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(54) METHOD FOR PRODUCING PEAT

VERFAHREN ZUR HERSTELLUNG VON TORF

PROCÉDÉ DE PRODUCTION DE TOURBE

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**EP-A2- 2 444 471 WO-A1-2010/084250
SU-A1- 688 629**

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- **ROCHEFORT, L. ET AL.: 'Restoration of degraded boreal peatlands' BOREAL PEATLAND ECOSYSTEMS vol. 188, 2006, PAGES 389, 397-399, 405-408 AND 410-411; XP008181013**

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Description

[0001] The application relates to a method for producing peat and a method for working a peat bog.

[0002] Environmental problems relating to conventional peat production have become a subject of intense media publicity. A particular concern is the impact of peat production on the water system which is feared to contaminate bodies of water particularly because of humus material and nutrient loading in the water, even though the peat production is subject to environmental permit, methods for water treatment are applied on the sites, and the production is under strict supervision. Agriculture and forestry have been found to have similar impacts. In addition to the impact on the water system, dust has been considered a problem, because dust is easily conveyed to ditches around peatland sites and is carried untreated into larger bodies of water. Therefore, according to new environmental protection guidelines for peat production, a protective zone should be provided around the site. In addition to its impact on the water system, the dust may in some cases disturb people living in the environment. Moreover, greenhouse gas emissions during the production as well as a reduction in biodiversity are caused by peat production. For the reasons mentioned above, it has become considerably more difficult to obtain permits for peat production, because permit applications are regularly appealed. As a result, a decline is seen in peat production capacity as old sites are becoming exhausted, which has caused a shortage of peat and even shifting to the use of coal in peat-fired power stations.

[0003] Therefore, attempts have been made to intensively develop peat production in recent years. In particular, Vapo Oy has developed a variety of methods, such as an asphalt production method (UTU) and a method based on a subsoil drainage field (SUTU), in which it has been possible to significantly reduce environmental hazards; see also patent F1122902 (application No. F120106096). However, among other things, the high cost of these methods has been a problem which has prevented them from being more commonly used. Other methods for peat production and restoration are shown in EP 2 444 471 and in "Restoration of degraded boreal peatland", (Rochefort, L et al. -2006). In the method to be presented here, the above mentioned problems can be solved efficiently and at low cost.

[0004] In the method for producing peat, peat is transferred from areas with a shallow layer of peat to production fields in such a way that a peat layer is formed and the deep parts of the bog are dried by means of drainage ditches. The bog area is prepared by peat moving so that the shallow fringe areas form a peat-free, mainly vegetation covered protective zone around a peat production site.

[0005] The mainly vegetation covered pit according to the method surrounding the production field, the vegetation basin, acts as a part of a water treatment system and as a storage basin for flood water. The mainly vegetation

covered pit formed around the production field having a thick layer of peat acts as a collector and binder of dust. The vegetation covered pit can constitute a carbon sink.

[0006] A primarily vegetation covered, either star-shaped or ring-shaped pit may be formed around a deep peat area. The pit may be uniform, or the pit may consist of basins connected to each other by connecting ditches.

[0007] As the fringe areas of the production field become shallower, the peat moving operation is carried out again, if necessary. Thus, the surface area of the pit is increased in comparison with the production field, and the water treatment is enhanced.

[0008] From a pump station at the lowermost point of the bog, water can be recirculated to the intermediate zones (the pit) in the upper part of the bog. From the pump station at the lowermost point of the bog, part of the water can be pumped to a runoff field, and part of the water can be recirculated to the intermediate zones (the pit) in the upper part of the bog.

[0009] The method makes it possible produce peat even in small bog areas and/or in bog areas with a shallow layer of peat.

[0010] The pit, i.e. the vegetation basin, according to the method may comprise flooded dikes.

[0011] In a method, a service road is provided around the pit, i.e. the vegetation basin.

[0012] In a method, willow trees are planted in the pit.

[0013] The basic features of the method are illustrated in the appended drawing 1, and its basic features are the following:

When preparing for peat production, the shallow fringe areas of the bog 1, typically lower than 2 metres, are prepared by moving the peat to the production fields 3 by using an excavator in such a way that an almost totally peat-free area is left between the fields and in the fringe areas of the bog, to surround the production fields 4. The live ground vegetation from the bog is returned to the harvested area 2 where it constitutes a live vegetation layer that binds carbon dioxide. The peat free area can be called an intermediate zone, a pit, or a vegetation basin. If there is no vegetation, for example around an existing peat production field from which the vegetation has been removed, the restoration of bog vegetation in the basin is enhanced by e.g. transplantation. The bog vegetation may comprise, for example, *Sphagnum* moss and/or *Eriophorum vaginatum* (hare's tail cottongrass).

