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**GUIDANCE for USE of SCRAP TIRES
In CIVIL ENGINEERING APPLICATIONS**
Solid Waste Bureau – New Mexico Environment Department

TABLE OF CONTENTS

1. SUMMARY.....2

2. PURPOSE / OBJECTIVES2

3. SCOPE AND APPLICABILITY.....2

4. DEFINITIONS.....2

5. REGULATIONS AND STATUTES.....3

6. USE OR DISPOSAL OF SCRAP TIRES IN A WATERCOURSE4

7. US ARMY CORPS OF ENGINEERS POSITION ON USE OF SCRAP TIRES4

8. GENERAL GUIDANCE.....4

9. GENERAL GUIDANCE for USE of SCRAP TIRE BALES5

10. GENERAL GUIDANCE for USE of LOOSE SCRAP TIRES.....7

11. AGRICULTURAL GUIDANCE.....8

1. SUMMARY

Civil Engineering Applications that use scrap tires must follow applicable federal, state, and local regulations. They must be constructed in a stable manner so that no scrap tires can break away from their parent structure and become "fugitives". This Guidance provides practices that assist in meeting that end. A list of applicable statutes and regulations are provided, as well as New Mexico Environment Department (NMED) application forms.

In general, both loose scrap tires and scrap tire bales must be anchored in order to prevent any movement of the resulting structure. Loose scrap tires should be filled with dirt, sand, rocks, or other inert material. In most applications, it is recommended that loose and baled scrap tires be covered with a suitable material.

2. PURPOSE / OBJECTIVES

The purpose of this document is to protect the health and welfare of current and future residents of New Mexico by providing guidance about the use of loose and/or baled scrap tires in civil engineering applications. NMED has responded to many scrap tire civil engineering applications which have lost their structural integrity because of poor design and/or construction. Those failures had particularly negative consequences when the scrap tires were in contact with surface water, causing them to float down streams and onto adjacent properties. The objective of this guidance is to promote better designed and constructed civil engineering applications, resulting in fewer failures.

3. SCOPE AND APPLICABILITY

With the exception of Indian nations, pueblos and tribes, this guidance applies to civil engineering applications that use scrap tires on all land, public and private, in the state of New Mexico, including projects constructed for agricultural purposes. It applies to scrap tires as defined in the New Mexico Recycling and Illegal Dumping (RAID) Act and the New Mexico Recycling, Illegal Dumping and Scrap Tire Management Rule (RIDSTMR). It applies to all erosion control projects, fences, corrals and projects that use scrap tires as a structural material for buildings. It does not apply to civil engineering applications that use scrap tires for land reclamation, scrap tires used as weights above buildings, scrap tires used as weights over tarps that cover animal feed, or recreational applications such as tire swings. It does not apply to civil engineering applications with facility plans, elevations, drawings and cross sections that have been signed and sealed by a professional engineer registered in New Mexico.

4. DEFINITIONS as excerpted from 20.9.20.7 NMAC

A. "Agricultural use" means the beneficial use of scrap tires in conjunction with the operations of a farm or ranch that includes construction projects and aids in the storage of feed, as defined in the RAID Act.

B. "Civil engineering application" means the use of scrap tires or other recycled material in conjunction with other aggregate materials in engineering applications.

- C. "Department" means the New Mexico Environment Department.
- D. "Land reclamation" means the filling and restoring of excavated land for the purpose of restoring the land to its approximate natural grade and to prepare or reclaim the land for re-use. Disposal of scrap tires in a permitted or registered solid waste facility is not "land reclamation."
- E. "Passenger tire equivalent" or "PTE" is a conversion factor for converting between numbers of scrap tires and weight; for passenger and light truck tires, the total weight of scrap tires, in pounds, divided by 22.5 pounds produces the passenger tire equivalent. For purposes of this part, any numerical requirement associated with scrap tires may be measured in either PTEs or the actual number of scrap tires.
- F. "Scrap tire" means a tire, including a baled tire, that is no longer suitable for its originally intended purpose because of wear, damage, defect or obsolescence.
- G. "Scrap tire baling" means the process by which scrap tires are mechanically compressed and bound into block form.
- H. "Scrap tire manifest" means a document containing information as required by 20.9.20.50 NMAC that is necessary to transport scrap tires in the state of New Mexico.
- I. "Storage" or "temporary storage" means storage for a period of time allowed by a permit for storage of scrap tires. Storage or temporary storage does not include a staging area where scrap tires will be staged for no more than five (5) days during construction.
- J. "Tire" means a continuous solid or pneumatic rubber covering that encircles the wheel of a motor vehicle.
- K. "Vector" means any agent capable of transmitting a disease from one individual or organism to another. Vectors include, but are not limited to, mosquitoes, flies and other insects, rodents and vermin.

