program organizational factors, tribes do not possess conventional government authority or, in general, certain physical and socio-cultural attributes associated with

western-industrialized conventional communities. Thus, in a variety of reservation situations, application of CSWM engineering is limited, or ineffective.

A management strategy is functional only when it is appropriate and the capacity to apply it is present⁴⁷. Therefore, a CSWM approach can fail when it is not possible to describe or predict the SWM situation or problem at hand accurately. A comparison of SWM program features for four case study tribes and a typical conventional community counterpart is presented in Table 3-1.

As shown in Table 3-1, there are several distinct differences between the two situations. While not an exhaustive list, a sampling of problems such differences can create is introduced below. For now, the reader will be left questioning exactly why CSWM failed, but each problem will be revisited in subsequent chapters, and should be viewed as a 'puzzle'. Answers are deferred because they require the detailed understanding of tribal circumstances described in the later chapters. Because of the sensitive nature of the problem, including concern over RCRA non-compliance, details of the tribes involved are excluded where warranted⁴⁸. However, while each tribe has particular circumstances, the cases below describe common occurrences, for reasons described in later chapters.

The Uneconomical Choice for a Tribal Landfill

Like many tribes, to meet RCRA standards, one tribe closed its former tribal landfill a few years ago⁴⁹. A comprehensive assessment of their wastestream, open dumping, and available SWD alternatives demonstrated that none of the conventional goals of SWM would be met with the construction of a new landfill.

For example, a nearby RCRA-compliant county landfill was situated within the same distance from the reservation population as any proposed new one would be, so convenience of location would not be gained, nor would the tribe's disposal alternative be improved. The wastestream of the reservation was too small to make a tribal landfill financially practicable. At less than one-fifth the cost, the subsidized, low tipping rates offered by the county landfill would make it extremely difficult for the tribe to persuade residents to use its own landfill. A new tribal landfill would not only be economically disadvantageous but, as demonstrated by the assessment, it would not help significantly in reducing the open dumping, so that environment and health would be unimproved as well.

According to conventional SWM decision-making, a tribal landfill would not be regarded as a desirable disposal option. Yet, while it may be unfeasible for the tribe to do so currently, construction of a new landfill is still desired by the Tribal Council and tribal members at-large, and preliminary geohydrological surveys have been carried out to locate a potential new site. Assuming that the tribe is aware of, and pursues, its own self-interests, conventional SWM "wisdom" is insufficient in this case to either describe the relevant SWM situation as it bears on the tribe, or to predict the tribe's response in the matter.

Table 3-1
Comparison of SWM program features between four tribal SWM programs and a typical conventional community.

Program Feature	Tribal situation or approach (of four tribes)	Conventional situation or approach
Program and/or staff specific to SWM	Absent, general environmental or Natural Resources program only	Yes
SWM ordinances	1 tribe only	Yes
Training and experience for manager, or person most active in SWM	B.S. Environmental Science for 1 tribe, H.S. diploma for 2 tribes, 1 - 5 years general environmental experience	B.S. or M.S. in environmental field, 5 - 10 + years SWM experience
Household collection	No	Yes
Designated landfill or on site transfer station	2 tribes only	Yes
Recycling program (voluntary or mandatory)	No	Yes
Household hazardous waste program	No	Yes
Funded by designated fee or general tax collection	No	Yes
Prevalent open dumping	Yes, (for one tribe, restricted to 3 designated sites)	No
Education or public information program	No	Yes
De facto SWM authority over served populace	1 tribe only	Yes
Participate in SWM regional planning	No	Yes
Political involvement (Tribal Council or City Council)	High	Generally mild except in facility siting

The Case of the Unused Transfer Station

Another tribe closed its tribal landfills several years ago, and wished to stop the open dumping continuing at dispersed locations⁵⁰. A conventional SWM approach to the problem might consist of siting a main transfer station at the site of the old tribal landfill, and additional waste containers at the scattered large open dumps. Because the population was relatively poor and unused to paying for disposal, the waste containers could be free-of-charge, and paid for by general tribal moneys to ensure people would use them. With both conveniently located and free disposal facilities (open at all hours), from a conventional SWM viewpoint, the open dumping problem would be assumed to be solved.

The Tribal Council, advised and assisted by IHS engineers, employed this seemingly straightforward approach. For reasons described later, the main transfer station located next to the closed landfill became heavily used. But in defiance of conventional SWM wisdom, the amount of open dumping in areas away from the old tribal landfill, with accessible waste containers in the immediate vicinity, continued almost unchanged. At one site, the rarely-used dumping bin was located adjacent to a heavily-used, odorous open pit. At another, the dumping bin was located on a main road at the junction of a potholed and hilly dirt road leading to the site. The 10 yd³ container provided was virtually unused. But regular dumping at the site, located in a storm gully, had resulted in some 3,000 yd³ of fresh, burned, and deteriorating wastes.