[0014] The parts 4 (normally middle parts) of the bog which are deeper than 2 m are normally prepared and dried by means of drainage ditches 5.

[0015] The prepared bog has a star-like or ring-like shape where the centre part is a normal production field 4 and the fringe parts form a peat-free area 2 which is primarily covered with vegetation.

[0016] When the fringe parts of the production field become shallow, a peat moving operation is carried out again, wherein peat from the shallow part is transferred to the existing peat field and is levelled 6. The new area for peat moving is illustrated with a broken line. Thus, the

surface area of the intermediate zone surrounding the production field will increase, and the surface area of the actual production field will decrease, respectively. In large peatlands, the peat moving operation can be performed several times, if necessary, until the production field has reached its minimum size and the peat production is finished by conventional methods.

[0017] The intermediate zones, *i.e.* the pits, replace conventional ditches on the fringe of the bog and act as storage basins for collecting flood water, if necessary, from which basins the water can be drained in a controlled manner to a water treatment system 7 and 8.

[0018] The peat production site is surrounded by a peripheral ditch, *i.e.* an isolation ditch. The isolation ditch prevents water from the outside or the environment of the peat production site from flowing to the peat production field. Conventionally, a peripheral ditch surrounds a protective zone surrounding the actual production field. Among other things, the protective zone prevents the spreading of dust from the production field to the environment. Now, the vegetation basins presented here can be used to replace the protective zone in whole or in part. The peat production site may also be provided with both a protective zone and a vegetation zone. The vegetation basin makes it possible to select and to utilize the vegetation in a versatile and efficient way, for example in comparison with the protective zone. With the vegetation basin, it is possible to effectively prevent the spreading of dust in the surrounding ditch.

[0019] The actual peat production is performed in the conventional way by means of normal production equipment.

[0020] Stack areas 10 and roads 11 are built on the fringes of the production field in the conventional way. A service road can be built between the peripheral ditch 1 of the bog area and the vegetation basin 2, to surround the peat production site. The service roads can be built from the borrow material of the peripheral ditch 1. The service road makes it possible to maintain the vegetation basin and, for example, to harvest willow from the area of the vegetation basin.

[0021] A water treatment system for the site is constructed by placing a pump station 7 at the lower fringe of the bog and by conveying the water from there to a runoff field 8. If necessary, chemicals can be applied to boost the treatment. The intermediate zones or pits formed and primarily covered with vegetation act as a first stage in water treatment by collecting dust, solids and nutrients.

[0022] The water treatment is intensified by circulating water to the upper parts of the bog, to the intermediate zones 9 covered with vegetation, wherein the vegetation in the pits is used as a purifying and filtering element. In the summer when the rate of runoff is low, the proportion of water circulated is higher and the efficiency of purification is better than in times of flooding. In times of little runoff, an almost closed circulation is achieved. In the summer, when evaporation is greater than precipitation

and there is little runoff, a closed circulation of water can be achieved. This is particularly important for binding dust and nutrients during the production. The content of impurities in water is the highest during the production period.

[0023] The most significant difference to the previously presented methods, such as the asphalt production method (UTU) and the method based on a subsoil drainage field (SUTU), as well as the method according to patent F1122902, is the intermediate zone (pit) surrounding the production field and primarily covered by vegetation, which intermediate zone is enlarged as the production fields become shallower and which acts as a storage basin for flood water, as a part of the water treatment system and as a treatment system for circulated water. Furthermore, the method is less expensive than other new methods in terms of costs, because efficient production methods of prior art can be utilized in the method.

[0024] Significant advantages are achieved by means of the presented method. The functionality of the water treatment system is significantly improved, because flood waters can be collected in the space (pits) formed in the intermediate zones and conveyed from there in a controlled manner through the treatment system. The most significant weakness of present treatment systems is uncontrolled runoff fluctuation, which causes problems in the dosage of chemicals as well as in the planning of the capacity of the treatment systems.

[0025] The water treatment capacity is liable to being exceeded during flooding. For example, the amount of water in the runoff field and a chemical dosing unit may temporarily exceed their receiving and/or treating capacity. Furthermore, the vegetation surface in the intermediate zones (pits) acts as a runoff field as such, effectively collecting fines, humus and nutrients. The circulation of water substantially improves the efficiency of water treatment. Also, some water evaporates from the pits, which decreases runoff, particularly during the production period. During the production period, when water evaporates, it is possible to obtain an internal circulation, wherein water is circulated within the area and there is no need to drain water from the production field.

[0026] Moreover, dust emissions from the production field to ditches are prevented as they are bound by the vegetation in the intermediate zones (pits). At the same time, the pits act as a protective zone for the production field.

[0027] The method is cost-effective as the preparations for the production are not significantly more expensive than normal preparations, because peat moving by an excavator is efficient. The costs for the preparation of the deep areas fall within the normal range. Also, the costs for the peat production itself are normal, because conventional methods and equipment are used in the production.

