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Compliance Management Practices at Construction and Demolition (C&D) Landfills in Indian Country Region 5 (for Compliance with federal requirements under 40 C.F.R. 257 Subpart A)

April 2007

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Compliance Management Practices at Construction and Demolition (C&D) Landfills in Indian Country Region 5 **(for Compliance with federal requirements under 40 C.F.R. 257 Subpart A)**

Introduction: Since 1984, it has been the U.S. Environmental Protection Agency's (EPA) policy to strive to assure compliance with environmental statutes and regulations on Indian Reservations. EPA's fundamental objective is to protect human health and the environment. C&D landfills in Indian Country are subject to the federal solid waste management regulations under 40 Code of Federal Regulations Part 257 (40 C.F.R. Part 257). Landfills which fail to meet the aforementioned requirements would be considered an "open dump". States do not have jurisdiction or regulatory authority over these landfills under federal law. Activities to achieve EPA Region 5's objectives in Indian reservations are documented in the Implementation Strategy for Indian Country (2006, U.S. EPA Region 5). This strategy calls for providing compliance assistance to help tribes meet applicable federal solid waste regulations for C&D and municipal solid waste landfills.

Consistent with EPA Region 5's Implementation Strategy for Indian Country, the purpose of this document is to provide compliance assistance for owners and operators of Construction & Demolition (C&D) landfills on Indian Country in Region 5. Management practices provided in this document are intended to help the aforementioned owners and operators develop and operate their C&D landfills in a manner that is protective of human health and the environment in compliance with applicable federal regulations.

In 2005 staff from the Waste Management Branch EPA Region 5 conducted an assessment of all of the C&D landfills in Indian Country in the Region. We found that all of the owner/operators of the facilities have decided not to accept or plan to accept any amount of hazardous waste including hazardous waste generated by conditionally exempt small quantity generators (CESQGs). CESQGs generate 100 kilograms or less per month of hazardous waste, or 1 kilogram or less per month of acutely hazardous waste. This decision makes them subject to 40 C.F.R. Part 257 Subpart A (not Subpart B, which contains groundwater monitoring and correction action requirements).
In addition, Tribal C&D landfills in Region 5 do not accept municipal solid waste, sewage sludge and septic pump pumpings. All of the C&D landfills are relatively smaller in operational scale & size compared to typical state permitted C&D landfills. The amount of C&D waste generated is intermittent and dependent on construction and/or demolition project(s) undertaken by the tribe.

In general, Tribal C&D landfills in Region 5 accept (for disposal) the typical C&D waste including: Concrete, untreated wood , asphalt (from roads and roofing shingles), drywall, metals, bricks, glass, plastics, trees, stumps, grubbing, shingles and cabinetry. Hazardous waste/materials not accepted by these facilities include: Animal carcasses, hazardous waste, food waste, medical waste, white goods, chemical containers, batteries, PCBs, pesticide containers, liquids, infectious waste, septic tank pumpings, & sludge of any kind.

Based on the results of the assessment and input from Tribal solid waste managers EPA Region 5 determined that a document (which Tribes in Region 5 could use to help them

comply with applicable federal solid waste management regulations) would be useful and help meet EPA objectives consistent with the Region's Implementation Strategy.

EPA originally intended 40 C.F.R. Part 257 Subpart A to be composed mainly of performance standards allowing flexibility in how facility owners/operators meet the requirements. This document provides a compilation of how some states have chosen to comply with the federal requirements (Attachment 1) plus guidance from EPA and other organizations such as the Solid Waste Association of America (SWANA). Requirements and guidance were included from states such as Minnesota, Wisconsin, and Michigan. Other references include: University of Florida/SWANA C&DD Operator Training Manual (2003); C&D Association of Ohio C&D Training Manual (2005); RCRA in Focus Construction, Demolition and Renovation (EPA, 2004), "ABCs of C&D Debris" Tribal Construction and Demolition Debris Management Training Course (Tribal Association for Solid Waste Management & Emergency Response, 2004); Solid Waste Disposal Facility Criteria Technical Manual (November 1993, revised April 1998).

Section 1. EPA Region 5 Implementation Strategy & Federal Regulations

States do not have jurisdiction or regulatory authority for solid waste management in Indian Country under federal law. The United States Environmental Protection Agency (EPA) does not issue permits for C&D landfills in Indian Country. However, all C&D landfills located in Indian Country are subject to enforcement in accordance with applicable provisions of the federal Resource Conservation and Recovery Act (RCRA).

EPA's fundamental objective is to protect human health and the environment. EPA recognizes tribal governments as sovereign entities with primary authority and responsibility for reservation populations. EPA's Indian Policy recognizes the Agency's commitment to working with tribes on a government-to-government basis in making decisions to carry out program responsibilities in Indian Country. In Region 5, the Agency is committed to conduct site visits to verify that C&D landfills are in compliance with federal criteria. Compliance assistance will be offered to help facilities maintain compliance.

C&D landfills in Indian Country are subject to the attached federal regulations under 40 C.F.R. Part 257 Subpart A. **C&D landfills in Indian Country must comply with requirements regarding:**

- 40 C.F.R. Part 257.3-1 **Floodplains**
- 40 C.F.R. Part 257.3-2 **Endangered Species**
- 40 C.F.R. Part 257.3-3 **Surface Water**
- 40 C.F.R. Part 257.3-4 **Groundwater**
- 40 C.F.R. Part 257.3-6 **Disease Vector Controls** (such as periodic cover)
- 40 C.F.R. Part 257.3-7 **Air** (no open burning)
- 40 C.F.R. Part 257.3-8 **Safety** (for explosive gases, fires, bird hazards, access)

Acceptance and disposal of hazardous waste from small quantity generators and large quantity generators are prohibited at C&D landfills. However, C&D landfills are allowed to accept and dispose of hazardous waste from conditionally-except small

quantity generator hazardous (as defined in 40 C.F.R. 261.5). When these wastes are accepted, additional requirements found in 40 C.F.R. Part 257 Subpart B apply. As mentioned previously, these additional requirements will not be addressed in this document.

Section 2 . Management Practices for Compliance with Federal Solid Waste Regulations 40 C.F.R. Part 257

The following describes the specific federal requirements applicable to C&D landfills in Indian Country and examples of management practices which have been used to comply with those regulations. These examples of compliant management practices are consistent with EPA Region 5's Implementation Strategy for Indian Country (Fiscal Year 2006) to assist tribal governments.

2.1 Floodplain Requirements - In accordance with 40 C.F.R. Part 257.3-1, C&D Landfills in floodplains shall not restrict the flow of the base flood, reduce the temporary Storage capacity of the floodplain, or result in washout of solid waste, so as to pose a Hazard to human life, wildlife, or land or water resources.

EPA defines floodplain as the lowland and relatively flat areas adjoining inland and coastal waters, including flood-prone areas of offshore islands, which are inundated by the base flood. Base flood is defined as a flood that has a one percent or greater chance of recurring in any year or a flood of a magnitude equaled or exceeded once in 100 years on the average over a significantly long period.

To help determine the location of floodplains in your area, the Federal Emergency Management Act (FEMA) provides 100 year floodplain maps. The website to access the maps is at:

http://msc.fema.gov/webapp/wcs/stores/servlet/FemaWelcomeView?storeId=10001&catalogId=10001&langId=-1

2.1.1 Compliance Management Practices for Floodplain Requirements:

Bans: Some states have promulgated regulations to comply with the federal floodplain requirements, by banning the location of C&D landfills in floodplains. These states include Minnesota, Wisconsin, Ohio, and Florida (See List of State Regulations Attachment 1).

Engineering Considerations: If the C&D landfill is within a flood plain, the owner/operator can conduct a demonstration of compliance. The C&D landfill must be located so the unit does not significantly restrict the base flood or significantly reduce temporary storage capacity of the floodplain. The landfill must also be designed to prevent the washout of solid waste during the expected flood event and that such measures do not pose a hazard to human health and the environment.

According to the EPA Solid Waste Disposal Facility Criteria Technical Manual (Chapter 2 Pages 24-29, Ref. 2), the demonstration that these considerations are met relies on

estimates of the flow velocity and volume of floodplain storage in the vicinity of the landfill unit during the base flood. The assessment should consider the floodplain storage capacity and floodwater velocities that would likely exist in the absence of the landfill unit. The volume occupied by the landfill in a floodplain may theoretically reduce the storage capacity and restrict the flow. In addition, the location of the landfill unit relative to the velocity distribution of the floodwaters will greatly influence the susceptibility to washout. This type of assessment will require a conservative estimate of the shear stress on the landfill components caused by the depth, velocity, and duration of impinging river waters.

The Army Corps of Engineers has developed several numerical models to aid in the prediction of flood hydrographs, flow parameters, and the effect of obstructions on flow levels, the simulation of flood control structures, and sediment transport. These methods may or may not be appropriate for a site; however, the COE has models which provide well-tested analytical approaches (See EPA Solid Waste Disposal Facility Criteria Technical Manual, pages 28-29, Ref 2).

Other cost-effective methods to protect the landfill unit from flood damage include embankment designs with rip-rap, geo-textiles, or other materials. Embankment designs will require an estimate of river flow velocities, flow profiles, and wave activity. Figure 2-3 (Ref. 2) provides a design example of for dike construction and protection of the landfill surface from flood water. It addresses height requirements to control the effects of wave activity. The use of alternate erosion control methods such as gabions, paving bricks, and mats may be considered. However, the dike design in Figure 2-3 (Ref. 2) may further decrease the water storage and flow capacities.

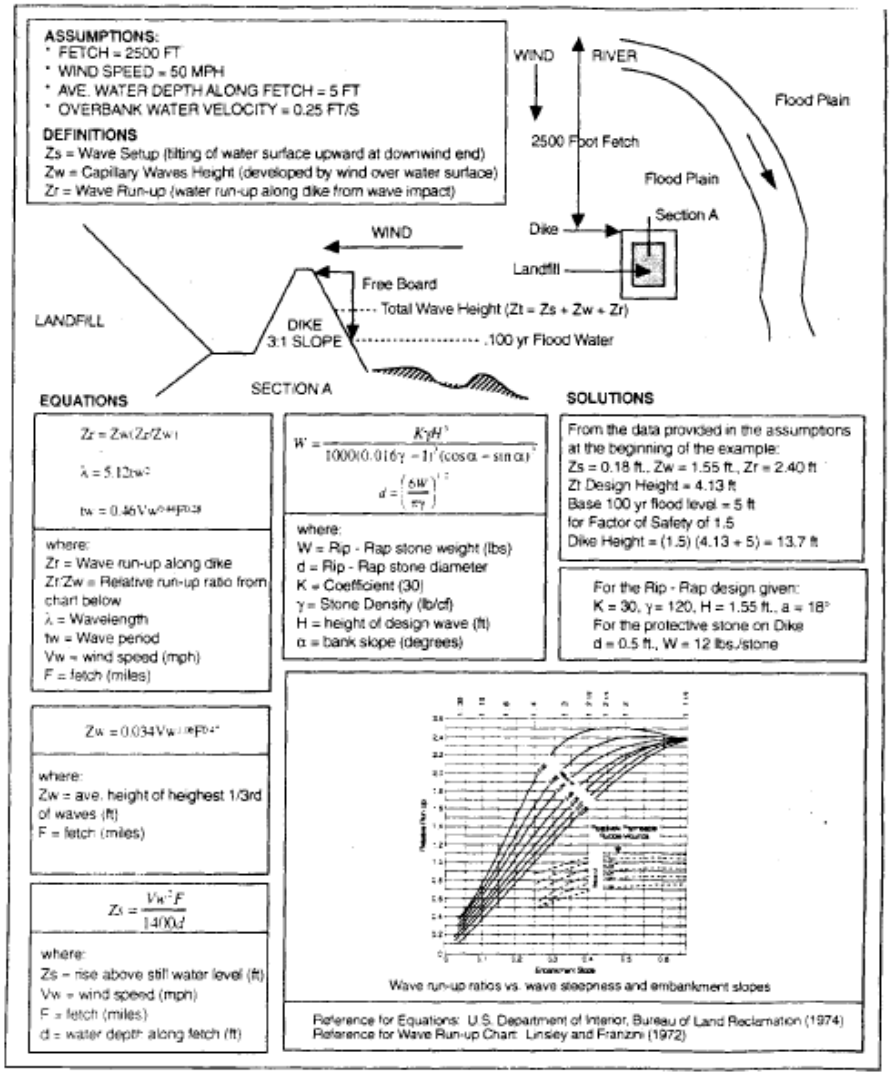


Figure 2-3. Example Floodplain Protection Dike Design

(Ref. 2)

2.2 Endangered Species Requirements - In accordance with 40 C.F.R. Part 257.3-2, C&D landfills shall not cause or contribute to the taking of any endangered species of plants, fish, or wildlife; or result in the destruction or adverse modification of critical habitat or endangered or threatened species. Endangered or threatened species means any species listed under the Endangered Species Act (ESA). Destruction or adverse modification means a direct or indirect alteration of critical habitat which appreciably diminishes the likelihood of the survival and recovery of threatened or endangered species using that habitat.

