



The regulator's approach to leadership, management and culture for safety

Regional Workshop on the development and
implementation of effective IMS based on GSR Part 2

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Regulatory Activities Section
Division of Nuclear Installation Safety (NSNI)
International Atomic Energy Agency (IAEA)
Department of Nuclear Safety & Security

Learning objectives

- Through this presentation the participants will gain understanding of
 - The nature of safety and accidents--importance of human and organisational factors
 - Which organisations have responsibilities for safety of an NPP
 - Who has primary responsibility and why
 - Actions to implement this responsibility
 - Common goals and methods of nuclear regulatory organisation
 - Approaches to regulatory oversight of leadership and management for safety and safety culture.



Nuclear Safety

- “The achievement of proper operating conditions, prevention of accidents or mitigation of accident consequences, resulting in protection of workers, the public and the environment from undue radiation hazards.”

IAEA Nuclear Safety Glossary



The nature of accidents

- Accidents involving complex technologies such as NPP, petrochemicals, aviation, marine, etc are recognized as having multiple causes in the interactions between people, organization and technology
- Active failures:
 - unsafe acts by people, equipment failures, natural hazards
- Latent failures:
 - organizational weaknesses, errors and omissions
- Preventing such accidents entails strengthening defences against accidents and losses
- “High Reliability Organizations”

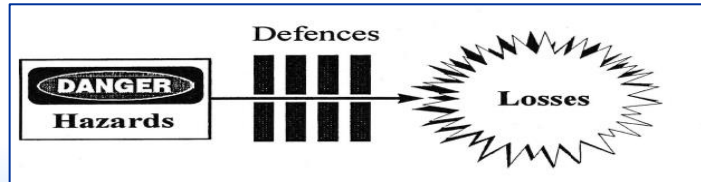


Deepwater Horizon, Gulf of Mexico, April 2010



Fukushima Daiichi

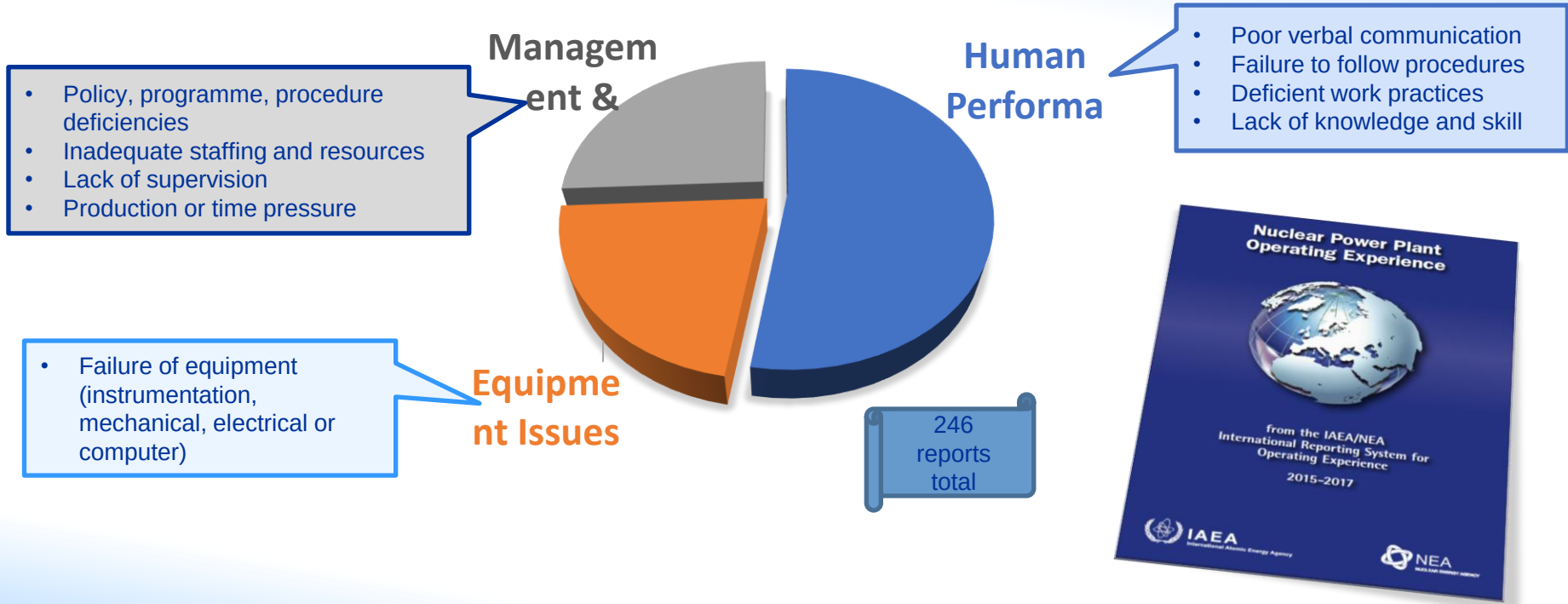
- Active failure: huge tsunami flooded the emergency generators which led to three reactor cores melting
- Latent failures:
 - Failure to recognize the hazard
 - Assumption that the plants were adequately safe
 - Regulator did not challenge assumptions



