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Session: Managing Technical, Human Resources and Organizational Changes in a Constantly Changing Environment...How Do We Prevent Future Disasters?

Subject: Managing Risk

First, I would like to thank the forum organizers for inviting me to speak with you today. It is a privilege to be here and share my perspectives on how Chevron strives to avoid operational disasters in an ever changing business environment.

Chevron Overview

Chevron is one of the world's largest integrated energy companies. Headquartered in San Ramon, Calif., we conduct business worldwide. We are engaged in every aspect of the crude oil and natural gas industry, including exploration and production, manufacturing,

marketing and transportation, chemicals manufacturing and sales, geothermal energy and power generation.

We're also investing in renewables and advanced technologies. We produced 2.7 MM BOE in 2009, nearly 4% of the world's production. We invested about 21 B \$ in the upstream business in 2009. We have about 60,000 employees and over 100,000 contractors.

Our business is handling flammable and combustible products. Managing HES risks is essential to our business survival.

Protecting people and the Environment: A Value

I am proud to work for a company that cites “protecting people and the environment” as one of its seven core values along with Integrity, Trust, Diversity, Ingenuity, Partnership and High Performance. Managing health, environment and safety is much simpler when it is viewed as a core value. We cannot place a business priority on personal safety, process safety or our environment. It's a value. Often, our business case for action is simply “it's the right thing to do”.

The Operational Excellence Management System: Expectations

Ten years ago, we began a journey to build and bring to life what we call our Operational Excellence Management System (OEMS). We call it **OE** for short. In today's world, responsible offshore operators will have a similar system in place. By the definition, our OEMS sounds simple - the systematic management of health, environment, safety, reliability and efficiency. And it is simple – yet it can be viewed as complex at the same time. It's simple when you get it. It's complex if you don't want to get it.

I could not have predicted the profound impact OE has had on our company culture and our results. It has created a step change in our performance and our ability to manage operational risks. OE has three major pieces to it; the Expectations, the Management System Process and Leadership Accountability. The first piece, the Expectations, is the system – the key elements, expectations, processes, standards, tools, competencies, etc. all built on best practice and lessons learned. This is the stuff that most if not all operators have in place. Historically, this is the part that we do well – telling people what to do. What is unique in Chevron's global upstream, is that we have been successful in standardizing more than twenty OE-related business processes that

address the Expectations. Given our decentralized decision making, not many people in Chevron thought this possible ten years ago. I call it centralized planning and decentralized execution. It's a learning journey, and quite rewarding to see what can be accomplished, when you just keep at it.

One of our key OE objectives is to be "incident and injury free". It's easy to say, but very hard to do. And, the way we achieve this objective is through execution of those standardized OE business processes in conjunction with strong leadership accountability.

Risk Management

By way of example, I want to single out two specific processes that drive our efforts to prevent serious incidents. Five years ago, we launched a Chevron-wide risk management process. For the first time, we prescribed risk assessment techniques, risk criteria and set forth specific step-wise procedures on how to group and assess risks to facilities and operations. We also prescribed what must be done to reduce and manage the risk if the risk rating fell into certain categories. Around the world, we trained and qualified dozens of risk practitioners.

Then, we gathered the right people to conduct initial assessments of all of our worldwide operations. These initial assessments identified:

- major risk contributors;
- where initial risk mitigation might be warranted; and
- where further detailed studies were needed.

We also established quantitative risk criteria for use in comprehensive quantitative risk assessments applied to existing facilities and new projects where there was a potential for a major accident. This business process is a key to identifying and avoiding catastrophic events. As you know, risk is based on the consequence and likelihood of an event. We have learned that it is critically important to have the right people involved in both qualitative and quantitative assessments.

The key to effective risk assessments are in the answers to these questions:

- “What can go wrong?”
- “What are the potential consequences?”
- “What safeguards are in place and how reliable are they”?
- “What is the likelihood of the consequences occurring, given the safeguards in place?”
- And finally, “What risk mitigation, if any, is needed”?

