



Alberta Environment and Parks
Management of
Sand and Gravel Pits
Followup

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Related Reports:

- [Management of Sand and Gravel Pits \(second followup\)](#) (July 2014 Report)
- [Management of Sand and Gravel Pits \(first followup\)](#) (April 2010 Report)
- [Management of Sand and Gravel Pits \(original audit\)](#) (October 2008 Report, p. 364)

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Report Highlights



Sand and gravel are **non-renewable natural resources** vital to Alberta's economy p. 5

Alberta Environment & Parks (AEP) is responsible for regulating the sand and gravel industry to ensure mining and reclamation comply with laws and requirements p. 5

Un-reclaimed sand and gravel pits create environmental and financial risks p. 4 & 5
AEP does not do enough to protect Albertans from these risks p. 3

10 years after our original audit, AEP's processes for reclamation monitoring and enforcement are still inadequate, and so is the reclamation security p. 3

715 out of **2,700** pits are not meeting reclamation requirements

260 of **715** have been inactive for up to **10 years**

No enforcement actions taken p. 11 & 12

Security collected by AEP does not cover reclamation costs. Albertans will have to cover the shortfall if operators fail to reclaim the land p. 16

Albertans owed \$25 million in uncollected royalties on oil sands sites due to unauthorized exemptions given by AEP p. 17

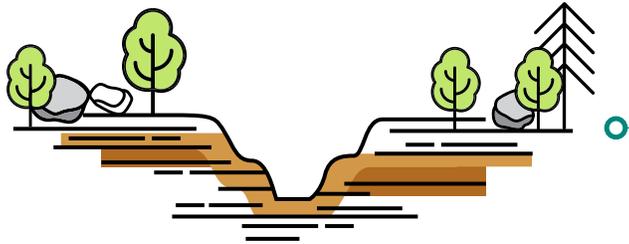


 **AEP implemented our recommendations to** p. 18 & 19

- verify reported volume and royalties
- assess sufficiency of security

Sand and Gravel in Alberta

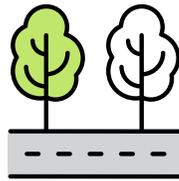
Source: The Alberta Sand and Gravel Association (asga.ab.ca)



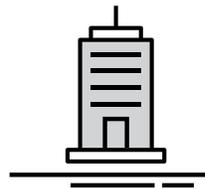
Sand and gravel are non-renewable resources that are extracted through open pit mining that occurs in both rural and urban communities throughout Alberta.

Sand and gravel, also known as "aggregate" includes sand, gravel, rocks, crushed stone, shale and any rock product mined from the ground.

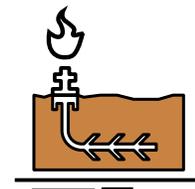
Common Uses for Sand and Gravel



Roads and pavement:
Roads, highways, parking lots, tennis and basketball courts, sidewalks



Buildings:
Office towers, homes, shopping malls, water treatment plants, schools, hospitals, overpasses, parkades



Resource development:
Hydraulic fracturing



One tonne is the equivalent weight of two fully grown moose.

How much sand and gravel is used annually in Alberta?


3 to 4 Million
Truck Loads

or


10 to 15 Tonnes
per Albertan

Number of tonnes of sand and gravel used to construct:


1 km of Highway:
30,000


1 km of Railroad:
16,000


House:
100 to 300


School or
Hospital:
2,000 to 4,000

Summary

The Department of Environment and Parks (AEP) does not do enough to protect Albertans from the risks created by sand and gravel pits. Specifically, **AEP does not:**

- **collect enough security** from pit operators to compel them to reclaim the land and to cover the cost of reclaiming pits—if AEP reclaims the land because operators fail to do so, Albertans may have to pay all costs above the security that AEP holds. If AEP does not reclaim the land, environmental and safety problems will likely result
- **enforce reclamation requirements** when operators repeatedly fail to meet them
- **collect all royalty payments** that pit operators owe to Albertans—oil sands operators owe \$25 million because AEP gave them exemptions it had no authority to issue

Un-reclaimed sand and gravel pits expose Albertans to unnecessary environmental and safety risks.

Albertans may have to pay millions of dollars to cover the cost of reclamation if AEP continues to collect insufficient security while not enforcing reclamation requirements.

Sand and gravel are non-renewable natural resources, vital to Alberta's economy. They are used in all types of construction: roads, schools, houses, hospitals, bridges, and water-treatment plants. Sand and gravel are the main components of concrete and asphalt.

