

Stand Alone Report 7
Weed Management Plan – Upton Plant Site

**WEED MANAGEMENT PLAN
FOR THE
RARE ELEMENT RESOURCES, INC.
BEAR LODGE PROJECT
UPTON PLANT SITE**



RARE ELEMENT RESOURCES, INC.

225 Union Blvd., Suite 250
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December 12, 2014

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LIST OF ACRONYMS

Act	Wyoming Weed and Pest Control Act
ATV	All Terrain Vehicle
BKS	BKS Environmental Associates, Inc.
BMP	Best Management Practice
MLRA	Major Land Resource Area
NAWMA	North American Weed Management Association
PAR	Pesticide Application Records
PUP	Pesticide Use Proposal
PUR	Pesticide Use Report
REE	Rare Earth Elements
RER	Rare Element Resources, Inc.
TBNG	Thunder Basin National Grassland
WMP	Weed Management Plan

1.0 INTRODUCTION

Rare Element Resources, Inc. (RER) proposes to mine and recover rare earth elements (REE) in the Bear Lodge Mountains of northeastern Wyoming. The proposed Bear Lodge Project consists of the Bull Hill Mine and Upton Plant Site. The proposed Bull Hill Mine, located approximately 12 miles north of Sundance, Wyoming, in central Crook County, will consist of an open-pit mining operation and physical upgrading (PUG) plant for REE mineral pre-concentration. REE mineral pre-concentrate produced at the PUG plant will be transported to the proposed Upton Plant Site which will consist of a hydrometallurgical plant and tailings storage pond. The proposed Upton Plant Site Permit Area is located approximately 40 miles south of the proposed Bull Hill Mine approximately 2 miles northwest of Upton, Wyoming, in north-central Weston County. The approximately 831.85 acre proposed Upton Plant Site Permit Area encompasses all or portions of Sections 28, 29, 32, and 33 T48N R65W.

The proposed Upton Plant Site is located in the Missouri Plateau, Unglaciaded Section of the Great Plains Province within the Interior Plains Major Land Resource Area (MLRA 60A) (NRCS 2006). The majority of MLRA 60A is characterized by mixed prairie grassland vegetation with some shrublands and trees (USDA 2006). Average annual precipitation within this MLRA is 13 to 22 inches (NRCS 2006). Elevation generally ranges from approximately 4,220 to 4,455 feet above sea level. Nearly all of MLRA 60A is farm or ranch land, which supports grazing and hay production.

The proposed Upton Plant Site Permit Area are almost entirely on private land, with a portion being within the Upton Regional Industrial Park. However, the southern boundary abuts the U.S. Forest Service Thunder Basin National Grassland (TBNG). Due to the close proximity to Forest System Lands, RER will conduct weed management at the Upton Plant Site according to guidelines established for the TBNG. This Weed Management Plan (WMP) will be reviewed and updated, if necessary, specifically after the Upton Plant Site Permit Area has been seeded and annual monitoring has begun.

2.0 LAND USE PLANNING

The TBNG Land and Resource Management Plan proposes the following standards and guidelines with respect to land use planning decisions for noxious weed management (USDA FS 2001):

- 1) Manage invasive plant species using integrated management techniques, including mechanical, chemical, and biological control methods.
- 2) To prevent the spread of undesirable non-native and invasive plant species, include necessary provisions in contracts and permits for use of the National Grasslands and its resources.
- 3) Allow haying only where noxious weeds are not present or are pre-

- treated to prevent seed set unless haying is needed as a method of noxious weed control. If used as such a control, ensure proper disposal of hay.
- 4) Contain and control established undesirable non-native infestations based on the following:
 - a) Rate of species spread
 - b) Invasion within special management areas
 - c) Probability of successful treatment(s) in meeting desired conditions
 - 5) Allow only certified weed seed-free products for animal feed or re-vegetation projects. This includes use of certified hay or straw, and heat treated, or other appropriately processed products.
 - 6) Utilize all methods feasible, including livestock grazing strategies in the integrated pest management program.
 - 7) Where technically or economically feasible, use genetically local native plant species in re-vegetation efforts. To prevent soil erosion, non-native annuals or sterile perennial species may be used while native perennials are becoming established.
 - 8) Restrict herbicide use where it would have adverse effects on species at risk.
 - 9) Set priorities for controlling invasive plant species based on the following:
 - a) Prevent the introduction of new invasive species
 - b) Treat new infestations