Fukushima Daiichi, Japan
March 2011



NPP operating experience 2015-2017



What organisations have responsibility for NPP safety?



Which organisation has primary responsibility?

- The licensee retains the primary responsibility for safety throughout the lifetime of facilities and activities and this responsibility cannot be delegated (IAEA SF-1)
- The government shall expressly assign the prime responsibility for safety to the person or organization responsible for a facility or an activity... (IAEA GSR Part 1)
- Countries implement this principle through their legal framework for nuclear safety



Other organisations' safety responsibilities

The government	The government establishes the legal and institutional framework for safety
The regulatory body	Sets out requirements for safety, authorizes activities, and verifies that the licensee is meeting its obligations
The design organization	Should establish and implement a management system for ensuring that all safety requirements...are considered and implemented in all phases of the design process
Technical support organisations	TSOs constitute an important technical resource for a regulatory body. "The regulatory body shall obtain technical or other expert professional advice or services as necessary in support of its regulatory functions".
Contractors and suppliers	Vendors and suppliers of NPP equipment and services must meet safety and quality requirements specified by the licensee



Why does this make sense?

- “Polluter pays” principle
- Puts the onus on the operator to mitigate the costs/risks to society of pollution, accidents
- The operator is best able to manage safety through its control over the people and processes involved in plant operation
- According to international convention, the operator is liable to pay compensation for nuclear damage in the event of an accident



Operator's fundamental safety responsibilities

- Establishing and maintaining the necessary competences
- Providing adequate training and information
- Establishing procedures and arrangements to maintain safety under all conditions
- Verifying appropriate design and the adequate quality of facilities and activities and of their associated equipment
- Ensuring the safe control of all radioactive material that is used, produced, stored or transported
- Ensuring the safe control of all radioactive waste that is generated



Operator's fundamental safety responsibilities

- “Leadership in safety matters has to be demonstrated at the highest levels in an organization.
- Safety has to be achieved and maintained by means of an effective management system. **This system has to integrate all elements of management so that requirements for safety are established and applied coherently with other requirements**, including those for human performance, quality and security, and so that safety is not compromised by other requirements or demands.
- The management system also has to ensure the promotion of a safety culture, the regular assessment of safety performance and the application of lessons learned from experience.”



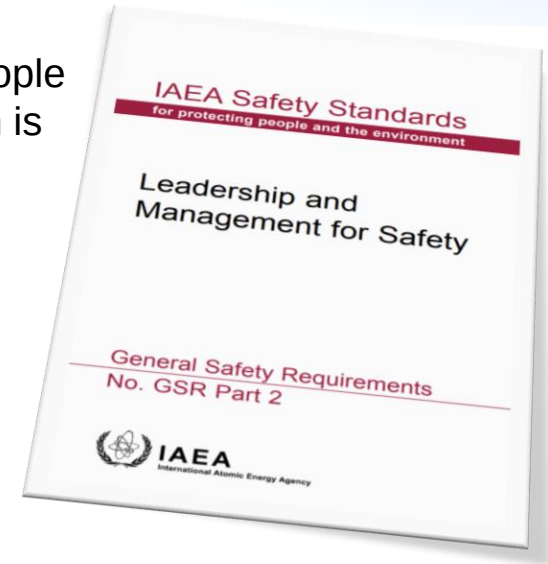
Safety does not
equal
compliance!



