

a study ("Damage Cases: Construction and Demolition Waste Landfills") to determine whether the disposal of C&D debris in C&D landfills has led to the contamination of ground or surface water or damages to ecological resources. All of the damage case information EPA evaluated came from existing information in State files and literature sources. EPA was able to identify only 11 C&D landfills with evidence of ground water or surface water contamination. EPA found no documented evidence of existing human health risks or ecosystem damages at construction and demolition landfills and little documented evidence of off-site contamination.

When the Agency reviewed existing sources of data for C&D damage cases, the Agency reviewed existing Superfund databases (NPL), contacted EPA regional representatives, 32 States, county environmental Agencies, and existing studies or reports providing background information on C&D facilities and damages.

When EPA searched for C&D damage cases, several criteria were used to identify where the damages could reasonably be associated with construction and demolition facilities and construction and demolition waste disposal. First and foremost, the Agency sought to identify C&D facilities that accepted predominantly C&D wastes. Landfills that had received significant quantities of municipal waste, non-hazardous industrial waste, or hazardous waste in the past were excluded from consideration. Additionally construction and demolition sites located near other facilities or leaking underground storage tanks that could reasonably be the source of contamination were excluded as possible C&D damage cases. Lastly, there needed to be documented evidence of contamination at the C&D site.

The 11 damage cases that the Agency has identified are from New York, Virginia, and Wisconsin. Virginia and Wisconsin have required groundwater monitoring since 1988 at C&D facilities. The facilities in New York were among 9 C&D sites investigated due to public concerns about possible hazardous waste disposal and potential human health and environmental impacts.

A study of the 11 C&D sites revealed on-site ground-water contamination at all of the facilities and surface water contamination at 6 of the 11 sites, with the main contaminants being metals and other inorganics. At 3 of the 11 facilities, sediment contamination was also detected. Although most of the contamination associated with these

damage cases occurred on-site, 2 of the eleven facilities did have off-site contamination (both facilities had sediments and surface water contamination occurring off-site).

Although most of the 11 sites were monitored for a wide range of organic and inorganic constituents, virtually all of the contamination was associated with inorganics. Constituents that exceeded State ground-water protection standards or Federal drinking water criteria most frequently were manganese (9 sites), iron (8 sites), total dissolved solids (6 sites), lead (5 sites), magnesium (4 sites), sodium (4 sites), pH (3 sites) and sulfate (3 sites). The other 8 constituents that were detected in ground water at these 11 sites were detected at only one or two sites.

For the 6 sites that had surface water contamination, the constituents that exceeded State surface water standards or Federal Ambient Water Quality Criteria most frequently were iron (4 sites), zinc (3 sites), lead (2 sites), and copper (2 sites). The other 5 constituents that were detected in surface water at these 6 sites were detected only once. No fish kills or other observable impacts on aquatic life were reported in any of the references that the Agency reviewed.

A look at the most frequently detected constituents in ground water or surface water reveals that of the 10 constituents, 7 are a concern due to SMCLs; only lead, magnesium, and sodium are not. Magnesium was found to exceed only an applicable State standard by a factor of 4 times, while sodium was found to exceed an applicable State standard by a factor of 14. Lead was found in ground water to exceed the Federal action level at the tap (15 µg/l) by a factor of 6. Lead was also found in surface water to exceed the established Federal Ambient Water Quality Criteria by a factor of 16 to 300 (although for the higher factor the reported value of lead in the surface water was "estimated").

c. Construction and Demolition Ground-Water Monitoring Data. Limited ground-water monitoring data suggests that a similar set of parameters that are detected in C&D leachate and that appear in damage cases associated with C&D facilities are also detected in ground water. Based on the limited ground-water data, only 19 parameters had a maximum value exceeding a health-based benchmark. Of these 19 parameters, 8 exceeded a secondary MCL (TDS, sulfates, Ph, manganese, chlorides, iron, copper, and aluminum). For the remaining 11 parameters, 5 are organics (Bis(2-ethylhexyl) phthalate, methylene chloride, tetrachloroethene, 1,2,4-trichlorobenzene, and 1,1,1-

trichloroethane), 5 are inorganics (arsenic, cadmium, lead, mercury, and nickel), and 1 is a conventional parameter (nitrate). Only one constituent (cadmium) exceeded its health-based value by an order of magnitude. Some constituents had a maximum ground-water value just exceeding its health-based value. It is important to remember that when looking at the limited ground-water monitoring data what is being discussed in this paragraph are maximum levels; additional sampling events for these constituents resulted in lower levels or non-detects.

d. Conclusions for Construction and Demolition Facilities. While the data on construction and demolition waste landfills are limited, the Agency has reached some conclusions. Based on evaluation of the data analyzed above, individual construction and demolition waste facilities may have caused limited damage to ground water and surface water and potentially, may pose a risk to human health and the environment. Individual C&D facilities may also affect usability of drinking water due to aesthetic impacts. However, the Agency believes that C&D facilities, in general, do not currently pose significant risks and that individual damage cases are limited in occurrence. The small number of damage cases and the leachate concentration data reviewed above support these conclusions. Ground-water monitoring and corrective action at these facilities will ensure that any releases and potential risks at individual facilities will be identified and corrected in a timely fashion to protect human health and the environment. Location restrictions will ensure that non-municipal solid waste disposal facilities that receive CESQG waste will be located in acceptable areas, thereby, providing further protection of human health and the environment. Because construction and demolition waste facilities, in general, do not currently pose significant risk, the Agency has concluded that the statutory minimum requirements will ensure protection of human health and the environment.

2. Off-Site Commercial Landfills

As for the 10–20 commercial off-site facilities that accept only industrial wastes, the Agency understands that corporate policy has been to subject these types of facilities to stringent environmental controls. In addition, State regulations also apply to these types of facilities. A facility of this type generally employs a liner, has closure and post-closure care requirements and financial assurance standards. These