[0028] By means of the method, it is possible to reduce greenhouse gas emissions during the production period, because the intermediate zone covered with vegetation

constitutes a sink as early as from the second year on. Furthermore, weather dependence can be reduced, because capillary rise of water in fields to which peat has been removed from the pits is cut off at the interface of the removed peat, and drying is more efficient than in normal fields.

[0029] Another significant advantage is the fact that by the method it is possible to efficiently utilize bogs which are shallow and have a small area and which could otherwise not be used for peat production. This is particularly important when it is difficult to obtain large bog areas for peat production, particularly within a short distance from clients. In a corresponding manner, shallower fringe areas of deeper bogs can be utilized.

[0030] By the method, it is also possible to accelerate subsequent use of the area, because the intermediate zones are restored already during the production. By the method, it is possible to increase the degree of variation of life, i.e. biodiversity. The vegetation basin formed provides a habitat for wetland plants, insects and birds even during the peat production period, from the beginning of the production.

[0031] In the method, peat is transferred from shallow peat areas 2 by an excavator to production fields 3 in such a way that a two to three fold peat layer is provided, depending on the thickness of the peat layer of the bog. The peat layer can also be thinner. The thickness of the peat layer will depend on the quantity of peat and on the extent of the surface area on which it is spread.

[0032] The pit 2 surrounding the production field is a uniform area. The pit 2 can be a uniform annular area around the production field 4. The pit can be a uniform area or it can comprise single basins. The pit can form a star-shaped area around the production field. For example, the pit can consist of fields extending towards the production field. The pit can contain non-uniform areas. The strips of the pit can constitute single basins. The pit can comprise several single basins linked to each other to facilitate water circulation. The basins are connected to each other by means of, for example, ditches. In the area of the pit, water is circulated either naturally within the uniform area, or via ditches connecting the single basins.

[0033] The shallow fringe part of the bog 1 constitutes a vegetation basin 2. Said vegetation basin 2 stores flood waters and enables controlled water treatment. The vegetation in the vegetation basin evaporates water, binds nutrients and peat dust, and acts as a runoff field. The bog vegetation in the vegetation basin binds carbon dioxide from the air. The vegetation basin acts as a carbon sink from the second year on at the latest, throughout the production period. In this way, the surface area 4 of the production field 4 that generates carbon dioxide in the air is reduced.

[0034] The vegetation in the vegetation basin 2 can contain, for example, *Sphagnum* moss, *Eriophorum vaginatum*, and/or willow. *Eriophorum vaginatum* (cotton-grass) is found even in harsh environments, and it col-

lects and binds nutrients well. In the vegetation basin, it is possible to grow e.g. willow as an energy crop already during the peat production. As an energy crop, the willow evaporates water and binds nutrients in an efficient way.

The willow evaporates even 500 mm during a growing season. For its part, the crop will intensify the treatment of waters. As a side product, useful biofuel can be produced from the willow as an energy crop. Willow planted or transplanted in the vegetation basin can form a bush-like fence around the production field. The willow fence will efficiently prevent the spreading of dust from the production field, for example compared with lower vegetation.

[0035] Service roads can be built between the ditch 1 that surrounds the bog area, and the vegetation basin 2. The service roads are useful in the cultivation of the vegetation and enable, for example, the harvesting of willow. In winter, the production field is frozen and has load-bearing capacity. The load-bearing capacity of the ice crust on the vegetation basin will depend on the ambient conditions. The service roads in the vegetation basin make it possible to maintain the vegetation basin irrespective of the ambient conditions. The service roads can be built by utilizing borrow material from the area. Earth does not need to be brought from elsewhere but the service roads can be made of material from the bog itself.

[0036] In a method, flooded dikes are provided at the bottom of the vegetation basin 2 surrounding the production field 4. By means of the flooded dikes, it is possible to slow down the circulation of water. The flooded dikes make water run more slowly from the production field 4 to the vegetation zone 2. By means of the flooded dikes, water is stored more evenly throughout the area of the vegetation basin 2. Runoff water can be guided forward in a controlled manner. The water can be pumped 7 to a runoff field 8. Water can be recirculated to the upper, drier areas 9 of the vegetation basin. The vegetation in the pit 2 filters and purifies water. The water purification can be intensified by circulating water from the wet, deeper parts of the vegetation zone to its drier, shallower parts 9. The flooded dikes make it possible to circulate water in a controlled manner.

[0037] Heavy precipitation, whose depth may be even e.g. 50 mm, loads the water treatment system as the amount of water is suddenly increased. Furthermore, there is bulk peat on the production field that is washed away with the water and causes additional loading in the water treatment system. Conventionally, a downpour may have caused runoff of unwanted material all the way to the waterways. At the time of spring flooding, there is no bulk peat on the production field, but nutrients and humus in the bog area constitute a load on the water treatment.