Implementing responsibility for safety

- RESPONSIBILITY FOR SAFETY
 - The licensee — starting with the senior management — shall ensure that the fundamental safety objective of protecting people and the environment from harmful effects of ionizing radiation is achieved.
- LEADERSHIP FOR SAFETY
 - Managers shall demonstrate leadership for safety and commitment to safety

“Leadership is a process whereby an individual influences a group of individuals to achieve a common goal”
Northouse, 2010



Implementing the responsibility for safety

- MANAGEMENT FOR SAFETY
- THE MANAGEMENT SYSTEM
- MANAGEMENT OF RESOURCES
- MANAGEMENT OF PROCESSES AND ACTIVITIES
- CULTURE FOR SAFETY
- MEASUREMENT, ASSESSMENT AND IMPROVEMENT

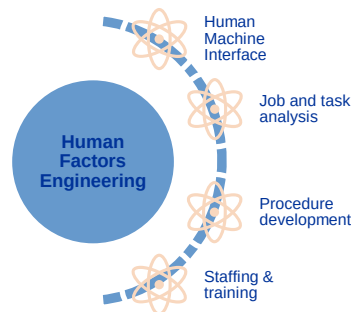
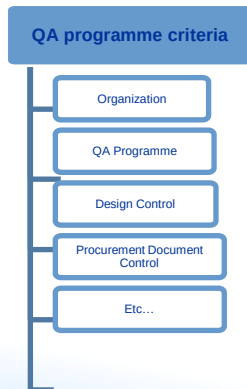


Development of HOF safety concepts

- Complex field with many inherent aspects
- Evolving, not static
- Variety of standards and regulatory approaches in current use
- Right balance between strategic, generic vs detailed, prescriptive



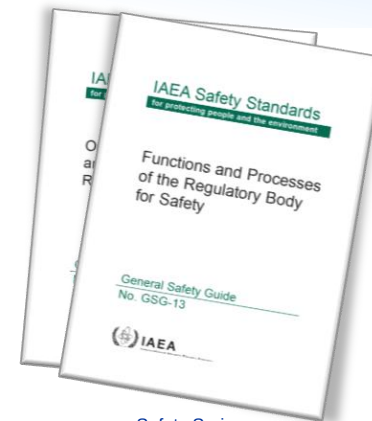
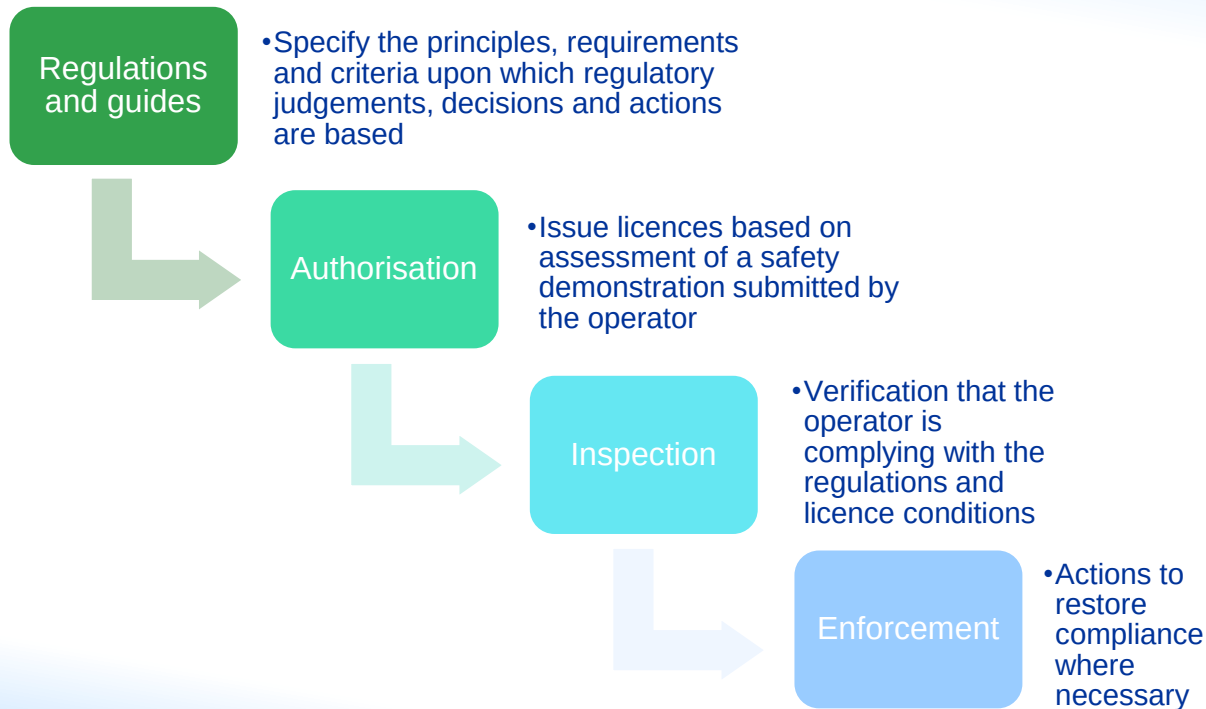
Evolution of Management Systems



