

Business Concept Memorandum--CERM

This document outlines possible collaboration opportunities between WKMC, LLC (WKMC) and potential partner entities. Central to this opportunity is the new Center for Excellence in Risk Management (CERM) described herein.

CERM Concept:

Create a new 'all things risk' business. Establish a world-recognized center for risk assessment and management (Center for Excellence in Risk Management (CERM)). Become internationally recognized as the holder and purveyor of the best practices in this field. Become resource center to provide services, answer questions, connect customers with other service providers, etc. Build reputation to point where certification by CERM becomes essential to demonstrate state-of-the-art and highest standard of excellence.

Initial focus is on pipelines, hydrocarbon, water, slurry, etc, and related facilities (tank farms, storage fields, pump/compressors, etc).

Profits may be immediately generated, but strategy is to forego short-term profits in order to establish a sustainable delivery and support framework. Focus is initially on content generation, brand building, and establishment of reputation.

WKMC brings expertise and reputation needed to build CERM. Development began in Mar 2020 (but utilizes decades of previous work).

Partners/collaborators are welcomed. If overall ownership would transfer to a partner, Mr Muhlbauer, on an as-needed basis, could collaborate via a focus on continued content development, QA/QC of deliverables, innovation, publishing, software, and other vehicles to advance the vision of CERM.

Proposed Core Tenets of CERM

CERM is an enterprise, mostly web-based, focused on improving safety of selected industrial assets via superior technical solutions. Key objectives include:

- Improve public safety
- Advance technology of risk management
 - demystify risk issues
 - provide conservative, approximate solutions to fill gaps
 - become a wikipedia for risk management
 - offer useful content to all levels: beginners to advanced
- Embrace 'open source' as the strategy for the future
 - *"no matter how many smart people you hire to work inside your company there will always be smarter people outside"*
 - Be the first open-source platform for IMP
 - Be the first open-source platform for risk management

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WKM Consultancy, LLC

WKMC is a multi-member LLC established in 2000 as a service provider of technical solutions to the pipeline industry. W. Kent Muhlbauer is the managing partner.

W. Kent Muhlbauer assets include all CERM content and other creations by W. Kent Muhlbauer that are not the protected IP or workproduct belonging to individual clients. Assets are owned by W. Kent Muhlbauer and include the following:

1. CERM
 - a. See details throughout this document

2. Textbooks
 - a. PL Risk Mgmt Manual, Eds 1-4, Elsevier Scientific Publishing; some translations available
 - b. PL Risk Assessment: The definitive Approach and its Role in Risk Management, Expert Publishing, LLC; Clarion.org, ebook and hard copy
 - c. Most recent text book now in CERM website, undergoing updates

3. Software
 - a. PL Risk Mgmt, Gulf Publishing Co
 - b. PL Rules Thumb Software, Gulf Publishing Co
 - c. PipeCalc, Gulf Publishing Co
 - d. Frontier Pipeline Risk Software,
 - e. MS Excel and MS Access files and models
 - f. See new apps listed below

4. Publications
 - a. Column for Pipelines International magazine
 - b. Numerous papers, publications,
 - c. PPT presentations for conferences, seminars, workshops, including Clarion public workshops, RRC, PHMSA presentations, etc

5. Models/tools, mostly MS Excel and MS Access files
 - a. Risk Assessment Engine workbook, QRA
 - i. Algorithms, assignments, defaults, SQL migrations, data linking, algorithm parsing into hierarchy (treeview), algorithm testing, etc
 - b. Frontier Risk Assessment, QRA (see App B)
 - c. Leak Detection Capability Analyses
 - d. LDS Dymaptic on-line version
 - e. Elevation/draindown estimator
 - f. ILI validations incl unity plotting, POD, anomaly characterization, excursions, etc
 - g. POE calcs and plotting
 - h. Digs for ILI validation sampling tbl, unity plots, ILI spec lookup
 - i. Fatigue cycling incl screening
 - j. Largest remaining defect analyses

