

## NEW MEXICO CITIZENS FOR CLEAN AIR & WATER, INC.

### REVISED COMMENTS REGARDING CASE 13586

#### Application of the New Mexico Oil Conservation Division for Repeal of Existing Rules 709, 710 and 711 Concerning Surface Waste Management and Adoption of New Rules Governing Surface Waste Management.

The Oil Conservation Division has continued the hearing, revising the proposed rules as of 11/14/05. Accordingly, we revise our discussion of Rule 53. This document replaces our comments submitted earlier in its entirety.

Rule 51 D: Denial of approval. As proposed on 11/14/05, Rule 51 D would allow the OCD to deny approval of a transportation permit for liquid wastes if an applicant had greater than 25% interest in an entity that is out of compliance. Previously, the proposed interest limit was 5%. We previously suggested the limit could be increased to 10% for practical reasons. Increasing the limit to 25% is unacceptable because it invites a manipulation of ownership to circumvent the rule.

Rule 53 A (2) (a) and (b): Exemptions. The first exemption would allow landfarming or landfill disposal of unlimited waste from one well, without regard to well spacing. The second exemption would allow 1500 bbl of liquid per month to be disposed by any single or affiliated operator, without permit. Furthermore, an operator could create any number of centralized landfills of less than 1400 cubic yards for disposal of his, or an affiliate's, wastes. We can see no reason why centralized facilities should be exempt from the environmental protections required of commercial facilities, particularly as smaller well spacings are being requested.

Rule 53 B (6) Major modification. The proposed rule would define "major modification" as an increase of the area occupied by the permitted facility. This wording is unclear, in that a "facility" may include roads, buildings, and unused area. We suggest that the definition be altered to apply to the specific area on which or within which wastes may be placed, temporarily or permanently. The definition of a major modification would then include *an increase in the area within which wastes have been authorized to be received or stored; or an increase in the area within which wastes have been authorized to be treated or disposed.* With this definition, conversion of a receiving area to a landfill, for example, would be a major modification. We believe this is the intent of the original proposal.

Rule 53 C (4) (b) refers to 53 C (2) (b), which apparently does not exist. The reference is probably to 53 C (4) (a).

Rule 53 D (2): Denial of permit. This rule enables OCD to deny a permit if an owner with greater than 25% interest also owns or has owned a portion of another facility that is out of compliance. Previously, the proposed interest limit was 5%. We previously suggested

the limit could be increased to 10% for practical reasons. Increasing the limit to 25% is unacceptable because it invites a manipulation of ownership to circumvent the rule.

Rule 53 E (3): Size. The rule requires that no surface waste management facility be larger than 500 acres. However, the rule in no way prohibits any number of adjacent 500-acre facilities, each with its own permit. We find no provision within the proposed rules that would allow OCD to deny a permit based solely on the existence of an adjacent facility. We suggest that the rule be revised to state that, within any 4500-acre space, no more than 500 acres may be permitted for surface waste disposal. This would assure that any 500-acre tract devoted to surface waste would be surrounded by at least 500 acres of land used otherwise, on all sides.

Rule 53 E (8) Tank covers. The proposed rule is designed to exclude migratory birds from tanks larger than eight feet in diameter. We have reports of cattle, deer, squirrels, and rabbits poisoned by access to contaminated liquids in smaller vessels, either on-grade or below grade. We see no reason why any toxic materials need to be kept in open containers. We therefore suggest that the wording of the rule be revised to the following:

To protect livestock and wildlife, all ponds, tanks and containers shall be covered or enclosed in such a manner as to prohibit entry of birds, mammals, and reptiles. All waste management facilities shall be fenced in a manner approved by the division.

This wording is less prescriptive than a specification of net size or mesh opening. The screening on many waste tanks already satisfies this wording. However, for those tanks that are carelessly constructed, our proposed wording discourages those openings in tanks that obviously admit the noses cattle and deer, and the bodies of smaller animals.