[0038] The water circulation may constitute a closed circulation during a dry period, for example in the summer. Water is circulated when the surface of groundwater is below a given maximum level. If the maximum level is exceeded, part of the water is conveyed to a water treat-

ment system 8 outside the area. During a dry period, some or a major part of the waters can be evaporated off. In winter, or when the ground is frozen, the amount of runoff is small. In times of frost, runoff is cleaner, so that water treatment is less loaded. Thus, the water under the ice crust of the vegetation basin can be pumped off. In this way, the capacity of the vegetation basin is increased. The pumped-off basin can receive eventual floodwaters in the spring. Draining the vegetation basin will increase the capacity of the vegetation basin to receive greater amounts of water and prevent adverse environmental impacts and/or loads in the subsequent steps of water treatment. Preferably, the amount of water in the pit can be regulated by means of a pump.

[0039] By means of the flooded dikes in the vegetation basin, it is possible to control impurities in water during the dry and wet seasons. In a dry season, for example in the summer when the water amount is relatively small, the nutrient content in water is relatively higher than in a wet season, for example during flooding, when the water amount is larger. In the summer, water can be circulated, aiming at an internal circulation, wherein water is not drained out of the bog area 1 of the peat production site, for example to a runoff field 8. If the amount of water is exceeds that which can be internally circulated in the bog area 1 of the peat production site, it is necessary to drain some of the water to the runoff field 8. The circulated water drained to the runoff field is cleaner than water pumped directly to the runoff field. In times of little runoff, such as during dry seasons or in the summer, water is circulated in the system. In this way, the efficiency of purification is increased. Moreover, runoff peaks can be controlled better. Said methods enable effective treatment and purification of waters. Thanks to the simple implementation, the implementation costs remain low.

[0040] As an example, we can look at a peat production field of 100 hectares. The area can have the shape of, for example, a square. The average depth of the peat layer in the peat production field to be examined is 3 meters. The area is surrounded by a vegetation basin having a width of 20 meters. The average depth of peat to be removed from the area of the vegetation basin is about 1.5 meters. Thus, the amount of peat to be moved is about 120,000 m³. For example, a precipitation of 50 mm (50,000 m³) in a production field of 100 hectares can be stored in a vegetation basin surrounding the production field and having a width of 20 m and a capacity of 80,000 m³. The capacity or maximum degree of filling of the vegetation basin is thus about 2/3 of its volume. The vegetation basin will bind part of the dust and humus contained in the runoff. The vegetation basin will collect part of the airborne dust. As the vegetation basin binds dust, less dust is carried to the ditches bordering the bog area and to the nearby areas. The basin is used both as a runoff field and as a settling basin.

[0041] The implementation contains equipment for, for example, moving peat mass from the fringe areas to the production field, for spreading the peat on the production

field, and for pumping water. The equipment may comprise known devices which are in use, such as equipment for pumping water and/or an excavator for moving and spreading masses of peat. By said methods, efficient techniques can be used in the production. The method can be implemented by equipment of prior art. In the method, it is possible to utilize equipment of prior art or new equipment of the future.

[0042] By the method, shallow fringe areas of wetlands can be utilized by turning them into a vegetation basin. For example, peat extracted from a vegetation basin is first lifted to form a fresh peat layer on top of an existing peat layer in the production field in the middle part of the bog area. Capillary water rise is discontinued between said existing and fresh peat layers. This improves the conditions for drying of the peat. Moreover, the weather dependence of the fringe areas is decreased.

[0043] The transfer of peat can be repeated several times. When the fringes of the peat production field become shallower, peat mass can be lifted from the fringe areas onto the production field. In the vegetation zone, the ground surface is about 2 to 2.5 meters lower than the ground surface in the production field. The production fields can become shallower by 7 to 14 cm per year, for example about 10 cm per year. When the fringe area of the production field comes too close to groundwater level, peat can be moved from the fringe area to the production fields in the centre. According to the example, the transfer of peat is repeated at intervals of about 4 to 5 years. Peat 6 from the shallower area is moved to an existing peat field in the central part of the production field. In this way, the surface area of the vegetation area will increase and the surface area of the production field will decrease, respectively. After the transfer, the peat mass in the production field will increase and the area will be higher than before the transfer. Depending on the size of the bog area, peat transfer from the shallower fringe area of the production field can be repeated several times.

[0044] According to and/or in addition to said methods, it is possible to use peat production methods of prior art or of the future. Even shallow bogs can be utilized by applying said methods.