How do regulators oversee an operator's responsibility for leadership and management for safety?



Core regulatory processes



Safety Series
GSG-12 & 13

Regulations & guides

- The regulatory body issues regulations and guides to specify the principles, requirements and criteria upon which regulatory judgements, decisions and actions are based
- Operators are required to conduct their activities in compliance with regulations
- Regulatory guides provide acceptable means of compliance and are usually non-mandatory



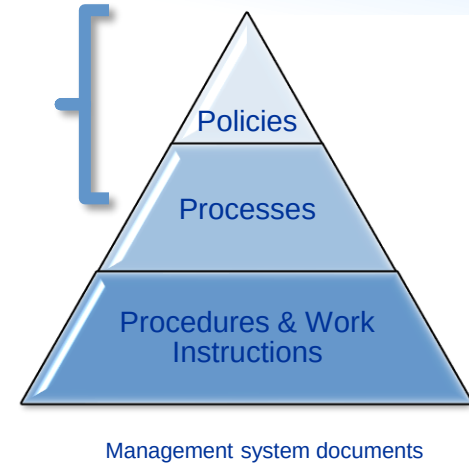
Examples of national regulations for leadership and management for safety

- UAE:
 - FANR REG-01 for Management Systems based on IAEA GS-R-3
 - FANR REG-16 for Operational Safety based on IAEA SSR 2/2
 - FANR regulatory guides refer to IAEA GSR Part 2, safety guides GS-G-3.1 and 3.5, ASME NQA-1, and other documents giving relevant guidance
- Canada:
 - Licence conditions refer to Canadian Standards Association N286-12 for general and specific requirements for NPP