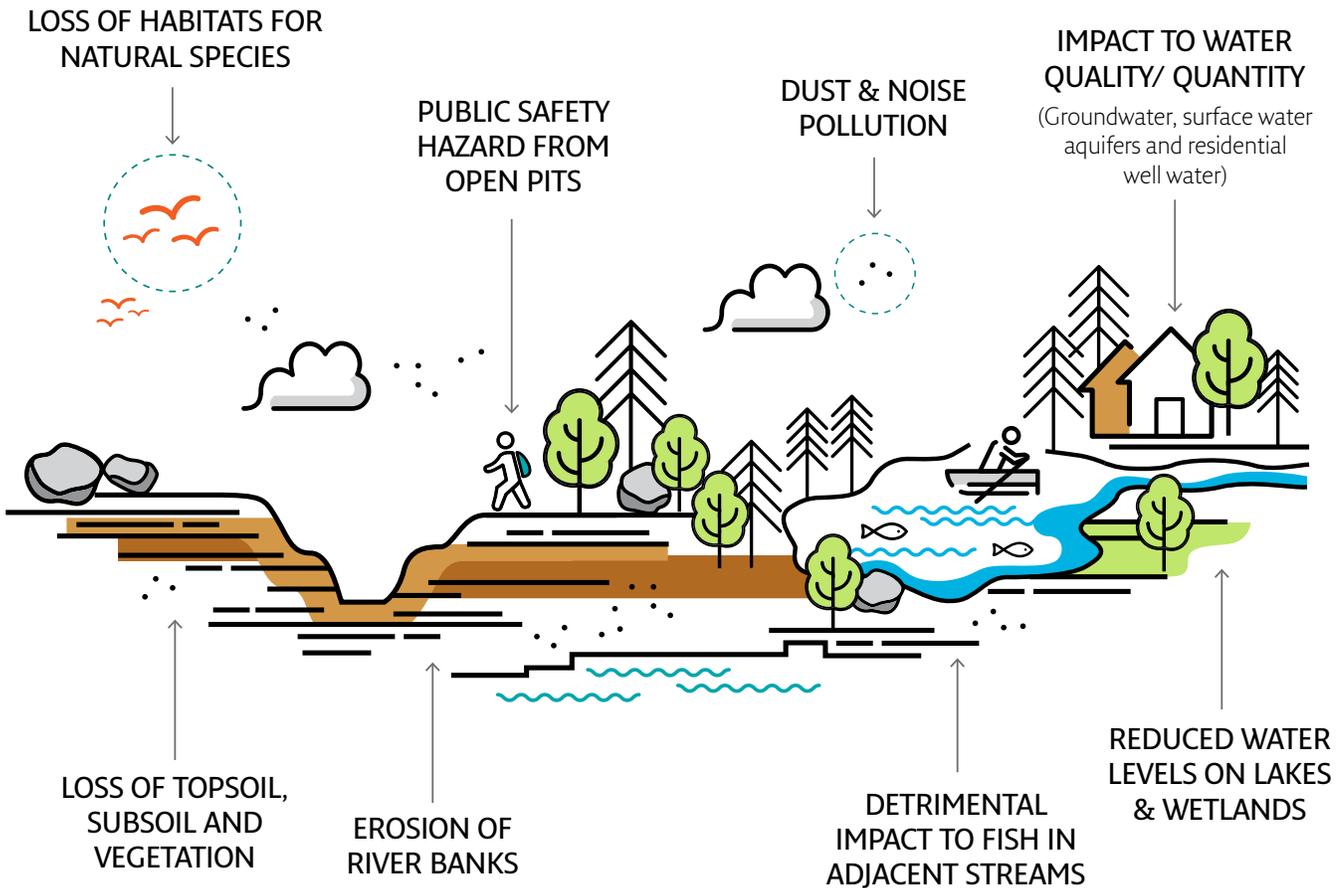
In 2008, we recommended that AEP assess if reclamation security is sufficient to cover reclamation costs. We also recommended that AEP improve inspection and enforcement of reclamation, and in our 2014 followup audit, we repeated the recommendation. As of January 31, 2019, 10 years after our original audit, AEP's reclamation inspection and enforcement processes are still inadequate, and so is the security.

In this report, we recommend that AEP collect sufficient security to compel operators to reclaim the land and to cover reclamation costs. We also recommend—a third time—that AEP enforce reclamation requirements. We also make a new recommendation that AEP collect outstanding royalties for sand and gravel used on oil sands sites.

Implementing the recommendations will mitigate the financial, environmental and safety risks from sand and gravel pits, produce a consistent approach to security and enforcement on public and private land, and allow AEP to use its resources more efficiently—demonstrating fiscal responsibility in a time of restraint.

On a positive note, AEP has implemented our recommendations to ensure operators report the correct volume of sand and gravel they extract and the royalties due, and to assess the sufficiency of the security.

Environmental Risks Associated with Sand and Gravel Pits



Background

Sand and gravel¹ are non-renewable natural resources vital to Alberta's economy. Sand and gravel are used in all types of construction. Everything from roads, schools, and houses to hospitals, bridges, and water treatment plants require sand and gravel. It is the main component of both concrete and asphalt, key building ingredients. Sand is also used in hydraulic fracturing, a way to extract underground oil and natural gas from shale gas formations.²

But the industry creates risks: sand and gravel mining temporarily disturbs the land. It also disrupts water and air. Un-reclaimed gravel pits can pose risks to the environment and to public safety. The major risks include destruction and disturbance of ecosystems and habitats that leads to reduction or loss of species, surface and groundwater pollution, and riverbank erosion.

Several laws apply to the sand and gravel industry in Alberta. Since this audit involved sand and gravel pits on public land, we focused on the *Public Lands Administration Regulation* and the *Environmental Protection and Enhancement Act*, and AEP's duties under them.

The purpose of the *Environmental Protection and Enhancement Act* is to protect the environment and ensure environmentally responsible development of natural resources. To achieve this goal, the Alberta government, through the Department of Environment and Parks (AEP), regulates the sand and gravel industry to ensure mining and reclamation complies with laws and requirements.

There are over 2,700 sand and gravel pits on public land and 2,400 pits on private land.³

AEP approves leases that give operators the right to mine sand and gravel. AEP also collects royalties, monitors operators' compliance with lease conditions and legislation, and verifies that operators reclaimed the land to an acceptable standard.⁴

Did you know...

Key statistics on Alberta's sand and gravel industry (2015)^{5, 6}

Revenue \$1,522 million⁷

GDP \$806 million⁸

Employment 4,120 FTE's⁹

¹ Sand and gravel are also called aggregate. Aggregate includes sand, gravel, rocks, crushed stone, shale and any rock product mined from the ground.

² Most natural gas in Alberta is extracted using hydraulic fracturing. Hydraulic fracturing has been used in more than 180,000 wells in Alberta since the 1950s. The process requires large volumes of sand. For example, a shale gas well requires over two million kilograms of sand or other proppant (solid material designed to keep a hydraulic fracture open, during or after a fracturing treatment).

³ On private land, there are 900 Class I pits (five hectares or more in area) and over 1,500 Class II pits (under five hectares), as at July 2018. https://www.alberta.ca/land-conservation-and-reclamation-guidelines-for-pits-and-surface-materials.aspx?utm_source=redirector#toc-4.

⁴ Under the *Conservation and Reclamation Regulation*, an operator must reclaim the land in accordance with the applicable standards, criteria and guidelines established by AEP.