3.0 DEFINITIONS

Designated Noxious Weed: These are “weeds, seeds, or other plant parts that are considered detrimental, destructive, injurious, or poisonous, either by virtue of their direct effect or as carriers of diseases or parasites that exist within this state, and are on the designated list”. The designated list is a list of weeds and pests that are “designated by joint resolution of the Wyoming Board of Agriculture and the Wyoming Weed and Pest Council”. The Wyoming Weed and Pest Control Act (Act) provides information on the State of Wyoming Weed and Pest Districts and the Wyoming designated and prohibited noxious weed species list. The Act currently includes 25 weed species and can be accessed at www.wyoweed.org/documents.html. Per this Act, weed control is the responsibility of the landowner or the owner of the right-of-way or easement (WWP 1973 and US 1999).

The 2014 Wyoming Designated Noxious Weeds and Prohibited Noxious Weeds List includes the 25 species listed below:

- 1) Field bindweed (*Convolvulus arvensis*)
- 2) Canada thistle (*Cirsium arvense*)
- 3) Leafy spurge (*Euphorbia esula*)

- 4) Perennial sowthistle (*Sonchus arvensis*)
- 5) Quackgrass (*Agropyron repens*)
- 6) Hoary cress (whitetop) (*Cardaria draba* & *Cardaria pubescens*)
- 7) Perennial pepperweed (giant whitetop) (*Lepidium latifolium*)
- 8) Oxeye daisy (*Chrysanthemum leucanthemum*)
- 9) Skeletonleaf bursage (*Franseria discolor*)
- 10) Russian knapweed (*Centaurea repens*)
- 11) Yellow toadflax (*Linaria vulgaris*)
- 12) Dalmatian toadflax (*Linaria dalmatica*)
- 13) Scotch thistle (*Onopordum acanthium*)
- 14) Musk thistle (*Carduus nutans*)
- 15) Common burdock (*Arctium minus*)
- 16) Plumeless thistle (*Carduus acanthoides*)
- 17) Dyers woad (*Isatis tinctoria*)
- 18) Houndstongue (*Cynoglossum officinale*)
- 19) Spotted knapweed (*Centaurea maculosa*)
- 20) Diffuse knapweed (*Centaurea diffusa*)
- 21) Purple loosestrife (*Lythrum salicaria*)
- 22) Saltcedar (*Tamarix* spp.)
- 23) Common St. Johnswort (*Hypericum perforatum*)
- 24) Common tansy (*Tanacetum vulgare*)
- 25) Russian olive (*Elaeagnus angustifolia*)

Declared Weed: This is “any plant which the Wyoming Board of Agriculture and the Wyoming Weed and Pest Council have found, either by virtue of its direct effect or as a carrier of disease or parasites, to be detrimental to the general welfare of persons residing within a district” (i.e., county weed and pest control district) (WWP 1973).

The 2014 Declared Weed List for Weston County (Wyoming Weed and Pest 2014) includes the 9 species listed below:

- 1) Wild licorice (*Glycyrrhiza lepidota*)
- 2) Puncturevine (*Tribulus terrestris*)
- 3) Sulfur cinquefoil (*Potentilla recta*)
- 4) Broom snakeweed (*Gutierrezia sarothrae*)
- 5) Cheatgrass / downy brome (*Bromus tectorum*)
- 6) Musk mustard (*Chorispora tenella*)
- 7) Black medic (*Medicago lupulina*)
- 8) Common purslane (*Portulaca oleracea*)
- 9) Curly dock (*Rumex crispus*)

Invasive Weed: Refers to a “species that is non-native to the ecosystem under consideration and whose introduction causes or is likely to cause economic or

environmental harm or harm to human health” (US 1999). Invasive weeds include not only weeds of concern, but designated noxious weeds, declared weeds, and other plants that are not native to this country.