2.2.1 Compliance Practices for Endangered Species Requirements : The Endangered Species Act provides a program for the conservation of threatened and endangered plants and animals and the habitats in which they are found. The U.S. Fish and Wildlife Service (FWS) of the Department of Interior maintains the list of 632 endangered species (326 are plants) and 190 threatened species (78 are plants). Species include birds, insects, fish, reptiles, mammals, crustaceans, flowers, grasses, and trees. Anyone can petition FWS to include a species on this list or to prevent some activity, such as logging, mining, or dam building. The law prohibits any action, administrative or real, that results in a "taking" of

a listed species, or adversely affects habitat. Likewise, import, export, interstate, and foreign commerce of listed species are all prohibited.

American Indian lands in the lower 48 States comprise over 45 million acres of reserved lands and an additional 10 million in individual allotments. There are another 40 million acres of traditional Native lands in Alaska. Much of this acreage remains relatively wild and unspoiled. Home to more than 560 federally recognized tribes, these lands provide the living space, the sacred and cultural sites, and many of the natural resources that tribes need to keep their people and cultures alive. The importance of these lands to the tribes cannot be overstated. They provide spiritual and physical sustenance, and increasingly, the means for economic self-sufficiency. Tribal governments generally place a high priority on preserving these lands and their natural resources, including many vulnerable wildlife species, for future generations

As a representative of the Federal government and a steward of our country's natural resources, the U.S. Fish and Wildlife Service has a responsibility to manage these natural resources in a way that:

- reflects our Federal trust responsibility toward Indian tribes
- respects tribal rights
- acknowledges the treaty obligations of the United States toward tribes
- uses the government-to-government relationship in dealing with tribes
- Protects natural resources that the Federal government holds in trust for tribes.

The USFWS and Indian tribes have a common goal of conserving sensitive species (including candidate, proposed, and listed species) and the ecosystems upon which they depend. Indian lands are not federal public lands or part of the public domain. They were retained by tribes or were set aside for tribal use pursuant to treaties, statutes, judicial decisions, executive orders or agreements. These lands are managed by Indian tribes in accordance with tribal goals and objectives, within the framework of applicable laws.

We recommend that Tribes consult with the USFWS liaison to ensure compliance with the EPA requirement under 40 C.F.R. Part 257.3-2 and the ESA. For Tribes in Region 5 the liaison is:

Contact: John Leonard (612) 713-5108
Bishop Henry Whipple Federal Building
One Federal Drive
Fort Snelling, Minnesota 55111-4056

For more information, the U.S. Fish and Wildlife Service Website addressing the ESA and Indian rights at: http://www.fws.gov/endangered/tribal/
Questions & answers regarding American Indian Tribal Rights, Federal-Tribal Trust Responsibilities, and the Endangered Species Act can be reviewed at: http://www.fws.gov/endangered/tribal/tribal_faq.html

2.3 Surface Water Requirements: 40 C.F.R. Part 257.3-3(a), (b) and (c):

(a) Section 402 Clean Water Act: C&D, landfills shall not cause a discharge of pollutants into waters of the United State that is in violation of the requirements of the National Pollutant Discharge Elimination System (NPDES) under the Section 402 Clean Water Act (CWA). The NPDES permit program controls water pollution by regulating point sources that discharge pollutants into waters of the United States. Point sources are discrete conveyances such as pipes or man-made ditches. Individual homes that are connected to a municipal system, use a septic system, or do not have a surface discharge do not need an NPDES permit; however, industrial, municipal, and other facilities, such as C&D landfills must obtain permits if their discharges go directly to surface waters. In most cases, the NPDES permit program is administered by authorized states. Since its introduction in 1972, the NPDES permit program is responsible for significant improvements to our nation's water quality. EPA works with the tribal governments in Region 5 to develop and issue NPDES permits to applicable facilities.

(b) Section 404 Clean Water Act**:** According to 40 C.F.R. Part 257.3-3C&D, landfills should not cause discharge of dredged or fill material to waters of the United States that is in violation of the requirements under section 404 of the CWA. Section 404 establishes a program to regulate the discharge of dredged or fill material into waters of the U.S., including wetlands. Section 404 requires a permit before dredged of fill material may be discharged into waters of the United States. For tribes that have not assumed Section 404 of the CWA, the Army Corps of Engineers (ACE) is the federal permitting authority. EPA is responsible for reviewing proposed permits.

(c) Section 208 Clean Water Act: A C&D landfill shall not cause non-point source pollution of waters of the U.S. that violations applicable legal requirements implementing an area wide EPA approved water quality management plan under section 208 of the Clean Water Act.

Major cause of pollution to surface waters from C&D landfills: Contaminated storm water run-off (or leachate) is a major source of pollution to surface water bodies from C&D landfills. Federal C&D regulations (40 C.F.R. Part 257.2) define leachate as liquid that has passed through or emerged from solid waste and contains soluble, suspended, or miscible materials removed from such wastes. Typically, leachate is generated at C&D landfills when storm water is allowed to pond in the active and inactive areas (see Photo 1).

Photo 1. Landfill where storm water has been allowed to pond; SWANA MOLO 2004. (Ref. 4)

Storm water run-off must not discharge pollutants into surface water bodies in violation of the Clean Water Act.

2.3.1 Compliance Management Practices for 40 C.F.R. Parts 257.3-3(a), Section 402 of the CWA:

Setbacks: State agencies such as Minnesota Pollution Control Agency do not allow C&D landfills within 1000 feet from a lake and 300 feet from a river, stream, or creek (Ref. 23). Wisconsin does not allow C&D disposal activities within 1000 feet of any navigable lake or pond (See Attachment 1) Tribes may consider these types of setbacks to help gain compliance with the federal surface water requirements and/or reduce their costs for controlling storm water at their C&D landfill.

Storm Water Pollution Prevention Plans/Best Management Practices: EPA remains the permitting authority for C&D landfills in Indian country. C&D landfills (existing and planned) in Indian country may undergo inspections (under the Clean Water Act) by the appropriate federal and tribal staff consistent with the Implementation Strategy for Indian Country U.S. EPA Region 5 or Direct Implementation Tribal Cooperative Agreements (DITCA). Such inspections may require the owner or operator of the C&D landfill to conduct actions to control storm water within the C&D landfill facility during and after its operational life.

Storm water discharges for C&D landfills may be regulated under an NPDES storm water general permit associated with industrial activity. To control these storm water discharges, these permits generally require the use of best management practices (BMPs). A storm water pollution prevention plan (SWPPP), incorporating those BMPs must be developed and implemented under the general permit. SWPPPs typically focus on identifying and implementing appropriate measures to reduce pollutants in storm water discharges from the facility and ensure compliance with the terms and conditions of the general permit. Information and guidance for EPA construction general permits and SWPPPs can be found at:

http://cfpub.epa.gov/npdes/
And

http://www.epa.gov/npdes/pubs/cgp2003_entirepermit.pdf

2.3.1.1 Surface/Storm Water Best Management Practices (BMPs) for C&D Landfills: (The following examples/case studies provide BMPs for managing storm water at C&D landfills)

A. EPA Recommended Run on/Run off controls: Stormwater entering the working face or landfill unit and contacts waste becomes leachate. The purpose of the run-on control system is to minimize the amount of storm water entering the landfill unit. Run-on control can be accomplished by constructing berms and swales above the filling area that will collect and redirect the water to stormwater control structures (Ref. 1).

Run-on water from outside the landfill that runs toward the landfill should be prevented from entering the containment area through ditches, dikes, and culverts. Keeping active landfill cells small and controlling grading to divert run-off from working areas helps minimize the amount of run-off collected. On inactive portions of the landfill, any rainfall that does not percolate into the groundwater can be discharged as storm water without having to be managed as leachate. This uncontaminated run-off must be managed to control erosion using controls such as perimeter ditches, berms, siltation fences, or hay bales, and sedimentation basins (Ref. 3). For example, perimeter ditches can be used to intercept storm water run-on/off and direct run-off to sediment basins Photos of the aforementioned controls are presented as follows in Photos 2, 3, &4):

Photo 2. Direct runoff ditch at a landfill, (SWANA, MOLO 2004, Ref. 4).

Photo 3. Sediment basin at a landfill, (SWANA, MOLO 2004, Ref. 4).

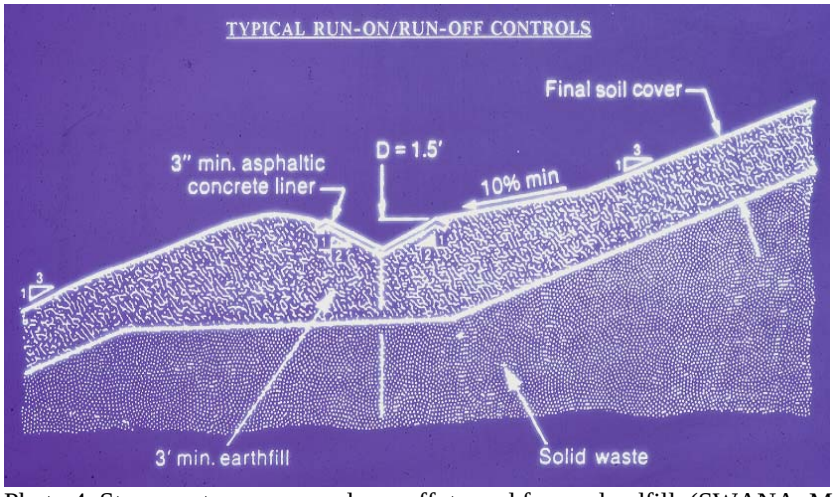


Photo 4. Storm water run-on and run-off to and from a landfill. (SWANA, MOLO 2004, Ref. 4).

B. Ohio C&D Training (2005) Recommendations for Stormwater Management (Ref. 4a) :

1. Provide appropriate drainage and site grading : i) convey water to slope benches and terraces; ii) use slope let-downs (pipe or channel slope drains); iii) use perimeter collection ditches and swales; iv) maintain consistent slopes; v) ensure minimum infiltration or water through cover soils and cap; vi) keep drainage structures in good repair.
2. Eliminate standing/ponding water and depressions. Ponding may be caused by improper construction practices, poor slope development. Water will infiltrate into the waste and create leachate which may lead to groundwater contamination.
3. Reduce run-on from adjacent lands and control run-off from landfill.
4. Control sediments in stormwater through the use of controls such as sedimentation basins
5. Provide erosion and sediment controls to preserve existing natural conditions as feasible and provide cover over disturbed soils and achieve stabilization through: i) temporary/permanent seeding; ii) mulching, matting, buffer strips; iii) construction phasing to minimize disturbed areas; iv) prevention of erosive flows through the use of rock check dams, erosion control matting, riprap lining, slope drains; v) control of sheet flow run-off with silt fencing and/or diversions.

Erosion can be controlled through the use of vegetative cover in inactive areas and the following additional controls: Silt fences and ditches lined with rip rap are also recommended as erosion controls (Photos 5 & 6).

Photo 5, Silt Fence at a landfill.
(SWANA, MOLO 2004, Ref. 4)

Photo 6, Ditch Lined with Rip/Rap.
(SWANA, MOLO 2004, Ref. 4)

C. Case Study: Summary of Wisconsin Stormwater Requirements (Ref. 5) :

Wisconsin promulgated regulations to control storm water during design and operation of C&D landfills. These regulations are summarized in this section and provides examples of BMPs for C&D landfills.

