

Business Case for Collaborative Development of Shared Processes and Procedures by Participating U.S. Federal and State Regulatory Agencies to Support Well Permits & Activity Reports

PREPARED BY

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POSC eRegulatory Special Interest Group

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Contents

- Executive Summary..... 3**
- Business Case Overview..... 4**
- Oil and Gas Industry Perspective 8**
- The Proposed Collaborative Developments 9**
- Appendices 13**
 - Appendix A: List of Relevant XML Specifications & Related Bodies of Work 14**
 - Appendix B: List of Business Processes to be Supported by ePermit 15**
 - Appendix C: Relevant Related Work 16**
 - Appendix D: Candidate Participating Organizations 18**

Business Case for Collaborative Development of Shared Processes and Procedures by Participating US Federal and State Regulatory Agencies to Support Oil and Gas Well Permits & Activity Reports

Executive Summary

Before an oil and gas operator can drill a well on virtually any land within the continental United States, including navigable waters and contiguous three-mile offshore areas, permission must be obtained from the appropriate state oil and gas regulatory agency. State permission is required on private, state, and federal lands, and, except for tribally operated wells on Indian lands and the Osage Mineral Reserve in Oklahoma, state permission is also required for wells drilled on Indian lands.

On federal and Indian land, there is overlapping state and federal jurisdiction, as federal permission is required in addition to state approval.

In most states, when drilling on federal and Indian lands, operators must submit separate applications to both the U.S. Bureau of Land Management (BLM) and to the state oil and gas regulatory agency. While the application and supporting materials submitted by the operator to the state is similar to the application package submitted to the BLM, there are differences, which vary from state to state, because each state has its own regulations and its own set of permitting forms.

With the advent of the Internet and electronic commerce technologies, both the BLM and the states realize the potential benefits that can be realized if operators are allowed to submit drilling applications and subsequent completion and operational activity reports electronically. The BLM and several states have already commenced the development and implementation of such electronic permitting and reporting solutions.

There is a growing recognition among agencies and industry that the development of uniform data transfer procedures, reusable computing resources, and supporting standards can accelerate the acceptance and reduce the cost of moving to electronic permitting.

A common approach to permitting data transfers will greatly simplify electronic filing for operators who must submit applications to both the BLM and the states as well as for operators who apply for permits in multiple states. A common approach to permitting data transfers will also facilitate sharing of associated well technical data between state and federal agencies. This will enable the state and federal governments to more easily share solution software designed to process and report on drilling application and completion data.

Thus, the associated business case sets out the tasks to accomplish this vision. These tasks involve defining and agreeing on a comprehensive and common set of data elements and definitions related to the electronic transfer of permitting, drilling, and completion data. These elements and definitions will include data used by the BLM and state agencies, from the common ones to those unique to a single agency. Based on the principle of maximizing consistency while respecting necessary differences, the proposed solution will allow for the transfer of exceptional data elements not

defined in the common set. Moreover, where possible, the proposed solution will employ data definitions and transfer messages currently being standardized by industry for operational purposes.

Ideally, all private operators and state and federal agencies would engineer their computer solutions based precisely on the commonly defined, standardized data elements. In actuality, however, most agencies and most operators have significant investments in existing and currently developing computer solutions. While a great deal of comparable data is stored in such systems, the same information may be referenced with different names and may be stored in somewhat different formats. Therefore, the business case calls for mappings to be defined with existing state, federal, and industry practices to facilitate effective data translations.

While defining such mappings to support translations is a significant effort, it is also an efficient approach because each mapping need be defined once and only once. For instance, if an operator drills in ten states and has wells on federal land, that operator must report and map to eleven somewhat dissimilar systems. As the goals of this business case proposal are met, that operator would only have to develop one mapping, as the agency-specific mappings will already have been defined. This is an essential benefit of this proposal for industry.

The associated business case document elaborates on this vision with specific proposals for a series of projects involving federal and state agencies and industry. The proposed projects spearhead a comprehensive, step-by-step approach to achieving the benefits described above. Additional participation from agencies and industry is being sought. There are opportunities for industry and other government agencies to join the proposed projects and opportunities to define subsequent and parallel projects tuned to the functional, timing, and economic needs of the participants. In the name of all of those who prepared these proposals, we commend this business case to you for serious consideration.

Business Case Overview

This business case describes the proposed development of shared processes and procedures for oil and gas regulatory well permits and activity reports by and for participating U.S. federal and state agencies. The development of shared processes and procedures specifically includes the definition, development and delivery of working Extensible Mark-up Language (XML) data transfer message specifications that will be proposed as an oil and gas industry regulatory electronic well permitting/reporting standard [i.e., as a potential American Petroleum Institute (API) Recommended Practice (RP), POSC Industry Standard, etc.].

