



KPMG LLP
Chartered Professional Accountants
777 Dunsmuir Street
Vancouver BC V7Y 1K3
Tel 604-691-3000
Fax 604-691-3031
www.kpmg.ca

INDEPENDENT SERVICE AUDITORS' REPORT

To the Department of Energy

Scope

We have audited the effectiveness of controls over the Petrinex system (Petrinex or the "system") maintained by Her Majesty the Queen in right of Alberta, as represented by the Minister of Energy (Department of Energy or the "entity"), during the period May 1, 2016 through April 30, 2017, in accordance with the 2016 version of the AICPA and CPA Canada trust services criteria for security, availability, processing integrity, and confidentiality (the "Trust Services Criteria") set forth in TSP section 100, *Trust Services Principles, Criteria, and Illustrations for Security, Availability, Processing Integrity, Confidentiality, and Privacy* (AICPA, *Technical Practice Aids*).

Responsibilities of the Department of Energy

The Department of Energy's management is responsible for the effectiveness of these controls and for its attached assertion thereon. Management's description of the aspects of Petrinex covered by its assertion is also attached. We did not audit the attached assertion or description, and accordingly, we do not express an opinion on them.

Service Auditors' Responsibilities

Our responsibility is to express an opinion based on our audit. Our audit was carried out in accordance with the standards for assurance engagements established by the Chartered Professional Accountants of Canada (CPA Canada), as set out in the CPA Canada Handbook – Assurance. Those standards require that we plan and perform our audit to obtain reasonable assurance as a basis for our opinion. Our audit included: (1) obtaining an understanding of the Department of Energy's relevant controls over system security, availability, confidentiality, and processing integrity; (2) testing and evaluating the operating effectiveness of the controls; and (3) performing such other procedures as we considered necessary in the circumstances. We believe that our audit provides a reasonable basis for our opinion.

Inherent Limitations

Because of the nature and inherent limitations of controls, the Department of Energy's ability to meet the aforementioned criteria may be affected. For example, controls may not prevent or detect and correct error or fraud, unauthorized access to systems and information, or failure to comply with internal and external policies or requirements. Also, the projection of any conclusions based on our findings to future periods is subject to the risk that changes may alter the validity of such conclusions.

Opinion

In our opinion, during the period May 1, 2016 through April 30, 2017, the Department of Energy maintained, in all material respects, effective controls over Petrinex in accordance with the Trust Services Criteria for security, availability, confidentiality, and processing integrity to provide reasonable assurance that:

- the system is protected against unauthorized access, use, or modification to meet the entity's commitments and system requirements;
- the system is available for operation and use to meet the entity's commitments and system requirements;
- information designated as confidential is protected to meet the entity's commitments and system requirements; and
- system processing is complete, valid, accurate, timely, and authorized to meet the entity's commitments and system requirements.

SOC Reports Logo

The AICPA Service Organization Control (SOC) Reports logo on the Department of Energy's Petrinex web site constitutes a symbolic representation of the contents of this report and is not intended, nor should it be construed, to update this report or provide any additional assurance.



Chartered Professional Accountants

Vancouver, Canada

May 31, 2017

Management's Assertion Regarding the Effectiveness of its Controls over the Petrinex system (Petrinex) based on Trust Services™ Principles and Criteria

Her Majesty the Queen in right of Alberta, as represented by the Minister of Energy (Department of Energy or “the entity”) is responsible for maintaining effective controls over the Petrinex system (Petrinex or the “system”). The management of the Department of Energy makes the following assertion regarding Petrinex:

The Department of Energy has maintained effective controls over Petrinex during the period May 1, 2016 through April 30, 2017, based on the 2016 version of the AICPA and CPA Canada trust services criteria for security, availability, processing integrity, and confidentiality set forth in TSP section 100, *Trust Services Principles, Criteria, and Illustrations for Security, Availability, Processing Integrity, Confidentiality, and Privacy* (AICPA, *Technical Practice Aids*) to provide reasonable assurance that:

- the system is protected against unauthorized access, use, or modification to meet the entity's commitments and system requirements;
- the system is available for operation and use to meet the entity's commitments and system requirements;
- information designated as confidential is protected to meet the entity's commitments and system requirements; and
- system processing is complete, valid, accurate, timely, and authorized to meet the entity's commitments and system requirements.