4.0 PURPOSE AND NEED

RER is committed to inventorying, monitoring, and treating weeds associated with the Upton Plant Site Permit Area. The purposes of this WMP are as follows:

- 1) Prescribe methods to treat existing weed infestations.
- 2) Prevent introduction and spread of infestations during construction.
- 3) Monitor and treat infestations after construction is complete.
- 4) Control expansion of existing noxious weed populations from within the Upton Plant Site Permit Area and from adjacent lands over the life of the Upton Plant Site.
- 5) Manage and control weeds where growth could increase fire hazard, cause excessive snow drifting in undesirable locations, or hinder successful reclamation of disturbed areas.

5.0 PRE-ASSESSMENT INVASIVE WEED INVENTORY

BKS Environmental Associates, Inc. (BKS) conducted a pre-assessment weed inventory for the proposed Upton Plant Site Permit Area on August 1, 2012. The weed inventory was conducted to determine if any state designated noxious weeds, Weston County declared weeds, or potentially invasive introduced plant species (based on professional judgment) were present. Any occurrences of state designated noxious weeds, Weston County declared weeds, or potentially invasive introduced plant species were photographed, marked by GPS points, and delineated on aerial imagery maps. Baseline vegetation assessment transect samples that contained prairie sagewort and broom snakeweed were added to the weed location map; however, populations and/or individuals were not marked in the field beyond these observations.

Canada thistle was the only state designated noxious weed observed within the proposed Upton Plant Site Permit Area. Three Weston County declared weeds were observed within the proposed Upton Plant Site Permit Area: wild licorice, broom snakeweed, and curly dock. Occurrences of these species were typically within and along existing disturbances; however, observations also occurred within native areas proposed for disturbance. Most weed species observed were prevalent along Coyote Creek and wetland areas within the proposed Upton Plant Site Permit Area. Broom snakeweed was common within the Big Sagebrush Shrubland, Greasewood Shrubland, and Mixed Shrubland vegetation communities. Observed species were typically found as isolated individuals or small populations. Refer to Map D8-2.2 in Addendum D8-2-F of Addendum D8-2 for a map of weed locations within the proposed Upton Plant Site Permit Area.

6.0 WEED MANAGEMENT

6.1 General Weed Management

An integrated weed management strategy will be employed by RER throughout the construction and operation of the Upton Plant Site. Any management actions will be consistent with the TBNG Land and Resource Management Plan standards and guidelines for noxious, non-native, and invasive species control. All factors of the weed population will be taken into consideration when deciding on a management action; these factors include species, location, size of population, soils, landscape position, and recovery potential of the site. This integrated approach will use one or more of the following methods:

Prevention and Education

- A significant part of weed management is educating personnel working on the Upton Plant Site project.
- Weed identification handbooks will be made available to all RER field personnel, including construction workers. Weed identification handbooks are free at the Wyoming Department of Agriculture, Wyoming Weed and Pest Control Districts, and the University of Wyoming.
- All RER project personnel (including maintenance and operations) will be trained to recognize and document new or spreading weed populations.

Cultural

- RER will incorporate Forest Service Best Management Practices (BMP's) for re-vegetation and soil protection to limit the establishment and spread of weeds.
- Disturbance will be minimized to limit the opportunities for weed infestations to colonize. If there are existing weed populations in a proposed disturbance area, treatment will occur before disturbance takes place to reduce potential spread and establishment.
- Once an infestation has been treated, the area will be re-seeded with desirable plant species to prevent establishment of more weed species.
- Disturbed areas will be immediately re-seeded with approved native seed mixes containing certified weed-free seed (blue tags). Seed will be tested for noxious weeds at the time of purchase.
- RER will use only certified weed-free hay, straw, and mulch where needed.
- Equipment and vehicles will be inspected before entering and leaving the Bull Hill Mine and Upton Plant Site Permit Areas. All equipment will be washed free of all mud and vegetative debris prior to being moved onto the Upton Plant Site Permit Area.

- Washing will occur at either a commercial truck wash or at a private facility where the water and debris are collected for treatment or disposal in an appropriate landfill.
- Use of domestic grazing animals may be used as a cultural control method.

Manual/Mechanical

- On smaller and new weed infestations, hand pulling, cutting, or digging with hand tools may be used for removal. Removed vegetation will be bagged to minimize dispersal of vegetative parts and seeds and disposed of properly.
- Mechanical treatments will include mowing, plowing, disking, tilling, or burning.