5. LIST of APPLICABLE STATUTES and REGULATIONS

- A. New Mexico Recycling and Illegal Dumping Act, NMSA 1978, Sections 74-13-1 et seq.
- B. New Mexico Solid Waste Act, NMSA 1978, Sections 74-9-1 et seq.
- C. Federal Water Pollution Control Act (Clean Water Act), 33 USC § 1251 et. seq.
- D. New Mexico Water Quality Act, NMSA 1978, Sections 74-6-1 et seq.
- E. New Mexico Recycling, Illegal Dumping and Scrap Tire Management Rule, 20.9.20 NMAC.
- F. New Mexico Solid Waste Rules, 20.9.2 through 20.9.10 NMAC.
- G. New Mexico Water Quality Control Commission Regulations, 20.6.2 NMAC.
- H. International Fire Code adopted by New Mexico on November 15, 2007, 10.25.5.1 NMAC.

- I. Local building codes, zoning ordinances and other local regulations.

6. USE OR DISPOSAL OF SCRAP TIRES IN A WATERCOURSE

A. The disposal or use of scrap tires in a watercourse is regulated by 20.6.2.2201 NMAC, DISPOSAL OF REFUSE, which states that "[n]o person shall dispose of any refuse in a natural watercourse or in a location and manner where there is a reasonable probability that the refuse will be moved into a natural watercourse by leaching or otherwise. Solids diverted from the stream and returned thereto are not subject to abatement under this Section."

B. Notwithstanding any other provision in this guidance, it is the position of the NMED that any scrap tire used in a civil engineering application that breaks away from its parent structure creates refuse in a water course that violates 20.6.2.2201 NMAC, and subjects the project owner / operator and the property owner to potential enforcement action.

7. US ARMY CORPS OF ENGINEERS POSITION ON USE OF SCRAP TIRES -

Use of loose or baled tires as bank stabilization or other fill within jurisdictional waters of the United States may require authorization from the U.S. Army Corps of Engineers (Corps) under Section 404 of the Clean Water Act. Jurisdictional waters may include dry arroyos, intermittent and perennial streams, and adjacent wetlands. Potential users are encouraged to contact the Corps to determine whether the proposed activity may be authorized and what requirements may apply. There are restrictions in the Section 404 federal regulations and Corps Albuquerque District New Mexico Regional Conditions which apply to the use of used tires as fill material. Please contact the Albuquerque District Regulatory Division at 505-342-3262 or see their website <http://www.spa.usace.army.mil/reg/> for more details. You may also be required to contact the Environmental Protection Agency (EPA) Dallas office to obtain EPA approval as well.

8. GENERAL GUIDANCE

A. All scrap tire civil engineering applications must be in compliance with applicable local, state and federal regulations.

B. All erosion control scrap tire civil engineering applications must be designed and constructed using traditional procedures for retaining wall designs. Even when not required under RIDSTMR, it is highly recommended that projects be designed by a registered professional engineer licensed in the State of New Mexico.

C. For erosion control projects, a permit from NMED, the U.S. Army Corps of Engineers and/or certification by the NMED's Surface Water Quality Bureau may be required. Please check with those agencies before any project is begun.

D. For scrap tire civil engineering applications to be constructed on land leased from the State of New Mexico, written authorization prior to construction is required. Please contact the State Land Office for the required application.

E. All scrap tire civil engineering applications must be constructed in a stable manner following the instructions provided in Sections 9 and 10 of this guidance document.