Dismissal of an Education Program

As a result of a cooperative effort between several agencies and the Yurok Tribe, the large open dump that several of the Tribe's members used (located just off-reservation) was closed recently⁵¹. A state-of-the art, for-fee, transfer station was constructed at another location to replace the open dump as a community disposal alternative. Because of the change in location and "open hours", together with the switch from free-of-charge to tipping fee disposal, one conventional SWM approach to the problem would be to initiate an education program, thus encouraging the population to use the transfer station.

The tribe, as well as all other parties involved, supported such a strategy, and an education program was funded in conjunction with the dump closure⁵². A "well known and experienced" consulting firm that specialized in community solid waste management education programs was hired⁵³. In keeping with conventional education approaches, flyers were posted and "town hall" information meetings were convened. But the program did not work. The transfer station was being used much less than projected. It was not until after the firm was fired, and the tribe took over and restructured the education program, that the community began to see positive results. In fact, no renewed dumping has occurred at the old site⁵⁴.

The Non-Enforced Enforcement Program

One tribe at a large reservation produced a set of anti-dumping ordinances and a solid waste management plan almost 20 years ago⁵⁵. Open dumping was then, and has continued to be, prevalent throughout the reservation. As is generally the case, Indians and non-Indians have regular open dumping sites that they use, typically separate from each other due to geographically separate

residences⁵⁶. In this tribe's case, their reservation provides a convenient stop off an interstate highway. Along their paralleling river banks is also a huge littering problem due almost exclusively to recreational (non-Indian) day travelers.

Assuming a disposal alternative was in place, a conventional management strategy would be to enforce the ordinances and cite those people operating or using open dumps, or littering the river and roadways. However, for a variety of reasons described in the next several chapters, not a single citation has been issued by tribal officers during the 20 year period, despite vocalized concern about the dumping from the Council and community.

The Fight Against a Corporate Landfill

Adding to the scrutiny of tribal SWM and the need for improved tribal SWM expertise, scores of tribes have been approached by waste management ventures to site landfills⁵⁷. As one example, a construction company offered the Lakota tribe on the Rosebud Reservation a lucrative deal to build a 6,000-acre state-of-the-art regional landfill on their lands⁵⁸. In addition to substantial and ongoing tribal revenue that would follow, many tribal jobs were promised to substantially reduce the 65% unemployment rate on the reservation. The tribe did not have the capacity to provide a sound disposal alternative for its 18,000 members at the time, and the nearest landfill was relatively expensive and quite distant. Open dumping (and burning) at many smaller sites throughout the reservation was the dominant SWD method. Use of the landfill would be free to tribal members, thus finally providing an environmentally sound and practical dumping alternative. Given that the tribe was unlikely to be able to afford a disposal alternative in the foreseeable future, the conventional choice in terms of meeting environmental and legal SWM goals would be to accept the corporation's offer.

Unlike the majority of tribes who have defied such conventional wisdom and turned down similar offers⁵⁹, this Tribal Council voted for the landfill. But the reservation community formed a coalition and held a series of citizen meetings. Support came from a neighboring reservation, where a similar offer by the company had been defeated, as well as from tribes across Indian Country who joined in an "anti-dump pow wow." Eventually, the project was defeated.

While not-in-my-backyard groups are relatively common⁶⁰, here the same community dumped their wastes in randomly located, unlined open pits, thus presenting what would be considered a much greater environmental and health risk than a managed and monitored sanitary landfill. Conventional SWM thinking would predict an environmentally aware and impoverished community such as this tribe would opt for the landfill.

Rejection of Available County Alternatives

As is a common circumstance, one medium-sized tribe could not provide recycling facilities or provisions for special waste collection, although it did operate a free transfer station for its members⁶¹. The adjacent county, to which the many non-tribal member residents of the reservation paid taxes, operated a comprehensive SWM program. Through the county, the tribe could obtain drop boxes and weekly collection free-of-charge, while they would be responsible only for their upkeep. Reservation residents also could participate free-of-charge in the household hazardous waste

collection program. Given the expense associated with such programs, it could be expected that the tribe would make use of county services to pursue their ISWM goals and ensure that a practical alternative was provided for hazardous wastes.