Biological

- Biological control agents, including domestic grazing animals, may be utilized for weed control, with species, management requirements, and desired results being considered.
- Biological treatments such as release of insects or inoculation with pathogens may also be implemented.
- Before releasing any biological control agents onto Forest System Lands, RER will approve the release with the TBNG.

Chemical

- Herbicides have been found to be very effective in controlling weeds. Selected herbicides will be EPA approved and appropriate for the target species. Herbicides used must be labeled for rangeland/forested lands and should be target specific.
- Spot spraying is the preferred method of application using handheld equipment. Vehicles, all-terrain-vehicle (ATV's) backpack sprayers, wickets, and other equipment developed for spot treatment are also application methods. Using spray booms for application will be determined on a site by site basis as appropriate.
- The applicator will obtain a General Permit for Minor Pesticide Discharges (WYG260000) prior to pesticide application and the applicator(s) will carry a copy while conducting herbicide applications.
- Herbicides will only be applied by a commercially licensed pesticide applicator; a copy of the applicator's license must be submitted to RER.
- Buffers will be used around water sources, lakes, wetlands and riparian areas, and streams to keep concentrations of chemical herbicides in water well below those harmful to drinking, irrigation, aquatic life, and non-target vegetation. Treatment of individual plants with aquatic-labeled chemical agents may occur within buffer areas.

- Adjuvants may be added to the herbicide tank mix to improve the effectiveness of the herbicide, promote better contact with the plant surface, and reduce drift.
- Herbicide use will be monitored on an annual basis. At the end of each treatment season, pesticide use reports will be completed to document types and amounts of herbicides used and submitted to RER and/or TBNG as requested.
- Daily logs of herbicide use will also be kept to document the herbicides used, pounds of active ingredient applied per acre, gallons used, method of application, target species, and locations of application.

6.2 Target Species Management

The following species descriptions are from the Wyoming Weed and Pest Council Weed Handbook. Integrated management techniques are derived from a variety of sources: Fremont County Weed and Pest (2012), Michigan State University (2012), New Mexico State University (2010), Stubbendieck et al. (2003), Thompson et al. (1995), USDA NRCS (2011), Williams et al. (1991), Winston and Schwartzlander (2011a), and Winston and Schwartzlander (2011b). Integrated management chemical control agents are based on the 2006-2007 Weed Management Handbook from Cooperative Extension Services (Dewey et al. 2006).

Canada thistle

Canada thistle is a colony forming perennial that reproduces from seed and creeping rootstalks, and can grow up to 4 feet tall. Leaves vary from light to dark green, oblong or lance shaped with deeply grooved spiny toothed margins. Flowers form in small bristly clusters that are light lavender to deep rose purple. Seeds are smooth, light to dark brown, tipped with a cupped conical point, and are approximately 1/8 inch long.

Management Objective: Containment

Integrated Management

- **Chemical:** Clopyralis, aminopyralid, chlorsulfuron, glyphosate, 2,4-D, picloram, dicamba, and curtail are all effective control agents.
- **Biological:** Canada thistle stem weevil (*Ceutorhynchus litura*), musk thistle crown weevil (*Trichosirocalus horridus*), and Canada thistle stem gall fly (*Urophora cardui*) are all approved, effective biocontrol agents.
- **Cultural:** Increased competition from desirable plants and proper management of perennial grasses is effective.
- **Manual/Mechanical:** Hand pulling is not effective. Repeated cultivation is successful, if conducted every three to four weeks.

Wild licorice

Wild licorice is a perennial that grows 1 to 3 feet tall and reproduces by seed or deep spreading roots. This plant grows erect in patches or clumps in moist areas. Leaves are alternate, compound with 11-19 lance shaped leaflets. Stems are simple or erect branches toward the top. Flowers are green-white to white in color, pea-type in clusters on a long stem. Seeds are bean shaped, 1/8 inch long, reddish brown, smooth and dull, contained in a bur-like seed pod to 3/4 inch long, covered with stout, hooked prickles.

Management Objective: Containment

Integrated Management

- Chemical: Picloram, dicamba, and clopyralid + triclopyr are all effective control agents.
- Biological: Bruchid beetle (*Acanthosclides aureoles*) is a known seed predator.
- Cultural: Livestock grazing early in the growth of the plants can reduce plant vigor.
- Manual/Mechanical: Hand pulling and digging can be effective on smaller populations.