Rule 53 F Operation of landfills. The proposed rule properly requires a liner to capture rainfall that filters through the wastes in the years during which a cell is accumulating wastes. However, a polymer liner will not reliably contain the soluble or volatile contents of a landfill throughout the centuries after it is closed. A toxic landfill is a permanent legacy. Approval of a landfill is in effect a designation that any future use of the particular area will be severely limited. Landfills should not appear in locations, or with such construction, that would allow the contained toxic materials to migrate within the expected duration of civilization. Except for groundwater, the proposed rule takes little notice of the geologic setting in which a landfill is sited. We therefore suggest that landfills for exempt or hazardous wastes be either constructed or located in geologic strata so as to provide confinement of vapors, saturated liquid transport, and unsaturated liquid transport. The strata or the construction should provide the equivalent of a layer of clay, two feet thick, with hydraulic conductivity less than  $1 \times 10^{-7}$  cm/s. Clay, whether constructed or naturally occurring, will be more resilient and durable than a polymer liner when the wastes shift in time. Furthermore, because flow through preferential pathways sometimes greatly exceeds the expected rate of transmission, landfills containing toxic wastes should be sited more than 500 feet from surface water, or from useable groundwater with less than 5000 ppm total dissolved solids. (Here, we distinguish water that occurs in *useable* quantity from protectable water, which is defined as having less than 10,000 ppm tds.)

Rule 53 G (6) Monitoring of landfarms. The proposed periodic soil sampling at landfarms includes testing for major ions and RCRA metals. However, the proposed rule does not specify how all of these sampling results are to be used. One important use of the monitoring is to assure that a landfarm not become so contaminated with non-degradable wastes that it becomes a legacy of surface contamination, with restricted future productivity or use.

Depth of sampling. The proposed rule specifies that samples be taken no deeper than three feet below the original surface of the cell. Three feet is too deep to detect migration of contaminants before the migration becomes a problem. We therefore suggest that: soil samples should be obtained at a location *between six and twelve inches beneath the bottom surface of treated material*. We recognize that obtaining a valid sample from this shallow depth will require care to avoid contamination of the sample with surface material. The proposed rule would require that concentrations not exceed background, which would cause an "exceeds background" measurement if a minor amount of surface material accidentally got into the subsurface sample. We therefore suggest relaxing the concentration limits for petroleum hydrocarbons to 100 ppm, the same limit specified for treated material prior to application of another lift.. We suggest that the limits for salts be set so as to maintain the capability of the land for future revegetation, as outlined below. With these relaxed, but meaningful limits, a subsurface sample would not raise an alarm even if a small amount of surface material accidentally entered the sample.

Capability for revegetation. Revegetation of a landfarm should not be inhibited by the excessive accumulation of salinity. Therefore, we suggest that the report of each subsurface sample should include the electrical conductivity (EC) of the *undiluted extract from a saturated paste*; and the sodium absorption ratio (SAR) of the soil. The EC relates most nearly to chloride content, and correlates with plant growth across a variety of soil types much better than chloride content or sodium content alone. The SAR relates to sodium damage to plants across a variety of soil types much better than sodium content alone. The SAR requires no testing beyond current requirements; it is simply a more meaningful way of expressing the sodium, magnesium, and calcium contents of the soil. We propose limiting values for the EC and SAR in our discussion of Rule 53 I (3) (d), below.

Metals. We suggest that metals not accumulate in a landfarm to the extent that, long after closure, the area would require remediation for unrestricted use. Therefore, we propose limiting values for the concentrations of metals in our discussion of Rule 53 I (3) (d), below.

Rule 53 G (11): Moisture at landfarms. The proposed rule requires the addition of moisture to control dust. This is appropriate. However, we have not observed any landfarm in the state that has evident irrigation. The rule should require demonstration that an applicant has legal and physical access to the water as needed.

Rule 53 G (subsequent to 13): Acceptable wastes. Wastes at a landfarm will be spread on the land. We therefore suggest that any non-soil wastes, including drill cuttings and muds, be tested for RCRA metals prior to acceptance at a landfarm, and that wastes not be accepted if the concentration of any contaminant exceeds the RCRA screening level for industrial land use, as presented in Table I. Knowledge of process, or a single test of a batch of wastes of the same origin, may be substituted for testing of each load.

Table I. Limits of metals in accepted wastes, ppm.