- k. UGS Cavern Risk Assessment Framework
 - l. Uncertainty distributions and quantification
 - m. PMM cost/benefit analyses incl screenings
 - n. AC induced corrosion screening
 - o. Dynamic segmentation
 - p. Events Table Generator (Excel to SQL)
 - q. Data logger
 - r. Spending optimization workbook: Ops vs Maint
 - s. Diminishing returns (PMM) workbook (digs, ILI, etc)
 - t. SCADA alarm estimation
 - u. Patrol FoF risk reduction analyses
 - v. Cost/benefit of clamp removal (temporary vs perm)
 - w. Facilities risk assessment from station inventory
6. R-Studio (R coded) routines generating HTML files
- a. Fatigue cycle counting; Rainflow analyses from SCADA data
 - b. Fatigue crack growth
 - c. ILI validation tutorial
 - d. Unity plots for ILI validation
 - e. PMM
 - f. Integrity assessment method selection
 - g. B31G remaining strength illustration
 - h. AC induced corrosion
 - i. PHMSA haz liq incident analyses
 - j. PHMSA nat gas transmission analyses
 - k. PHMSA nat gas distribution analyses
 - l. Risk dashboards
 - m. Risk input distributions for PRA
 - n. Leak detection relevant extracts from PHMSA incidents databases
7. VB and VBA Coded EXE's and MS Excel/Access routines
- a. Dynamic segmentation from events style or flatfile formats; field selection
 - b. Dissolving (compress to remove unnecessary records)
 - c. Data prep routines: Pt events to bands, resolve overlaps, categorizations, formatting, etc
 - d. Algorithm parsing into hierarchy
 - e. Treeview generator (Excel to Access) and interactive summary for RA results
 - f. Frontier input file prep workbook
 - g. Dashboard file exports for R code
 - h. Workbook imports (multi-tab excel files) into MS Access
 - i. Functions module (for RA algorithms)
 - j. Numerous QA/QC queries for RA
 - k. Queries generating histograms, profiles, etc for RA
 - l. PMM cost/benefit screening; ALARP; HCA tools

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- m. MAOP/press test calcs
 - n. AC interference log-odds
 - o. Confidence spans
 - p. Data logger
8. Presentations/Training Materials
- a. 2-day Workshops for Clarion
 - i. Ppt's, exercises, handouts, etc
 - ii. Rosen Competence Club Certified
 - b. Client training presentations
 - i. For practitioners (2 hr to 2 days versions)
 - ii. For managers (20 min to 1.5 hrs versions)
 - iii. For SME mtgs as part of IMP deliverables (Ph1 & Ph2)
 - c. Specialized presentations/training
 - i. PMM, ILI validation, UGS, NACE, PHMSA guidance critique, Essential Elements, QRA, HDD, etc
 - d. Manuals
 - i. Risk assessment, risk management (PMM), LDS, EFRD, etc
 - ii. Software procedures
9. Websites: pipelinerisk.com, pipelinerisk.net, CERM.tech with content including article reprints, blogs, certification processes, etc
- a. CERM website as of Apr 1, 2021
 - i. ~120 pages and posts
 - ii. 11.5 apps
 - iii. 150 items in media library
 - iv. Images 7M+
 - v. Training: 3G+, 147 files; numerous training videos and ppt's
 - vi. Short form ~100 page/posts around 2,000 words each
 - vii. Long form: ~15 page/posts @ 20K+ words
 - b. See list of domain names owned
 - c. See list of HTML files built from R Studio projects
10. Web domains: pipelinerisk.com, pipelinerisk.net, pipelinerisk.org, cerm.tech, riskexcellencecenter.org, wiki-imp.org, wiki-imp.com, plriskmgmt.org, plriskmgmt.com

Additional WKMC contributions to CERM (initial and possible on-going)