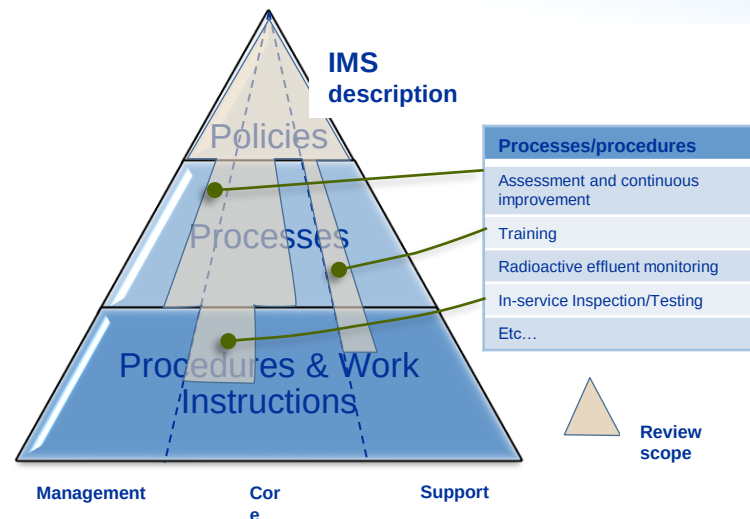
Licensing—application

- The applicant for a licence submits a demonstration of the safety of its activities
- The content and format of each application is specified in regulations and guidance
- Typically requires a summary description of the management system
- Ex:
 - In Canada the Class 1 facilities regulations require licence applicants to provide “*a description of the proposed management system for the activity to be licensed, including measures to promote and support safety culture.*”



Licensing-review and assessment

- Assess if policy commitments and process descriptions are complete and effective
- Focus on areas important to safety
- Appropriate scope and depth of review
 - Typical IMS consists of hundreds of documents
 - Impractical to review all



Licensing-review and assessment

- Generic process model for NPP

Management Processes	Core Processes	Support Processes
Direct and manage the business	Operations	Training
Provide human resources	Maintenance	Emergency Preparedness
Provide financial resources	Technical Support	Environmental Monitoring
Manage external relationships		Procurement
Assessment and improvement		Regulatory interface
		Documents and records

IAEA Safety Guide GS-G-3.5



Regulatory inspection-general objectives

- Trust, but verify!
- Verification of:
 - the licensee's management system and quality assurance programme provide adequate oversight and control of activities
 - facilities, equipment and work performance conform with requirements
 - compliance of licensee activities with applicable regulations and licence conditions
- Inspection plan gives adequate coverage of different licensee activities considering risk factors such as criticality to safety and security, propensity for error, opportunity for future inspection, etc.

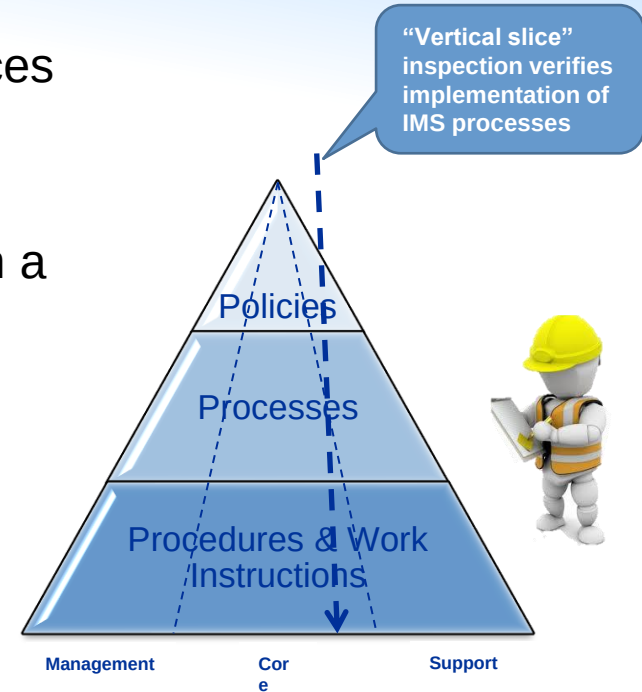
Regulatory inspection-scope

- The regulatory inspection programme activities relate to the stages of the licensing process:
- Site evaluation
- Construction
 - Licensee/prime contractor procurement, QA and oversight
 - Major equipment vendors and supply chain
 - Site construction
 - Preoperational testing
 - Verification of operational readiness
- Commissioning and operation



Conduct of inspections

- Important for regulator to observe work practices and product conformance
- Verify effectiveness of licensee IMS controls
- Each inspection conducted in accordance with a specific plan
 - Notice to licensee
 - Entry meeting
 - Inspector observations
 - Exit meeting-share prelim findings