Design: C&D Landfills should incorporate the following concepts in the design of both temporary and permanent erosion and sediment control measures: 1) retain vegetation whenever feasible; 2) disturbed areas should be vegetated and mulched; 3) grading and

construction should be scheduled to minimize soil exposure; 4) runoff should be diverted away from disturb and active fill areas; 5) runoff velocities should be minimized; 6) sediment should be trapped on-site; 7) runoff control measures should be inspected and maintained.

Storm water drainage ditches, structures, and sedimentation basins should be designed to be constructed during the initial stages of construction of the facility. All temporary and permanent storm water drainage ditches, swales, conveyance channels, channel linings, outlet protections, culverts, and other storm water control structures should be designed using a 25 year time of concentration storm event to determine peak flow rates. Temporary and permanent sediment control measures should be designed to settle .015 mm size particles for all storms up to and including the 25 year 6 hour storm event. Storm water should be diverted away from the active fill area of the landfill and any borrow areas to a sedimentation control structure. Storm water in contact with active fill areas should be handled, treated , and disposed of as leachate. Containment berms placed around active fill areas should be designed to control and collect the liquid volume from the 25 year 24 hour storm event. Storm water drainage ditches, structures, and sedimentation basins should discharge along existing drainage patterns capable of accepting the anticipated flow volume. Storm water diversion and construction should be designed to minimize impacts on and from adjacent property, such as erosion, sedimentation and flooding. Slopes and drainage ways must be designed to prevent erosion. Slopes greater than 200 feet must be interrupted with diversion drainage ways. Final contours of the fill area must be a minimum of 2% and a maximum 20% slope.

Operations: Storm water should be diverted away from the working area and areas already filled with C&D waste. Depressions and low areas which cause storm water to pond or stand should be prevented and eliminated at the active and inactive areas. Storm water from upslope areas should be diverted around disturbed areas to minimize erosion, entrain sediment, and minimize the amount of water contacting the disturbed area. Size and duration of the disturbances should be minimized to the extent practical to minimize the transport of sediment off-site. Runoff channels should be protected to prevent scour and erosion that generate sediment. Storm water drainage ditches, structures, and sedimentation basins should be cleaned and maintained.

2.3.2 Compliance Management Practices for 40 C.F.R. Part 257.3-3(b), (Section 404 of the Clean Water Act)

Location : Several states have regulations which prohibit an owner or operator from establishing solid waste management facilities within a wetland (Florida, Minnesota, etc..). EPA believes that locating a new landfill in wetlands should be done only where there are no less damaging alternatives available (Ref. 2). Tribes may consider locating new C&D landfills in areas where wetlands will not be damaged.

Compliance with 404 Permits: Section 404 of the CWA requires a permit before dredged or fill material may be discharged into waters of the United States. You do not generally need a permit under Section 404 if your discharges of dredged or fill material are associated with normal farming, ranching, and forestry activities such as plowing, cultivating, minor drainage, and harvesting for the production of food, fiber, and forest products or upland soil and water conservation practices. This exemption pertains to

normal farming and harvesting activities that are part of an established, ongoing farming or forestry operations.

The basic premise of the program is that no discharge of dredged or fill material may be permitted if :1) a practical alternative exists that is less damaging to the aquatic environment or 2) the nation's water's would be significantly degraded. When you apply for a permit, you must show that you have to the extent practicable: i) taken steps to avoid wetland impacts; ii) minimized potential impacts to wetlands; iii) provided compensation for any remaining unavoidable impacts. (Ref. 6).

According to the EPA Region 5 Implementation Strategy for Indian Country (Ref. 1), for tribes that have not assumed Section 404 of the CWA, the Army Corps of Engineers (ACE) is the federal permitting authority. EPA is responsible for reviewing and providing comments on the proposed Section 404 permits. EPA and ACE are responsible for ensuring that Section 404 permits are obtained where required, and complied with. Region 5 will work with interested tribes to explore the feasibility of assisting with Section 404 related inspection activities.

For more information regarding Wetlands and the Section 404 of the CWA please go to the following websites:

EPA's Wetlands Website: *http://www.epa.gov/owow/wetlands/*
Wetland Delineation Manual: *www.wes.army.mil/el/wetlands/wlpubs.html*
USACE Regulatory Program: *www.acace.army.mil/inet/functions/cw/cecwo/reg/*
EPA Wetlands Fact Sheet Series: *http://www.epa.gov/owow/wetlands/facts/contents.html*

2.3.3 Compliance Management Practices for 40 C.F.R. 257.3-3(c), Section 208 of the Clean Water Act - A C&D landfill shall not cause nonpoint source pollution of waters of the U.S. that violates applicable legal requirements implementing an area wide EPA approved water quality management plan under section 208 of the Clean Water Act. Section 208 requires tribes to assess damages to water quality from nonpoint source pollution and to develop and implement programs to control them.

In establishing non-regulatory non-point source pollution programs as required under Section 208, tribes were required to develop Best Management Practices (BMPs) for the major land uses. In 1987, Congress added section 319 to the CWA to enable tribes to address the problems caused by nonpoint source pollution. Section 319 established baseline requirements for state and territorial nonpoint source management programs and authorized national funding to support implementation of approved management programs. Section 319(h) of the Clean Water Act is the principal source of U.S. Environmental Protection Agency (EPA) funding dedicated to nonpoint source control.

Tribes who receive 319 Grants must write Nonpoint source assessment report and Non-point Source Management Plans. The nonpoint source assessment report describes existing and potential nonpoint-source-related water quality problems on tribal lands, using existing water quality data. The report identifies the nature, extent, and effect of nonpoint source pollution and the causes of such pollution. It should also describe existing programs and methods used for controlling the pollution. This report has to be approved by the EPA Regional 5. The nonpoint source management plan describes how the tribe intends to correct and/or prevent the existing and potential nonpoint source

problems identified in the assessment report over the four fiscal years following submission of the program. If the tribe is unable to develop a nonpoint source management program that addresses all nonpoint source categories, the management program can focus on nonpoint sources identified as priorities. The management program must also be approved by the appropriate EPA Region 5.

Compliance with the 40 C.F.R. 257.3-3(c) requires correcting and preventing applicable non-point source problems as described in the tribe's EPA approved nonpoint source management plan. Owners and operators of C&D landfills should be aware of their tribe's nonpoint source management plan and implement actions as appropriate.

Additional information regarding EPA/Tribes nonpoint source programs can be found at

tribal nonpoint source planning handbook:
http://www.epa.gov/owow/nps/tribes/tribes2.htm
Tribal Information Page: nonpoint source
http://www.epa.gov/owow/nps/tribal/
EPA Region 5 nonpoint source:
http://www.epa.gov/region5/water/wshednps/topic_nps.htm
EPA Region 5 Water Division Organization and Contacts:
http://www.epa.gov/region5/water/org.htm

2.4. Groundwater Protection Requirements - In accordance with 40 C.F.R. Part 257.3-4 C&D landfills shall not contaminate an underground drinking water source beyond the boundary of the facility. Boundary means the outermost perimeter of the solid waste (projected in the horizontal plane) as it would exist at completion of the C&D landfill. C&D landfills which accept and dispose of hazardous waste from conditionally exempt small quantity generators (CESQG) must implement a groundwater: monitoring, assessment, and corrective action program in accordance with 40 C.F.R. Parts 257.22 to 257.28 Typically, groundwater contamination occurs at C&D landfills when hazardous constituents present the C&D debris waste are transported to groundwater through leachate.

2.4.1 Compliance Management Practices for Groundwater Protection: States such as Wisconsin have location restrictions which do not allow C&D landfills within 1200 feet of any public or private water supply well. Minnesota does not allow C&D landfills in areas with active karst features and where the topography, geology, or soil is inadequate for protection of groundwater. Tribes may comply with the federal requirements and follow these examples by locating their C&D landfill in an area which is does not present a threat to their underground drinking water resources.

The location of the tribe's present and future underground drinking water sources may be found through the tribes' source water protection program. The source water protection program is authorized under the amendments to the Safe Drinking Water Act and outlines source water protection plans to protect public health through protection of drinking water sources. For more information about EPA's source water protection program in Indian Country please go to: http://www.epa.gov/safewater/protect/tribe.html

C&D landfill owner/operators may implement several practices to protect groundwater. These practices can be implemented individually or in combination depending on site-specific conditions:

i. *Control of storm water to prevent ponding* (to reduce leachate). Elimination or reduction of ponding reduces the possibility that contaminants will be transported to the groundwater through leachate (See Section 2.3).

ii. *Identification and Screening of Hazardous Waste.* Reducing the amount of hazardous waste in the C&D waste stream reduces the amount of hazardous constituents in the leachate, thus reducing the risk of groundwater contamination (See Section 2.8).

iii. *Groundwater monitoring and corrective action program* as per 40 C.F.R. 257 Subpart B (see Section 2.4.1.1)

2.4.1.1 Groundwater Monitoring and Corrective Action Program Requirements –

EPA has specific requirements for implementing a groundwater monitoring, assessment and corrective action program for C&D landfills which accept and dispose of hazardous waste from conditionally exempt small quantity generators.

In general, groundwater monitoring requirements requires testing groundwater wells to determine whether waste materials have escaped from the landfill. Corrective action provisions control and clean up landfill releases and achieves groundwater protection standards. These requirements are documented in detail under 40 C.F.R. Part 257.22 to 257.28 (see Attachment 1). States such as Wisconsin, Minnesota, and Michigan have adopted these regulations for their C&D landfills.

C&D landfills which do not accept and dispose of hazardous waste do not have to comply with these requirements. However, these regulations provide the minimum criteria for protection of groundwater and tribes may implement these requirements to ensure protection of their underground drinking water resources

2.5 Disease (Vector Controls) Requirements - In accordance with 40 C.F.R. Part 257.3-6 C&D landfills shall minimize the on-site population of disease vectors through the periodic application of cover material or other techniques as appropriate so as to protect public health. Disease vectors include birds, flies, mosquitoes, rodents, snakes, and other animals.

2.5.1 Compliance Management Practices for Disease Control Requirements:

EPA recommends that application of cover reduces access to waste by most disease vectors. Application of six inches of soil compacted on the water generally is sufficient to control vectors (Ref. 3). The frequency of application varies depending on requirements from each state and site specific conditions.

Mosquitoes (Photo 7) thrive in warm, protected, stagnant water. In addition to tires, sources of stagnant water include low points and drainage ditches. Mosquitoes serve as vectors for potentially fatal diseases in humans such as West Nile virus, eastern equine encephalitis, and dengue fever. Measures should be taken to control worker exposure to mosquitoes, especially during active breeding seasons in areas prone to these diseases. Exposure control measures include 1) wearing long-sleeved shirts and pants to minimized exposed skin, 2) using insect repellent; 3) spraying sites to control adult and larvae populations. Procedures to control standing water may be implemented as described in Section 2.3. Accumulation of rainwater in tire piles should be avoided by shredding tires or sending waste tires to another disposal facility. (Ref. 7).

Photo 7. Mosquito (CDC).

Other measures which can be used to protect workers from animal bites and scratches include: 1) Requiring workers to wear boots, heavy gloves, long sleeves and pants; and 2) Identifying the nearest medical facilities capable of treating bites and other injuries. (Ref. 7).

2.6 Air Requirements - In accordance with 40 C.F.R. Part 257.3-7 C&D landfills shall not engage in open burning of residential, commercial, institutional, or industrial solid waste. This requirement does not apply to infrequent burning of agricultural wastes in the field, silvicultural waste for forest management purposes, land-clearing debris, diseased trees, debris from emergency clean-up operations, and ordnance.

2.6.1 Compliance Management Practices for Air Requirements: Open burning of solid waste at solid waste disposal facilities is banned in all states with an approved solid waste permit program. Compliance with this requirement in Indian Country would be accomplished by establishing and implementing a ban on open burning (as per 40 C.F.R. 257.3-7) C&D debris at the facility.

2.7 Safety Requirements - In accordance with 40 C.F.R. Part 257.3-8 C&D landfills must comply with regulations regarding explosive gases, fires, bird hazards to aircraft, and access (site security). In addition, there are safety issues associated with other activities; such as screening for hazardous materials as they come to the facility and working in an environment where there are trip hazards and large machinery. These will be discussed in later sections.