- Brand/reputation in industry and with regulators
- IP and expertise
- Customer base / industry contacts
- Current/past projects
- Oversight and content creation

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- Training of next generation of practitioners to take over all processes (probably AFS personnel)
- Support/training of risk-related projects and services (IMP, HCA, EFRD, leak detection, etc)
- Design and oversight of new software

CERM Monetization

The focus has not yet been on commercializing CERM for profit generation but rather for notoriety/reputation. If CERM is to be monetized, there is precedent for open-source enterprises to become profitable in many ways. For example, marketable items currently identified include:

- Consulting services
 - Reports/analyses
 - Procedures
 - Regulatory compliance
 - Special problem-solving
- Certifications for individuals, processes, and risk assessment models
- Books, documents, software, web-based services (eg, subscriptions, certifications)
- Training

Regardless of for-profit status, CERM should generate indirect revenues (business development) from:

- Free content and services offered to industry
- Specialized tools
- Certifications
- Active and completed projects
- Extensive name recognition opportunities
- Other business development activities

Emerging Markets Currently Untapped

The following are a sample of markets in 'need' of services to be provided by CERM. Some are already mandated by regulation; all need services as part of prudent asset stewardship:

- New pipeline regulations
 - Pending and proposed regulations will likely bring many more miles of pipeline into mandatory formal risk management
- Underground Storage
 - Nat Gas already mandated by regulation
 - Other hydrocarbons
- Facilities
 - Tank farms, pump stations, compressor stations, meter/regulating stations, truck loading, marine, etc
- Distribution systems
 - Tens of thousands of miles of pipeline currently only minimally served by formal risk management

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- Water/sewer infrastructure
 - Especially municipalities: pipes, tanks, reservoirs, pumps, sewer, etc
- Other assets (linear and fixed)
 - Roads/highways/bridges
 - Rail
 - Electrical transmission/distribution
 - Power plants
 - Chemical plants
- Due diligence
- TVC risk quantification and management
- Permitting efforts
- Litigation
- Insurance

WKMC has or has had projects in all of the above spaces.

Notes on Markets

A current under-served niche in the oil/gas industry is the small pipeline owner/operator. These are often associated with assets such as power plants and chemical plants, ie owners who have resources but not expertise.

Anticipate an eventually strong involvement from legal community seeking support in litigation. CERM can be a clearinghouse for connecting attorneys with qualified individuals in the risk management space.

Possible involvement from insurance industry.

If CERM remains an independent organization, it can refer inquiries/projects to partner(s) and perhaps act as clearinghouse for RFP's to engage service providers when necessary.

WKMC pro-bono and BD activities underway or planned that CERM can take on:

- Training of PHMSA auditors
- Writing columns for industry journals (Pipelines International magazine since 2012 (6-8 per year)
- Participation in PHMSA research project oversight
- Technical article/book reviews
- Support of university inquiries
- National Academy of Sciences engagements (if invited)
- Conference presentations
- Submissions to other publications

Notes on Tools/Applications/Software

Current and future CERM offerings include tools/apps in various software formats to accommodate the wide range of client preferences.

Formats

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Frontier

Standalone app currently available, 50% ownership by WKMC, 50% C. Moravac. User builds lists of algorithms, defaults, and data in a spreadsheet. Frontier then attaches to user-provided events table, performs dyn seg, assigns defaults where needed, houses algorithms, performs calculations, outputs results. Powerful viewing and diagnostic capabilities. Free and for-pay versions contemplated:

- Explorer
- Scout
- Ranger
- Regulator

See Attachment B

Excel

MS Excel tool for QRA, offered as part of Clarion workshops and upon request. Efficient for fewer segments—perhaps up to about 50,000 segments, perhaps max 1,000 miles of pipeline with limited data.