[0045] Said methods have a positive effect on the environmental impacts of peat production. Dust possibly spread from the bog can be bound in a more effective way, whereby dust emissions are reduced. Carbon dioxide emissions are reduced. Biodiversity is increased. Environmental restoration is accelerated, as the restoration process begins on the fringe of the bog already at the beginning of the production. The restoration area will expand towards the centre of the area as the production proceeds. Runoff waters and entrained nutrients are utilized in the restoration. In this way, wetlands are formed, which are useful for e.g. waterfowl and waders. The water balance of the bog area will be restored faster. When the water balance is restored and the water level remains high, the vegetation will start to form peat. In other words, the peatland will begin to function as a real bog.

[0046] The pit, *i.e.* the vegetation basin around the site, acts as a fire protection basin. The vegetation basin will prevent a possible fire from spreading outside the peat production site. Because the pit surrounding the peat production site contains water, water is available on all sides of the peat production site, and no separate fire water basins will be needed.

[0047] In a method according to an example for producing fuel peat or horticultural peat, peat is transferred from shallow peat areas by an excavator to production fields 3 in such a way that a two to three fold peat layer is provided, depending on the thickness of the peat layer of the bog. Live bog vegetation from the location of the peat layer to be transferred is returned to its original location, whereby a carbon-binding vegetation zone is provided. The deep parts of the bog are dried in the normal way by means of drainage ditches 5. The bog area 1 is prepared by peat moving in such a way that shallow (typically shallower than 2 m) fringe areas form a peat-free protective zone 2 around the peat production site, primarily covered by vegetation and acting as storage basins for flood water and as a part of the water treatment system for the site. A star-shaped or ring-shaped pit 2 primarily covered with vegetation is formed around the deep peat area 4. As the fringe areas of the production field become shallower, the peat moving is performed again 6, if necessary, wherein the surface area of the pit increases in comparison with the production field, and the water treatment is enhanced.

[0048] In the above mentioned example, the actual peat production can be implemented by means of normal production equipment in a cost-efficient way.

[0049] In the above mentioned example, the pit 2 formed, surrounding the production field and mainly covered by vegetation, acts as a part of the water treatment system and as a storage basin for flood water.

[0050] In the examples above, part of the water is pumped from the pump station 7 at the lowermost point of the bog to the runoff field 8, and part of the water is recirculated to the intermediate zones 9 in the upper part of the bog (to the pit).

[0051] In the above examples, the mainly vegetation-covered pit 2 formed around the area with a thick layer of peat acts as a collector and binder of dust.

[0052] In the examples above, the pits covered with vegetation can be used to reduce greenhouse gas emissions from the site, the pits constituting a carbon sink, and to reduce emissions caused by residual peat by means of more economical utilization of the peat.

[0053] In the above examples, the restoration of the bog after the peat production can be performed quickly by means of pits 2, or the area can also be prepared for agricultural or forestry use.

[0054] In the above examples, the peat production can be implemented in an efficient, economical and environmentally friendly way, even in bog areas which are small or have a shallow layer of peat.

[0055] Obvious modifications can be made in the

above described methods and examples without deviating from the scope of protection. Features according to the methods and examples can be combined, omitted and/or replaced with others.

Claims

1. A method for producing peat, wherein a bog area (1) is prepared by peat moving, wherein peat from areas with a shallow layer of peat is transferred to production fields (3) in such a way that a peat layer is provided, and in such a way that the shallow fringe areas form a peat-free pit (2) primarily covered by vegetation around the peat production site, wherein the deep parts of the bog are dried by means of drainage ditches (5), wherein water treatment is intensified by circulating water to the upper parts of the bog, to the peat-free pit (2), and wherein the vegetation in the pit (2) is used as a purifying and filtering element.
2. The method according to claim 1, **characterized in that** bog vegetation from the location of the moved peat layer is returned to its location.
3. The method according to any of the claims 1 to 2, **characterized in that** peat is transferred from shallow peat areas to production fields (3, 5) in such a way that a two to three fold peat layer is provided, depending on the thickness of the peat layer of the bog.
4. The method according to any of the claims 1 to 3, **characterized in that** the shallow fringe areas are shallower than 2 m.
5. The method according to any of the claims 1 to 4, **characterized in that** the pit (2) formed, surrounding the production field and primarily covered by vegetation, acts as a storage basin for flood water and as a part of the water treatment system of the site.
6. The method according to any of the claims 1 to 5, **characterized in that** the pit is continuous.
7. The method according to any of the claims 1 to 6, **characterized in that** the pit consists of basins connected to each other by connecting ditches.
8. The method according to any of the claims 1 to 7, **characterized in that** when the fringe areas of the production field become shallower, peat moving is performed again (6), if necessary.
9. The method according to any of the claims 1 to 7, **characterized in that** when the fringe areas of the

production field become shallower, the peat moving is performed again (6), if necessary, wherein the surface area of the pit (2) increases in comparison with the production field (4), and the water treatment is enhanced.