<u>Metal</u>	<u>Wastes</u>
As	1.8 <sup>+</sup>
Ag	5700
Ba	79,000
Cd	560
Cr	500 <sup>++</sup>
Pb	800 <sup>*</sup>
Hg	68 <sup>**</sup>
Se	5700

+ cancer risk

++ total, a mix of III and VI valences

\* not including tetraethyl lead, which has lower screening levels

\*\* assuming that the mercury is present as, or will be converted to, methyl mercury

The RCRA screening levels for EPA Region 6 can be found in the tables cited by:

[http://www.epa.gov/earth1r6/6pd/rcra\\_c/pd-n/screen.htm](http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm) .

Rule 53 H (2): Construction of evaporation ponds. The proposed rule specifies that evaporation ponds have an outside grade no steeper than 3:1. However, that grade does not necessarily control erosion. We have noted an evaporation pond at which the outer surface of the berm is eroding rapidly. The rule should specify that the outside grade be protected from erosion.

Rule 53 I (3) (b): Closure standards for landfill cells. The proposed rule specifies that landfill cells be closed with a polymer cover or evapo-transpiration cap. The polymer cover will not be durable throughout the centuries that the landfill should remain secure. The meaning of "evapo-transpiration cap" is not specific in that it applies to a wide variety of designs, including a layer of dirt with plants on top. We suggest that the closure requirements for toxic landfills include the following items.

The landfill should contain wastes to no higher than three feet below the undisturbed grade level to prevent exposure of the wastes by erosion. From bottom to top, the cap layers should be gravel, cobbles, clay, and vegetated soil. The gravel will inhibit upward capillary transport. Cobbles of sufficient size will inhibit rodent penetration, which we have observed in other landfills. Clay will retard the downward movement of rain water, which will be transpired back to the surface by the soil and vegetation. These layers will

be more robust than a polymer layer as the materials in the landfill shift and move after closure. As proposed, the top should be contoured to a gentle slope not exceeding 5%, preferably with adjacent cells contoured together to avoid forming channels between adjacent cells. Revegetation, not simply "capable of sustaining native plant growth", should be required. Vegetation with plants that develop penetrating tap roots should be avoided.

Rule 53 I (3) (c): Landfill post closure. We support the proposed 30-year period of post-closure monitoring to allow repair of intrusions and water channels that may result due to erosion, animals, and shifting of buried solids. We have observed such intrusions in closed landfills.

Rule 53 I (3) (d): Landfarm closure standards--metals. Sub-paragraph 53 G (1) anticipates that landfarms may accept wastes other than hydrocarbon-contaminated soils. If the wastes happen to include metals, those metals will accumulate. The wastes are diluted in the soil by spreading and mixing, so it is reasonable for a landfarm to accept wastes more concentrated than the soil concentrations allowed at closure. Therefore, in Table I above we suggested that wastes be accepted so long as the contaminant concentrations *in the wastes* do not exceed the screening levels for industrial land. At closure, we suggest that the concentrations in the soil of a landfarm should not exceed the residential screening levels. We suggest that no further wastes should be accepted if the periodic monitoring of sub-paragraph 53 G (6) reveals that the concentration of any metal in the landfill surface soil (6"-12" depth) exceeds the RCRA screening level of Table II below, in which most values are EPA screening levels either for *residential* land use, or for plants. If any of these levels are exceeded, the cell should be closed as soon as the remaining hydrocarbons have been remediated.

Toxicity depends on presumed pathway and exposure to humans or biota. The RCRA residential and industrial screening levels are indicators of the threat to *human* health at a presumed human activity on the land, and are not necessarily protective of the environment, including wildlife. Although humans may, in the future, occupy the lands that are now used as landfarms, it is more likely that the lands will be used for grazing or habitat of livestock and wildlife. In that case, the animals would probably experience much more exposure than a human in the presumed residential scenario. It therefore is not overly restrictive to require that the concentrations of contaminants in a landfarm not exceed the residential or plant screening levels.

Table II, below, presents the RCRA Region 6 background levels and our recommended limits for landfill soil at closure, in ppm. The recommended limits are the RCRA screening levels, except for barium. For barium, we recommend the industrial level for both landfill soils and acceptable wastes, because exempt wastes are likely to contain barium as barite, a rather harmless mineral. The recommended values for Cd and Pb are EPA soil screening levels for plant receptors.