Enforcement actions

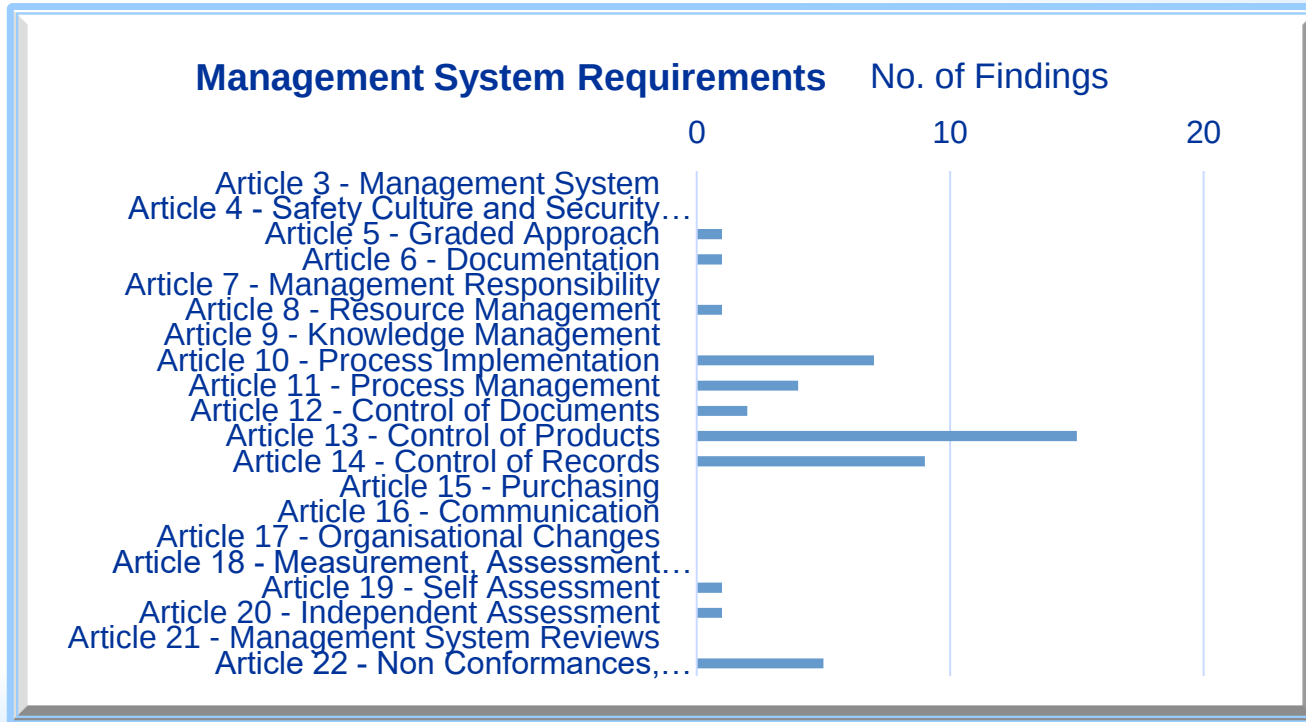
- When a regulatory inspector identifies and documents an apparent violation, the regulatory body will:
 - Assess significance -- for safety, security or safeguards as relevant
 - Determine whether a condition exists that requires immediate action
 - Decide graded enforcement actions such as:
 - Request for corrective action
 - Issuance of a formal notice of violation
 - Licensing action
 - Administrative penalties
 - Referral for prosecution
 - Issue the inspection report and any further notice to the licensee
 - Monitor and track the satisfactory resolution of inspection findings

Integrated Licensee Performance Assessment

- Periodic review of inspection findings and OPEX can help to develop a view of the effectiveness of the licensee's management system:
- Each finding categorized against
 - Management system regulatory requirements
 - QA programme criteria
 - Safety culture criteria
- Assess trends, deficiencies in broad areas such as management, procurement or engineering and whether there is an adequate level of performance
- Share findings with licensee
- Inspection plans adjusted based on risk insights gained



Example of licensee performance assessment



Monitoring safety culture

- Actions to promote safety culture may be more effective than enforcement approach
- Regulators can require a licensee to establish programmes that foster desired leadership behaviours and organizational culture
- The implementation of such programmes can be monitored
- Inspectors also have opportunities to observe leadership and safety culture behaviours in the field



Questions and feedback?



Ian Grant Consulting



Thank you!
Questions?

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