10. The method according to any of the claims 1 to 9, **characterized in that** some of the water is pumped from a pump station (7) at the lowermost point of the bog to the runoff field (8), and some of the water is recirculated to the peat-free pit (2) in the upper part of the bog (to the pit).
11. The method according to any of the claims 1 to 10, **characterized in that** the water from the pump station (7) at the lowermost point of the bog is recirculated to the peat-free pit (2) in the upper part of the bog (to the pit).
12. The method according to any of the claims 1 to 11, **characterized in that** the restoration of the bog after the peat production is carried out quickly by means of pits (2), or the area is also prepared for agricultural or forestry use.
13. The method according to any of the claims 1 to 12, **characterized in that** the pit comprises flooded dikes for guiding water forward in a controlled manner and/or enabling to circulate water in a controlled manner.
14. The method according to any of the claims 1 to 13, **characterized in that** the amount of water in the pit can be regulated by means of a pump.
15. The method according to any of the claims 1 to 14, **characterized in that** biota are planted in or transplanted to the pit; and/or willow trees are planted in the pit.

Patentansprüche

1. Verfahren zum Torfabbau, wobei ein Mooregebiet (1) durch die Umlagerung von Torf vorbereitet wird, wobei Torf aus Gebieten mit einer Torfschicht von geringer Stärke derart in Abbaubereiche (3) verbracht wird, dass eine Torfschicht bereitgestellt wird, und derart, dass die Randgebiete mit geringer Schichtstärke eine torffreie Grube (2) bilden, die in erster Linie von der Vegetation bedeckt wird, welche die Torfabbauanlage umgibt, wobei die tiefliegenden Abschnitte des Moores mit Hilfe von Entwässerungsgräben (5) trockengelegt werden, wobei die Wasserbehandlung intensiviert wird, indem Wasser derart umgewälzt wird, dass es in die höherliegenden Abschnitte des Moores, in die torf-

freie Grube (2) gelangt, und wobei die Vegetation in der Grube (2) als reinigendes und filtrierend wirkendes Element genutzt wird.

2. Verfahren gemäß Anspruch 1, **dadurch gekennzeichnet, dass** die Moorvegetation, welche von dem Ort der umgelagerten Torfschicht stammt, an ihren Ort zurückgebracht wird.
3. Verfahren gemäß einem beliebigen der Ansprüche 1 bis 2, **dadurch gekennzeichnet, dass** der Torf derart aus Torfgebieten mit geringer Schichtstärke in Abbaubereiche (3, 5) verbracht wird, dass sich eine verdoppelte oder verdreifachte Torfschicht bereitgestellt wird, in Abhängigkeit davon, wie stark die Torfschicht des Moores ist.
4. Verfahren gemäß einem beliebigen der Ansprüche 1 bis 3, **dadurch gekennzeichnet, dass** die Randgebiete mit geringer Schichtstärke eine Schichtstärke von weniger als 2 m aufweisen.
5. Verfahren gemäß einem beliebigen der Ansprüche 1 bis 4, **dadurch gekennzeichnet, dass** die Grube (2), welche nach ihrer Bildung den Abbaubereich umgibt und in erster Linie von Vegetation bedeckt ist, als Speicherbecken für Flutungswasser und als Teil des Wasseraufbereitungssystems der Anlage dient.
6. Verfahren gemäß einem beliebigen der Ansprüche 1 bis 5, **dadurch gekennzeichnet, dass** die Grube sich durchgehend erstreckt.
7. Verfahren gemäß einem beliebigen der Ansprüche 1 bis 6, **dadurch gekennzeichnet, dass** die Grube aus Becken besteht, die über Verbindungsgräben miteinander verbunden sind.
8. Verfahren gemäß einem beliebigen der Ansprüche 1 bis 7, **dadurch gekennzeichnet, dass** die Torfumlagerung erforderlichenfalls erneut durchgeführt wird (6), wenn die Schichtstärke in den Randgebieten des Abbaubereichs abnimmt.
9. Verfahren gemäß einem beliebigen der Ansprüche 1 bis 7, **dadurch gekennzeichnet, dass** die Torfumlagerung erforderlichenfalls erneut durchgeführt wird (6), wenn die Schichtstärke in den Randgebieten des Abbaubereichs abnimmt, wobei sich die Flächenausdehnung der Grube (2) im Vergleich mit dem Abbaubereich (4) vergrößert und sich die Wasseraufbereitung verbessert.
10. Verfahren gemäß einem beliebigen der Ansprüche 1 bis 9, **dadurch gekennzeichnet, dass** eine Teilmenge des Wassers von einer Pumpstation (7) am

tiefsten Punkt des Moores zum Ablauffeld (8) gepumpt wird und eine Teilmenge des Wassers in die torffreie Grube (2) im höherliegenden Abschnitt des Moores (in die Grube) zurückgeführt wird.