Scope

Such development would substantially benefit all concerned parties by virtue of the increased clarity and consistency of these processes. The intended scope of this effort is to address the following business processes:

- Industry well permit/activity report submissions to state/federal regulatory agencies.
- Well permit approval -- activity status inquiries from industry or amongst regulatory agencies.
- Transmission of state/federal regulatory permit approval information back to the industry.
- Sharing of well permit/report data between regulatory agencies.

The business process scope to be addressed includes the following current types of interactions:

- Applications for permit to drill (APDs).
- Miscellaneous well activity reports (e.g., spud notices, completion reports, etc.).
- Well sundry activity permits/reports (e.g., notice of intent to plug and abandonment, etc.)

Work to be accomplished by this business case proposal may encompass:

- Mapping of currently used regulatory permit/report data elements and their definitions to existing, relevant and current permitting and reporting data transfer message definitions, e.g. XML specifications, using prior and ongoing mappings to the Petroleum Industry Data Dictionary (PIDD).
- Development of new permitting and reporting data transfer message definitions, e.g. XML specifications and components, when determined necessary.
- Development of associated reference software for writing, reading, and validating data transfer messages for use in pilot projects and for ongoing operations where appropriate.
- Pilot testing of the resulting permitting and reporting data transfer message definitions between industry and regulatory agencies as well as amongst regulatory agencies (e.g., States and BLM).
- Development of implementation and use guidelines that address agency specific permitting and reporting data submission requirements and respective code and translation domains.
- Submission of resulting permitting and reporting data transfer message definitions, once demonstrated to be valid and useful, to formal standardization and future support / enhancement process(es).

Data Transfer Technology

The authors of this business case believe that the eXtensible Markup Language (XML) technology is the appropriate data transfer message definition context for sharing and transmitting data between and amongst oil and gas industry operators and regulatory agencies using current Internet-based communication technologies. Two factors contribute strongly to this perception: its low cost in comparison with the cost of traditional electronic data interchange (EDI) and the wide-scale availability of XML development tools. For all XML-enabled EDI data transfer message definitions, a *schema*, or standard set of syntax and formatting requirements is needed. To account for the high degree of commonality among message definitions, schemas often share common aspects including actual shared components (also known as modules), stylistic guidelines, and communication / transmission protocols. Every effort will be made to re-use already defined specifications and components. This applies within and beyond the scope of U.S. regulatory permits and reporting.

Benefits

Key benefits that would accrue to the industry and State/Federal regulatory agencies include:

- Reduced cycle times for permit submission and regulatory approvals. Administrative delays would be minimized because data validation would be automated, and operators would receive immediate feedback as to data transfer status.
- Operator submit once concept. Alleviate redundant submission requirements when more than one regulatory agency must be notified (e.g., both State and Federal). Industry that operates across state boundaries could report to multiple state regulatory agencies in one standard format, reducing the need to customize permit/reports submissions to conform to agency-specific formatting particularities or to be manually entered into differing regulatory form-based websites now being developed by each agency. Industry business and service company partners could readily exchange well activity data.
- Easily facilitate the electronic submission of multi-well “batch” permit submissions to the regulatory agency as a result of increased oil and gas activity.
- More efficient permit approval status tracking and quicker problem resolution turnaround.
- Reduction in agency effort and associated costs with permit/report data transcription, validation and most importantly, automation of much of the well permit regulatory review, analysis and approval process. In the case of Federal onshore well permit operations, the use of a common reporting process minimizes the need and cost to develop specific data sharing technology with each respective State agency where there is both federal and state mineral estate responsibilities.
- Utilization of web-based industry driven “self permitting technology” where such approvals are necessary but require minimal action on the part of the regulatory agency.
- Provide browsing environments whereby an operator can leverage an array of existing well-related data provided by the regulatory agency in the area of interest that can be used to start a permit application, thereby minimizing the need to develop such permit data from scratch.
- Utilization of simple word processing file – permit content templates, which can be use by small “low tech” or “mom and pop” operators. The content templates (or existing permit forms) developed by the agencies can be enabled to feed the Internet-based data transfer solution including use of agency code validation, thereby allowing the operator to email or batch uploaded the permit content templates directly to the agency’s regulatory well permit databases. The use of such content templates could easily encompass new or emerging business processes such as Master APD or Plan of Development filing submissions.
- Improved oil and gas resource development and recovery as a result of more timely, accurate and comprehensive data that is readily available to the industry and regulatory agencies.
- Facilitate the development and use of commercial software using the common reporting solution to support existing or emerging well operator, service company industry and regulatory agency business requirements.