As I mentioned earlier, the right people are critically important to the success of the assessments. If people doing the assessment have not experienced an event or are unaware of a similar event in their lifetime, it's hard for them to imagine it happening to them. Did anyone in this room believe that an event like BP/Deepwater Horizon was "likely"? It's a good example of a very low probability, extremely high consequence event – in short, a disaster. It's important to note, that in our drilling operation, as an extra measure of precaution, we have a specific process to address Risk and Uncertainty Management for the Subsurface. We commonly refer to this as RUMS. This process is accompanied by a management of change process for our subsurface well designs.

Management of Change

This leads me to the second process - the critical companion to risk management - management of change (MOC). Without rigorous and disciplined management of change, we are unlikely to effectively manage risk and avoid disasters. It's important to understand that MOC doesn't just apply to facility design. We have broadened our definition of change and realized that other changes can significantly impact our risk. For example, changes in procedures, organizational

structures, suppliers, technology, technical specifications, and even people, can lead to serious consequences if not properly managed. We all know that bad things can happen when conditions or circumstances change and the changes are not addressed. An unmanaged change can cause a disaster several years later.

In fact, many major accidents can be traced back to an innocent change, usually for the sake of improvement. I take you back to Bhopal, India, 1984. A minor piping modification led to one of the world's worst industrial disasters – a chemical release that killed over 3000 people and injured tens of thousands.

Beyond our industry, the Chernobyl disaster was initiated by a safety enhancement experiment conducted without an analysis of the operational changes. It can't be over emphasized,... proper management of change is critical to avoiding disasters. We must embrace a rigorous and formal management of change process, understand why it's so important and apply it consistently across the entire breadth of our operations.

The Management System Process (MSP)

I will spend the rest of my time addressing the other two pieces of OE that are difference makers in Chevron. We call the next piece, the Management System Process, or MSP. It has five steps:

1. vision and objectives;
2. assessment;
3. planning and resources;
4. operate; and
5. review

We do the assessment step at various levels in the business and roll up the results. We use a few key principles, or questions, to decide what to focus on in the planning step. They are:

- **Data driven** - Can we confirm the gap with data?
- **Material impact** – at this level in the organization, can we make a difference?
- **Risk based** – Is this a significant risk deserving of resources relative to other risk reduction opportunities?
- **Fit for purpose** – Can we create a scalable solution that can be applied in various situations?

The MSP has been successful because we have integrated it with our business planning process. What gets in our business plans typically gets done. Much like - “what gets measured gets managed.”

Businesses always struggle with “break in” work. That is, work that comes upon us after plans have been made and resources allocated. The better the assessment of the risks, the better the plan will be. The better the plan, the more likely we will be successful in achieving the objectives. Resourcing our plans with adequate funds and competent people is very important to our success.

In my experience, we are good at the planning (deciding what to do) but until OE, we fell short on understanding the organizational capability to do the work and sustain it. Now, we spend considerable effort understanding what it will take to sustain the system or behavior we want. A significant benefit to the MSP has been the understanding of continual improvement – that is setting a solid foundation and building on that success year after year, learning as we gain experience.

Things Are Bigger

Now days, oil and gas exploration and production are large, complex businesses. We are operating in places many thought impossible, and with technology that we could not envision ten years ago. The size and scale of our facilities have dramatically expanded. They are designed to handle much higher volumes, temperatures and pressures.

These “mega” facilities contain more and larger equipment in limited space and usually require more people to operate and maintain them. Once unique in the upstream, these “mega” facilities have become common around the world. These facilities also represent mega investments.

Often, they rest in very remote and harsh environments or are floating far offshore in thousands of feet of water. All of these factors increase the risks to people and to our capital. I just recently attended a process safety workshop with some of our key leaders. I heard an interesting fact. Based on the last 17 years insurance data for the petroleum industry, ranked by capital lost, ten of the top twenty incidents in the

world were in the upstream. This does not include the BP/Deepwater Horizon explosion and fire.

The Differentiator: Leadership Accountability

So the last, but most important piece, of the OE puzzle, is what we call leadership accountability. People follow their leaders – not so much what they say, but what they do OR don't do. Our success in OE is primarily due to the prevailing culture our best leaders have created – we call it “a culture of caring and concern”. It shows in Chevron – you can feel it. Our leaders talk about people and how we want people to go home safely to their families every single day. We start every meeting with a safety moment, thousands every day across the globe – simple, but a constant reminder of our values.