11. Verfahren gemäß einem beliebigen der Ansprüche 1 bis 10, **dadurch gekennzeichnet, dass** das Wasser von der Pumpstation (7) am tiefsten Punkt des Moores in die torffreie Grube (2) im höherliegenden Abschnitt des Moores (in die Grube) zurückgeführt wird.
12. Verfahren gemäß einem beliebigen der Ansprüche 1 bis 11, **dadurch gekennzeichnet, dass** die Renaturierung des Moores nach dem Torfabbau mittels der Gruben (2) auf rasche Weise erfolgt, oder das Gebiet weiterhin für eine land- oder forstwirtschaftliche Nutzung vorbereitet wird.
13. Verfahren gemäß einem beliebigen der Ansprüche 1 bis 12, **dadurch gekennzeichnet, dass** die Grube überspülbare Wälle umfasst, um das Wasser auf kontrollierte Weise weiterzuleiten und/oder eine kontrollierte Wassenumwälzung zu ermöglichen.
14. Verfahren gemäß einem beliebigen der Ansprüche 1 bis 13, **dadurch gekennzeichnet, dass** die Menge an Wasser in der Grube mittels einer Pumpe reguliert werden kann.
15. Verfahren gemäß einem beliebigen der Ansprüche 1 bis 14, **dadurch gekennzeichnet, dass** lebende Organismen in der Grube angepflanzt oder dorthin umgepflanzt werden; und/oder Weiden in der Grube angepflanzt werden.

Revendications

1. Procédé de production de tourbe, dans lequel une zone de tourbière (1) est préparée par déplacement de tourbe, dans lequel de la tourbe en provenance de zones présentant une couche peu épaisse de tourbe est transférée vers des champs de production (3) de telle manière qu'une couche de tourbe est fournie, et de telle manière que les zones périphériques peu épaisses forment une fosse exempte de tourbe (2) essentiellement recouverte de végétation autour du site de production de tourbe, dans lequel les parties profondes de la tourbière sont asséchées au moyen de tranchées de drainage (5), dans lequel un traitement de l'eau est intensifié en faisant circuler de l'eau vers les parties supérieures de la tourbière, vers la fosse exempte de tourbe (2), et dans lequel la végétation de la fosse (2) est utilisée comme élément de purification et de filtration.

2. Procédé selon la revendication 1, **caractérisé en ce que** de la végétation de tourbière en provenance de l'endroit où la couche de tourbe a été réintégrée à son emplacement initial.

3. Procédé selon la revendication 1 ou 2, **caractérisé en ce que** de la tourbe transférée de zones de tourbe peu épaisses vers des champs de production (3, 5) de telle manière qu'une couche de deux ou trois strates de tourbe est fournie, en fonction de l'épaisseur de la couche de tourbe de la tourbière.

4. Procédé selon l'une quelconque des revendications 1 à 3, **caractérisé en ce que** les zones périphériques peu épaisses présentent une épaisseur inférieure à 2 m.

5. Procédé selon l'une quelconque des revendications 1 à 4, **caractérisé en ce que** la fosse (2) formée, qui entoure le champ de production et est essentiellement recouverte de végétation, fait office de bassin de stockage pour de l'eau de ruissellement et constitue une partie du système de traitement de l'eau du site.

6. Procédé selon l'une quelconque des revendications 1 à 5, **caractérisé en ce que** la fosse est continue.

7. Procédé selon l'une quelconque des revendications 1 à 6, **caractérisé en ce que** la fosse est constituée de bassins raccordés les uns aux autres grâce à des tranchées de raccordement.

8. Procédé selon l'une quelconque des revendications 1 à 7, **caractérisé en ce qu'un** déplacement de la tourbe est à nouveau mis en oeuvre (6), si nécessaire, lorsque les zones périphériques du champ de production deviennent moins épaisses.

9. Procédé selon l'une quelconque des revendications 1 à 7, **caractérisé en ce que** le déplacement de la tourbe est à nouveau mis en oeuvre (6), si nécessaire, lorsque les zones périphériques du champ de production deviennent moins épaisses, dans lequel la surface de la fosse (2) augmente par rapport au champ de production (4), et le traitement de l'eau est amélioré.

10. Procédé selon l'une quelconque des revendications 1 à 9, **caractérisé en ce qu'une** partie de l'eau est pompée vers le champ de trop-plein (8) par une station de pompage (7) située au niveau du point le plus bas de la tourbière, et une partie de l'eau est amenée à recirculer vers la fosse exempte de tourbe (2) dans la partie supérieure de la tourbière (vers la fosse).

11. Procédé selon l'une quelconque des revendications 1 à 10, **caractérisé en ce que** l'eau en provenance

de la station de pompage (7) située au niveau du point le plus bas de la tourbière est amenée à recirculer vers la fosse exempte de tourbe (2) dans la partie supérieure de la tourbière (vers la fosse).