⁵ <http://asga.ab.ca/upload/assets/ASGA%20Report%20-%20January%202018%20FINAL.pdf>

⁶ Direct impacts arise from the industry's core activities (sand and gravel mining). Indirect and induced impacts arise from linkages that exist with suppliers and other industries, including the transportation of sand and gravel, equipment suppliers, technology developers and service providers, and machinery and vehicle maintenance.

⁷ Includes direct output of \$932 million, and indirect and induced output of \$590 million.

⁸ Includes direct GDP of \$480 million, and indirect and induced GDP of \$326 million.

⁹ Includes direct employment of 2,098 FTEs, and indirect and induced employment of 2,022 FTEs.

About this Audit

We first audited how AEP manages sand and gravel resources in 2008 and followed up on our recommendations in 2010 and 2014. This audit assessed if AEP has implemented the three remaining recommendations from 2008.

Objective and Scope

The objective of our audit was to assess if AEP has implemented our outstanding 2008 recommendations¹⁰ to:

- improve processes to verify operator reports of sand and gravel mined from public land and royalties due to the Crown
- improve processes to inspect sand and gravel mines on public land and to enforce reclamation requirements
- assess the sufficiency of security deposits collected to reclaim the land

Our audit focused on AEP's 2016-2017 and 2017-2018 processes for royalty audits and reclamation monitoring and enforcement. For the security, we focused on AEP's activities in the past five years.

Criteria

We used the audit criteria from our original 2008 audit and management agreed with their suitability.

What We Examined

The audit covered AEP's processes to:

- verify operator reports of quantities of sand and gravel mined from public land and royalties due to the Crown
- monitor sand and gravel pits on public land and enforce reclamation requirements

We also examined AEP's actions and plans for evaluating the sufficiency of the current security, and developing and implementing sufficient security.

We conducted our fieldwork between June 2018 and January 2019, and completed our audit on September 26, 2019.

¹⁰ *Report of the Auditor General of Alberta—October 2008, pages 355-367.*

Conclusion

We conclude that AEP did not implement our recommendation to improve processes to inspect sand and gravel mines on public land and to enforce reclamation requirements.

AEP implemented our recommendation to assess the sufficiency of security deposits collected to reclaim the land. However, AEP has not acted on findings from that assessment.

AEP implemented our recommendation to improve processes to verify operator reports of sand and gravel mined from public land and royalties due to the Crown.



Why This Conclusion Matters to Albertans

Un-reclaimed sand and gravel pits expose Albertans to unnecessary environmental and safety risks such as destroyed ecosystem and habitats, water pollution and riverbank erosion.

Albertans may have to pay millions of dollars to cover the cost of reclamation if AEP continues to collect insufficient security while not enforcing reclamation requirements.

Albertans are owed \$25 million of royalties that AEP has not yet collected.

Summary of Recommendations

REPEATED Recommendation:
Improve reclamation monitoring and enforcement

We again recommend that AEP improve the effectiveness and efficiency of reclamation monitoring and enforce reclamation requirements.

NEW Recommendation:
Collect sufficient security

We recommend that AEP collect sufficient security to compel operators to reclaim the land and to cover reclamation costs if operators fail to do so.

NEW Recommendation:
Collect outstanding royalties

We recommend that AEP collect outstanding royalties for sand and gravel on oil sands sites.

IMPLEMENTED Recommendation:
Material and royalties not properly verified

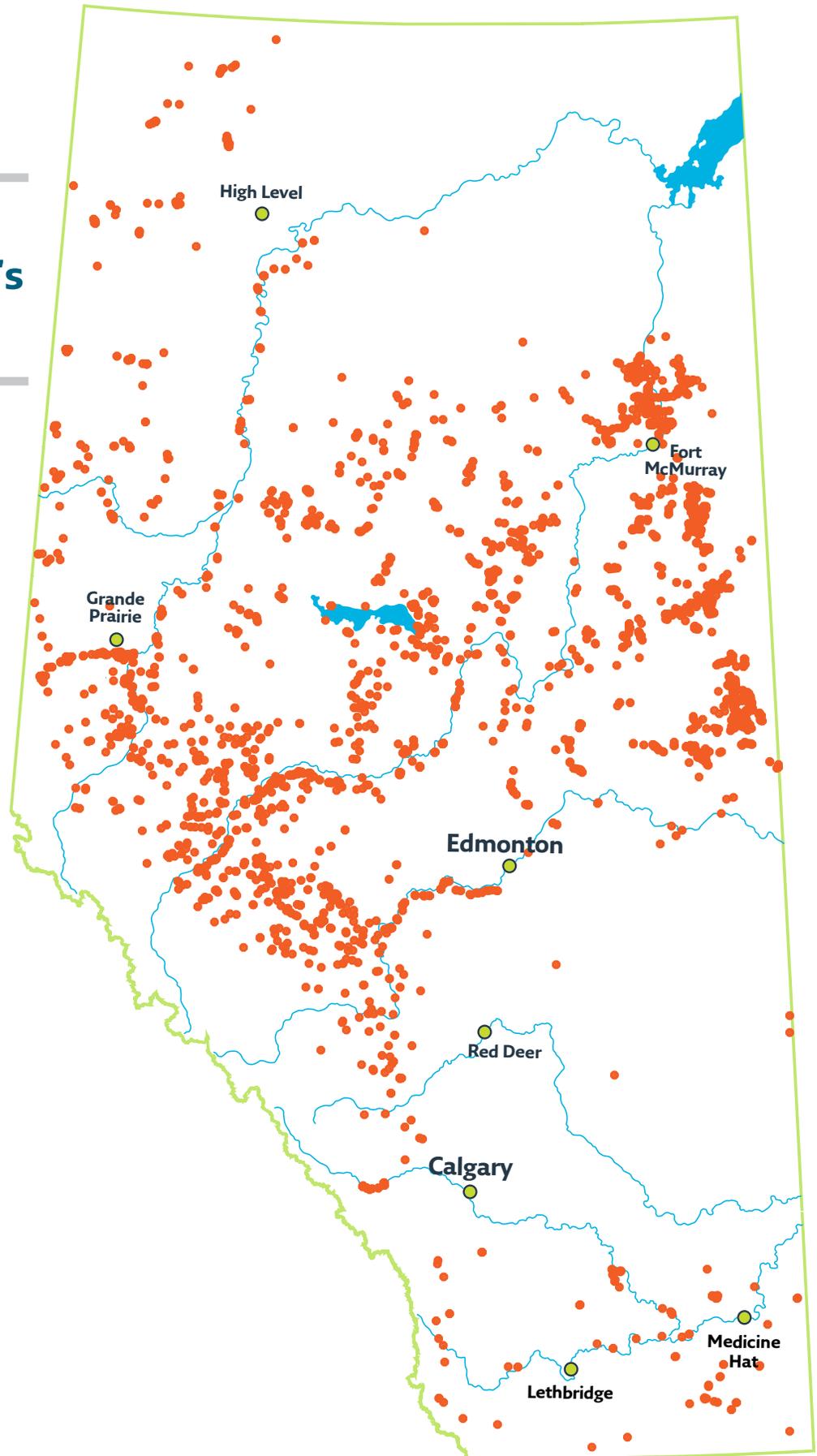
AEP implemented our recommendation to verify reported volumes and royalties.