When it comes to our safety and environmental values, we do not differentiate between our company employees and our business partners. We are highly leveraged with a large contract workforce. When it comes to safety, we are one workforce. The concern for safety is genuine and heartfelt. On a few occasions, I have witnessed

executives break down and weep while describing a workforce fatality – talking about someone they had never met. That,... is caring.

Tenets

Several years ago, when we launched OE, we deployed ten tenets of operation. The tenets were developed based on a scientific study of serious refining incidents. Each tenet starts with the word “Always”. They were cascaded level by level throughout our organization. One level would sit with the next to discuss and debate the tenets until the leadership agreed to follow them, and more importantly, **allow them to be followed**. The tenets are prefaced with two principles:

“Do it safely or not at all” and

“There is always time to do it right”.

The ten tenets are:

(Read card)

1. Always operate within design and environmental limits.
2. Always operate in a safe and controlled condition.

3. Always ensure safety devices are in place and functioning.
4. Always follow safe work practices and procedures.
5. Always meet or exceed customer's requirements.
6. Always maintain integrity of dedicated systems.
7. Always comply with all applicable rules and regulations.
8. Always address abnormal conditions.
9. Always follow written procedures for high risk or unusual situations.
10. Always involve the right people in decisions that affect procedures and equipment.

Stop Work Authority (SWA)

Another ingredient in leadership accountability is our “stop work authority”. Some say, it should be called “stop work responsibility”. In any case, it works. Any worker, employee or business partner, has the right to stop work if they suspect an unsafe condition or are just unsure what is happening. This is real... and powerful... in Chevron today.

Many of our units review work stoppage situations and reward workers for exercising their stop work authority. We know there could be some downside to this policy, but we also know that the upside is that a disaster could be avoided. People closest to the work typically know when something's not right. Workers need to know that they are "safe" and protected if they stop the work. We encourage workers to stop their supervisors, peers and technical people, anyone who is planning or executing the work they believe to be unsafe.

In some cultures, this is a difficult concept to accept. Telling an elder or any authority figure to "stop" is taboo. That's why it's so important to educate people with good examples of why we want them to stop work when unsure— it may save their life.

Operational Discipline

Last but not least, we expect our leaders to instill, and demand, operational discipline. We expect every task to be done the right way, every time. Tall order, but this is discipline – no matter how big or small the task – the right way, every time. If you don't know the right way, stop work and find out.

We can't legislate or impose a system that will eliminate all risk. Risk is inherent in our business. You took a risk coming here for this forum, but evidently, it was acceptable to you. However, we can manage risk, set clear standards and boundaries when needed, and reinforce the right behaviors.

We can't really teach good judgment either. However, we can role model the right behaviors and provide people with good tools like the Tenets of Operation and Stop Work Authority that help them make good decisions on the spot.

All of this added together will take us a long way towards avoiding disaster. We are not just expecting our workforce to comply; we are reinforcing them to always do the right thing.

Process Safety

In closing, I want to address process safety. The concepts of process safety apply to upstream operations. These concepts have never been

more important than now, given the complexity of our operations. The two processes, RM and MOC, I mentioned earlier are integral to good process safety. By definition, process safety is meant to avoid disasters. In Chevron, we used the process safety as set forth by the Center for Chemical Process Safety (CCPS) and integrated those concepts into our OE. Simply put, the key to process safety is keeping the harmful substances where they belong.

In Chevron upstream, we have embraced and adopted two important concepts. One, is changing our view of “an incident”. We are looking at all process safety incidents – in our facilities, an incident no longer has to have a consequence to count. For example, if a safety device is found not to work, that’s an incident. Or, if a safety device is not active when it should be, that’s an incident. All incidents are investigated based on their potential severity or consequence.

The second concept is measuring loss of containment (LOC). Once again, the goal is to never lose containment . As I said before, our business is the production of flammable and combustible substances. These are our products - they provide energy for our economy and keep us in business. Our simple goal – keep the product in the pipe –

makes good business sense. The integration of process safety concepts into our routine upstream business will enable us to do just that – keep the product in the pipe.

Thank you for your attention.

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