A common permitting and reporting data transfer solution in use by a number of federal and state agencies and a candidate for approval in formal industry standards processes would have greater value beyond the purposes of only the regulatory agencies. Industry could produce additional oil and gas more cost-effectively if operators had access to both the current and historical data

warehoused in oversight agencies' databases. Data access in combination with desktop analytical and geographic information system (GIS) tools are useful to operators in performing well and reservoir asset and infrastructure planning and management, analyzing production trends, determining regulatory and environmental constraints, minimizing project risks and other similar activities.

Broadly Based Collaboration

The organizations and groups that have participated in the preparation of this business case description believe that there is a unprecedented opportunity for broadly based collaboration in the development, deployment, and evolution of contemporary standards for use across the U.S. by operators and both state and federal agencies. At the same time, we take a realistic view of the need to proceed in an iterative way in terms of scope of regulatory functionality, scope of operator and agency use, etc. This is largely influenced by the continued strong incentives for cost reduction and cost control on the one hand and the need to respect current policies and the current developments of improved solutions by various agency/operator groups.

Growth of Participation

While we do not expect to attract all U.S. state and federal agencies and operators to join this effort, we do ask all parties to be aware and to offer advice to those of us who are engaged in collaborative standards development. Where feasible, we invite additional organizations and groups to seriously consider joining the collaboration. All participants in the collaboration are asked to (a) stay informed, (b) provide feedback and advice, (c) provide resources in the form of participants and/or funding, and (d) participate and support deployment activities.

Important Relationships

The collaboration will endeavor to maintain and enhance our relationship with the U.S. federal departments (Interior and Energy) and with the formal standards organizations, API and POSC. The Department of the Interior oversees the effort of federal agencies, BLM, MMS Offshore Minerals Management (MMS-OMM) and MMS Minerals Revenue Management (MMS-MRM). The Department of Energy encourages and funds relevant work by state agencies. The API and POSC host standards development, publication, and support activities: the API leveraging its PIDX eCommerce focus addressing standards development for non-technical, often lease-oriented regulatory activities, while POSC leverages its petrotechnical standards development to address standards development for physical well, reservoir, and facilities-oriented regulatory activities. PIDX and POSC cooperate in many aspects of oil and gas industry standards including and beyond the regulatory area. In addition, this collaboration also must include the involvement of the oil and gas industry: operators who permit activities with federal and state agencies, both onshore and offshore, as well as oil and industry service companies, who provide data deliverables to the industry and regulatory agencies. The Ground Water Protection Council (GWPC) is a national association of state agencies whose mission is to promote the protection and conservation of ground water resources. In addition GWPC states cooperate and coordinate in the development and deployment of regulatory procedures and processes.

The Role of Standards Organizations

The vision for this business case is a series of iterative and valuable collaborative efforts involving groups of operators and agencies and supported by the standards organizations, which over time will result in increased consistency and decreased costs of overall regulatory activity and reporting. The standards organizations, in this case API/PIDX and the REGS group as well as POSC and the

eRegulatory Special Interest Group, play an important role throughout this process. In early stages, they encourage and support early iterations by smaller groups of operators and agencies. They provide expertise in open, collaborative facilitation and decision making, in the development of effective, technology based specifications. They provide publication and active marketing of the specifications en route to become standards, making them easily available to all. They also provide knowledge of existing standards and specifications that can be re-used, avoiding divergent duplicate work efforts. As the scope of collaboration and use grows to cover large segments if not all of the operators and regulatory agencies, the now industry proven and widely accepted specifications will earn full status as formally approved API, POSC, or even ANSI/ISO standards.

Call to Action

This document specifies the next step in this series, which is a permitting capability solution focused on some of the producing states using the Ground Water Protection Council's RBDMS software and the U.S. DOI's Bureau of Land Management (BLM). Future documents will describe subsequent specific projects in the series. All parties are invited to address the authors of this document with suggestions for worthwhile future work efforts.

Oil and Gas Industry Perspective

For every oil and gas well drilled, produced, serviced or abandoned either onshore or offshore within the United States, well permits and activity reports are submitted by the Oil & Gas Industry to Regulatory Agencies. Quantifying this permitting and reporting activity from an operational perspective -- over 3.5 million oil and gas wells are monitored by the oversight of 29 state and three federal regulatory agencies (onshore and offshore) and operated by 250 major and over 8000 smaller oil and gas companies. There are tens of thousands of well permits and millions of reports submitted to these entities on a yearly basis. These well permits and reports are very similar in nature when compared for each agency's data requirements, but unfortunately are not standardized as a whole. Operators find themselves submitting the same data to different regulatory entities but having to do so using a variety of manual formats.

