Risk Communication #1	Conduct a needs assessment study (survey) of external stakeholders for spill response literacy, dispersant information needs and expectations and recommendations for future preparedness and response
Objectives	Supply laypeople (political/elected officials/general public/local stakeholders) with credible information they need to make informed judgments about risk to health, safety, and environmental tradeoffs associated with oil spill response including dispersant application
Guidelines (including whether lab/field study, etc)	Identify what the information needs are based on stakeholder group perspective [culturally sensitive] and develop recommendations for mechanisms to meet this information need and expectations using multiple research methods (e.g., focus groups, surveys, structured interviews, etc)
Issues/Problems	Acknowledge external (general public) stakeholder perception that unified command inherently involves a conflict of interest (for example transparency on the release of proprietary ingredients) [N.B. more to be added]
Application to decision making process	yes
Length of Time of Project (<1 yr; 1-2 yr; >2 yr)	2 year
Total Cost Estimate($) [High= >$400,000; Med =$100,000 – $400,000; Low = <$100,000]	high

Risk Communication #2	Research methods to effectively communicate, educate stakeholder groups (general public) with regard to dispersants and oil spills, environmental trade-offs, human health and seafood safety issues
Objectives	Identify specific content and delivery channels and mechanisms for providing additional information for internal and external stakeholders. Translate scientific issues relating to oil spills, spill technologies, and dispersants into something tangible for the general public by narrowing the gap.
Guidelines (including whether lab/field study, etc)	Field applications including nominal group processes, two-way exchange Intent is for research topic 1 to inform research topic 2

Issues/Problems	-Overcome barriers of stove piping specialized knowledge. -This topic cuts across multiple issue topics. -Solutions and products will need to be maintained/updated/revisited periodically -Need to reevaluate periodically (e.g., every 5 years) -Cultural/geographic sensitivities
Application to decision making process	This fosters interagency and scientific collaboration
Length of Time of Project (<1 yr; 1-2 yr; >2 yr)	2 years or more
Total Cost Estimate($) [High= >$400,000; Med =$100,000 – $400,000; Low = <$100,000]	High

Risk Communication #3	Regional perceptions of spill response, dispersants and seafood safety
Objectives	To determine attitudes and behaviors relative to consumption in restaurants and household purchases.
Guidelines (including whether lab/field study, etc)	Field study
Issues/Problems	Address the continuing consumer fear of GOM seafood
Application to decision making process	Provide information to target communication of seafood testing and monitoring to reluctant consumers and inform local seafood associations
Length of Time of Project (<1 yr; 1-2 yr; >2 yr)	1 year
Total Cost Estimate($) [High= >$400,000; Med =$100,000 – $400,000; Low = <$100,000]	Medium

Degradation #1	Degradation rates of dispersed oil
Objectives	A *research program* on quantification of degradation rates of chemically dispersed, physically dispersed, and undispersed oil.
Guidelines (including whether lab/field study, etc)	1. Compare oil degradation on surface vs. shoreline vs. water column vs. sediment 2. Develop analytical protocols for detection of chemical dispersants and degradation rates under variable environmental conditions 3. Develop the ability to conduct "science of opportunity" from unanticipated spills, R&D response team 4. Need field experiments (changes in microbial community structure and function, fluorescence, stable isotope analysis) 5. Influence of suspended particulate material on dispersed oil degradation 6. Development and application of tools including models that provide multiple lines of supporting evidence during actual spill events (analytical tracers) 7. Determine the significance of photo-degradation, other weathering processes in the presence of dispersants 8. Integration of biodegradation rates to predictive models 9. Study biodegradation of oil from deep sea dispersant injection
Issues/Problems/ Opportunity	Expensive, requires a well coordinated, multi-disciplinary effort. Needs to be coordinated with other R & D efforts on issues like fate and transport, modeling, biological effects, etc; National funding programs such as ESTCP and SERDP may be funding sources
Application to decision making process	***Provides critical information related to oil degradation required for the development of operational guidelines.***
Length of Time of Project (<1 yr; 1-2 yr; >2 yr)	>5 years Key milestones and deliverables all along the way.
Total Cost Estimate($) [High= >$400,000; Med =$100,000 – $400,000; Low = <$100,000]	High. Looking at 9 individual projects each funded in the medium-high range. Expectation that these projects will be leveraged with other funding and national user facilities.