IMPLEMENTED Recommendation:
Sufficiency of security not assessed

AEP implemented our recommendation to assess whether the security for pits on public land is sufficient.

Location of Sand and Gravel Pits

Over 2,700 pits on Alberta's public land



Life Cycle of a Sand and Gravel Pit



Exploration



Operator collects information about the site to determine if it is suitable for development and to estimate the available quantity of sand and gravel.

Operator's Role:

- Explore site
- Pay security
- Reclaim site

AEP's Role:

- Approve exploration lease
- Collect security
- Verify reclamation meets standard



Regulatory Approval



Operator seeks regulatory approval from AEP to mine sand and gravel. Successful applicant receives approval to mine a specified area for a set period. Operator submits conservation and reclamation business plan (plan).

Operator's Role:

- Submit application for approval
- Submit plan
- Pay security

AEP's Role:

- Approve lease or reject application
- Approve plan



Mining



Operator annually reports to AEP on volume of sand and gravel mined and royalties due, and AEP audits the reported amounts. Operator progressively reclaims the pit, and reports to AEP on the disturbed and reclaimed areas. AEP inspects the pit to verify whether operations and progressive reclamation meets the plan, and evaluates if security is sufficient.

Operator's Role:

- Report on volume mined and royalties due
- Report on areas disturbed and reclaimed
- Progressively reclaim pit

AEP's Role:

- Audit reported volume and royalties
- Inspect pit for reclamation compliance
- Evaluate if security is sufficient or needs to increase



Reclamation



When mining is complete, operator carries out remaining reclamation in accordance with the plan and applies for a reclamation certificate. AEP conducts final inspection to verify that reclamation meets the plan, issues reclamation certificate, and returns security to operator.

Operator's Role:

- Complete final reclamation
- Apply for reclamation certificate

AEP's Role:

- Inspect pit and verify reclamation meets the plan
- Issue reclamation certificate
- Return security to operator



Areas covered by the Office of the Auditor General of Alberta followup audit: Management of Sand and Gravel Pits

Detailed Findings and Recommendations

Our findings fit into four key themes:

- deficient reclamation monitoring and enforcement
- security collected not sufficient to cover reclamation costs
- uncollected royalties
- implementation of recommendations to verify reported volumes and royalties and assess sufficiency of security

Deficient Reclamation Monitoring and Enforcement REPEATED

Context

To mine sand and gravel on public land, an operator must first obtain an exploration lease, which authorizes access to a maximum of 130 hectares for six months. The purpose is to estimate the quantity of sand and gravel available and define working parameters such as overburden depth and groundwater levels.

Successful exploration typically leads to an application for a long-term lease, which authorizes access to a maximum of 30 hectares for 10 years and is renewable. For smaller deposits, operators may seek a short-

term lease, which grants access to a maximum of two hectares for one year and is for a specified amount of sand and gravel.

Operators must reclaim the land disturbed by sand and gravel mining, following an AEP-approved conservation and reclamation business plan (plan).¹¹ The plan describes how the operator will reclaim the land during operations (progressive reclamation) and at the end of the mining (final reclamation).¹²

Operators must pay a reclamation security to AEP to ensure they will reclaim the disturbed land. Operators must also submit an annual operating report indicating the disturbed and reclaimed areas. AEP uses this information to determine if the security it currently holds is enough, or if the operator needs to pay more.

AEP periodically inspects pits to check whether operations and progressive reclamation follow the plan.¹³ If the reclamation does not meet requirements, AEP can provide direction, give more time, enforce compliance through an enforcement or environmental protection order, refuse to issue or renew a lease, or cancel the lease.^{14, 15}

When operators finish mining, they must complete all remaining reclamation and apply for a reclamation certificate. Once AEP conducts a final inspection and confirms that reclamation is complete, operators can get their security back.

¹¹ *Environmental Protection and Enhancement Act. Public Lands Administration Regulation.*

¹² Under the *Conservation and Reclamation Regulation*, an operator must reclaim the disturbed land to an equivalent land capability. Equivalent land capability means that the ability of the land to support various land uses after conservation and reclamation is similar to the ability that existed prior to the activity conducted on the land, but that the individual land uses will not necessarily be identical.

¹³ Progressive reclamation is proactive and ongoing reclamation during the life of a pit.

¹⁴ Under the *Environmental Protection and Enhancement Act*, Part 6, an order can be made to reclaim the land. The order is enforceable in court.

¹⁵ Under the *Public Lands Act*, s. 15(1), the Director can refuse to issue or renew a lease if an applicant is in non-compliance with the Act. Under the *Conservation and Reclamation Regulation*, s. 14, if reclamation is incomplete, the inspector can provide further direction, give more time, issue an environmental protection order, and refuse to issue a reclamation certificate.