While manual form submission is still the norm, many oil and gas companies have developed or procured information technology (IT) to more efficiently manage business data about their well operations. In leveraging their IT solutions to save time and money, these companies generate hard copies of well permits or reports and then manually submit them to appropriate regulatory agencies. Regulatory agencies that have a substantial IT infrastructure transcribe the basic well permit or report attributes (via keyboard entry) into their systems or are now providing Internet-based web-form data entry capabilities for the industry -- extending further, the labor associated with this one way submittal process. Many of the web-based forms, like the manual data collection systems still in use, are fraught with inefficiency and prone to errors because of the inability to validate data easily, leading to excessive iterations for corrections and manual data checks on the part of both the industry and agencies. To conclude the business cycle, the agency processing and final approval of the permit or report is usually performed by manual mailing of the approved permit to the submitting company.

In areas of where there is high drilling and field development activity, the Industry, State and Federal regulatory agencies have taken action to streamline well permit processing to include:

- Master APD/SOP submissions. Use of field or basin-wide master APD or standard operating procedures (SOPs). The industry submits a permit that only describes operational departures to a referential or master APD/SOP, thereby greatly reducing subsequent or individual well permit content requirements.
- Plan of Development (POD) submissions. Use of a project level POD where a number of wells, roads, pipelines and related infrastructure are described within the permit. An example of this submission approach is for the Powder River Basin of Wyoming and Montana where rapid and extensive coal bed natural gas development is occurring. Up to 45 wells are permitted using a single POD submission.

The permit streamlining approaches described above represent high workload volumes where permit agents, industry and the regulatory agencies critically need commonly developed electronic submission capabilities.

From the industry viewpoint, with millions of oil and gas wells nationwide, providing this information through iterative, manual methods is a financial and administrative burden. Particularly for small- to mid-sized and independent operators, preparing well permits and reports often involves several format changes as data from one system is re-keyed or converted into another. In addition, the data reported—data that may be a part of the public record—remains difficult to access in agency data repositories.

The Proposed Collaborative Developments

During the early formative stage of this business case, an initial business requirements survey was developed, forwarded and compiled for insight amongst key international, Federal, state and industry participants that have come to sponsor this collaborative standards development initiative. The business requirements survey helped to focus the scope and prioritization of the work effort.

Initial Scope: BLM and GWPC Collaboration

During the development of this Business Case, considerable discussion has taken place amongst the sponsoring members of this effort. There is a consensus that GWPC and BLM have constituted a relatively mature set of U.S. Onshore well permit/report business process improvement requirements that are or can be supported by electronic commerce technology.

The success of this work effort is defined by the operational deployment of solutions based on the standards specifications developed here for the specified interactions between the BLM and, at a minimum, the GWPC states of California and Colorado.

Collaboration to leverage such existing or ongoing GWPC and BLM business requirements would substantially benefit all concerned parties by increasing the clarity and consistency of these current processes, and by expanding the scope to address the following business processes (also see Appendix B):

- Industry well permit/activity report submissions to state/federal regulatory agencies.
- Well permit approval -- activity status inquiries from industry or amongst regulatory agencies.
- Transmission of state/federal regulatory permit approval information back to the industry.

- Sharing of well permit/report data between regulatory agencies.

The business process scope to be addressed by a BLM and GWPC collaboration includes the following current types of interactions:

- Applications for permit to drill (APDs).
- Miscellaneous well activity reports (e.g., spud notices, completion reports, etc.).
- Well sundry activity permits/reports (e.g., notice of intent to plug and abandonment, etc.)

Resources

Appendix C presents a comprehensive list of relevant related work from the Groundwater Protection Council (GWPC) states, the Petrotechnical Open Standards Consortium (POSC), and the REGS User Group. The overall intent of this proposal is to utilize this XML body of knowledge and best practices in a manner that will allow rapid development and component re-use to efficiently construct the proposed data transfer message specifications.

Appendix D lists organizations that either already participate or that will be invited to participate in the proposed projects. These include regulatory agencies, industry (operators and service companies), and industry standards organizations. Additional participants are welcome to join the collaboration by either joining the initial series of work efforts or conducting parallel, related work efforts. The DOI's Offshore Mineral Management Service (MMS-OMM) is currently evaluating the details of its participation.