Degradation #2	Effect of sub-sea dispersant application on water soluble hydrocarbons
Objectives	Impact of chemical dispersants on the dissolution/degradation of water soluble hydrocarbons including VOCs from subsea releases
Guidelines (including whether	• Reevaluation of existing DWH data • Lab experiments to fill data gaps

lab/field study, etc)	• Design a study plan for either spill of opportunity or controlled experimental spill
Issues/Problems	Spills of opportunity only represent a specific situation. Human health concerns.
Application to decision making process	Supports FOSC decision to apply dispersants to protect human health.
Length of Time of Project (<1 yr; 1-2 yr; >2 yr)	1-2 years (potential for 1 year)
Total Cost Estimate($) [High= >$400,000; Med =$100,000 – $400,000; Low = <$100,000]	Medium

Seafood Safety #1	Conduct literature review of dispersant constituents that are found on the NCP product schedule to determine relevant information such as chemical makeup, environmental fate, kinetics, toxicity, BCF/BAF in order to identify constituents of concerns or chemical markers.
Objectives	Identify available information and gaps
Guidelines (including whether lab/field study, etc)	Secondary research, literature review
Issues/Problems	Proprietary issues
Application to decision making process	Direct
Length of Time of Project (<1 yr; 1-2 yr; >2 yr)	< 1 year
Total Cost Estimate($) [High= >$400,000; Med =$100,000 – $400,000; Low = <$100,000]	Low

Seafood Safety #2	Establish standardized experimental design criteria and perform environmental fate, kinetics, BCF/BAF studies on constituents of concern
Objectives	To determine likelihood of exposure from seafood consumption
Guidelines (including whether lab/field study, etc)	Consensus based discussion; lab
Issues/Problems	Developing Consensus; time and money;
Application to decision making process	Critical to feed into decision making process
Length of Time of Project (<1 yr; 1-2 yr; >2 yr)	>2 years
Total Cost Estimate	High

Seafood Safety #3	Establish standardized experiment design criteria and perform mammalian toxicity studies on constituents of concern in order to develop reference exposure levels.
Objectives	Identify or Develop reference exposure levels
Guidelines (including whether lab/field study, etc)	Consensus based discussion; lab
Issues/Problems	Developing Consensus; time and money
Application to decision making process	Critical to feed into decision making process
Length of Time of Project (<1 yr; 1-2 yr; >2 yr)	>2 years
Total Cost Estimate($) [High= >$400,000; Med =$100,000 – $400,000; Low = <$100,000]	High

Efficacy and Effectiveness #1	**Subsea dispersant effectiveness**
Objectives	Define the conditions of operability for dispersant use -What to apply? (dispersant characteristics) -When to apply? (physical parameters) -How to apply? (flow rate, mechanism, DOR) -How effective will it be? (type of oil, characteristics of source) -Confirm VOC reduction for worker safety. (Potential H&S project)
Guidelines (including whether lab/field study, etc)	-Coordination with other ongoing R&D efforts -lab→meso-scale→field
Issues/Problems	-Wide range of potential release conditions to be considered -Volume, Pressure, Depth, oil characteristics etc. -Specialized facilities required for deep sea conditions
Application to decision making process	-Efficiency of response -Identification of trade-offs -Reduction of uncertainty -Identifying technology and equipment gaps -Worker safety benefits from reduced VOC exposure
Length of Time of Project (<1 yr; 1-2 yr; >2 yr)	>2 yr
Total Cost Estimate($)	High

Efficacy and Effectiveness #2	**Innovative analytical techniques for surface and subsurface**
Objectives	-Improve aerial surveillance for identifying thick oil (surface) -Improve targeting of thick oil (surface) -Improve instrumentation for measuring dispersant effectiveness e.g. ROV's (subsea and surface) -Availability of information during response in real-time -Refine "SMART" protocol for subsea and surface response
Guidelines (including whether lab/field study, etc)	-Coordination with other ongoing R&D efforts -lab→meso-scale→field
Issues/Problems	-testing a wide range of technologies -inherent limitations of specific technologies -scalability from lab to field -Permits for field studies

Application to decision making process	- improves operational effectiveness -supports decision making process of continued use
Length of Time of Project (<1 yr; 1-2 yr; >2 yr)	>2
Total Cost Estimate($) [High= >$400,000; Med =$100,000 – $400,000; Low = <$100,000]	High