However, the opposite case is true. While heavily concerned with the environmental integrity of their lands, the tribe does not take advantage of any of the county's programs. Not only do they not participate in the programs, they do not notify their residents of the programs by posting flyers, etc. for upcoming hazardous waste days. While invited, the tribe does not participate in County SWM planning meetings except in rare cases where direct disruption of tribal interests is perceived.

3.4 CHAPTER CONCLUSIONS

Conventional SWM practices and principles are widely applied to Indian Reservations. However, as evidenced by the poor condition of the bulk of tribal SWD facilities and widespread occurrence of open dumping, the successful application of the CSWM approach on Indian Reservations is limited. As examined in subsequent chapters, tribes do not possess conventional governmental authority or a western culture, and so do not fit the CSWM model of Chapter 2. Socio-cultural, legal, and program organizational factors all contribute to the non-conventional SWM situation on reservations, limiting CSWM engineering applicability.

¹ U.S. Senate, *Workshop on Solid Waste Disposal on Indian Lands*, Hearings before the 102nd Congress, Select Committee on Indian Affairs, July 29, 1991, S.R. 102-72, 1992.

² 42 U.S.C. §§ 6901-6992k.

³ Federal Power Commission v. Tuscarora Indian Nation, 3622 U.S. 99 (1960).

⁴ For example, Madison, M., C. Burbee, and D. Crohn, *Solid and Hazardous Waste on California Indian Lands: A Review of Technologies, Law, Enforcement, and Resources*, Univ. of Calif., Div of Ag and Nat. Res., Waste Management Workgroup. Pub. No. 1, 1994. However, this handbook is geared towards landfill siting situations and does not address SWM circumstances on reservations.

⁵ Paul Young, *personal communication*, Director, Environmental Health Services, California Area Indian Health Service, Oct 15 1996; Notes, Tribal solid waste training needs assessment forum, Third National Tribal Conference on Environmental Management, Polson, Montana, May 21-23, 1996.

⁶ House of Representatives, *Hearing on S. 720, To clean up open dumps on Indian Lands, and for other purposes*, Subcommittee on Native American Affairs, 103rd Congress, 2nd Session, July 26, 1994, #103-102, 1994.

⁷ Indian Service Population and Labor Force Estimates, U.S. Dept. of Int., Bur. of Ind. Aff., 1995.

- ⁸ Zender, L., and G. Tchobanoglous, "Assessment of illegal dumping of MSW in rural communities: procedure and evaluation" *Proceedings of the Eleventh International Conference on Solid Waste Technology and Management*, Philadelphia, Nov 1995.
- ⁹ See for example, Environmental Protection Agency, *Decision-makers guide to solid waste management*, Solid Waste and Emergency Response (OS 305) EPA/530-SW-89-072, 1989, and Tchobanoglous, G., H. Theisen, and S. Vigil, *Integrated Solid waste management: Engineering principles and management issues*, McGraw-Hill Inc, 1993.
- ¹⁰ For example, see statement of EPA Representative Martin Topper in: U.S. Senate, *Workshop on solid waste disposal on Indian Lands*, supra note 1.
- ¹¹ Ibid.
- ¹² Notes, Tribal solid waste training needs assessment forum, Third National Tribal Conference on Environmental Management, Polson, Montana, May 21-23, 1996.
- ¹³ Indian Health Service, *Open dumps on Indian Lands 1997 report: Indian Lands Open Dump Cleanup Act PL 103-399*, Dept. of Health and Human Services, Rockville, MD, Oct 1, 1997.
- ¹⁴ The lack of a SWD facility is ranked third, below unsafe drinking and sewage facilities, in a 5-level priority system mandated under section 302(g)(4) of Indian Health Care Improvement Act, PL 94-437. Tribes have affirmed this priority except in extraordinary cases (see H.R. Serial No 103-50).
- ¹⁵ Indian Health Service, *Open dumps on Indian Lands 1997 report*, supra note 13.
- ¹⁶ U.S. Senate, 105th Cong., 1st Sess., *Oversight hearing of the President's budget request for the Bureau of Indian Affairs and the Indian Health Service*, Feb 26, 1997, S. Hrg. 105-65, Pt. 1 and Pt. 2, U.S. Govt. Prt. Off., Wash., D.C., 1997.
- ¹⁷ Notes, Tribal solid waste training needs assessment forum, Third National Tribal Conference on Environmental Management, Polson, Montana, May 21-23, 1996.
- ¹⁸ U.S. Senate, *Workshop on Solid Waste Disposal on Indian Lands*, supra note 1.
- ¹⁹ U.S. Senate, *Hearing on S. 720 to clean up open dumps on Indian Lands*, Committee on Indian Affairs, 103rd Congress, 1st Session, Nov 3, 1993, Washington D.C., S. Hrg. 103-460, 1994.
- ²⁰ For discussion of managerial problems and site characteristics, see Zender, L., and G. Tchobanoglous, *Manual on Open Dumping Assessment on Indian Lands: Site Closure and Management*, Bureau of Indian Affairs Report, Portland Area Branch, Dec 1996.