2.7.1 Explosive Gases Requirements, 40 C.F.R. Part 257.3-8(a) – Federal regulations states that the concentration of explosive gases generated by the C&D landfill shall not

exceed twenty five percent of the lower explosive limit for the gases in facility structures (excluding gas control and recovery components) and the lower explosive limit for the gases at the property boundary.

In general, C&D landfills generate smaller amounts of explosive gas than municipal solid waste landfills (MSWLFs). This is because C&D landfills have lower amounts of organic waste than MSWLFs (which accept food waste). Consequently federal and state regulations are typically less stringent for C&D landfills when it comes to landfill gas control. For example federal regulations require owners and operators of MSWLFs (unlike C&D landfills) to implement a routine methane monitoring program and a remediation plan if methane levels are exceeded.

C&D landfill gas composition consists largely of hydrogen sulfide, methane, carbon dioxide, nitrogen, and oxygen (Ref. 8). Of these, hydrogen sulfide (H_2S) and methane pose the greatest potential health threat to on-site workers and residents in surrounding areas. The amount of landfill gas generated and characteristics will depend on the amount of organic material (e.g. wood, vegetative debris, etc..) present.
A landfill gas problem unique to C&D landfills are odor problems (hydrogen sulfide) due to decomposition of gypsum wallboard under moist and anaerobic conditions. (Ref. 9) .

Owner/operators of C&D landfills should be aware of the potential problems with explosive gases at their facility so they may take action(s) as appropriate.

Source of hydrogen sulfide (H_2S) in C&D Debris Landfills: Pulverized gypsum drywall has been identified as the major contributor for H_2S gas production and emission in landfill environments. Gypsum is composed of calcium sulfate dehydrate (CaSO4•2H2O) and is the major component of drywall. Drywall consists of 90% gypsum and 10% paper. When wetted, the sulfate, in the drywall, dissolves into solution. H_2S gas is generated as a result of a series of reactions that biologically reduce the sulfate leached from pulverized gypsum board under anaerobic (absence of air) conditions like those prevalent at many C&D debris landfill sites. Under these anaerobic conditions, sulfate reducing bacteria (SRB) produce H_2S gas from the sulfate (SO_4^{-2}) in pulverized gypsum and the organic carbon waste materials. (Ref. 10, 12).

H_2S gas is an extremely toxic gas with a low odor threshold and a pungent (rotten-egg) odor. This gas also has flammability hazard with a flammable range of 4% (lower explosive limit) to 45% (upper explosive limit). The vapor density of H_2S is greater than air which means it may accumulate in low lying areas and may travel a considerable distance to an ignition source. (Ref. 13, 14).

Additional characteristics, standards, guidelines and screening levels of H_2S gas include (Ref. 13 & 14):

Hydrogen Sulfide Gas Standards, Guidelines, & Screening Levels	**Concentration**
Hydrogen Sulfide Olfactory Lower Range	0.0005- 0.3 ppm
Hydrogen Sulfide Olfactory Fatigue	100 ppm (at 2-15 minute exposure)
EPA Region 9 Preliminary Remediation Goal ; Chronic exposure (residential) scenario, 30 years 24 hours a day, taking into account child exposure	0.0007 ppm
EPA Acute Inhalation Exposure Guideline	0.51 ppm for 1 hour exposure 0.36 ppm for 4 hour exposure 0.33 ppm for 8 hour exposure
Agency for Toxics Substances and Disease Registry (ATSDR) Acute Minimum Risk Level (1-14 day exposure); Intermediate Minimum Exposure Level (15-356 exposure) ***	.070 ppm (acute) .030 (intermediate)
OSHA Permissible Exposure Limit , General Industry	20 ppm (50 ppm peak for 10 minutes)
NIOSH Recommended Exposure Limit (40 hours) / Immediately Dangerous to Life or Health	10 ppm/100 ppm

Methane (CH_4) - Landfills are the largest human-related source of methane in the U.S., accounting for 34% of all methane emissions. CH_4 is generated in landfills and open dumps as organic waste decomposes under anaerobic (without oxygen) conditions. The amount of methane created depends on the quantity and moisture content of the waste and the design and management practices at the site. C&D landfills generally have less organic waste than municipal solid waste landfills and produce less methane.

CH_4 is a simple asphyxiant and is extremely flammable. This gas also has a high flammability hazard with a flammable range of 5% (lower explosive limit) to 15% (high explosive limit). Methane is an odorless, colorless, and is lighter than air. Because methane is lighter than air, it tends to rise and accumulate near the higher, stagnant parts of enclosed buildings. (Ref. 15).

The Occupational Safety and Health Administration (OSHA) has no permissible exposure limit for methane, but the National Institute for Occupational Safety and Health's (NIOSH) maximum recommended safe methane concentration for workers during an 8-hour period is 1,000 ppm (0.1 percent). Methane is considered an asphyxiant at extremely high concentrations and can displace oxygen in the blood (Table 1). (Ref. 15).

Table 1. Methane exposure levels and effects (Ref. 15).

Exposure level (ppm)	Effect or symptom
1000	NIOSH 8-hours TLV*
50,000 to 150,000	Potentially explosive
500,000	Asphyxiation

- TLV = Threshold Limit Value

2.7.1.1 Compliance Management Practices to Prevent Odors and Explosive Levels of Explosive Gases -

Prevention and control of H_2S and methane gas may be achieved through implementation of an effective detection, monitoring, and control program at the facility boundary and to protect on-site workers, with a focus on H_2S gas and methane. Detection of these gases, especially methane (since it is odorless) can be best identified and quantified by the use of direct reading instruments. Human smell can be used as an early detection method for H_2S gas because of its low olfactory range. The information provided by direct reading instruments can be used to institute appropriate protective measures. There are a number of combustible gas meters on the market that are suitable for this application. The standard instruments will measure %Oxygen, %LEL, and % Toxicology.
On-site workers should be trained to be familiar with explosive gases such as hydrogen sulfide and methane, operating direct reading instruments, and operational conditions which may produce explosive levels.

Once detected, methane may be controlled by the installation of passive and/or active gas collection and treatment systems. Passive systems include vent wells, vent/barrier trenches, and building protection. Active systems include extraction wells, horizontal extraction pipes, extraction trenches, air injection wells and building protection (Ref. 8 & 9). In general, H_2S gas can be effectively controlled if the C&D debris containing gypsum wallboard debris is kept dry and covered (Ref. 10). This can be achieved by implementing the aforementioned surface and storm water management practices and the application of intermediate cover.

Active gas collection and recovery systems, if properly designed, can collect and treat the effluent gas and effectively reduce H_2S gas and methane emissions at C&D debris landfills. However, due to the high capital, operations, and maintenance costs, active gas collection systems may be considered as one of the last control options to be implemented at a given site. (Note: If such a system is put into place, the owner and operator may want to consult a qualified professional engineer to design and construct the system.)

Additional information regarding the prevention and control of hydrogen sulfide gas emissions at C&D Landfills can be found on the web at the Ohio EPA website: http://www.epa.state.oh.us/dsiwm/document/newsPDFs/cdd_h2s_bmps.pdf

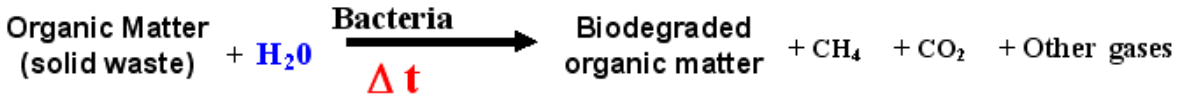
2.7.2 Fire Requirements, 40 C.F.R. Part 257.3-8 (b) , (Ref. 9, 16 & 17) **-** Federal requirements indicate that a C&D landfill shall not pose a hazard to the safety of persons or property from fires. There are three elements in a fire: Fuel, oxygen, and ignition. If

one of the three is missing, there is no fire. Landfill fires are complex and present an immediate threat to public health and the environment. Preparations against them must be taken.

Landfill fires can be caused by (Ref. 9):

a. Hot Loads (ashes from fireplaces or barbecues, reactive swimming pool chemicals, smoldering cigarette butts) ;
b. Equipment (hot engine, catalytic converter);
c. Arson;
d. Smokers;
e. Spontaneous combustion

In spontaneous combustion, waste material is heated by chemical oxidation and biological decomposition. The resulting heat causes the material to reach the point of ignition. This type of rapid oxidation in a municipal or construction/wood waste facility is directly related to the amount of moisture present in the fill. The bacteria--both aerobic and anaerobic--present in organic matter require water to biologically breakdown organic matter. As shown in the equation below, as organic material is biodegraded, heat is produced along with other constituents.



Equation Text Description: In the presence of bacteria, organic matter (solid waste) and water react to produce increased heat (delta t), methane (CH4) gas and carbon dioxide (CO2) gas as well as other gases and degraded organic material.

With the correct conditions present, spontaneous combustion can occur at construction debris facilities. This type of combustion will produce excessive amounts of carbon monoxide (CO) and other trace toxic gases due to incomplete oxidation.

Components of a C&D landfill which include wood, plastic, and dry vegetation are highly flammable. C&D Landfill fires are possible. Landfill fires can be quite dangerous if not detected quickly (by producing elevated levels of toxic gases, and subsurface voids); be difficult to put out, sometimes taking days or weeks (& may cost millions of dollars); generate a lot of nuisance smoke off site; and create problems regarding public health, the environment, worker safety, and public relations. In Ohio, C&D landfill fires have been documented at two facilities (now closed): 1) Warren Recycling Inc., and 2) Exit C&D Landfill Inc. (Photos 8, 11,&12).

There are two types of landfills fires, surface and subsurface. Surface fires in general have the following characteristics:

a. Involve recently buried or un-compacted waste generally surface to 1 feet in depth;
b. Generally burn at low temperatures;
c. Emission of dense white smoke (see Photos 9);
d. Smoke includes irritating agents such as organic acids;

e. Burning zone temperature can be high if tires or plastics are burning, high temperatures cause breakdown of volatile compounds which emit dense black smoke;

f. Accidental (hot loads, discarded cigarettes, etc..) or deliberate (arson).

Photo 8. Subsurface landfill fire, Warren Recycling (C&D) Landfill, Ruesch USEPA 2004

Photo. 9. Surface landfill fire, CalEPA, Thalhammer (Landfill Fire Conference, Ohio EPA 2006, Ref. 17)

Photo 10. Surface landfill fire Kentucky. (Landfill Fire Conference, Ohio EPA 2006 Ref. 17)

Subsurface fires in general have the following characteristics:

g. Occur deep below the landfill surface (i.e., 40 feet) and involve materials months or years old;
h. More difficult to extinguish than surface fires;
Substantial settlement over a short period of time (See Photo 11). Has the potential to create large voids (sinkholes) within the landfill;
i. Produce flammable and toxic gases (such as carbon monoxide, CO at levels in excess of 1000 parts per million (ppm).
j. Most common cause is increase oxygen content of the landfill, which increases bacterial activity and raises temperature;
k. Often detected by smoke or smoldering odor emanating from a portion of the landfill (see Photos 8 and 12).
l. Temperatures in excess of 170 degrees Fahrenheit.

Photo 11. Depression caused by subsurface fire, 2004, Exit C&D landfil l (Landfill Fire Conference, Ohio EPA 2006, Ref. 17)

Photo 12. Smoke venting from subsurface fire in 2003, Exit C&D landfil l (Landfill Fire Conference, Ohio EPA 2006, Ref. 17)

To confirm a subsurface fire the CO results must be acquired through quantitative laboratory analysis. Most field portable equipment only have qualitative abilities and are susceptible to cross-sensitivity with high temperatures, humidity, and other constituents of landfill gas (for example, volatile organic compounds, hydrogen sulfide, etc.). As a result, landfill gas containing these conditions and constituents may produce artificially high carbon monoxide readings when using portable monitors.

The California Integrated Waste Management Board (CIWMB) staff considers levels of CO in excess of 1,000 ppm to be a positive indication of an active underground landfill fire. Levels of CO between 100 and 1,000 ppm are viewed as suspicious and require further air and temperature monitoring. Levels between 10 and 100 ppm may be an indication of a fire but active combustion is not present.

Worker Health and Safety Risks - Subsurface landfill fires can create many types of life threatening conditions. These conditions must be communicated to all site personnel and anyone who is involved in the project. Site hazards may include:
Slips, trips, falls, confined space issues, carbon monoxide, and toxic gas exposures, possible cave-ins due to void spaces; and burn issues from the elevated temperatures.