The attached description of Petrinex identifies those aspects of the system covered by our assertion.

The Department of Energy

Geoffrey Wacowich Chief Information Officer (CIO), Alberta Department of Energy

May 31, 2017

Petrinex

Overview and Description

April 2017

1. Introduction

Petrinex is a shared, secure, interactive database, accessed through the Internet. Petrinex incorporates re-engineered business processes targeted to improve the quality and management of key volumetric, royalty and infrastructure information associated with Alberta and Saskatchewan's upstream petroleum industry.

Petrinex serves three distinct functions. It is a central database for all of the volumetric and infrastructure data related to Alberta and Saskatchewan's upstream oil and gas industry. It is a communication tool enabling Alberta Energy, the Saskatchewan Ministry of the Economy and industry stakeholders to exchange accurate information quickly and efficiently and, it is an analysis tool. As an analysis tool, Petrinex avoids common mathematical errors by saving the information in its most basic form and then performing calculations as required. Each of these functions is explained in greater detail below.

Data Repository

Petrinex is a central, electronic repository of volumetric and infrastructure data related to Alberta and Saskatchewan's upstream oil and gas industry.

Petrinex contains records of wells, facilities, business associates, operators of record, and company contacts. It replaced, or streamlined, many previous methods of distributing and obtaining volumetric, allocation, valuation, and pipeline split information.

Petrinex interacts with Ministry business systems through a number of interfaces. It makes data available through Internet access via browsers, lookup tools, and reports.

Petrinex's web-based interface provides users with online access to information. It makes it possible for data to be uploaded directly from industry systems and allows stakeholders to submit and edit their data online.

Data in Petrinex is valid, complete, standardized, and secure. Security protocols ensure that proprietary data is accessible only to authorized users.

Shared data is accessible and usable by entitled Industry and Ministry stakeholders only. Access to data in the public record is unrestricted.

Petrinex is accepted as the single, authoritative petroleum data source and the data it houses is considered the "data-of-record" for all stakeholders. All data is available in one place. Since all stakeholders have access to Petrinex data, and since the same data can be used for a variety of purposes, there is no need for multiple submissions to multiple stakeholders. This saves time and money, avoids duplication of effort and minimizes errors.

A Communication Tool

Petrinex facilitates communication by means of data uploads, downloads, and e-mail. Ministry and Industry stakeholders use Petrinex as their primary communication tool and rely on the data to be current and free of mathematical errors.

Data is validated before it is accepted into Petrinex. Once it is posted, all stakeholders can "read from the same page." That is, they can access the same view of the data at the same time. If there are errors, or if data is missing, operators receive prompt, electronic notification. This gives them the opportunity to correct mistakes and avoid potential compliance penalties or provisional assessments.

Petrinex provides the tools and data primary users need for two-way communication with regulatory bodies, working-interest owners, pipeline companies, shippers, purchasers, and other business associates.

An Analysis Tool

To avoid mathematical calculation errors, Petrinex data is stored in its most granular form. Petrinex is capable of making calculations and deriving other types of information on the basis of these granular elements. For example, Registry users submit allocation factors to Petrinex. Petrinex applies these factors to total volumes in order to derive the volumes for which particular owners are responsible. It calculates sum totals and locates cross-references. This ensures mathematical accuracy and ensures that all data in Petrinex remains "in balance."

1.1. Background

In 1997, at the request of Industry, the Minister of Energy created a task force of Industry and Ministry experts (representing stakeholders/clients) and gave them the authority and necessary resources to find ways to improve the administration of the natural gas royalty regime (and related information) in the province of Alberta.

In January 1998, the Royalty and Related Information Review (RRIR) issued a Task Force Report proposing changes to the Gas Royalty Regime and the management of data commonly used by Industry and the Ministry. The results of this review were distributed to both Ministry and Industry stakeholders, who provided feedback. On the basis of this input, the Task Force developed new recommendations released in June 1998.

From these recommendations, the Volumetric and Infrastructure Petroleum Information Registry (VIPIR) project was born in the summer of 1999. This \$35 Million project was comprised of multiple working teams each containing representatives from industry and the Ministry, tasked with re-engineering the information flow between all stakeholders.