Broom snakeweed

Broom snakeweed is a perennial sub-shrub that grows up to 18 inches tall and spreads by seed and roots. Stems grow from the crown each year and are stiff and sometimes resinous. Flowering heads are mostly on branch tips, with small yellow flowers. Leaves are alternate, narrow, 1 to 1 ½ inches long and green in color. Seeds are tan, hairy, and have short tufts of bristles at the tip.

Management Objective: Containment

Integrated Management

- Chemical: Picloram, picloram + 2,4-D, and metsulfuron are all effective control agents.
- Biological: Snakeweed grasshoppers (*Herperotettix viridis*) are approved, effective biocontrol agents.
- Cultural: Seeding desirable perennial grasses and forbs will provide competition with the broom snakeweed. Grazing management can help decrease populations.
- Manual/Mechanical: Burning can be effective as long as desirable competitive species are established after the burn.

Curly dock

Curly dock is a perennial that grows 2 to 5 feet tall and spreads primarily by seed. Stems are erect, branching toward the base, often reddish in color. Flowers are small in dense green terminal and axillary clusters. Inflorescences turn reddish-brown at maturity. Leaves are mostly basal with wavy margins, 4 to 12 inches long. Seeds are 1/8 to 3/16 inch long, enclosed in a papery or corky structure, making them easily dispersed by wind and water.

Management Objective: Containment

Integrated Management

- **Chemical:** Chlorsulfuron, metsulfuron, glyphosate, aminopyralid, clopyralid + 2,4-D, picloram, and 2,4-D B amine or ester are all effective control agents.
- **Biological:** There are no known biocontrol agents approved for use.
- **Cultural:** Seeding desirable perennial grasses and forbs will provide competition with the curly dock.
- **Manual/Mechanical:** Tilling to two inches below the soil surface and mowing before seed-set are both effective control measures.

7.0 TIMING OF MANAGEMENT

Weed management will occur in three phases: pre-construction, during construction, and post construction. Weed infestations can occur and/or be discovered in each phase. The pre-construction phase details the weed inventory prior to construction activities and aids in determining if new weed populations were brought into the Upton Plant Site Permit Area due to construction activities. Post construction monitoring will take place annually to determine if the weed populations are under control or if treatment is required. Once implemented, a treatment and monitoring program must be carried out for a minimum of five years to determine and/or maintain the effectiveness of the management plan.

7.1 Pre-Construction

The pre-construction weed inventory was conducted in August 2012 with the following species being observed within the proposed Upton Plant Site Permit Area: Canada thistle, wild licorice, broom snakeweed, and curly dock. Cleaning of vehicles and equipment should be conducted to prevent the spread of the weed species already present within the Upton Plant Site Permit Area and introduction of new weed species. All vehicles and equipment will be washed free of all mud and vegetative debris before being moved onto the Upton Plant Site Permit Area. Equipment must be washed at a commercial truck wash or private facility where the debris is collected for disposal at an appropriate landfill.

RER will conduct pre-construction spraying at the Upton Plant Site Permit Area for species listed above according to pesticide label directions. The pre-construction spraying may decrease the spread of designated and declared weeds and weeds of concern once construction crews are on site.

7.2 During Construction

To ensure protection of the Upton Plant Site Permit Area from introduction of invasive weeds and to ensure weed control, the following items will be implemented:

- 1) To the best available, gravel and mineral materials transported to and from the Upton Plant Site Permit Area will be weed free.
- 2) Construction equipment and vehicles are required to be certified weed free when arriving on the Upton Plant Site Permit Area. This will be verified through inspection of equipment and vehicles from all accessible points, including use of mirrors, as necessary.
- 3) The extent of vegetation or soil disturbance will be limited to the minimum required to safely perform construction activities as designed.
- 4) Disturbed areas not needed as work areas/road surfaces, such as road ditches, will be reclaimed/re-seeded within six months of initial disturbance.
- 5) Certified weed free seed (blue tag seed) will be used during reclamation of disturbed areas within the Upton Plant Site Permit Area. Seed will be tested for noxious weeds at the time of purchase.
- 6) Hay, straw, or other material used as mulch within the Upton Plant Site Permit Area will be weed free.