- ²¹ U.S. Senate, *Indian Lands Open Dump Cleanup Act of 1994*, S. Rep. 103-253.
- ²² U.S. Senate, *Workshop on Solid Waste Disposal on Indian Lands*, *supra* note 1.
- ²³ Riverside County Department of Environmental Health, *Refuse Collection Review*, 1995.
- ²⁴ Zender, L., and G. Tchobanoglous, *Assessment of illegal dumping of MSW in rural communities*, *supra* note 8.
- ²⁵ See Skumatz, L., H. Van Dusen, J. Carton, "Illegal dumping: incidence, drivers, and strategies." *Skumatz Economic Research Report No. 9431-1*, November 1991, and U.S. Environmental Protection Agency, "Charging households for waste collection and disposal: the effects of weight- or volume-based pricing on solid waste management." EPA/530-SW-90-047, Washington, D.C. 1990.
- ²⁶ Indian Health Service, *Open dumps on Indian Lands 1997 report*, *supra* note 13. See also testimony of Gary Hartz, Director, Division of Environmental Health, IHS in House of Representatives, *Oversight Hearing on abandoned and leaking underground storage tanks and open dump sites on Indian Reservations*, Subcommittee on Native American Affairs of the Committee on Natural Resources, 103rd Congress, 1st Session, Oct 14, 1993, H.R. serial 103-50, 1994.
- ²⁷ *Ibid.*
- ²⁸ Note the Indian Lands Open Dumps Clean Up Act of 1994 was passed partially in response to the uncertainty of the numbers and relative health risk posed by reservation open dumps. See for example, U.S. Senate, *Workshop on Solid Waste Disposal on Indian Lands*, *supra* note 1, House of Representatives, *Oversight Hearing on abandoned and leaking underground storage tanks and open dump sites*, *supra* note 26.
- ²⁹ House of Representatives, *Hearing on S. 720, To clean up open dumps on Indian Lands*, *supra* note 6.
- ³⁰ Zender, L., and G. Tchobanoglous, *"Solid Waste Disposal at the Yakama Indian Reservation: Site Assessment and Program Management"* Bureau of Indian Affairs Report, Yakama Nation of Confederated Bands and Tribes, Toppenish, WA. Nov, 1995.
- ³¹ National Tribal Environmental Council, *National Tribal Environmental Review Final Report*, May 17, 1994.
- ³² Discussion Notes, Indian Health Service, *Workshop on assessment of open dumping and solid waste management planning on Indian Lands*, Red Lion Inn, Redding, Sacramento IHS Office, Sacramento, Double Tree Highland Resort, Rancho Bernardo, CA, Oct 10-11, 16-17, 22-23, 1996.

- ³³ Zender, L., and G. Tchobanoglous, *Manual on open dumping assessment*, *supra* note 20. For description of open dumping problems, causes and site character, see also Zender, L., and G. Tchobanoglous, *Assessment of illegal dumping of MSW in rural communities*, *supra* note 8.
- ³⁴ Field notes for Zender, L., and G. Tchobanoglous, *Manual on open dumping assessment*, *supra* note 20. One exception is a semi-urban reservation where open dumping accounts for about 1 to 2 percent of the reservation waste stream because (1) disposal alternatives are relatively convenient, (2) less open space exists to dump openly than on rural reservations, and (3) the tribe has instigated several fairly successful enforcement measures.
- ³⁵ *Ibid.*
- ³⁶ *Ibid.* See also various tribal testimonies, such as Makah, Navaho Nations in House of Representatives 103rd Congress, 2nd Session, *Hearing on S. 720, To clean up open dumps on Indian Lands*, *supra* note 6, and U. S. Senate, *Hearing on S. 720 to clean up open dumps on Indian Lands*, *supra* note 19
- ³⁷ 40 CFR Part 258. Final cover installation extension by October 9, 1998, granted to most tribes under small community extension criteria. Those tribes with annual rainfall over 25 in, with practical surface transportation to alternative disposal not impeded for at three months of the year were expected to install final covers by October 9, 1995, regardless of whether wastes disposed meet 20 t/d of small community definition.
- ³⁸ Congressional Budget Office estimate based on EPA and IHS staff discussions. *Indian Lands Open Dump Cleanup Act of 1994*, 103rd Congress, 2nd session, S. Rep. 103-253, Apr 25, 1994.
- ³⁹ Zender, L., and G. Tchobanoglous, *Manual on open dumping assessment*, *supra* note 20. See also Comments by Gary Hartz, Director, Division of Environmental Health, IHS, in House of Representatives, *Hearing on S. 720, To clean up open dumps on Indian Lands*, *supra* note 6.
- ⁴⁰ Discussion Notes, Indian Health Service, Workshop on assessment of open dumping, *supra* note 32. See for example also, Blackfeet Tribe comments in U.S. EPA, "Financing Opportunities and Revenues for Solid Waste Management Activities", *Third National Tribal Conference on Environmental Management*, May 21-23 1996, Polson, MT, U.S. EPA, EPA530-R-96-052, Nov 1996.
- ⁴¹ Field notes, Zender, L., and G. Tchobanoglous, *Manual on open dumping assessment*, *supra* note 20.
- ⁴² *Ibid.* and discussion notes, Indian Health Service, *Workshop on assessment of open dumping*, *supra* note 32.