9. GUIDANCE for USE of SCRAP TIRE BALES

A. Examples of scrap tire bale use include:

- (1) Fence
- (2) Corral
- (3) House, garage, or other building
- (4) Erosion control
 - a) Slope repair
 - b) Scrap tire bale retaining wall
 - i) Slope stabilization
 - ii) Bank stabilization

B. A BUILDING PERMIT from the Construction Industries Division of the New Mexico Regulation and Licensing Department may be required for your project. For more information, contact one of the Construction Industries Division offices. In Albuquerque, call (505) 222-9800 in Las Cruces call (575) 524-6320, and in Santa Fe, call (505) 476-4691.

C. Bales should be securely baled using stainless steel or heavy gauge baling wire, free of any contaminants, such as petroleum products, weed seeds, or animal matter.

D. **STACKING:** Scrap tire bales should be stacked, staggering the joints so that the vertical connections are offset from one another, preferably in alternating / brick style. In most applications they should not be stacked directly on top of each other or stacked at more than a 45 degree angle. For maximum stability, bales should be stacked pyramid style with the same number of tires at the base as are stacked vertically.

E. **ANCHORING** for bales not used for stream/arroyo bank stabilization: Unless the bales are held in place by several feet of compacted soil, the ends of rows of bales shall be stabilized, either by a fence, with rebar inserted no less than one foot below the surface, or by an alternate means specifically approved in the permit, if applicable.

F. **ADDITIONAL STABILIZATION** for bales used in stream/arroyo bank or landfill side slope stabilization: Place subgrade rows of bales on gabion basket wire(anchor mesh), bring wire mesh cover up from the end, place on top and bring remaining end and bury beneath last bale. Use corner stiffeners diagonally across the corners, crimp and close. Use gabion basket wire to secure bale rows as necessary in each lift.

G. **COVERING:** For aesthetic reasons, additional erosion pathway prevention, and to separate the scrap tire bales from material that may come into contact with the bales, it is recommended that scrap tire bales be covered with shotcrete or concrete, unless the bales are situated below ground level. Shotcrete may not be appropriate if the bales are to be placed within or along the banks of a watercourse/arroyo if they are placed below the ordinary high water mark.

H. Additional guidance for scrap tire bales used for stream / arroyo bank stabilization:

(1) Select appropriate location:

- a) Scrap tire bales are recommended in upland areas as embankment fill outside the OHWM of the bank.
- b) Avoid wet, corrosive, and/or inundated areas.
- c) Avoid streams with wide fluctuation of discharge and shear forces.
- d) Scrap tire bales can be used to stabilize the bank of an intermittent stream or arroyo. They are not to be used to stabilize a perennial stream.

(2) Follow the following main steps:

- a) Determine the forces acting on the bank, slope, wall, floor of arroyo, or intermittent water course.
- b) Check that the resisting moment exceeds the overturning moment by a suitable safety factor.
- c) Check that the resistance exceeds the active horizontal force by a suitable safety factor.
- d) Verify that the resultant force falls within the middle third of the wall's base, and that the maximum bearing pressure is within the allowed limit.
- e) The wall stability must be checked at the base and at each course or lift.

Repeat steps until a suitable design that meets all criteria is achieved.

(NOTE: It is highly recommended that this analysis be done by a registered professional engineer licensed in the State of New Mexico.)

(3) If possible, the eroded channel bank (which will receive the scrap tire bales) should be reshaped and/or the slope reduced to improve the chances of a successful project.

(4) Scrap tire bales should be placed parallel to the stream flow, following the curve of the bank. They should not be placed perpendicular to the flow as a dam, unless the bales are being used at the stream / arroyo head cut to prevent scour. Scour is defined in the Merriam Webster Dictionary as the process to "clear, dig, or remove by ... a powerful current of water."

(5) The toe of the scrap tire bales should be buried below the channel bed in hard soil, or on bedrock to prevent damage or loss of bales during scour.

(6) Scrap tire bales should be placed on the erosion side of a meandering stream rather than the deposition side.

(7) Scrap tire bales should be cabled or wired together, or connected by an alternate means specifically approved in the permit, if applicable.

(8) Scrap tire bales must be securely anchored to prevent their movement during high flows. Possible anchoring options include:

a) Anchor scrap tire bales to a buried "deadman" (heavy object) permanently located landward of the river bank.

b) Place scrap tire bales in concrete footer with rebar into the underlying bedrock.

c) Bore holes into sidewalls of scrap tires and into earth, then push earth anchors through holes and hammer into the ground.

d) Bury one or more feet of rebar through the bottom layer of bales down into channel in order to securely hold the rebar in place. Use greater lengths of rebar as needed to hold the rebar in place.

e) Other alternate manner of anchoring, as specifically approved in the permit, if applicable.