Architecture

The objective of the effort is to achieve broad use in an efficient and effective manner. Given that some operators are very large organizations while others are much more modest in size, a variety of mechanisms of data transfer will be addressed.

- Web Forms provided by an agency for online input by an operator
- Client Forms for input in an operator's computing environment for subsequent transfer to an agency
- Larger operators are expected to integrate their data input functions into their own systems from which transfers will be made

These modes of input will be unified through XML-based data transfer standards, whereby the same data transfer message formats will be produced respectively by the Web Forms, the Client Forms, and the large operator systems.

On the receiving side, where agencies also differ in size, two options are being addressed.

- A reference implementation of an agency system will be developed for use by agencies for receipt and validation of data transfer messages.
- Larger agencies are expected to integrate the data transfer message receipt and validation functions into their own systems.

Proposed Projects

In order to achieve support for the in-scope permitting activities and in order to support the variety of operator and agency modes of interaction, a series of six projects are being proposed for collaborative development.

- Project 0: Vision and Open Participation
- Project 1: Data Transfer Message Specifications
- Project 2: Agency Data Transfer Receipt Reference Implementation
- Project 3: Agency Web Forms Reference Implementation
- Project 4: Operator Client Forms Reference Implementation
- Project 5: Operator Embedded Capabilities Pilot

Project Participation and Governance

Project 0 will elaborate on the vision for permitting regulatory activities manifest in this business case proposal. Beyond that, the expanded vision will describe criteria for additional participation and/or additional projects. A balance will be maintained between achieving positive results for the early participants and expanding the number of agency and industry participants further. The criteria defined in Project 0 will ensure clarity of intent so that each agency can determine when and how to participate in this initiative.

The planned start date for Project 0 is early in 2004.

A goal of the progression towards standardization will be to deliver value at each and every stage, from each and every project, and to each and every participant.

A policy of balance will be followed between the objective of respecting differences that do exist in the needs of agencies and industry operators while using education and deliberation to reduce differences where possible. This iterative and incremental approach to collaboration and standardization is essential to the initial success of this effort and to its continued success.

All organizations that are now or will become invested and committed to this effort will find a place in the governance structure of the overall initiative. This will ensure that short-term objectives and long-term objectives are kept in balance.

Individual projects, however, will be resourced and governed by the organizations directly involved in that project. This will ensure the success needed at each and every stage of the initiative.

The value of serious pilot testing has often been demonstrated and is especially relevant to collaborative standards-related initiatives such as this one. Operationally valid pilot testing will be included as an integral part of all projects (except Project 0).

Process Re-Engineering

The value and opportunities afforded by project re-engineering of regulatory activities is recognized in this initiative. As and where relevant, innovative business and technical processes will be considered during these projects, however, the degree of process studies in each project will be

limited to an agreed level that will not severely delay or extend the time required to complete the project.

Among the innovative opportunities recognized at this time are:

- Single submission of data transfer message for delivery to multiple agencies
- Autonomous well permitting and reporting within agreed guidelines
- Master approvals applying to multiple wells within agreed operational guidelines
- Coal bed natural gas (CBNG) submissions of permit applications and development plans

Project 0: Vision and Open Participation Project

(Note: References in brackets are to project task identifiers in the separate detailed activity plan.)

In the course of carrying out Project 0, these deliverables will be produced:

- Expanded Regulatory Permitting Vision [0.1]
- Participation Criteria based on short business process re-engineering study [0.2]
- Strengthened Inter-Agency Coordination [0.3]
- Strengthened Statement of Industry Benefits [0.4]
- Letter of Intent to Participate in the Initiative Overall [0.5]
- Letter of Intent to Participate in specific Projects [0.6]
- Governance Policies for the Initiative and for Individual Projects [0.7]

Project 1: Data Transfer Message Specifications Project

In the course of carrying out Project 1, these activities will be carried out deliverables will be produced:

- Review Transaction Set 625 – Well Information. Map to the PIDD Dictionary. Note this was defined five years ago and may require some augmentation or other changes. [1.1]
- Recognize GWPC eReport V3.5 – Use mapping to PIDD Dictionary. Note upgrade to V4.0 is in progress. [1.2]
- Identify and Study Permitting Forms – Map forms to PIDD Dictionary. Consider forms from California, Wyoming, Colorado, Alaska, BLM POD or Master APD, MMS-OMM, etc. [1.3]
- Study Relevant Resources – Request documentation and PIDD Dictionary mappings for the most relevant associated work materials, e.g. POSC WITSML. [1.4]
- Agree on Technical Guidelines [1.5]
- Develop and/or Incorporate and/or Endorse for Use the XML Specifications to support permitting activities. [1.6]