Efficacy and Effectiveness #3	**New dispersants**
Objectives	-Develop new highly effective dispersants for use in different extreme environments -Evaluate need for separate subsea specific dispersant
Guidelines (including whether lab/field study, etc)	-Depth, pressure, temperature, ice -consider the use of environmentally benign materials
Issues/Problems	-Getting large scale production -scalability from lab to field -Permits for field studies
Application to decision making process	-Address stakeholder concerns about existing approved products
Length of Time of Project (<1 yr; 1-2 yr; >2 yr)	>2
Total Cost Estimate($) [High= >$400,000; Med =$100,000 – $400,000; Low = <$100,000]	High

Human Health #1	Toxicological
Objectives	• Determine the biological affects in mammalian systems of dispersant oil/mixtures and compare to those predicted or measured by exposure to individual components alone. o Dispersants vs. ingredients o Oil vs. dispersed oil o Acute, repeat, longer term exposures o Target pulmonary, cardiovascular, CNS, and immune response ▪ Synergistic and additive effects • Better characterization of toxicological profiles of additional dispersant products in mammalian models • Develop an understanding the biological affects (health hazards) of the dispersants as a formulation and a target agents (oil) • Determine the short and long term human health impacts from various routes of exposure and various ranges of exposure for each dispersant that is available for use. • Can we measure or develop standardized animal in vitro or in silico models that can be used to evaluate the toxic effects for human health.
Guidelines (including whether lab/field study, etc)	Laboratory, models
Issues/Problems	Proprietary information Selection of the appropriate model and endpoint Formulations of oil, dispersants and/or mixtures
Application to decision making process	Accurate for hazard identification Proof of principle Importance of mixtures Maintain an appropriate schedule of dispersants Criteria for selection for a safe and effective dispersant Better incorporation of safety data
Length of Time of Project (<1 yr; 1-2 yr; >2 yr)	Various, depends on scope
Total Cost Estimate($)	High

Human Health #2	Exposure
Objectives	• Can we measure or develop models to estimate exposure to dispersants and or dispersed oil to human populations o Occupational o Resident • Develop an upper bound of exposure of the variable exposure scenarios associated with the dispersant use o Environmental o Occupational
Guidelines (including whether lab/field study, etc)	Lab and field
Issues/Problems	Access or gather existing information
Application to decision making process	Exposure control, potentially operational decision making, risk communication
Length of Time of Project (<1 yr; 1-2 yr; >2 yr)	1-2 years
Total Cost Estimate($) [High= >$400,000; Med =$100,000 – $400,000; Low = <$100,000]	Medium

Human Health #3	Epidemiology
Objectives	• To study the health effects in known potentially exposed human populations (dispersant manufacturing and response and remediation application). • To develop relevant biological markers of exposure and guidelines for responsible use of the biomarker.
Guidelines (including whether lab/field study, etc)	Lab and a field based exercise
Issues/Problems	Dealing with humans

	Identification of large enough exposed population Appropriate controls, validation of relevant biomarker
Application to decision making process	Human health risk assessment, potential bio-monitoring,
Length of Time of Project (<1 yr; 1-2 yr; >2 yr)	>2 years
Total Cost Estimate($) [High= >$400,000; Med =$100,000 – $400,000; Low = <$100,000]	High, could be millions

Biological Effects #1	Identifying Resources at Risk to Dispersed Oil: Population Sensitivity Analyses
Objectives	Create a Ecosystem Consequence Analysis (ECA) that considers key populations at risk, recovery rates, food web consequences, using Population Sensitivity Tables that inform many decisions (e.g., ecological to economic), identify data gaps, identify key species that drive tradeoff decisions
Guidelines (including whether lab/field study, etc)	Primarily a modeling approach. Use existing data to develop sensitivity tables and effects models
Issues/Problems	Lack of data to make resource-based decisions. Understanding of long-term impacts
Application to decision making process	Use of dispersants based on ecosystem consequences and tradeoffs.
Length of Time of Project (<1 yr; 1-2 yr; >2 yr)	2-3 yrs
Total Cost Estimate($) [High= >$400,000; Med =$100,000 – $400,000; Low = <$100,000]	300,000- 400,000

Biological Effects #2	Developing a systematic process for area specific biological effects assessments for dispersant use: Application to two contrasting environments (Cook Inlet, Alaska and Florida Keys, Florida)