Criteria

AEP should have effective processes to inspect sand and gravel pits on public land and to enforce reclamation requirements.

Our followup audit findings

Key Findings

- No enforcement actions taken.
- Reclamation inspections inefficient.
- Reclamation not actively monitored on pits operated by government.
- No evaluation of reclamation trends and lack of data to enable it.

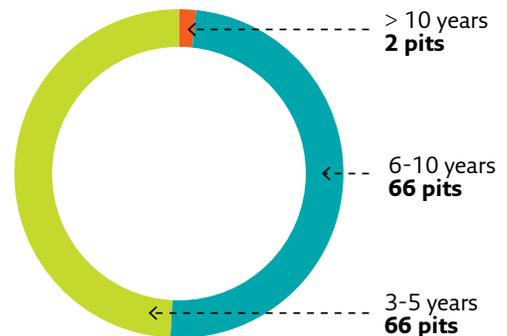
No enforcement actions taken

Inspections based on completion rates—not risk

AEP requires annual inspections of all sand and gravel pits on public land.¹⁶ It measures the success of its inspection program and evaluates inspectors' performance by the number of inspections completed. So inspectors visit as many pits as possible rather than focusing on pits with increased compliance risk, for example, pits that are currently not meeting requirements, have never been inspected, or have a history of non-compliance.

Currently, 715 of 2,700 pits are not meeting reclamation requirements; 260 of these pits have been inactive a long time—some for over 10 years. There is a risk these could be orphan pits. AEP has not prioritized inspections of these 260 inactive, un-reclaimed pits. Further, over 400 pits have no inspection record so AEP does not know their reclamation status. Without inspecting the pits, AEP cannot assess what needs to be done, compel operators to reclaim them, or assess what it will cost AEP to reclaim the land.

Number of Un-reclaimed and Inactive Pits Not Meeting Reclamation Requirements



¹⁶ AEP inspected nearly 2,500 pits during 2016-2017 and 2017-2018.

No escalation of response to repeated non-compliance

AEP is supposed to take corrective actions if it finds non-compliance during inspections. If that does not work, AEP is supposed to escalate the case for enforcement action.¹⁷ AEP's records show many pits that are unreclaimed for a long time. Yet AEP has never taken enforcement action on reclamation. And, AEP knows that if it does not start legal action within two years of finding non-compliance, a court will likely dismiss it.¹⁸

No deadline to finish reclaiming land

Operators must reclaim land, but there is no deadline (in law or plans) for finishing the reclamation. Without a deadline, enforcement is difficult or impossible.

Requirement for reclamation plan not enforced

Since 2006, operators have had to provide a specific reclamation plan upon lease approval and renewal. But AEP has not been enforcing this requirement. As a result, some pits are operating without plans. Other pits have a plan that is unclear about how reclamation will be done, or a plan that no longer reflects current operations.

No or inadequate plans, combined with no reclamation deadline, increase the risk of land not being reclaimed.

Leases renewed despite outstanding non-compliance

Operators must apply for a lease renewal before their lease expires or risk losing the right to use the land.¹⁹ They can also continue operating month-to-month with an expired lease. Since 2017, AEP has renewed over 300 expired leases but over 200 active pits are still operating under an expired lease, some expired for 10 years.

AEP renewed leases for pits not meeting reclamation requirements and for pits lacking a reclamation plan.²⁰ AEP gave operators without a plan four years to provide one. It did not require a plan before renewing the leases. Further, AEP does not track whether operators eventually submit a plan.

AEP renewed leases for pits that were inactive, and that had not submitted annual royalty returns in several consecutive years. The operators might not be occupying the land, but that is a condition for renewal.

Reclamation inspections inefficient

Inspection planning does not consider key information that would help AEP decide when to assess reclamation and make reclamation assessments more efficient. For example, AEP did not consider mining phases (described in approved reclamation plans) and areas disturbed and reclaimed (described in annual reports operators submit). Since operators do not have to begin reclamation of one phase until mining in the previous phase is complete, reclamation inspections are inefficient if they do not consider mining phases. Further, AEP did not consider the location of pits to optimize inspector travel time.

¹⁷ Available enforcement tools include administrative penalties; enforcement, environmental protection and court orders; prosecution and creative sentencing.

¹⁸ The limitation only applies to pits where an operator no longer occupies the land.

¹⁹ *Public Lands Administration Regulation*, s. 18 and s. 21.

²⁰ Nearly 90 leases were renewed for pits assessed as not meeting reclamation requirements when last inspected.

Reclamation not actively monitored on government-operated pits

AEP does not regularly monitor reclamation of pits operated by government entities, mainly, the Department of Transportation.²¹

AEP and Transportation jointly monitor compliance, but responsibilities are not clear and there is no established information-sharing process. Transportation inspects a sample of pits annually and maintains inspection records. But it does not assess reclamation. AEP inspects pits on an ad-hoc basis and assesses progressive reclamation, but the inspection records are in paper files with insufficient details. Therefore, there is no formal record of reclamation status. We estimated that it would cost \$48 million to reclaim the government-operated pits.²²

AEP's electronic records show that 85 per cent of active pits operated by government have no reclamation plan.²³ Since the electronic records were not always complete or reliable, and existing plans were in paper files, we could not establish how many active pits operate without a plan.

Lack of reclamation plans and monitoring increases the risk of no reclamation and future generations having to deal with the financial and environmental impacts.

No evaluation of reclamation trends and lack of data to enable it

AEP does not regularly evaluate reclamation trends or the effectiveness and efficiency of reclamation monitoring and enforcement. So AEP does not know if its processes are working, and cannot identify areas that need to improve. AEP last examined reclamation trends in 2013.