(9) To prevent water from getting behind the tire bale structure, an impermeable layer of geomembrane should be placed above and behind the structure.

I. Assure long-term stability of the project:

(1) Conduct performance inspections throughout the life of the project.

a) Conduct inspections every 3 months the first year and once a year thereafter, unless otherwise prescribed in the permit. Conduct inspections following high flow events. Prepare annual reports on performance.

(2) Conduct maintenance of structures and correct unintended erosion, as necessary.

(3) Provide for Contingency. In the event that the use of the scrap tires are discontinued or dismantled, or in the event of a failure of the approved design of the project, as indicated in the permit, scrap tires must be properly disposed.

10. GUIDANCE for USE of LOOSE SCRAP TIRES

A. Examples of loose scrap tire use include:

1) Fences

2) Rammed earth houses, garages or other structure

3) Scrap tire mat

B. A BUILDING PERMIT from the Construction Industries Division of the New Mexico Regulation and Licensing Department may be required for your project. For more information, contact one of the Construction Industries Division offices. In Albuquerque, call (505) 222-9800 in Las Cruces call (575) 524-6320, and in Santa Fe, call (505) 476-4691.

C. STACKING: Scrap tires should be stacked, preferably brick style in alternating rows.

D. FILLING: In most applications, scrap tires should be filled with dirt, sand, rocks, or other inert material meeting the definition of "clean fill" in the New Mexico Solid Waste Rules, 20.9.2.7.(C)(4).

E. ANCHORING: If loose scrap tires are to be used for erosion control, they shall be anchored using the methods described for scrap tire bales in Section 9.H.(8) of this guidance document.

F. CONNECTING: If loose scrap tires are to be used for erosion control, they should be cabled or wired together, or connected by an alternate means specifically approved in the permit, if applicable.

11. AGRICULTURAL GUIDANCE:

Please see GUIDANCE DOCUMENT FOR DETERMINING ACCEPTABLE BENEFICIAL AGRICULTURAL USE OF SCRAP TIRES.

Although many beneficial agricultural uses are exempt from the permit requirement, agricultural uses are not exempt from the requirements of other portions of the RIDSTMR or from other applicable federal, state, county or local statutes, rules, ordinances or regulations. Agricultural users should pay careful attention to avoid violating:

- 20.9.20.8.F NMAC: A person shall not engage in the open burning of scrap tires.
- 20.9.20.8.G NMAC: A person shall not store or dispose of scrap tires or tire-derived products in a manner that creates a public nuisance, promotes the breeding or harboring of disease vectors or creates a potential for fire or other health or environmental hazards.
- 20.9.20.8.I NMAC: A person shall not engage in, maintain or allow illegal dumping.
- 20.9.20.37.N NMAC: The civil engineering application must have suitable structures or features to prevent surface water run-on from surrounding areas as well as preventing surface runoff from leaving the facility.
- 20.9.20.37.O NMAC: The scrap tire storage site shall be designed, constructed and maintained in accordance with all local building codes, fire codes, and other applicable local codes and regulations including litter and nuisance codes.
- 20.9.20.41.E. NMAC: After completion, all civil engineering applications should be inspected on a regular basis by the site owner or operator to observe any weakness or failure of the structure.
- 20.9.20.41.F. NMAC: In the event of a crack, break or collapse of the civil engineering application, the failure will be repaired in a timely manner so that scrap tires do not enter contiguously owned property or become a health hazard.
- 20.9.20.41.G. NMAC: Loose scrap tires used for civil engineering applications shall be filled with soil or other suitable fill material to prevent the scrap tires from becoming harborage for vectors.

- 20.9.20.50.A. NMAC: Each shipment of ten or more scrap tires ... shall be accompanied by a scrap tire manifest ... in a format approved by the department unless otherwise exempted pursuant to 20.9.20.O, 20.9.20.P, or 20.9.20.Q NMAC.

APPROVED:



F. DAVID MARTIN
SECRETARY

3-16-11

DATE