Workers should be careful when approaching burn sites. If the area has been burning for a while the subsurface burn zone can undercut the surface. Under such a condition, vehicles and people may fall into these holes. Safety protocols and considerations related to subsurface landfill fires should be implemented for site workers.

2.7.2.1 Compliance Management Practices to Prevent and Respond to Landfill Fires (Ref. 9, 16 & 17)**:**

A. Prevention

The following recommendations apply to the prevention of landfill fires.
The facility may adopt the following practices:

a. Ban the practice of open burning, as required under EPA regulations, 40 C.F.R. Part 257.3-7(a).
b. Exercise good compaction practices (daily or needed) (Ref. 9).
c. Apply intermediate (daily, weekly, etc..) cover (Ref. 9).
d. Implement good procedures for screening “hot” loads (Ref. 9).
e. Have access to fire extinguishers other fire fighting equipment on-site to control accidental fires and arrangements made with the local fire protection agency to acquire its services when needed (Ref. 9).
f. Prepare a Contingency/Emergency Plan This document sets out an organized, planned, and coordinated course of action to be followed in case of a fire, explosion, or other accidents that releases toxic chemicals, hazardous wastes or materials that threaten human health and the environment (Ref. 17).

Contingency /Emergency Plan - The following factors should be considered and addressed in the plan: location of facility, location of population **,** available water/foam**,**

available resources**,** available agencies**,** environmental impacts, air emissions**,** funding**,** evacuation procedures, and media communications. The Plan should also include contact information for: The Fire Department, Other Landfills, Local and State Health Department, State EPA, US EPA, Private FF companies, and Private Consultants.

In case of an emergency, to request assistance from the EPA please contact:
US EPA Emergency Response, National Response Center: 1-800-424-8802

Hot loads - In order to prevent hot loads (such as smoldering BBQ coals, wood, ashes, etc..) from starting a landfill fire the following is recommended: 1) Train operators to look for hot loads; 2) Designate a hot load area (dirt or concrete area not near active fill area); 3) Direct vehicle to hot load area; 4) Discharge load and smother with soil; 5) Monitor until no evidence of smoldering or high temperature exists; 6) Relocate material to disposal area.

Vehicle fire - In order to prevent vehicle or equipment fires from spreading to the landfill the following actions are recommended: 1) If load is involved, and equipment is not, discharge the load where the fire can be contained and extinguish with dirt, water, or extinguishers; 2) If the equipment is involved in or the source of a fire attempt to extinguish small fires with on-board fire extinguishers or abandon the equipment as close as possible to good access, and call the fire department.

Fire extinguishers - Extinguishers are classified by the types of fire. Class A type fire involves cloth, wood, plastics and rubber where quenching by water or insulating by dry chemical is effective. Class B are fires involving burning liquids such as gasoline, greases, oils, etc.... where smothering action is required. Class C are fires involving electrical equipment such as switches, motors, appliances, etc...where a non-conducting extinguishing agent is required.

The following table provides the types of extinguishers available and types of fire they are designed to extinguish:

Extinguisher Type	**Class of Fire**
Dry Chemical	ABC and BC
Pressurized water	A
Carbon dioxide	B and C
Halon	ABC

B. Response

The following recommendations may be applied when responding to landfill fires:

<u>For above ground fires:</u>

a. Immediately extinguish small fires with extinguishers, water or smother with dirt.
b. Immediately isolate burning materials, if possible, with dirt berms or other suitable fire break.

c. Carefully dig (excavate) burning areas out, if possible. Extinguish by smothering with soil or water (Photo 9).
d. Wet down areas adjacent to the fire.
e. Smother larger fires with dirt. Be prepared to haul large quantities of dirt.
f. Keep working until fire is completely extinguished.
g. Monitor for evidences of sub-surface fires.
h. Notify local fire department and local solid waste authorities.
i. Do not break cover for 10 days after fire is extinguished.
j. Implement Contingency/Emergency plan as appropriate.

For below ground fires:

a. Watch for rapid surface subsidence and smoke vents (See Photos 8,11 & 12);
b. Isolate burning area, if possible;
c. Cut out avenues for air to enter the landfill, wet down cover, patch washouts and cover active face, use relatively tight soils;
d. If authorized, inject water into the fire zone (see Photo 13);
e. Call for help and notify authorities, implement contingency/emergency plan as appropriate.

Photo 13. Firefighting at the Exit C&D landfill Ohio (Landfill Fire Conference, Ohio 2006, Ref. 17)

The California Integrated Waste Management Board (CIWMB) has published guidance on how to prevent and respond to landfill fires. The information provided in this guidance is relevant to C&D landfills except for references to gas collection systems which are not typically found in C&D landfills. The document can be found at: http://www.ciwmb.ca.gov/leaCentral/Fires/LFFiresGuide/default.htm
The guidance is also attached to this document (Attachment II).

2.7.3 Bird Hazards to Aircraft Requirements, 40 C.F.R. 257.3-8(c) - According the federal regulations, a C&D landfill that dispose of putrescible wastes that may attract birds and which occurs within 10,000 feet of any airport runway used by only piston-type aircraft shall not pose a bird hazard to aircraft. This requirement only applies if the

facility is disposing of putrescible waste such as waste able to rot quickly enough to cause odors and attract flies. Such wastes (such kitchen wastes or dead animals) are decomposed by microorganisms with sufficient speed to create nuisance odors and/or gases. In order to gain compliance with this requirement, owner/operators may consider locating the C&D landfill (that dispose of putrescible wastes) beyond 10,000 feet from any airport runway.

C&D landfills which do not accept putrescible wastes do not have to comply with this requirement

2.7.4 Access (Site Security) Requirements, 40 C.F.R. Part 257.3-8(d) – According to federal regulations, a C&D landfill shall not allow uncontrolled public access so as to expose the public to potential health and safety hazards at the disposal site.

2.7.4.1 Compliance Management Practices to Comply With Access (Site Security) Requirements: States have promulgated regulations to comply with this requirement. Tribes may consider these as examples of how states have complied with the federal requirements. For example, Wisconsin requires that access be restricted through the use of fencing, natural barriers or other approved methods. In addition, a gate is required at the entrance to the operation and is to remain locked when the operator is not on duty. (Ref. 5).

EPA recommends the following measures used to limit access of unauthorized persons to disposal facilities: gates, fences, trees, hedges, berms, ditches, and embankments. Chain link, barbed wire added to chain link, and open farm-type fencing are examples of fencing than may be used. Access to facilities may be controlled through gates that can be locked when the site is unsupervised. Gates may be the only additional measure needed at remote facilities (Ref. 2).

2.8. Waste Screening at C&D Landfills

Purpose of Waste Screening: EPA regulations pertaining to C&D landfills (40 C.F.R. 257) do not have specific requirements for waste screening. EPA left it up to owners and operators of C&D landfills to assure that the facility is not accepting waste that is not allowed for disposal. For example, Owners and operators that elect not to receive CESQG hazardous waste may develop a screening procedure that is effective in screening out CESQG materials. EPA encourages owners and operators to work with their state agency to learn that state's screening procedures as guidance for their facility (Ref. FR 257, 1996).

Solid waste arriving at the C&D landfill, should be screened to: 1) ensure that it is appropriate for disposal at the facility; 2) ensure safety; 3) prohibit hazardous waste disposal; 4) facilitate reuse/recycling; 5) ensure that hot loads which may start a landfill fire are detected before they are disposed of in the active cell of the C&D landfill. (Ref. 9)

Procedures for Screening Waste at the C&D Landfill: To have a successful waste screening program, the C&D landfill facility should develop a solid waste management plan that includes (Ref. 8):

- list of wastes that will not be accepted;
- the reasons for accepting/rejecting certain wastes;
- procedure to evaluate a waste;
- how to inspect incoming waste and record violations.

Operating personnel must be trained in the above procedures and not allow unacceptable waste to enter the facility. The final decision to accept or reject a waste and the responsibility for the waste's proper handling and liability for future problems lie with the operating personnel. Therefore, they must be empowered to make the decision whether to accept or reject any incoming loads (Ref. 8).

If unacceptable waste does enter the tribal facility, the tribe should have a procedure to remove the material. If the material is hazardous or infectious, a procedure should be in place to direct or handle any spills. Personnel must know what to do if they find unacceptable waste (i.e., who to call, how to handle it, and where to place it). (Ref. 8)

Once at the landfill, the site attendant, spotter, and equipment operators should be on the lookout for prohibited materials. The following roles are recommended (Ref. 9):

a. Role of Site Attendant (Gatekeeper) **:**
   1. Initial Screening and Classification of Incoming Waste
      - look for obvious signs of something unusual like leaking fluids, chemical smells, drums or containers with hazmat signage, etc.
      - get waste description and customer data from driver
      - know customer's past experience
   2. Direct vehicles to appropriate working face or disposal area
   3. Collect fees
   4. Keep records

b. Role of Spotter
   1. Directs the unloading of waste
   2. Sees the load as it is dumped
   3. Visually screens for prohibited wastes
      - Inspect loads for unacceptable materials or materials to be segregated
      - Watch for hazardous, reportable wastes, "hot' loads
      - Try to handle before hauler leaves, last chance to have material removed by hauler.

c. Role of Equipment Operator

1. Sees load as spread or placed in the disposal area
   (Some materials cannot be seen until the load is broken up).
2. Watches for safety issues as well as environmental
3. Last observer to detect unacceptable waste before they are buried.

2.8.1 Acceptable C&D Waste

A C&D landfill typically receives any one or more of the following types of solid wastes: roadwork material, excavated material, demolition waste, construction/renovation waste, and site clearance waste. Construction and demolition (C&D) debris consists of the materials generated during the construction, renovation, and demolition of buildings,

roads, and bridges. C&D debris often contains bulky, heavy materials that include (Ref. 18):

- concrete,
- wood (from buildings),
- asphalt (from roads and roofing shingles),
- gypsum (the main component of drywall),
- metals,
- bricks,
- glass,
- plastics,
- salvaged building components (doors, windows, and plumbing fixtures), and
- trees, stumps, earth, and rock from clearing sites

2.8.2 Unacceptable Wastes: C&D landfills regulated under Subparts A and B of 40 C.F.R. 257 are not allowed to accept hazardous waste from small quantity or large quantity generators. Further, C&D landfills which do not meet the location, groundwater and correction requirements of 40 C.F.R. 257 Subpart B are not legally allowed to accept hazardous waste from Conditionally Exempt Small Quantity Generators. (CESQG: facilities which produce less than 100 kg or less of hazardous waste per month or 1 kg or less of acutely hazardous waste per month; (Ref. 19).

Household waste is not allowed at C&D landfills since only facilities which meet more stringent design and operating criteria such as municipal solid waste landfills are allowed to accept such waste. This is because its accelerated decomposition will lead to leachate generation which can contaminate groundwater. Likewise, liquid waste cannot be placed in any landfill because it contributes to leachate generation. Household waste means any solid waste (including household hazardous waste, garbage, trash, and sanitary waste in septic tanks) derived from households (including single and multiple residences, hotels and motels, bunkhouses, ranger stations, crew quarters, campgrounds, picnic grounds, and day-use recreation areas). (As defined under 40 CFR Part 258.2).

Hazardous waste is (Ref. 8):

• Ignitable-with a flash point of less than 140 F; examples are paint thinners, alcohol, gasoline, solvents, and uncured resins; and/or
• Is an oxidizer-a chemical that supplies oxygen to a reaction when air is absent; examples are peroxides, nitrates, and chlorates; and/or
• Corrosive-with a pH of 2.0 or less or 12.5 or more-strong acids or bases like lye; and/or
• Toxic-examples are paint wastes, some batteries, pesticides, and electroplating sludges; and/or
• Reactive—meaning waste that is unstable and may react violently when it comes into contact with water or air; an example is a lithium battery; and/or
• PCB-contaminated—with the waste containing 50 parts per million or more of polychlorinated biphenyls.

Hazardous material must be marked and/or labeled by law. However, it will most likely not be marked if it is illegally dumped. Be on guard for such material. Reject them. Get assistance for proper disposal or assistance with any contamination if the material enters your facilities.