Our own analysis found that the area containing pits not meeting reclamation requirements has more than doubled since 2013, and covers between 67,000 and 235,000 hectares.²⁴

Most of the data needed for the evaluation is either unavailable or hard to get, and the available data is not reliable. There are three causes:

1. Data is fragmented. For example, information on inspections, reclamation, enforcement, security and royalties is divided among three databases. Lease agreement information, reclamation plans and annual operating reports are only in paper form. Information on areas reclaimed, orphan pits and the cost to reclaim them is currently unavailable.
2. Information management is deficient. For example:
 - AEP does not track whether operators submit the annual operating reports and does not review the submitted reports within a reasonable time.
 - Cancelled leases lack records indicating pre-cancellation inspection results or why inspection was not required.
 - AEP received over 200 applications for reclamation certificates but issued only 34 certificates in the past 10 years. AEP claims that more certificates may have been issued but not recorded in the system due to limited resources.
3. Quality control over the accuracy and completeness of electronic records is inconsistent or absent. For example, inspection records lacked information on why reclamation was considered satisfactory or unsatisfactory, and what actions were taken to resolve non-compliance. In some cases, incorrect data was entered.

REPEATED RECOMMENDATION: Improve reclamation monitoring and enforcement

We again recommend that AEP improve the effectiveness and efficiency of reclamation monitoring and enforce reclamation requirements.

Consequences of not taking action

Un-reclaimed pits create environmental and safety risks. Albertans may have to pay reclamation costs.

²¹ The operation and reclamation of government-operated pits is subject to the same regulatory requirements as the privately operated pits, except for the security deposit.

²² This is the cost to reclaim government pits with currently disturbed land. No reclamation security is collected for these pits because the government is responsible for reclamation.

²³ Based on Alberta Biodiversity Monitoring Institute satellite data and AEP's electronic records.

²⁴ Our analysis used AEP's data, and assumptions based on AEP's historical inspection results.

Security Collected Not Sufficient to Cover Reclamation Costs

Context

The goal of reclamation security is to ensure land disturbed by sand and gravel mining is reclaimed after the mining. *The Public Lands Act* authorizes AEP to require security in an amount and form acceptable to the director.²⁵ The security must be sufficient to ensure reclamation, based on the estimated cost of reclamation submitted by the operator.²⁶

Our 2008 audit found that security for pits on public land was insufficient to cover the full cost of reclamation, thus creating a risk that operators would abandon their security instead of reclaiming the land. Further, AEP lacked processes to identify orphan, un-reclaimed pits.

Operators of pits on private land must pay security based on the estimated full cost of reclaiming the pits. In contrast, the current security for pits on public land is \$2,500 per hectare.²⁷ The security amount operators have to pay corresponds to the planned phases of operation in the approved plan. For example, if the first phase covers 10 hectares, the security will be \$25,000, even if the total lease is for a greater area. The expectation is that the operator will finish mining on the 10 hectares and begin reclamation before moving to the next phase of operation. Operators can carry security forward by showing progressive reclamation of the first phase or pay more security for the next phase.

Performance bonds and surety bonds are acceptable forms of security.²⁸ The use of bonds as security is common in construction contracts and contracts with defined deliverables. Industry prefers bonds to lines of credit or other financial security because they do not tie up operating funds and generally cost less.

Criteria

AEP should collect sufficient security to compel operators to reclaim the land, or to cover AEP's cost of reclamation if they fail to do so.

Our followup audit findings

Key Findings

- AEP agreed to assess if security is sufficient but took seven years to do so.
- New security formula developed but needs further testing.
- AEP knows that current security is too low to cover reclamation costs but has not increased it.
- Process for collecting security is deficient.

Little progress since 2008

After accepting our 2008 recommendation to assess the sufficiency of the reclamation security for sand and gravel pits on public land, AEP decided not to change it. Instead, it planned to improve its compliance and enforcement tools to encourage reclamation—even though pits on private land require much higher security, based on the estimated full cost of reclaiming the land.

AEP implemented a new inspection program, resulting in mandatory annual inspections for sand and gravel pits, and more pits being inspected. In 2013, the AEP completed its only overall evaluation of reclamation and found that 5,000 hectares of inactive leases and 20,000 hectares of active leases were not meeting reclamation requirements. No further evaluation has been done to see if the problem is improving.

In 2014, AEP started to evaluate the actual cost to reclaim pits and the sufficiency of the security. That was after an independent study reported shortfalls in the management of pits on public lands, and inconsistencies in the security for pits on private and public land.²⁹ AEP found that the current security for pits on public land is insufficient to cover the full cost of reclamation. Full reclamation was estimated as \$15,000 per hectare, six times higher than the current security requirements.

²⁵ *Public Lands Act*, s. 20(8).

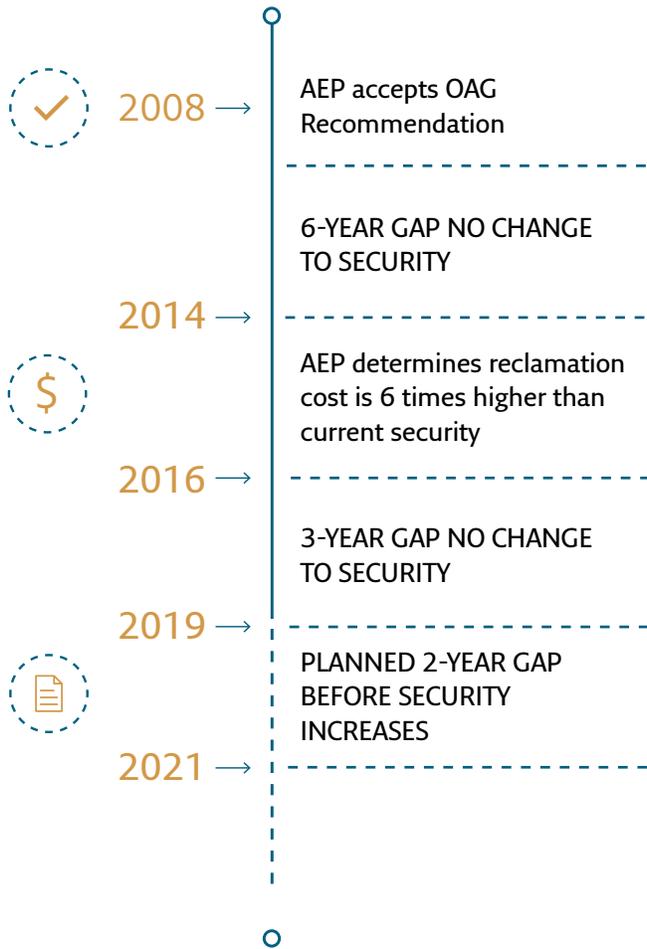
²⁶ *Conservation and Reclamation Regulation*, s. 18(1).