7.3 Post-Construction

Inventory, monitoring, and treatment of weed infestations will continue post-construction and will follow the guidelines presented in Section 6. Mapping of weed populations within the Upton Plant Site Permit Area will continue into off Permit Areas, if the weed population extends off the Upton Plant Site Permit Area and is a direct result of the project. RER will treat infestations of weeds that occur within the Upton Plant Site Permit Area and weeds in the adjacent undisturbed area, if these are a direct result of the RER project.

To ensure protection of the Upton Plant Site Permit Area from the spread of weeds during maintenance and operations, the access roads will be surveyed for weeds as stated in Section 8.1.

8.0 MONITORING AND RECORD KEEPING

RER will collect and maintain all records pertaining to the control and management of weeds within the Upton Plant Site Permit Area. This includes, but is not limited to, the following: inventories, treatments, monitoring, and re-infestation trends as related to frequency of re-occurrence in specific areas, and the rate of spread of existing infestations. Contractor reports will be written and submitted to RER annually, after the treatment season (generally in the fall). Reports will be submitted to the TBNG as requested.

8.1 Monitoring

This section provides for monitoring of the Upton Plant Site Permit Area for noxious and invasive weeds. Monitoring by RER or an approved contractor will be conducted throughout the life of the project and for at least five years following its completion.

Annual surveys, as well as monitoring, will continue throughout the life of the Upton Plant Site project and for at least five years following the completion of the Upton Plant Site project. Inventories will be in accordance with protocols contained in the North American Invasive Plant Mapping Standards (NAWMA 2002). Contractor findings will be submitted to RER by December 31 of each year.

Weed locations will be in a shape-file and in UTM Zone 13, NAD 83, meters. Applicable monitoring forms will be included as an appendix of the annual interim reclamation report. Reports and shapefiles will be submitted to the WDEQ-LQD as required and upon request to the TBNG. The intent of post-construction inspections will be not only to identify and inventory new infestations, but also to maintain control of weeds before seed is set and dispersed. RER will also inspect for invasive weed populations which extend outside of the Upton Plant Site Permit Area, if the weed population is a direct result of the project.

8.2 Report Submittal

There are three types of reports to be submitted annually—the Annual Report (as part of the interim reclamation monitoring report), pesticide application records (PAR), and pesticide use reports (PUR). Reports will be submitted to the WDEQ-LQD as required and upon request to the TBNG.

8.3 Annual Report

Weed inventory information is a part of the annual reporting requirements for the Upton Plant Site project. A contractor for RER will compile an annual Reclamation Monitoring Report to be submitted to WYDEQ-LQD. Included are

percent cover of invasive weeds and the species present, as well as listing of the following: weed treatment contractor, contractor license number and expiration date, date(s) treated, and methods of treatments applied (chemical, biological, mechanical).

8.4 Pesticide Application Records

These records will be filled out within 24 hours of each herbicide application. Completed forms will be submitted to RER at the end of each treatment season and to the TBNG as requested. The following information will be recorded on each form: date and time of herbicide application; herbicides, adjuvant, and surfactants used; rates applied; weather and site conditions, locations of infestations treated, and monitoring comments on the site.

8.5 Pesticide Use Report

A summary report of all application activity, the Pesticide Use Report (PUR), will be submitted at the end of the treatment season, along with the monthly PARs. The weed control contractor will be responsible for filling out these reports and submitting them to RER. Reports will be submitted to the TBNG as requested. This report will include herbicide usage by trade names, rates, species treated, weed locations, and acres treated.

9.0 FEDERAL LAWS, REGULATIONS, AND POLICIES AFFECTING FOREST SERVICE WEED CONTROL

- 1) Public Rangelands Improvement Act of 1978.
- 2) Federal Noxious Weed Act of 1974, as amended by Sec. 15 - Management of Undesirable Plants on Federal Lands, 1990.
- 3) Wyoming Weed and Pest Control Act 1973.
- 4) Executive Order 13112 (Invasive Species), signed on February 3, 1999.
- 5) Thunder Basin National Grassland Land Resource Management Plan: Grassland-wide Direction – Section J. Insect and Disease Control, Noxious Weeds, Non-native, and Invasive Species 2001.
- 7) Wyoming Department of Environmental Quality – Water Quality Division: General Permit for Minor Pesticide Discharges (WYG260000)

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