- Conduct Reviews [1.7]

Project 2: Agency Data Transfer Receipt Reference Implementation Project

- Identify and Review Relevant Resources – Identify existing implementations and/or commercial tools [2.1]
- Define Detailed Requirements [2.2]
- Develop and/or Incorporate and/or Endorse for Use the reference software [2.3]
- Conduct Reviews [2.4]
- Conduct Pilot Tests [2.5]
- Publish Results [2.6]

Project 3: Agency Web Forms Reference Implementation Project

- Identify and Qualify Participants [3.1]
- Define Requirements and Detailed Plan [3.2]
- Develop Web Forms Design [3.3]
- Define Use Cases [3.4]
- Develop or Modify or Assemble Reference Implementation Software [3.5]
- Run Pilot Tests [3.6]
- Migrate to Operational Use [3.7]

Project 4: Operator Client Forms Reference Implementation Project

- Identify and Qualify Participants [4.1]
- Define Requirements and Detailed Plan [4.2]
- Develop Client Forms Design [4.3]
- Define Use Cases [4.4]
- Develop or Modify or Assemble Reference Implementation Software [4.5]
- Run Pilot Tests [4.6]
- Migrate to Operational Use [4.7]

Project 5: Operator Embedded Capabilities Pilot Project

- Identify and Qualify Participants [5.1]
- Define Requirements and Detailed Plan [5.2]

- Coordinate Separate Operator Efforts [5.3]
- Define Use Cases [5.4]
- Ensure Agencies have Capabilities to Receive and Validate [5.5]
- Monitor Pilot Tests [5.6]
- Monitor Migration to Operational Use [5.7]

Funding Requirements

The major players of this work effort, BLM and certain GWPC states, will be primarily responsible for the funding, resource provisions, and leadership of the initial work efforts. The wider set of collaborating organizations and groups, including the standards organizations will participate in overall planning, review, and feedback activities. Industry at-large will be invited to participate in reviews and deployment activities.

Separate Action Plans characterizes the current view of the Projects 0-5 major work elements/action items, associated steps and deliverables, responsible person/group, resource needs, planned start and end dates and action remarks. Action Plans will be revised and maintained throughout the life of the multiple project collaborations.

Appendices

Appendix A: List of Relevant XML Specifications & Related Bodies of Work.....	14
Appendix B: List of Business Processes to be Supported.....	15
Appendix C: Relevant Related Work.....	16
Appendix D: Candidate Participating Organizations	18

Appendix A: List of Relevant XML Specifications & Related Bodies of Work

- Groundwater Protection Council's (GWPC) existing ePermit XML work materials
- GWPC eReport XML Schema
- POSC XML Guidelines
- POSC WellHeaderML and other technical XML schemas/modules for well logs, well path, well schematics, production reporting, etc.
- POSC WITSML Standards, including well, wellbore, trajectory (path), real-time (MWD), well logs (LWD), etc.
- POSC Units of Measure, coordinate systems, and other reference data standards
- NIST EDI ASC X12 Transaction Set 625 – Well Information
- Petroleum Industry Data Dictionary (PIDD)
- API/PIDX Recommended Practices 3901
- UNCE Standards for Units of Measurement

Appendix B: List of Business Processes to be Supported

Business Process	Sub-Process	Use Cases
Registration	<i>Establish Operator</i>	<ul style="list-style-type: none"> • <i>Operator Registration</i> • <i>Agent Registration</i> • <i>Operator Clearance or Change</i> • <i>Local Government Designee</i>
Well Permit Processing	<i>Process Applications-for-Permit-to-Drill (APD)</i>	<ul style="list-style-type: none"> • <i>Notice of Staking (NOS)</i> • <i>APD</i> • <i>Project Plan of Development (POD)</i> • <i>Master APD/SOP</i> • <i>Site /Road Reclamation</i> • <i>Performance Bond</i>
	<i>Operator Check of Permit Status</i>	<ul style="list-style-type: none"> • <i>Web-based Capability</i>
	<i>Process Miscellaneous Well Reports</i>	<ul style="list-style-type: none"> • <i>Well Pad Construction Notice</i> • <i>Notice of Rig Move</i> • <i>Well Spud Notice</i> • <i>Well Completion Report</i> • <i>Well First Production Report</i> • <i>Lease/Agreement Last Production Report</i>