Objectives	1. Expand ERA process (transport, fate, receptors) to identify data gaps for determining area-specific biological effects of dispersed oil. Identify whether appropriate toxicity data and test conditions exists for resources at risk or their surrogates 2. Fill data gaps (additional information on transport, fate, resources, toxicity testing) to be able to apply results to decision making (including population models, trophic cascading effects). 3. Experimental validation at appropriate scales
Guidelines (including whether lab/field study, etc)	
Issues/Problems	Could not separate biological effects gap analysis from transport, fate, resources at risk Every region has differing transport, fate, resources at risk
Application to decision making process	Application to decision making process: Reduces uncertainty by providing relevant data
Length of Time of Project (<1 yr; 1-2 yr; >2 yr)	>2 years
Total Cost Estimate($) [High= >$400,000; Med =$100,000 – $400,000; Low = <$100,000]	>400,000

Biological Effects #3	Worldwide compilation, synthesis and analysis of biological effects from dispersed oil under controlled and uncontrolled oil spills
Objectives	1. Data mining of peer review and gray literature of worldwide information and dispersant use in field laboratory, and accidental oil spills 2. Evaluate and analyze available data in scientifically rigorous process to extrapolate to relevant situations or decisions 3. Easily accessible, summarized, searchable (keywords e.g. species, acute vs. chronic, characteristics), interactive and geo-referenced database on the effects of dispersant use 4. Initial report of findings with annual/ biannual updates
Guidelines (including whether lab/field study, etc)	Literature review of lab, field and real world monitoring

Issues/Problems	Accessibility for database (publicly accessible Maintenance and continuing updates (how, who, when, where) Training on database use (e.g. manual, on site trainings) Data may not be available (e.g. proprietary data
Application to decision making process	Informed tradeoff decisions based on past experiences Help identify risks and reduce uncertainty
Length of Time of Project (<1 yr; 1-2 yr; >2 yr)	2 years
Total Cost Estimate($) [High= >$400,000; Med =$100,000 – $400,000; Low = <$100,000]	Medium (100,000 to 400,000)

Physical Transport & Chemical Behavior #1	Data mining for dispersant information from DWH
Objectives	-Correlating quantitative information on subsurface dispersant effectiveness and dispersant application time series -Correlating the subsurface injection with emulsification at the surface -Is there evidence in the chemistry samples from DWH of dispersant components in the oil droplets
Guidelines (including whether lab/field study, etc)	Use existing data
Issues/Problems	Access to NRDA data and completion of laboratory analysis
Application to decision making process	-Will help answer the question of whether subsea dispersant application was/is effective
Length of Time of Project (<1 yr; 1-2 yr; >2 yr)	1-2 years
Total Cost Estimate($) [High= >$400,000; Med	Medium

=$100,000 – $400,000; Low = <$100,000]	

Physical Transport & Chemical Behavior #2	-Determine the role of dispersants on the transport, dissolution, leaching, and biodegradation processes
Objectives	-What is the effect of dispersant on droplet size/bubble size distribution and trapping height of plume? -What are the interactions of chemically dispersed oil droplets with suspended particulate matter and how do these processes affect the rate of oil biodegradation and ultimate fate of dispersed oil? -What is the degree, rate, and consequence of surfactant leaching from chemically dispersed oil droplets? -What is the role of dispersants on the dissolution process (short and long term)? -Does the application of subsea dispersants change the characteristics of that oil at the surface? -Are the effects of photolysis the same on chemically and physically dispersed oil droplets?
Guidelines (including whether lab/field study, etc)	Surface and subsurface Consider pressure and temperature effects on surfactant leaching
Issues/Problems	
Application to decision making process	
Length of Time of Project (<1 yr; 1-2 yr; >2 yr)	>2 years
Total Cost Estimate($) **[High= >$400,000; Med =$100,000 – $400,000; Low = <$100,000]**	High

Physical Transport & Chemical Behavior #3	Development of localized integrative models and decision support tools for planning and response
Objectives	-Improve existing models -Integrate biological and physical transport models -Make models useable/accessible for decision makers and planners -Used to inform the general public
Guidelines (including whether lab/field study, etc)	Geared for decision makers
Issues/Problems	
Application to decision making process	
Length of Time of Project (<1 yr; 1-2 yr; >2 yr)	2 years
Total Cost Estimate($) **[High= >$400,000; Med =$100,000 – $400,000; Low = <$100,000]**	High (but scalable)