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12. Procédé selon l'une quelconque des revendications 1 à 11, **caractérisé en ce que** la remise en état de la tourbière après la production de tourbe est réalisée rapidement au moyen de fosses (2), ou bien la zone est également préparée en vue d'une utilisation agricole ou forestière. 10
13. Procédé selon l'une quelconque des revendications 1 à 12, **caractérisé en ce que** la fosse comprend des levées inondées permettant de guider l'eau vers l'avant de manière commandée et/ou permettant de faire circuler l'eau de manière commandée. 15
14. Procédé selon l'une quelconque des revendications 1 à 13, **caractérisé en ce que** la quantité d'eau dans la fosse peut être régulée au moyen d'une pompe. 20
15. Procédé selon l'une quelconque des revendications 1 à 14, **caractérisé en ce que** des biotes sont plantés ou transplantés dans la fosse ; et/ou des saules sont plantés dans la fosse. 25

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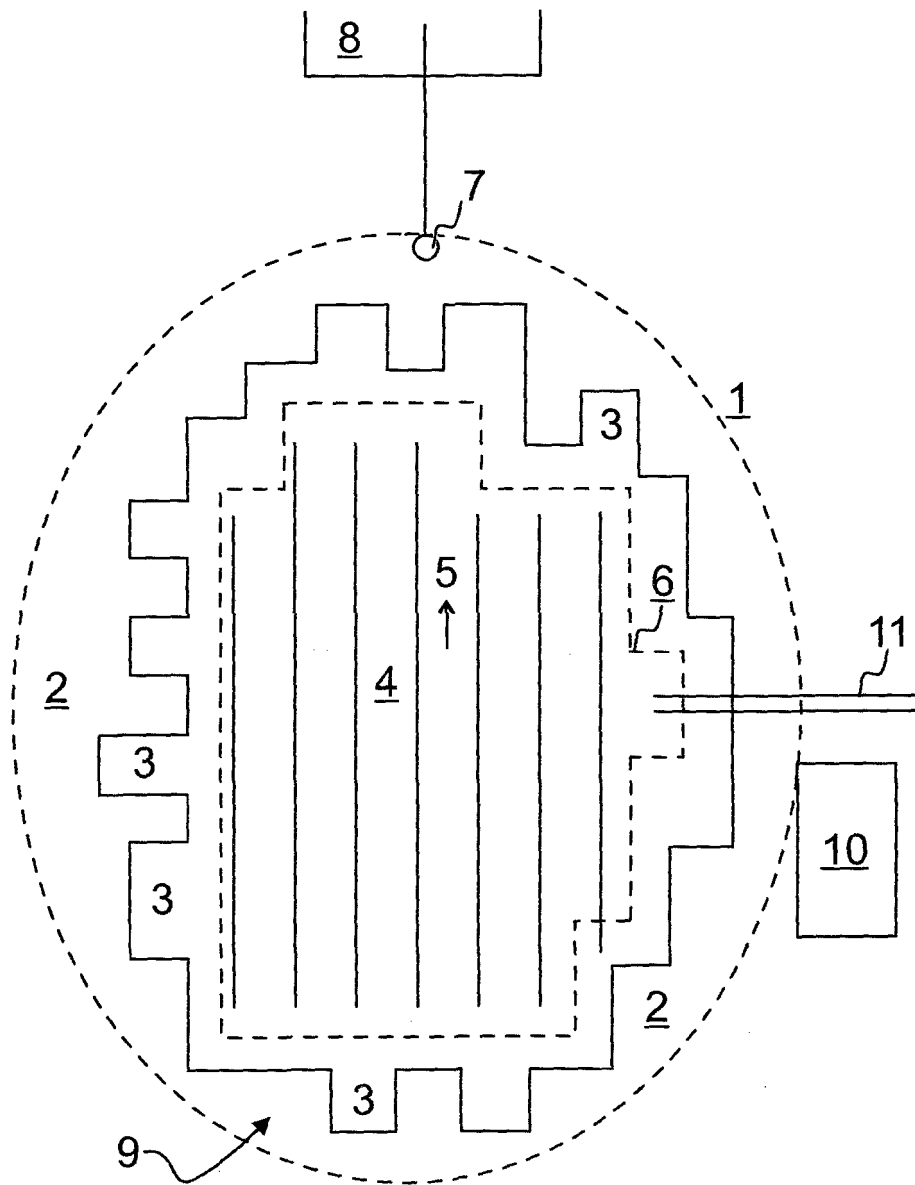


Fig. 1

REFERENCES CITED IN THE DESCRIPTION

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- **ROCHEFORT, L et al.** *Restoration of degraded boreal peatland*, 2006 [0003]