Business Process	Sub-Process	Use Cases
Operational Reports	<i>Process Routine Operational Reports</i>	<ul style="list-style-type: none"> • <i>Monthly Operations Report</i> • <i>Response Fund</i> • <i>Monthly Conservation Levy</i> • <i>Environmental Plant Report</i> • <i>Bottom Hole Pressure Test</i> • <i>Monthly injected Fluids</i> • <i>Class II Waste Disposal Source Authorization</i> • <i>Earthen Pit Permit / Report</i> • <i>Bradenhead Test</i> • <i>Complaint Report / Response</i> • <i>Spill/Release Report / Response</i> • <i>Seismic Intent Notice</i> • <i>Seismic Completion Report</i> • <i>Mechanical Integrity Test</i> • <i>Accident Report / Response</i> • <i>Loss of Well Control Report / Response</i> • <i>Soil Analysis Report</i> • <i>Water Analysis Report</i> • <i>Produced Water Disposal Source</i> • <i>Site Workplan / Progress Report</i> • <i>Land Treatment Facility Permit</i> • <i>Underground Injection Formation Permit Application</i> • <i>Interim Reclamation Report</i> • <i>Injection Well Permit</i> • <i>General Data Request</i> • <i>Financial Assurance Tracking</i> • <i>Field Inspection Report</i> • <i>Alleged Violation Notice</i> • <i>Recompletion Check</i> • <i>Timesheet / UIC Time Record</i>

Business Process	Sub-Process	Use Cases
Operational Reports	Process Sundry Notices (Notice of Intent or Subsequent Report)	Notice of Intent or Subsequent Report <ul style="list-style-type: none"> • Recomplete and/or Plugback • Convert to Injection/Disposal • Annular Disposal • Well Completion Mechanical Repair • Casing Repair / Alternation • Frac or Acidizing • Water Shut-off • Water Well Assumption • Well Plugging & Abandonment • Temporary Abandonment • Sub-surface Commingling • Surface Commingling • Off-Lease Measurement • Disposal of Produced Water • Surface Disturbance • Flaring or Venting • Suspension of Operations and/or Production • Regulatory Guideline Variance • Wash Sand • Jet-in Well • Artificial Lift • Perforate • Other Sundry Type • Deepen Well • Sidetrack Well • Change of Plans

Appendix C: Relevant Related Work

The recently defined and standardized data encoding technology known as XML has been demonstrated, in combination with Internet-based transmission technologies, to make EDI tools available to the small- and medium-sized companies where previously only the largest companies could meet the capital investment needed to effectively use EDI. Many tools are now available to generate, validate, and accept XML-formatted data into receiving databases. Because of this combination of factors—the significantly reduced cost of operating an XML “EDI” solution and the large number of available XML development tools and related products—the format is ideal for regulatory agencies with severely restricted budgets. XML is an ideal method for sharing information between loosely coupled systems. Therefore, the development of one or more *schemas* to express the syntax and formatting requirements specific to the oil and gas regulatory well permitting and reporting, is needed.

Over the past few years, an emerging body of XML schemas and similar bodies of work focused on specific business application areas have been developed by the oil and gas industry and active regulatory agencies in the U.S., Canada and internationally. These XML schemas with their respective sub-components have generally been developed in cooperation with the API-PIDX, POSC and PPDM standard bodies. These existing standards provide an important opportunity to leverage existing best practice XML components for re-use, thereby saving considerable development time and effort.

Specific examples of relevant XML schemas/components applicable to regulatory permitting and reporting domain include:

- Groundwater Protection Council’s (GWPC) eReport XML Schema. The GWPC, which represents 20 State oil and gas regulatory agencies, has developed the eReport XML Schema for the purpose of supporting well production/injection and well legal/land description reporting requirements. This schemas’ subcomponents include:
 - Customer (Operator)*
 - Two levels of *Facility*, which is defined as a single well, a lease, a unit, a tank farm, or any other method of grouping oil, gas, and UIC structures and entities.
 - Location*
 - Produced/Injected/Disposition Volume*

 - Denotes an XML schema or sub-component which has undergone testing or actual use*

- Groundwater Protection Council’s (GWPC) ePermit XML Work Materials. In 1999, long before the eReport schema was developed and when XML was first emerging as an Internet protocol, the GWPC sponsored the development of the ePermit Web application to support well permitting/reporting requirements. Since the W3C was only beginning to evaluate the use of schemas, and DTDs were very cumbersome, GWPC based its ePermit application on well-formed XML combined with multiple tiers of immediate client-side and automatic server-side data integrity checks. The XML elements for each of the five permit notices (See Appendix B) in ePermit were named to match the field names in the SQL Server data source. The application tracks the following subcomponents:
 - Customer (Operator)*
 - Well construction information*