In October 2002, the Petroleum Registry of Alberta Information Network (Petrinex) went live on time and on budget. The transformation from the VIPIR project to the live PRA

application was the culmination of efforts from many functional units within both the Department of Energy and the Alberta Energy Regulator as industry support from a cross-section of the upstream oil and gas industry.

In June 2008, as part of their System Renewal Initiative, the Government of Saskatchewan approached the Petroleum Registry of Alberta for options on rationalizing its portfolio of systems and business processes within their Ministry. Following existing Registry protocols, an Opportunity Assessment/Evaluation was conducted which was then followed by a detailed Business Case. In fall 2009 the Registry Saskatchewan Inclusion Project was launched, setting the stage for a multi-year project culminating with the full inclusion of Saskatchewan Ministry of the Economy into the Petroleum Registry in April, 2012.

In March 2012 a rebranding initiative commenced for the Petroleum Registry of Alberta. In recognition of the Province of Saskatchewan joining the organization, compounded with advanced discussions with other jurisdictions across Canada, a “strategic narrative” was created in efforts of creating a new identity for the Registry.

All stakeholders embraced the decision to find a new name.

- To articulate a long-term vision that would inform the rebranding decision and ensure that the new name would stand the test of time, a rebranding committee was struck with members from the DoE, ECON, AER, Industry and Registry, with assistance of outside consultants, to develop a “Strategic Narrative”
- Using the “Why”, “How” and “What” leadership framework the committee agreed on the statements that allowed us to land on the Petrinex name, which contained three key elements of our “Why” statement.

We represent a mutual Government and Industry commitment to Canadian PETRoleum-related Information Excellence.

- Our tagline “Canada’s Petroleum Information Network” lends additional description to the organization and emphasizes the dynamic flow of information.
- Our logo includes the outline of the Maple Leaf representing “Canada’s”, with the building blocks implying that the organization is in motion, aspiring and expanding.

The end result: *Petrinex, Canada’s Petroleum Information Network*

1.2. Infrastructure

Petrinex’s Application and Maintenance team manages the day to day activities of Petrinex, with hardware, network and general system support provided by the Information Management & Technology Services Branch of the Department of Energy. Petrinex has a separate Active Directory (ADS) domain with a dedicated IT infrastructure.

There are three separate environments for development, acceptance testing and production. All security zones related to the Development, Acceptance Test and Production environments are further isolated from one another at the network layer by one or more firewalls. And in the case of production it is separated from the DOE network as well. The following Network controls are in place: Firewalls, Change/Configuration Management, Internetworking Devices, Remote Connectivity, Intrusion Detection and Prevention Systems (IDS/IPS), 3rd party audit, and Disaster Recovery Planning (DRP). Petrinex's Application and Maintenance team adopts best practices for securing web applications as recommended by the "Open Web Application Security Project (OWASP)".

1.3. Software

Petrinex is a joint strategic organization supporting Canada's upstream oil and gas industry and it dramatically streamlines the way upstream petroleum companies exchange information with the Alberta Energy Regulator (AER), the Alberta Department of Energy (DOE), Saskatchewan Ministry of the Economy (ECON) and Industry partners.

Petrinex utilizes a web-based system for its automated business functions and processes that facilitate fast, standardized, safe and accurate management/exchange of key volumetric, royalty and commercial information associated with the upstream petroleum sector.

1.4. People

Petrinex is comprised of several key functional units tightly integrated to ensure not only quality performance from the Petrinex application but also ensuring the needs of its vast stakeholders are continually met. The Petrinex team was assembled through a very exclusive arrangement between the Industry sector (supported by the respective CAPP and EPAC governing bodies) and the Ministries of Alberta (the Department of Energy and the Alberta Energy Regulator) and Saskatchewan in which full time resources from each of the entities were contracted to work exclusively on Petrinex. The Industry resources are managed by the Industry Team Manager, who oversees the activities of the Industry Team.

This is a unique precedent set by Petrinex in which all stakeholders groups can interact with each other on a continual basis to address any emerging issues that may arise on a daily basis.