Components

- Events Table Generator
- PL RA Outliner
- Template
- Treeview Generator VBA
- Assignment, Default Generators
- Calcs generators
- Treeview

Pros/Cons

Easy to understand, diagnose

Easy to break

Access/SQL/other database environments

MS Excel 'engine' file and MS Access database are typical deliverables accompanying all current risk assessment engagements. Included are various tools built to support pipeline risk management and assessment:

- Dyn seg
- Assignments/defaults
- Algorithms
- Results compilations
- QA/QC
- Histogram analyses
- Version control

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- Data translations and links
- Etc

Clients can use these tools to fully replicate initial assessments and continue to perform new assessments in the future.

Pros/Cons

Efficient for larger datasets

More compatible with enterprise systems including GIS

Underlying tables are generally portable to other databases

Requires some manual steps and basic skills with MS products

R Studio (R Code) Applications

Open source environment designed to facilitate data analyses and presentation. WKMC apps typically produce html files. Interactive html is also possible but requires server-specific capabilities and therefore has been avoided.

Typical apps read in large sets of data and have code to easily update tables, graphics, and statistics: PHMSA stats, RA dashboards, fatigue cycling from SCADA data, ILI unity plots, etc.

Web Sites

Active Sites: Pipelinerrisk.com, pipelinerrisk.net, pipelinerrisk.org

Domain names owned: Pipelinerrisk.com, pipelinerrisk.net, pipelinerrisk.org, CERM.tech, riskexcellencecenter.org, plriskmgmt.com, plriskmgmt.org, wiki-IMP.com, wiki-IMP.org

www.CERM.tech nearing launch date

Consortiums and Strategic Partnerships

There may be a strong business case for various collaborations, including with academia, industry groups, and relevant non-profits. Perhaps also with other consultants who offer complimentary or even competing products/services.

Notes

New publications in the form of a recommended practice (RP) should be produced. Free templates of specific procedures can precede the RP development process (getting useful content into discussion early).

Recruitment of consortium of partner companies should begin after initial website launch. Possible co-authoring of procedures by partners.

Solicit participation/recognition from PHMSA, API, ASME, ASCE, INGAA, AGA, water industry trade groups, NACE, trade publications, PEMEX, OCP, Andes Petroleum, TGB, and other foreign entities with whom WKM already has strong working relationships, other consultants (Kiefner, CFER, Geofields, NCS,

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DNVGL, etc), US pipeline operating companies (see extensive client list), pl construction companies, related service organizations, etc.

Sales and complimentary offerings of certification processes are planned for shortly after initial website going live.

Attachment A WKMC, LLC Client Lists

<u>recent clients</u>			
<u>name</u>	<u>contract type</u>	<u>type client</u>	<u>noteworthy</u>
access midstream	prime	operations	
AGL	prime	legal	distribution
Atmos	sub	operations	UGS
audubon	prime	consult	
BASF	sub	operations	CL2
BHP	sub	operations	
Blueknight	sub	operations	
chalmette	sub	operations	
China CPE	prime	consult	
clarion	prime	consult	since 1994
cox	sub	operations	incl offshore
CVR	sub	operations	
DCP	sub	operations	
DTE	prime	operations	distribution
eastman	prime	operations	since 2007
enable	prime	operations	since 2008
enbridge	expert witness	legal	marshall, MI incident
enserv	prime	consult	
enstor	sub	operations	UGS & PL
ETC	sub	operations	HDD design-phase
exxon-mobile	prime	legal	yellowstone and mayflower incidents
flyscan	prime	consult	leak detection
HNTB	prime	operations	
horizon	sub	operations	
ITC-Deer Park	sub	operations	
ITC-Pasadena	sub	operations	
kinder morgan	expert witness	legal	
KPC	sub	operations	
Lavaca	sub	operations	
LBC	sub	operations	
matheson	sub	operations	H2
NewCentury	prime	consult	
noble	sub	operations	
Nortex	sub	operations	
NorthWest Energy	sub	operations	
NSTX	sub	operations	
Olin	sub	operations	CL2, styrene, etc