Table II. Background and recommended closure limits, ppm.

<u>Metal</u>	<u>Background</u>	<u>Closure</u>
As	1.1-16.7	0.39 <sup>+</sup>
Ag	0.01-5	390
Ba	430	79,000 <sup>#</sup>
Cd	0.01-1.0	32 <sup>*</sup>
Cr	38	210 <sup>++</sup>
Pb	10-18	120 <sup>*</sup>
Hg	0.1	6.1 <sup>**</sup>
Se	0.2	390

+ cancer risk

# RCRA screening level for an industrial site, assuming most Ba appears as barite.

++ total, a mix of III and VI valences

\* screening level for plants

\*\* levels for methyl mercury

The RCRA screening levels and background levels for EPA Region 6 can be found in the tables cited by: [http://www.epa.gov/earth1r6/6pd/rcra\\_c/pd-n/screen.htm](http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm) .

The RCRA screening levels for Pb and Cd, relevant to plants, can be found at

<http://www.epa.gov/ecotox/ecossl/pdf/eco-sslead.pdf> and

[http://www.epa.gov/ecotox/ecossl/pdf/eco-ssl\\_cadmium.pdf](http://www.epa.gov/ecotox/ecossl/pdf/eco-ssl_cadmium.pdf) .

**Rule 53 I (3) (d): Closure standards for landfarms--salts.** Salt toxicity of the soil is best indicated by the electrical conductivity (EC) of the extract of a saturated paste, and by the SAR of the soil. Individual plant species vary widely in the threshold values at which damage begins, but the EC and SAR values for a given specie remain approximately unchanged across a wide variety of soil types. Because revegetation will take place in an arid climate, and the data behind the EC and SAR limits are based on adequate moisture, we suggest that the allowed limit of salinity in New Mexico should be smaller than the values published for salt-tolerant plants.

The most complete report on salinity and vegetation of which we are aware was compiled by Bright and Addison (2002). The data of their Appendix B show that the salinity threshold of damage for moderately salt tolerant plants varies in the EC range of 2 to 6 mmhos/cm (dS/m), and that the plant productivity decreases by 5 to 20% for each unit increase in EC above the threshold. As they report in their Appendix C, several Canadian provinces have remediation levels based on EC of approximately 2 for "good" soil or for all plants, and values in the range of 2 to 5 for "fair" soil or for moderately tolerant crops. The same tables suggest SAR values should be less than 5 for unconditional growth, and they offer values in the range 4-8 for "fair" soil. Other agricultural literature suggests plant damage often begins near the SAR value of 5. Given that revegetation in New Mexico will occur on arid lands where plant germination is difficult at best, we suggest that a landfarm cell should receive no additional waste if the EC (saturated paste) and SAR values exceed the following limits at any point within the landfarm soil.

Limit	<u>EC</u> (mmho/cm)	<u>SAR</u>
	3	5

Rule 53 I (4): Alternatives to re-vegetation. The proposed rule allows any operator who "contemplates" post-closure use of the land for a purpose inconsistent with vegetation to implement an alternative surface treatment that is consistent with his contemplated use. Such a proposal invites abuse from which the OCD has no recourse. For example, an operator could "contemplate" a barn and corral on a 200-acre facility, and thereby declare that no post-closure treatment of any form would be needed. We suggest that only the land actually covered by post closure activity, such as a building, should be released from the requirement for re-vegetation, and that bond be retained until the cover exists and the remaining land is re-vegetated.

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Reference:

Bright, D. A., and Addison, J., 2002. "Derivation of Matrix Soil Standards for Salt under the British Columbia Contaminated Sites Regulation." Report to the British Columbia Ministry of Water, Land and Air Protection, Ministry of Transportation and Highways, British Columbia Buildings Corporation, and the Canadian Association of Petroleum Producers. Applied Research Division, Royal Roads University, 2005 Sooke Rd., Victoria, BC V9B 5Y2. A pdf file can be downloaded from a link in [http://wlapwww.gov.bc.ca/epd/epdpa/contam\\_sites/whats\\_new/saltstandardsreport.html](http://wlapwww.gov.bc.ca/epd/epdpa/contam_sites/whats_new/saltstandardsreport.html).

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