²⁷ The security of \$2,500 per hectare applies to long-term and short-term leases. Security for exploration leases ranges from \$600 to \$2,500 per hectare, depending on size.

²⁸ Under the *Conservation and Reclamation Regulation*, s. 21, AEP (Director) has discretion to determine what constitutes an acceptable form of security.

²⁹ In 2011, the *Alberta Association of Municipal Districts and Counties* and the *Alberta Sand and Gravel Association* released a report identifying the shortfalls in the sand and gravel program, and recommendations for improvement.

Timeline



New formula developed but needs more testing

AEP developed and tested a new formula that operators could use to estimate reclamation cost. It developed the formula using reclamation costs from construction projects because the data for sand and gravel pits was unavailable. And the data was limited and is now over five years old. AEP has not collected any sand and gravel reclamation costs data to further test and refine the formula, and ensure it produces a reasonable estimate of full reclamation cost.

AEP knows security is too low but has not increased it

The security remains unchanged because AEP has not yet decided how to implement the increase and minimize the perceived burden on sand and gravel operators and customers.³⁰ AEP is deciding on an acceptable form of security that could help reduce this perceived burden.³¹

The Sand and Gravel Association told AEP that a full cost security should be required for pits on both private and public lands to ensure the government has sufficient funds to reclaim the pits in case operators fail to do so. The association requested more information on the security calculation, how it will apply, acceptable forms of security, and process changes, so operators understand the impact on their cost, and business and administrative practices. AEP has not yet provided this information.

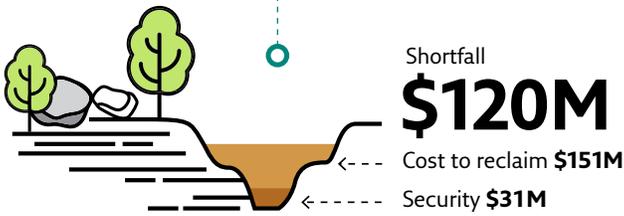
AEP said it intends to release new program requirements in 2019 and fully implement them in 2020-2021, even if a new form of security is not available.

³⁰ AEP's internal document states that higher security might result in decreased working capital that could jeopardize operation viability, and increased cost of business that could be passed on to customers, and thus increase project costs. We found no analysis supporting AEP's perception of burden on industry from higher security.

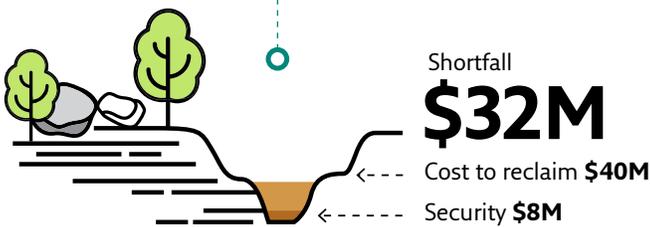
³¹ AEP is considering demand forfeiture bonds as a form of security.

Security shortfall scenarios

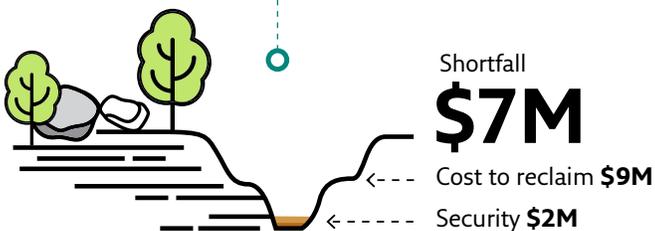
If government has to reclaim all pits (all operators fail to reclaim the land)



If government has to reclaim pits currently not meeting reclamation requirements



If government has to reclaim pits currently inactive and not meeting reclamation requirements, some of which could be orphan pits



Security does not cover reclamation costs

AEP currently holds \$31 million in security but it would cost \$151 million to reclaim all the currently disturbed pits on public land. In the very unlikely scenario of all operators failing to reclaim the land, Albertans would have to pay \$120 million³²—the difference between the security AEP holds and reclamation cost.

A more likely scenario is that Albertans will have to cover the shortfall between security collected and reclamation costs for pits currently not meeting reclamation requirements. The shortfall for these pits is \$32 million.

The most likely scenario is that Albertans will have to cover the shortfall for the un-reclaimed and inactive pits, some of which could be orphan pits. The shortfall for these pits is \$7 million.

Process for collecting security is deficient

AEP has failed to collect security in some cases and has collected insufficient security in others. For example, nearly 50 pits had no security; the security should have been \$400,000. For over 800 pits, AEP did not collect enough based on the disturbed area. The shortfall is \$9 million. For over 80 pits on oil and gas sites, AEP did not collect any security. The security is expected to be collected under the oil and gas lease program, which this audit did not cover.

NEW Recommendation:
Collect sufficient security

We recommend that AEP collect sufficient security to compel operators to reclaim the land or to cover reclamation costs if operators fail to do so.

Consequences of not taking action

Albertans may have to pay reclamation costs.

³² Using \$15,000 per hectare as the estimated cost of reclamation.

Uncollected Royalties

Context

All operators must submit annual returns reporting volume of materials removed and the royalties due. AEP conducts desk and field audits to verify the reported amounts.