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Oryx	sub	operations	
P66	prime	consult	
Perdure	sub	operations	CO2
PGE	expert witness	legal	san bruno
PGE	prime	operations	incl distribution
PHMSA	prime	govt	
Plains	expert witness	legal	santa barbara and tennessee incidents
Reliance	sub	operations	
rosen	prime	consult	competency club
Sanare	sub	operations	
TBG	both	operations	
TGN	both	operations	
TheCompliance Group	prime	consult	
Tinsley	sub	operations	
westlake	both	operations	
XTO	sub	operations	

older			
name	contract type	type client	noteworthy
AI Bass Trigon	prime	consult	
air liquide	prime	operations	H2, O2, etc
Air products	sub	operations	H2, O2, NH3, etc
aleyska	prime	operations	
apache	prime	legal	
BP	prime	legal	
BP Ulysses	prime	operations	
BPX alaska	prime	operations	
BTS	prime	operations	
chandler	prime	legal	
citgo chicago	prime	operations	
City san diego water	prime	operations	water system
colonial	prime	operations	2002 to 2010
conoco-philips	prime	operations	2006 to 2017
DFW	prime	operations	urban gathering
DNV	prime	operations	
dominion	prime	operations	
DOW	prime	operations	
dynamic risk	prime	consult	
El Paso	prime	operations	offshore Taiwan
emprimus	prime	consult	
enbridge	sub	operations	

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enbridge	prime	operations	DTP construction
enogex	prime	operations	became Enable
enterprise/williams	prime	legal	
faison/colonial	prime	legal	
GSX	sub	operations	offshore/govt EA
hiland	prime	operations	
Husky	prime	operations	
integrity solutions	prime	consult	
ITT	prime	operations	
jana labs	prime	consult	distribution/plastics
Keystone	prime	operations	
koch	prime	operations	
kodak	prime	consult	leak detection
Landwatch	prime	consult	
LDH	prime	operations	
longhorn	sub	operations	govt EA
magellan	sub	operations	
marathon	prime	operations	
national acadamy of sciences	prime	operations	dilbit study
national grid	prime	operations	
NDT/tuboscope	prime	consult	
NGA/Nysearch	prime	consult	
northern natural	prime	operations	
oasis pipeline	prime	operations	
OXY	prime	consult	
pemex	multiple	operations	
peru natural gas	prime	operations	
phillips	prime	operations	
progress energy	prime	operations	H2
pugent sound energy	prime	operations	distribution
sabir	prime	operations	
semgroup	prime	operations	
sourcegas	prime	operations	
southern star	prime	operations	
targa	prime	operations	2004 to 2010
texas eastman	prime	operations	
transco	prime	operations	incl offshore
transredes	prime	operations	
TROW	prime	consult	keystone
TRS	prime	operations	
uponor	prime	operations	plastic
WGP-Norwest	prime	operations	
williams	multiple	operations	incl offshore

Attachment B Frontier Pipeline Risk Software



The Frontier Series of Pipeline Risk Software

[FEATURES](#)

[KNOWLEDGEBASE](#)

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Features

A simple, single application system that can be setup, configured and run by one person that gives you the power and flexibility you need to calculate your Pipeline Risk Assessment.

[Download Free Risk Software](#)

	Explorer	Scout	Ranger	Regulator
Provides the basics of Risk Assessment				
<ul style="list-style-type: none"> ▪ Import your data and your algorithm ▪ Dynamic Segmentation ▪ Formula Computation ▪ Graphs/Charts ▪ Export data to Excel 	✓	✓	✓	✓
Integrates with other systems		✓	✓	✓
Integrates with GIS			✓	✓
Checks Algorithms for Errors	✓	✓	✓	✓
Creates graphs and charts	✓	✓	✓	✓
Creates tree view from Algorithms	✓	✓	✓	✓
Desktop based with automatic updates	✓	✓	✓	✓
Price	Free!	Coming Soon!	Coming Soon!	Coming Soon!