Infectious/Medical waste (Ref. 8) : These wastes include: blood, body parts, body fluids, needles, and dressings. These materials can threaten worker safety, attract rodents and insects, and spread disease. They are required by law (U.S. Dept. of Transportation 49 C.F.R. Part 172.323) to be marked but are, again, likely to be unmarked if illegally dumped. Their source are facilities such as hospitals, nursing homes, dental offices, clinics, veterinary offices, research labs, and mortuaries. From a C&D debris perspective, be aware of the problem when these structures are torn down, remodeled, or deconstructed.

Dead animals: EPA considers dead animals to be a solid waste which can be disposed of in municipal solid waste landfills. Dead animals may not be appropriate for disposal in C&D landfills due to the threats posed by such waste to groundwater resources and their potential to spread disease. In general, states regulate the disposal of dead animals. Tribes are encouraged to contact state and local public health departments for information on how to properly dispose of animal carcasses. For small animals the local humane society may also have programs. Other possibilities include contacting a local veterinarian or the landfill operator directly. (Ref. 20).

2.8.2.1 Recommended List of Hazardous Waste/Constituents at Construction and Demolition Sites that should not be accepted for disposal at C&D landfills (Ref. 11):

- Ignitable wastes (flashpoint of less than 140 F) such as paint thinners, paints, paint, and varnish strippers, epoxy resins, adhesive degreasers, and spent cleaning solvents.
- Corrosive wastes (acids with pH less than 2 or bases with pH greater than 12.5) such as rust removers, cleaning fluids, and battery acids.
- Reactive wastes (can explode or violently reach) such as cyanide, plating waste, bleaches, and waste oxidizers.
- Toxic wastes (meeting certain concentrations) such as materials containing metals (e.g. mercury, cadmium, or lead) or solvents (e.g. carbon tetrachloride or methyl ethyl ketone). Materials may include: adhesives, paints, coatings, polishes, varnishes, thinners, and treated woods (Photo 14).
- Spent solvents listed under RCRA (hazardous waste codes F001, F002, F003, F004, &F005).
- Discarded commercial chemical products containing listed chemicals under RCRA (hazardous waste codes P & U).
- Mercury containing wastes (e.g., fluorescent bulbs, broken mercury switches, batteries or thermostats)
- Lead-based paints (note that lead-based paint debris from homes and residences is not covered by hazardous waste requirements.)
- Used oil and hydraulic fluid
- Soil contaminated with toxic or hazardous pollutants
- PCBs
- Asbestos containing material


Photo 14. Toxic waste: adhesives, paints, coatings, polishes, varnishes, & thinners, Townsend 2004 (Ref. 28)

2.8.2.2 Focus On Some Hazardous Constituents Common In C&D Waste (Ref. 8 & 9): Poly Chlorinated Biphenyls (PCBs) containing devices, mercury containing devices, chromated copper arsenate [CCA] treated wood, asbestos containing materials, and lead & lead based paint.

PCBs: PCBs were widely used before 1979 as dielectric fluid to insulate electrical equipment such as capacitors, transformers, switches, and voltage regulators, circuit breakers, and for fluorescent lamp ballasts. PCBs are considered hazardous because studies have shown them to cause cancer as well as reproductive and developmental defects in laboratory animals. Handling and disposal of materials containing PCBs is regulated by the Toxic Substances Control Act (TSCA), the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), and 40 C.F.R. Part 761-federal regulations governing disposal and liability from improper disposal of PCB-containing materials.

In the fall of 1993, the EPA received data from several sources indicating that PCBs were found in the insulating (potting) compounds of fluorescent light ballasts (Photo 15) generally manufactured prior to 1978 (all ballasts manufactured through approximately 1978 contain PCBs and some manufactured after 1978 contain PCBs as well). Ballasts that contain potting compounds that have 50 ppm or more PCBs (which includes any PCB-containing ballast you will encounter) are termed PCB Articles. PCB Articles must be stored, transported, and disposed of in accordance with Toxic Substances Control Act (TSCA) regulations. Contact an EPA Regional or State Operations Office.


Photo 15. Example of a PCB containing Fluorescent Light Ballast, Townsend 2004 (Ref. 28)

To avoid incurring liability from improperly managed ballasts that have PCB-contaminated potting compounds, the EPA recommends that untested ballasts or ballasts that do not carry a "No PCBs" label should be managed as PCB waste.

PCB is defined as a hazardous substance under CERCLA (Superfund). CERCLA lists one pound as the reportable quantity for PCBs when they are disposed of in a landfill. Each small capacitor in fluorescent light ballast contains at least 0.1 pounds of pure PCB. So if your facility is disposing of 10 or more light ballasts, your facility is subject to CERCLA reporting requirements. Reporting places your facility on a list of potential Primary Responsible Parties in any subsequent Superfund cleanup of the landfill. For this reason, you can avoid liability by managing ballasts in an alternative manner such as recycling.

EPA has established a policy that recommends against disposing of individual small PCB capacitors, small PCB capacitors contained in fluorescent light ballasts, or untested fluorescent light ballast potting compounds as municipal solid waste. Instead, the EPA encourages disposal of non-leaking fluorescent light ballasts and small PCB capacitors at a TSCA-approved facility. These facilities include recyclers, landfills, and incinerators that have EPA approvals to dispose of PCBs.

Ballasts in a lighting system can be punctured or damaged, exposing an oily, tar-like substance (the potting compound). If the leaking ballast is identified as containing PCBs, the ballast and all materials that come in contact with it are fully regulated and are subject to federal PCB requirements.

Should you encounter a leaking ballast containing PCBs, follow these procedures:

• Immediately (within 24 hours) follow detailed spill procedures outlined in 40 C.F.R., Part 761, and Subpart G.

• Leaking ballasts must be disposed of in an EPA-approved PCB incinerator.

• You can transport the leaking ballasts yourself or you can hire a certified hauler. If you transport the ballasts yourself, contact the incinerator first to make sure your ballasts will be accepted. If you hire a certified hauler; the leaking ballasts must be manifested for shipment. Some haulers are authorized as PCB commercial storers and may be used to arrange for the disposal of ballasts containing PCBs.

Used, nonleaking ballasts may be recycled even if they contain PCBs. Recycling reclaims valuable metals, reduces the volume of solid waste sent to landfills, and prevents toxic substances from being burned in an incinerator or buried in a landfill.

Mercury Containing Devices - Scientific study and recent experience confirm that environmental exposures to mercury, particularly in its highly toxic organic form, methylmercury, can result in harm to human beings and wildlife. Humans are exposed to methylmercury through fish consumption. Although mercury is a naturally-occurring element, the amount of mercury released to the environment has increased since the beginning of the industrial age. Once released, mercury persists in the ambient environment, where it circulates among air, water, sediments, soil, vegetation and wildlife. Most of the mercury sources entering the environment is believed to be the result of air emissions that are transported through the atmosphere and eventually deposited on land and water surfaces. Once mercury enters water, biological processes transform it to a highly toxic form (methylmercury) that builds up in fish and animals that eat fish. Exposure to high levels of mercury has been linked to serious nervous system and developmental problems in humans, especially children.

Mercury-containing devices that can be found in demolished structures include (Ref. 28):

Fluorescent lamps (Photos 16 & 17)
Mercury lamps
Metal halide lamps (Photo 18)
High pressure sodium lamps (Photo 18)
Thermostats and thermometers (Photo 20)
Mercury switches and relays (Photo 21)
Neon Lamps
Float Control Switches

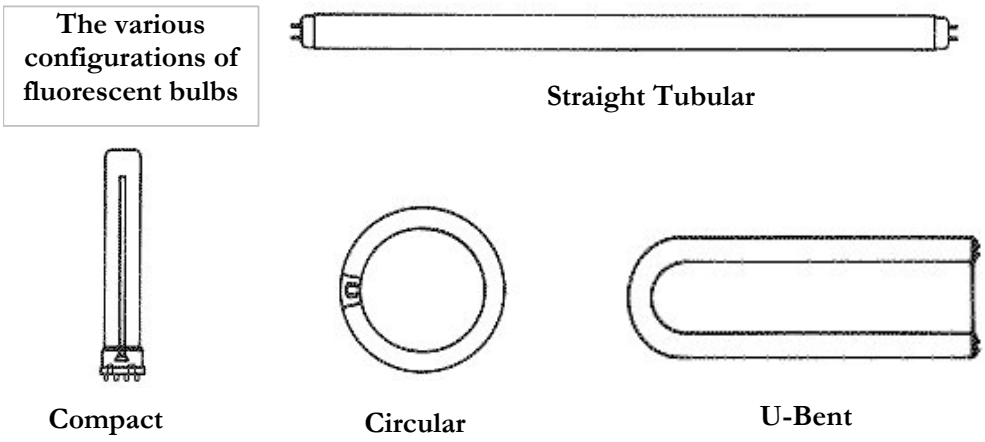


Photo 16. Typical Fluorescent Lamp Fixture , Townsend 2004 (Ref. 28

Photo 17. Improper Disposal of Fluorescent Lamps, Townsend 2004 (Ref. 28).

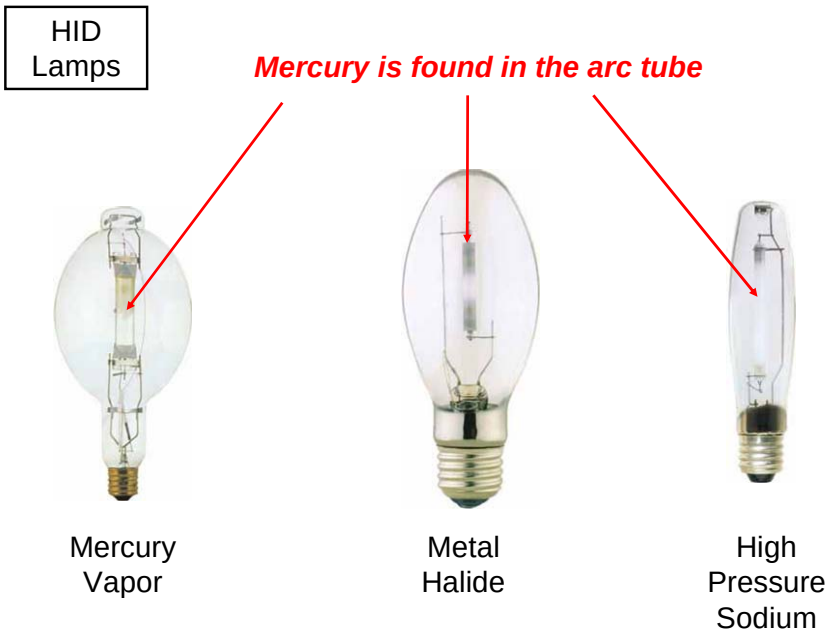
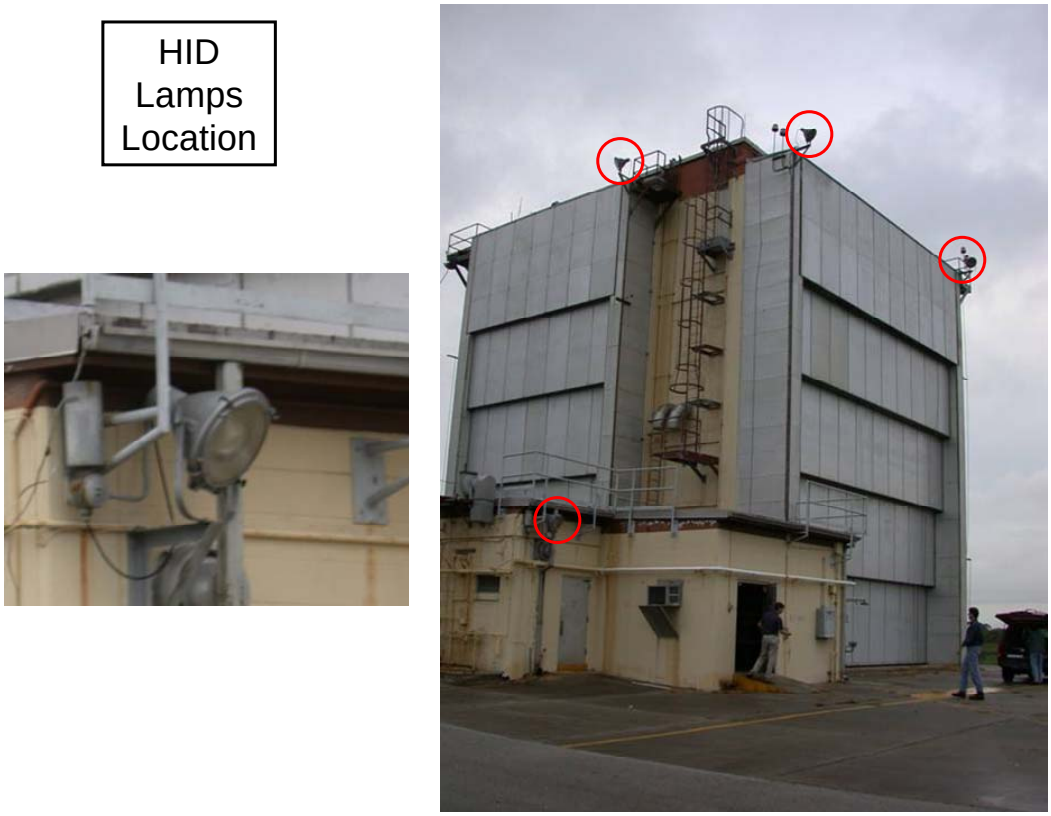