Operators must pay royalties on all sand and gravel removed during the year. The only general exception is sand and gravel required by government or used on government-owned projects.³³

Criteria

AEP should collect royalties on all sand and gravel subject to royalties.

Our followup audit findings

Key Findings

- AEP did not charge royalties to oil sands operators that it should have.
- AEP collected \$16 million in 2018 but \$25 million is still owed—there is no concrete plan or timeline for collecting the remaining royalties.

Unauthorized royalty exemptions resulted in \$25 million owing to Albertans

AEP commonly allows oil sands operators to mine sand and gravel and use it for on-site construction and maintenance. Operators are required to pay only royalties, which cost them much less than buying the sand and gravel. In the Fort McMurray region, it could cost an oil sands operator \$20 to \$30 per cubic yard to buy the sand and gravel offsite while current royalties are \$0.70 per cubic yard for sand and \$1.20 for gravel.³⁴

Between 2009 and 2018, AEP did not charge royalties to some oil sands operators for the sand they mined and used on-site although the legislation required royalties to be paid.³⁵ The unauthorized exemptions started when AEP implemented a policy that contradicted legislation, and continued undetected for nine years. We discovered that AEP's royalty internal audit found

\$16 million of the unauthorized exemptions but AEP did not disclose this to us. We determined that the \$16 million are royalties for one pit but AEP gave the same exemptions to operators of six other pits.

AEP has since collected the \$16 million, and says it intends to carry out royalty audits during the 2019-2020 audit year to determine the remaining royalties due. But it has no concrete plan or timelines to do so. We estimate that \$25 million is still due.

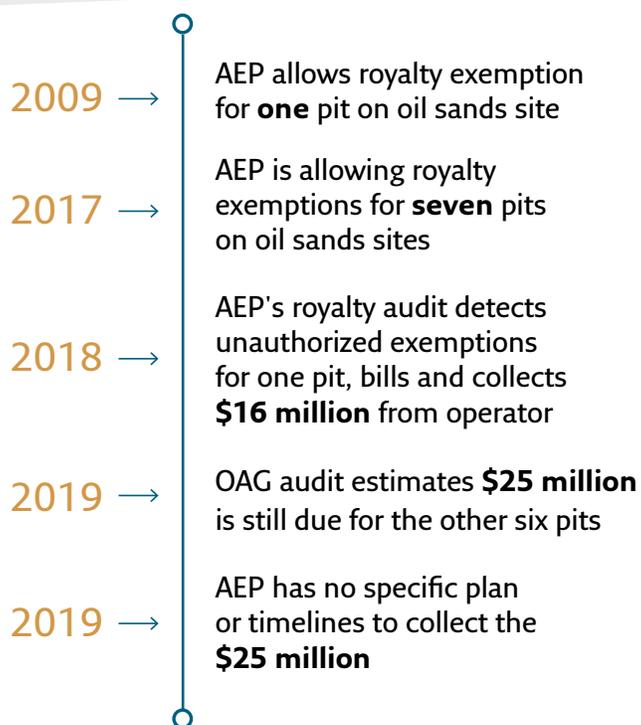
NEW Recommendation: Collect outstanding royalties

We recommend that AEP collect outstanding royalties for sand and gravel on oil sands sites.

Consequences of not taking action

Albertans will not receive the royalties due for the province's sand and gravel.

Uncollected Royalties Timeline



³³ *Public Lands Administration Regulation*, s.115.

³⁴ AEP's internal document dated April 25, 2018.

³⁵ Royalties must be paid for all sand and gravel except material required by government or used on government-owned projects.



Material and Royalties not Properly Verified

IMPLEMENTED

Context

We previously found that AEP's royalty audits focused on operators who reported material mined but no royalties. AEP did not audit operators reporting both material and royalties.

Criteria

AEP should have processes to verify operator reports of sand and gravel mined from public land and royalties due to the Crown.

Our followup audit findings

AEP implemented our recommendation to verify reported volumes and royalties.

AEP used a risk-based audit approach considering both material mined and royalties. The audits included royalty returns with significant royalties, material mined but no royalties, and no material mined and no royalties. AEP audited nearly 600 returns during 2016-2017 and 2017-2018.

AEP implemented a rigorous process to select audits and review completed audit files, and developed audit procedures and templates. It completed an analysis of the annual audit results, which identifies key issues and trends and informs next year's audit approach. AEP plans to use a similar audit process for the next three years.

Sufficiency of Security not Assessed

IMPLEMENTED

Context

Our 2008 audit found that security was insufficient to cover the full cost of reclamation, thus creating a risk that operators would abandon their security instead of reclaiming the land. In contrast, pits on private land required security that estimated the full reclamation cost.

Criteria

AEP should have processes to ensure operators of sand and gravel pits meet regulatory requirements.

Our followup audit findings

AEP implemented our recommendation to assess whether the security for pits on public land is sufficient.

In 2014, AEP evaluated the actual cost to reclaim pits and the sufficiency of the security, and found that the current security for pits on public land is insufficient to cover the full cost of reclamation.

The security remains unchanged while AEP is determining how to implement the increase. See *Security Collected Not Sufficient to Cover Reclamation Cost* section of this report for our new recommendation.

Audit Responsibilities and Quality Assurance Statement

AEP's management is responsible for the systems to ensure sand and gravel operators comply with their obligations to pay royalties and reclaim public land.

Our responsibility is to express an independent conclusion on whether AEP has improved these systems in areas where our previous audits have found deficiencies.

We conducted our audit in accordance with Canadian Standard on Assurance Engagements 3001 issued by the Auditing and Assurance Standards Board (Canada). The Office of the Auditor General applies Canadian Standard on Quality Control 1 and, accordingly, maintains a comprehensive system of quality control, including documented policies and procedures regarding compliance with ethical requirements, professional standards and applicable legal and regulatory requirements. The office complies with the independence and other ethical requirements of the Chartered Professional Accountants of Alberta Rules of Professional Conduct, which are founded on fundamental principles of integrity and due care, objectivity, professional competence, confidentiality and professional behaviour.



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