- ⁴³ See for example, Blackfeet Tribe comments, U.S. EPA, "Financing Opportunities and Revenues for Solid Waste Management Activities", *Third National Tribal Conference on Environmental Management*, May 21-23 1996, Polson, MT, U.S. EPA, EPA530-R-96-052, Nov 1996.
- ⁴⁴ See testimony of Gary Hartz, Director, Division of Envr. Health, Office of Envr. Health and Engr., IHS in House of Representatives, *Oversight Hearing on abandoned and leaking underground storage tanks and open dump sites*, *supra* note 26.
- ⁴⁵ Discussion notes, Indian Health Service, *Workshop on assessment of open dumping*, *supra* note 32.
- ⁴⁶ L. Zender, "Solid waste disposal on Indian Reservations: An overview", *Proc. of the 89th Annual Conference of the Air and Waste Management Association*, Nashville, Jun 1996.
- ⁴⁷ See generally for example, Shafritz, J. and J. Ott, *Classics of Organization Theory*, Dorsey Press, Chicago, IL, 1987.
- ⁴⁸ Many tribes have declined to allow any documentation of reservation sites, fearing liability and EPA enforcement. Notes, Indian Health Service, *Workshop on assessment of open dumping*, *supra* note 32; Indian Health Service, *Open dumps on Indian Lands 1997 report*, *supra* note 13.
- ⁴⁹ Field notes, Zender, L., and G. Tchobanoglous, *Manual on open dumping assessment*, *supra* note 20.
- ⁵⁰ Ibid.
- ⁵¹ See California Integrated Waste Management Board, "*Partnerships for Remediation*", (videotape), Mar 1996.
- ⁵² Paul Young, *Personal communication*, Director, Environmental Health Services, California Area Indian Health Service, Oct 16 1996.
- ⁵³ Ibid.
- ⁵⁴ Discussion notes, Indian Health Service, *Workshop on assessment of open dumping*, *supra* note 32.
- ⁵⁵ Field notes, Zender, L., and G. Tchobanoglous, *Manual on open dumping assessment*, *supra* note 20.
- ⁵⁶ Zender, L., and G. Tchobanoglous, *Manual on open dumping assessment*, *supra* note 20.

- ⁵⁷ For example, Anderson, J. "Waste Merchants Target Reservations", *Washington Post*, Feb 22, 1991. Also see statement of Thomas Daschle, U.S. Senator, SD in U.S. Senate, *Workshop on solid waste disposal on Indian Land*, *supra* note 1.
- ⁵⁸ Schneider, P. and D. Lamont, "Other people's trash: A last ditch effort to keep corporate garbage off the reservation", *Audubon*, 108-119, Jul/Aug 1991.
- ⁵⁹ Western Governor's Association, Survey, Sep 1991. Half of tribes in western states had been approached by waste companies, while only 4 did not immediately reject offer. Also three-fourths of tribes attending workshop were approached for and rejected landfill offers. Discussion notes, Indian Health Service, *Workshop on assessment of open dumping*, *supra* note 32.
- ⁶⁰ For example, see Frammolino, R. "Pact reached to regulate dumps on Indian Lands", *Sacramento Times*, Sep 11, 1991, or Backcountry Against Dumps v. EPA, 100 F. 3d 147 (D.C. Cir. 1996).
- ⁶¹ Field notes, Zender, L., and G. Tchobanoglous, *Manual on open dumping assessment*, *supra* note 20.