Photo 18. HID Lamps, Townsend 2004 (Ref. 28)



Photos 19. HID Locations, Townsend 2004 (Ref. 28)

Mercury Thermostats

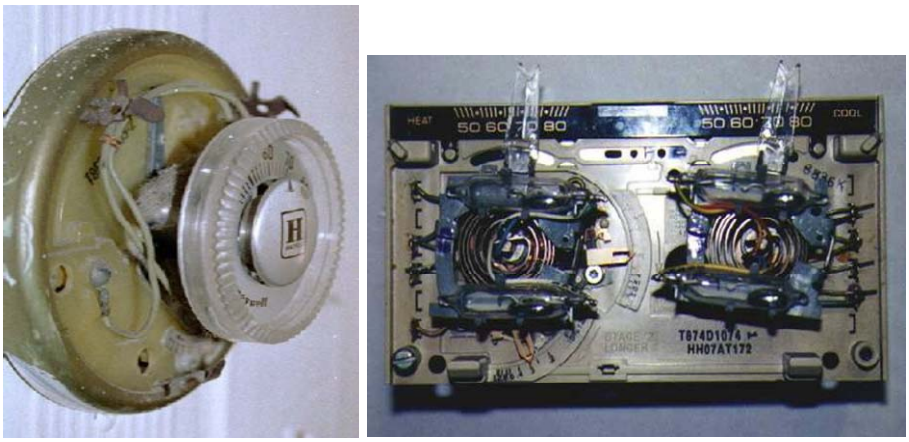


Photo 20. Mercury Switches, Townsend 2004 (Ref. 28)

Mercury-Containing Silent Wall Switch

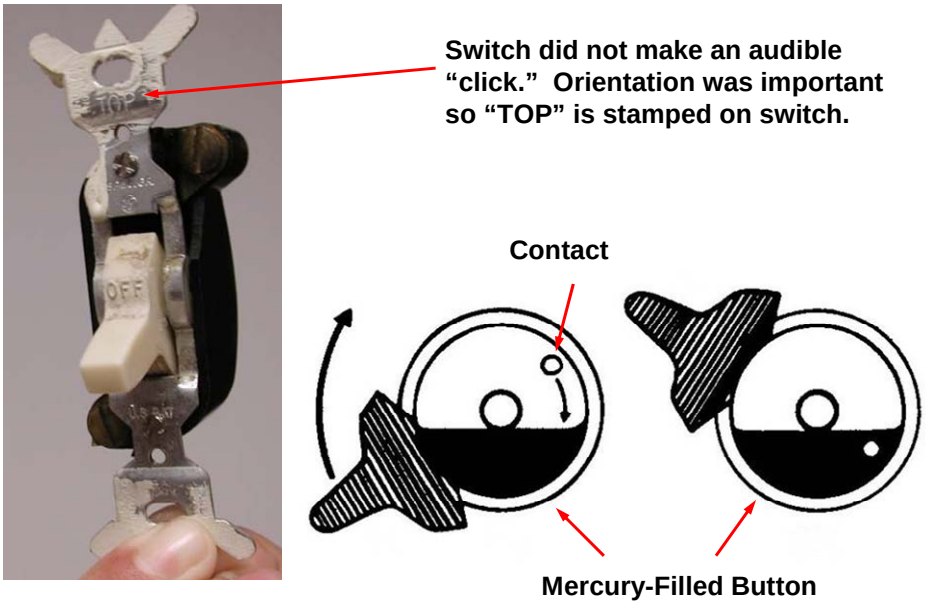


Photo 21. Mercury Containing Switch. Townsend 2004 (Ref. 28)

EPA has developed a Safe Mercury Management Program to encourage activities that best support the goals of proper recycling and ensuring safe storage and disposal of mercury wastes and elemental mercury. This program includes projects that come from stakeholders such as States, the regulated community and environmental organizations, as well as ideas that we have developed while regulating the treatment and disposal of mercury-bearing a wastes.

Projects that support the goal of proper mercury disposal include the following:

• Lamp Recycling Outreach Program. EPA has initiated a recycling outreach program for mercury-containing lamps (e.g., fluorescent ,light bulbs). The program promotes lamp recycling by commercial and industrial users of mercury-containing lamps, and increases awareness of proper disposal methods in compliance with Federal and state Universal Waste rules. The St. Regis Mohawk Tribe is developing lamp education and behavior modification projects that will include training workshops and seminars.

• Mercury Switch and Auto Recycling Program. The automotive industry has used mercury in a variety of applications, including electrical switches for convenience lights and some anti-lock brake . systems. Much of the mercury in the more than 215 million mercury switches still in vehicles will be released to the environment when the vehicles are scrapped or recycled, unless programs are in place to remove these mercury switches before final disposal of the vehicles. This project will build on state efforts to remove mercury switches from automobiles and to prevent mercury releases during automobile recycling.

• Universal Waste Rule (40 C.F.R. Part 273) . The Universal Waste Rule was written in 1995 to streamline environmental regulations for wastes generated by large numbers of businesses in relatively small quantities. It is designed to reduce the amount of hazardous waste disposed of in municipal solid waste, encourage the recycling and proper disposal of certain common hazardous wastes, and reduce the regulatory burden for businesses that generate these wastes. The rule defines Universal Wastes to include batteries, pesticides, thermostats and lamps. This rule also includes certain mercury-containing equipment. Mercury is used in several types of instruments that are common to electric utilities, municipalities and certain industries. Some of these devices include switches, barometers, thermometers, temperature gauges, and sprinklers. Note, however, such devices from households would not be subject to the universal waste standards.

Asbestos Containing Materials - Asbestos refers to a group of naturally-occurring fibrous minerals that separate into very fine fibers. Asbestos fibers are strong, heat-resistant, and very durable. Asbestos is considered most dangerous when it is crushed, crumbled, or disturbed (occurs especially during remodeling or demolition) because it can release tiny fibers into the air. These fibers remain suspended in the air for a long time and can easily penetrate body tissue after being inhaled or ingested. Inhalation of asbestos fibers can lead to asbestosis (scarring of the lungs), mesothelioma (cancer), and lung cancer.

Because of these serious health risks, building materials containing asbestos must be disposed of according to strict federal regulations, which include disposal only in landfills certified by the state or Tribal to accept asbestos waste. Contractors are liable for failure to follow regulations, procedures, and permitting requirements for containing, hauling, disposing, and keeping records of asbestos waste.

The Clean Air Act (CAA) requires the U. S. Environmental Protection Agency (EPA) to develop and enforce regulations to protect the general public from exposure to airborne contaminants that are known to be hazardous to human health. In accordance with Section 112 of the CAA, EPA established National Emissions Standards for Hazardous

Air Pollutants (NESHAP) to protect the public. Asbestos was one of the first hazardous air pollutants regulated under Section 112. On March31, 1971, EPA identified asbestos as a hazardous pollutant, and on April 6, 1973, EPA first promulgated the Asbestos NESHAP in 40 C.F.R. Part 61. The demolition and/or renovation of structures with asbestos is governed by 40 C.F.R. Part 61.145. Standards for active waste disposal sites which accept asbestos containing waste material are specified under 40 C.F.R. Part 61.154. Currently, EPA has the responsibility of administering the NESHAP program for Tribes in Region 5.

The Asbestos NESHAP regulations protect the public by minimizing the release of asbestos fibers during activities involving the processing, handling, and disposal of asbestos-containing material. Accordingly, the Asbestos NESHAP specifies work practices to be followed during demolitions and renovations of all structures, installations, and buildings (excluding residential buildings that have four or fewer dwelling units). In addition, the regulations require the owner of the building and/or the contractor to notify applicable Tribal agencies and/or EPA Regional Offices before all demolitions, or before renovations of buildings that contain a certain threshold amount of asbestos.

Asbestos/Demolition: The primary concern about asbestos-containing material is when it exists in friable form. Friable means that the material can be crumbled or crushed with hand pressure and is therefore likely to emit fibers. Asbestos-containing material existing in nonfriable form and in good (undamaged) condition should present no problems as long as it is left alone and maintained in good condition.

The following are examples of places in a house where asbestos might be found:

• Exterior Surfaces - exterior walls and closed decks built with fire retardant sheeting that looks like gray cardboard; cement asbestos board (usually light gray in color) used as sheets for straight and lap siding, or shaped to substitute for wood shingles; roof felt or window putty.

• Wall and Ceiling Insulation - loose blown-in (e.g. zonolite) and batt insulation (especially in homes built or remodeled between 1930 and 1950) found where interior spaces need to be protected from outside temperatures (such as outside walls and floor or roof/attic spaces between structural joists and rafters).

• Floor Coverings - sheet vinyl (including the backing or underlayment), vinyl tile, and vinyl adhesive. Furnaces, Boilers, Heaters, and Piping - insulation blankets (the outside covering or shell), door gaskets, duct insulation, and tape at duct connections of furnaces and boilers; furnaces with asbestos-containing insulation and cement (the material is white or gray in color and resembles plaster) generally installed in older homes between 1920 and 1972; on and inside furnace ducts; insulation or asbestos paper (which looks like corrugated cardboard) around steam and water pipes, particularly at elbows, tees, and valves; cement sheets, millboard, and paper frequently used as thermal insulation for protection of floors and walls around woodstoves.

• Interior Surfaces - sprayed-on or troweled-on surface material on wall and ceiling surfaces; acoustical tiles, textured paint, or heat reflectors (woodstoves).

• Electrical Equipment - materials in older lamp socket collars, electric switch and receptacle boxes, liners for recessed lighting, backing for switchboard panels, fuse boxes, and old-fashioned "knob & tube" wiring. Built-in Equipment - oven'or dishwasher (in cabinet) units were often wrapped in insulation blankets or sheets until the mid1970s; water heaters, range hoods, or clothes dryers.

• Appliances - parts with asbestos-containing materials in refrigerators, freezers, portable dishwashers, or ovens.

The above list does not include every material or place in a house that may contain asbestos. More than 3,000 building products contain asbestos. The age of the building is not a valid way to determine the presence of asbestos. Suspicious material should always be tested.

Owner and operators of a demolition activity: 1) Must thoroughly inspect the affected facility for the presence of asbestos prior to commencement of the demolition or renovation operation; 2) Submit to EPA a notification of demolition and renovation prior to the commencement of demolition or renovation operation; and 3) Comply with all applicable procedures for asbestos emission control. EPA has the responsibility to verify compliance with the aforementioned activities. EPA inspectors will coordinate enforcement with credentialed /trained tribal staff as appropriate in accordance with the EPA Region 5 Implementation Strategy for Indian Country.

Requirements for Facilities Which Disposal of Asbestos Containing Materials: As stated previously, standards for active waste disposal sites which accept asbestos containing waste material are specified under 40 C.F.R. Part 61.154. Owner/operators who wish to operate such facilities must also 40 C.F.R. Part 61.151 upon closure of the facility. In general, active asbestos disposal sites must meet requirements which include:

- No visible emissions to the outside air from any active disposal site where asbestos containing material (ACM) has been deposited or: 1) be properly covered with non ACN material every 24 hours; or 2) covered with an effective dust suppression agent that binds dust and controls wind erosion; or 3) use an alternative emission control method that has been approved by the Administrator.
- Deter access through a natural barrier or install warning signs and fencing.
- Maintain operational records including generator & transporter information plus location, depth, area, & amount on a diagram or map.
- Comply with applicable closure requirements.