- Location*
 - Produced Fluids*
 - Permit review status*
- POSC WITSML. Major oil and gas operators in conjunction with large service companies have developed a large family of XML schemas that supports real-time and contextual well-site data transfer. POSC manages the support and future enhancement and expansion of WITSML. WITSML includes schemas addressing the following subjects:
 - Well*
 - Wellbore*
 - ✓ *Wellbore Geometry*
 - Trajectory*
 - ✓ *Target*
 - ✓ *Rig*
 - ✓ *Bottom-hole Assembly Run*
 - ✓ *Mud*
 - ✓ *Fluids*
 - ✓ *Tubular*
 - ✓ *Cement Job*
 - ✓ *Formation Marker*
 - ✓ *Survey Program*
 - Log*
 - ✓ *Coring, Sidewall Core*
 - ✓ *Message*
 - ✓ *Real-time*
 - ✓ *Operations Report*
 - POSC WellHeaderML. POSC has developed a basic well information schema. The U.K. oil industry and regulatory agency in conjunction with POSC have adapted the base schema to form a U.K. profile that supports the transmission of basic U.K. well information used in conjunction with a national well information repository and elsewhere. POSC anticipates the developments of other profiles of WellHeaderML in other regulatory areas / countries, for compatibility with given data models (e.g., PPDM), and for other special uses. This schema's subcomponents include:
 - Document*
 - Security*
 - Business Associate*
 - Well*
 - Location*
 - Formation Tops*
 - Units of Measure*
 - Geodetics*
 - EDI ASC X12 Transaction Set 625 – Well Information. During 1997 and 1998, a working group from within API-PIDX REGS comprised of BLM, MMS Offshore Minerals Management, State oil and gas commissions and industry developed and obtained ANSI approval for an electronic data interchange (EDI) for regulatory well permitting/reporting. Transaction Set 625 – Well Information constitutes a considerable body of work associated

with well life cycle permit-related activities, code domains and Petroleum Industry Data Dictionary mappings. Approximately 61 well life cycle objects have been defined around a seven-level hierarchical structure for Transaction Set 625. This transaction sets major hierarchical components include:

- Permit/Report*
- Fields/Pools*
- Contract Designation*
- Facility*
- Well*
- Wellbore*
- Well Completion*

Appendix D: Candidate Participating Organizations

The following organizations have been or will be invited to sponsor and participate in the proposed work effort:

- Agencies in the U.S. Department of the Interior:
 - ◆ U.S. Bureau of Land Management [BLM] (Federal onshore)
 - ◆ U.S. Minerals Management, Offshore Minerals Management [MMS-OMM] (Federal offshore)
 - ◆ U.S. Minerals Management, Minerals Revenue Management [MMS-RMP]
- Groundwater Protection Council [GWPC] sponsored by the U.S. Dept. of Energy with participation of the following State governments:
 - ◆ Alabama Oil & Gas Board
 - ◆ Alaska Oil & Gas Conservation Commission
 - ◆ Arkansas Oil & Gas Commission
 - ◆ California Division of Oil, Gas & Geothermal Resources
 - ◆ Colorado Oil and Gas Conservation Commission
 - ◆ Kansas Corporation Commission
 - ◆ Kentucky Division of Oil & Gas
 - ◆ Michigan Department of Environmental Quality/Geological Survey Division
 - ◆ Mississippi Oil & Gas Board
 - ◆ Missouri Department of Natural Resources
 - ◆ Montana Board of Oil & Gas Conservation
 - ◆ Nebraska Oil and Gas Conservation Commission
 - ◆ Nevada Department of Environmental Quality and Department of Mines and Minerals
 - ◆ New Mexico Energy Minerals and Natural Resources Department
 - ◆ New York Division of Mineral Resources
 - ◆ North Dakota Industrial Commission
 - ◆ Oklahoma Corporation Commission Oil & Gas Conservation Division
 - ◆ Osage Indian Nation
 - ◆ Pennsylvania Department of Environmental Protection
 - ◆ Utah Division of Oil, Gas, and Mining
- Additional state oil and gas Regulatory Agencies:
 - ◆ Wyoming Oil and Gas Conservation Commission
 - ◆ Texas Railroad Commission
 - ◆ Louisiana Department of Natural Resources
- Industry including:
 - ◆ Majors
 - ◆ Independents
 - ◆ Permit Agents

- Service companies including:
 - ◆ Well service companies
 - ◆ Software companies

- Oil and gas standard bodies including:
 - ◆ API-PIDX REGS User Group
 - ◆ POSC
 - ◆ PPDM