Overseeing the entire operations of Petrinex is the Petrinex Chief Executive Officer, who ensures not only that the immediate operational needs of Petrinex stakeholders are continually being met, but also ensures that the strategic direction of Petrinex as set by the Petrinex Executive Board is followed and adhered to within the respective functional units of Petrinex.

In terms of a brief summary of the distinct functional units within Petrinex:

- **Petrinex Service Desk:**
 - Headed by the Service Desk Team Lead, the Service Desk is the first-point-of-contact for Industry, AER, DOE and ECON regarding utilization of Petrinex.
 - All incidents submitted by Industry, DOE, AER and ECON users are recorded within the ITSM incident management system.
 - Incidents are prioritized based upon their business impact as defined in the Petrinex Business Change Management Process.
 - The Service Desk attempts to resolve the majority of incidents themselves.
 - A Knowledge Database is collectively maintained by the Petrinex Service Desk team and the Petrinex Subject Matter Experts.
 - Regular daily and weekly statistical reporting on events, operational issues and performance metrics.
 - The Petrinex Service Desk Leader leads and manages the Petrinex Daily Operations meetings (Petrinex team, Industry, AER, ECON, DOE members present).
 - **Petrinex Change Management Team**
 - Headed by the Petrinex Business Information Solutions Director, the Change Management Team meets on a weekly basis and is comprised of members from all stakeholder groups (Petrinex, DOE, AER, ECON and Industry).
 - The Change Management team employs a rigorous change management process to ensure all change items are adequately vetted, prioritized, scheduled, tested and implemented.
 - The Change Management team ensures the System Delivery Lifecycle methodology is consistently applied to all change items.
 - The Change Management Team determines the composition for the monthly Petrinex release contents.
 - **Petrinex Application Maintenance and Support (AMS) Team**
 - Headed by the on-site AMS manager, the AMS team ensures Petrinex consistently meets stakeholder performance/processing expectations not only on a day to day basis, but also on an hour to hour basis.
 - The AMS manager ensures his team of application developers, DBA's, Production Operations analysts and Change Management analysts are immediately available to address any issue that may arise, in addition to ensuring the operational needs of Petrinex are addressed, both current and in the future.
 - **Petrinex Communications Coordinator**
 - The Petrinex Communications Coordinator ensures that timely communication (tips/alerts/broadcast messages, links to relevant documents) is provided to Petrinex stakeholders on the Petrinex website.
-

- The targeted communication must be succinct, accurate and provide enough information to be useful to its intended audience.
- **Petrinex Training Coordinator**
 - The Petrinex Training Coordinator ensures Petrinex's comprehensive online training system (comprised of dozens of individual training modules comprising both Alberta and Saskatchewan functionality) is available to all its registered users. The modules must be constantly reviewed (in light of any change items implemented that have an impact to the modules) to ensure the information is current, informative and accurate.

1.5. Procedures

Petrinex has incorporated the following procedures:

- Incident Response Procedures
- Change Management Procedures
- Emergency Response Procedures
- Business Resumption and Disaster Recovery Procedures
- Security administration and monitoring procedures
- Security auditing and log analysis procedures
- Performance monitoring procedures
- Interest Expressed from Outside Parties Procedures
- Founding Stakeholder Initiated Enhancement Procedures
- Petrinex Central Security Administrator Procedures
- Petrinex Document Release Protocol Procedures
- Communication Procedures, including Media Contact Procedures

1.6. Data

Data is received by Petrinex from clients securely logging in to the application and submitting data in one of two main manners: online or batch. The data is validated by Petrinex, and then when applicable, sent to the applicable Ministry for further use in its business processes. The output from the applicable Ministry is then sent back to Petrinex for the end-user to access at specified periods in the submission cycle.

1.7. List of Services

The following is a brief summary of the activities that can be performed on Petrinex (whether it be online, batch or both):

- Volumetric Reporting
- Stream Allocation/Owner Allocation Reporting
- Pipeline Split and Transportation Allowance Reporting
- Infrastructure Reporting (Wells, Facilities, Business Associates, etc.)
- Raw Gas Allocations Reporting
- Allowable Cost Reporting

- Report requests on dozens of pre-defined reports
- Download Ministry Statements and Reports
- Information Download capabilities
- Changes to user profiles by the respective User Security Administrator
- Oil Valuation
- Royalty Tax Payer