In general, Tribes or owner/operators in Indian Country who are interested in constructing/operating a disposal facility which receives asbestos containing materials should be aware of the permit requirements under the Clean Air Act which includes:

- A Title V operating permit in accordance with 40 CFR part 71;

- A New Source Review Construction permit if emissions due to the construction of the facility will exceed significant thresholds. (See 40 CFR Part 52.21)

For more information regarding permitting requirements under the Clean Air Act contact:

Danny Marcus
Environmental Engineer
U.S. Environmental Protection Agency
Region 5 - Air and Radiation Division
Phone: (312) 353 - 8781
Fax: (312) 886 - 5824

For more information regarding asbestos, Tribes can also contact the following Tribal Coordinators from the Region 5 Air and Radiation Division:

Michigan	**Minnesota**	**Wisconsin**
Stephanie Cheaney	Ben Giwojna	Timothy Carter
312-886-3509	312-886-0247	312-886-7613
cheaney.stephanie@epa.gov	giwojna.benjamin@epa.gov	carter.timothy@epa.gov

The Region 5 asbestos website can also be visited at:
`http://yosemite.epa.gov/r5/r5ard.nsf/asbestos+main?OpenView`

Chromated Copper Arsenate (CCA or Arsenic) Treated Wood (Ref. 21)- C&D waste stream may include wood that have been treated with chromated copper arsenate. Some construction-related material has generated specific attention. Random tests conducted by the Environmental Working Group in Washington, DC, concluded that the amount of arsenic found on the surface of pressure-treated lumber used widely for decks and play sets exceeds safe levels even after years of wear. On February 12, 2002, lumber companies, in an agreement with EPA, said that after December 2003 they no longer would use CCA, a powerful pesticide, to protect lumber from decay and insect damage in residential settings. As part of the agreement, EPA said it did not believe there was any reason for people to replace the CCA-treated wood, which is used in an estimated 90% of such outdoor wooden structures as decks, play sets, and picnic tables.

Excessive exposure to inorganic arsenic may be hazardous to your health. Certain activities can facilitate the release of inorganic arsenic, so people working with CCA-treated wood should take a number of precautions, as follows:

- Saw, sand, and machine CCA-treated wood outdoors. Wear a dust mask, goggles, and gloves.
- Clean up all sawdust, scraps, and other construction debris thoroughly and dispose of it in the trash (i.e., municipal solid waste). Do not compost or mulch sawdust or remnants from CCA-treated wood.
- Do not burn CCA-treated wood, as toxic chemicals may be released as part of the smoke and ashes.
- After working with the wood, wash all exposed areas of your body, especially the hands, thoroughly with soap and water before eating, drinking, toileting, or using tobacco products.
- Wash your work clothes separately from other household clothing before wearing them again.

These precautions will reduce your exposure from inhaling or ingesting sawdust, protect your eyes from flying particles, and prevent exposure to toxic smoke and ash. For more suggestions on avoiding unnecessary exposure to CCA, the Agency has identified some Common Sense Tips. Before working with CCA-treated wood, always consult the Consumer Safety Information Sheet (Ref. 21) , which is also available in hard copy at 1-800-282-0600.

CCA treated wood may be disposed of in C&D landfills. Homeowners should never burn CCA-treated wood or use it as compost or mulch. CCA-treated wood can be disposed of with regular municipal trash (i.e., municipal solid waste, not yard waste) in many areas. However, state or local laws may be stricter than federal requirements. For more information, please contact the waste management agency in your state, which you can find at http://www.epa.gov/epaoswer/osw/stateweb.htm.

CCA treated wood should not be used where routine contact with food or animal feed can occur. Do not use CCA-treated wood for cutting boards, counter tops, bee hives, compost, mulch, or structures or containers for storing human food or animal feed. Furthermore, since some animals like to eat wood, CCA-treated wood should not be used where animals can chew on the treated wood. Also, do not use where treated wood may come into direct or indirect contact with drinking water. CCA-treated wood should not be used to build Tribal sweat houses or boats for children or put in the mouth of a Tribal member in the traditional process of using wood strips to make baskets. See the Guidance for Uses of Chromated Copper Arsenate (CCA) AWPA Commodity Standards (numeric order) (Ref. 21) for allowed and disallowed uses and examples.

Studies conducted by the University of Florida indicated the CCA treated wood has the potential to contaminate groundwater when disposed of in unlined landfills. Studies are ongoing and Florida is considering banning CCA treated wood from unlined landfills.

Lead/Lead Paint (Photo 22) - According to the EPA, approximately three-quarters of the nation's houses built before 1978 (approximately 64 million dwellings) contain some lead-based paint (LBP), although lead-based paint is not used in new residential construction. Lead is also a common component in C&D debris, found in roofs, cornices, tank linings, and electrical conduits. These materials may leach lead into the environment if not properly managed. Soft solder, an alloy of lead and tin, is used in plumbing for soldering joints. Soft solder has been banned from many uses in the United States.

Photo 22. Lead based paint in deteriorated condition, Townsend 2004 (Ref. 28)

An estimated one in eleven American children has high lead levels in their blood. The Centers for Disease Control (CDC) describes lead poisoning as the most significant, preventable health problem affecting children today. Consumers are suing contractors for lead contamination that occurs during demolition and renovation. You can protect yourself by becoming aware of the hazards of lead poisoning, managing lead-containing demolition debris appropriately, and by examining your liability carefully.

The major source of lead in a home is from contaminated dust (old paint, contaminated soil, and leaded gasoline/auto exhaust residues). Other sources of lead include dust from remodeling and lead in the water from solder or fixtures. LBP is most commonly found in areas where high durability is needed: windows, doors, door frames, woodwork, and furniture. LBP is only a hazard if the paint is damaged (peeling, cracking, etc.). The presence of the paint itself is not necessarily a hazard. When disposed, however, materials with LBP pose a contamination problem, especially if it gets into the groundwater or surface water. Research has shown that small doses of lead, once thought to be harmless, can cause serious damage to the human body. Young children are at the greatest risk for lead poisoning, which can cause delayed development, reading and learning problems, lowered IQ, hyperactivity, and discipline problems. Larger doses of lead can cause high blood pressure, anemia, and kidney disorders (even in adults).

EPA estimated that the cost of LBP debris if disposed of as hazardous waste was $316/ton and much less if it was disposed of as municipal solid waste. There was fear that the high cost frustrated LBP removal. To help accelerate the pace of LBP removal from residences, and so reduce exposure to children and adults from the health risks associated with lead, EPA has changed its regulations to allow the disposal of residential LBP debris in construction and demolition (C&D) landfills, effective June 18, 2003.

EPA defines residential LBP waste as: waste containing lead-based paint, which is generated as a result of activities such as abatement, rehabilitation, renovation and remodeling in homes and other residences. The term residential lead-based paint waste includes, but is not limited to, lead-based paint debris, chips, dust, and sludges.
So if the LBP waste is generated from a residence as a result of abatements, renovations, or remodelings then it can go to a C&D landfill or a municipal solid waste landfill. If the LBP waste in question is generated as a result of demolition or deconstruction of a residence or is a waste generated by the renovation or remodeling of a commercial building , then that waste stream is treated as any other waste stream: the generator uses process knowledge or testing to show that it is not hazardous or it is hazardous. Testing would be conducted in accordance with 40 C.F.R. Part 261.

For example, a lead Toxicity Characteristics Leaching Procedure test would be conducted on a representative sample of LBP abatement waste to determine if the wastes are characteristically hazardous. The maximum concentration of contaminants for the toxicity characteristic for lead is 5 mg/l. Results exceeding this concentration would cause the waste to be called hazardous, requiring it to be disposed accordingly as a hazardous waste.

2.8.3 Examples of Materials/Waste Accepted or Banned in Michigan, Wisconsin, Minnesota, & Tribal C&D/Demolition Landfills:

The following examples may assist Tribes as models to help develop screening lists at C&D landfills.

Examples of Acceptable Waste:

1. Wisconsin C&D landfills accept waste which meets its definition of "construction and demolition waste": solid waste resulting from the construction, demolition, or razing of buildings, roads and other structures. C&D waste typically consists of concrete, bricks, bituminous concrete, wood, glass, masonry, roofing, siding, and plaster. This definition does not include waste paints, solvents, sealers, adhesives or similar materials.(Ref. 26).

2. Minnesota has an acceptable C&D waste list which applies to any demolition landfill in the state. This list includes: Bituminous concrete (includes asphalt pavement and blacktop), concrete (including rerod), stone, uncontaminated soil, masonry, untreated wood, siding, wall covering, electrical wiring and components, roofing materials, duct work , wallboard, sheetrock, built-in cabinetry, plumbing fixtures, affixed carpet and padding, ceramic items, conduit and pipes, glass (windows) , insulation, plastic building parts, sheathing, molded fiberglass, rubber, drain tile, recognizable portion burned structures, metal, ceiling tile, wood and vinyl flooring. (Ref. 23)

3. The Grand Portage Band of Lake Superior Chippewa C&D landfill (Minnesota) has the following acceptable C&D waste list: Asphalt, bituminous concrete, bricks, concrete (including re-rod), masonry, tree stumps, root balls, untreated wood, insulation, siding, sheetrock, shingles ;Waste materials as part of a demolished structure including: built-in cabinetry, ceramic fixtures, conduit, glass, insulation (fiberglass, cellulose, etc.), metal, plastic, roofing, shingles, tile (ceramic, floor, vinyl, etc.), wiring and wood (Ref. 25).

2. The Nett Lake Reservation Demolition Debris Land Disposal Facility (Bois Forte Band of Chippewa) accepts solid waste resulting from the demolition of buildings and other man-made structures including: concrete, brick , bituminous concrete, untreated wood, masonry, trees, and glass or plastic building parts, asphalt, concrete including rerod, tree stumps, grubbing, root balls, untreated wood, insulation, siding, sheetrock, shingles, built-in cabinetry, ceramic fixtures, conduit, glass, insulation, metal, plastic, roofing , shingles, tile, wiring, wood. (Ref. 24).

Examples of Prohibited Wastes:

1. Michigan prohibits the following materials from disposal at their C&D Landfills: Household waste, hazardous waste, liquid waste, materials that would adversely affect the liner.(Ref. 22)

2. The Grand Portage Band of Lake Superior Chippewa C&D landfill has the following unacceptable C&D waste list: adhesive, agricultural chemicals or containers, animal carcasses, white goods, heaters/furnaces, asbestos wastes or waste that could spontaneously combust or ignite due to high temperatures, ashes, batteries, caulking, cardboard, carpet and padding, chemical containers, epoxy, fluorescent tubes and ballasts, food waste, foundry waste, furniture, glue, hazardous waste, high-intensity discharge lamps, household waste, infectious waste, liquids, machinery/engine parts, mattresses, medical waste, packaging materials (cardboard, paper, etc.) , paints, thinners, solvents, varnishes, PCBs, containers, filters, dust collectors, pesticide containers, petroleum products, radioactive waste, resins-epoxy, sandblasting waste, sealants, septic tank pumpings, sludge of any kind, street sweepings, tar, thermostats and switches container mercury, tires, treated wood, vehicle of any type, and yard wastes. (Ref. 25)

3. The Nett Lake Reservation Demolition Debris Land Disposal Facility (Bois Forte Band of Chippewa) has the same list of non-acceptable/prohibited waste as the Grand Portage Band of Lake Superior Chippewa C&D landfill. (Ref. 24).

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27. Landfill Operational Criteria Chapter NR 506. Wisconsin Department of Natural Resources. January 2006. http://www.legis.state.wi.us/rsb/code/nr/nr506.pdf

28. C&D Debris Management and Environmental Impacts:Overview and Current Topics, Timothy G. Townsend, PhD, PE Dept of Environmental Engineering Sciences University of Florida, Ohio EPA C&D Debris Workshop, June 1-2, 2004.

Attachment I : Table of Selected State C&D Landfill Requirements and Internet Links

Attachment II: Landfill Fires Guidance Document. California, 2007

Attachment III: Example of C&D Landfill Permit Nett Lake Reservation Boise Forte Band of Chippewa (Minnesota)