



## National Source for Energetics Expertise

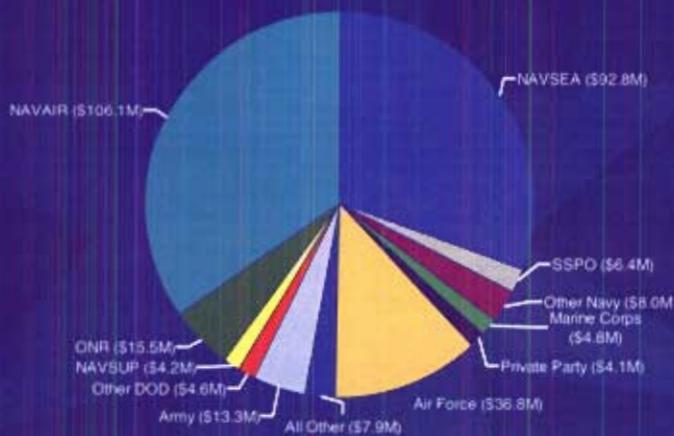
- **Largest Energetics Workforce in DoD**
  - Total 848 dedicated workers
  - 700 Scientists & Engineers
  - 55 PhDs
- **Collaborative relationship with academia e.g., UM/JHU/CSM**
  - Graduate curriculum in energetics
  - Specialized research projects
  - Technician training
- **Experience based on mentoring culture**
- **Energetics expertise is grown in-house**



Developing the Next Generation of Energetics Experts



## FY04 Sponsor Base



**Total Reimbursable = \$304.5M**

**Indian Head is a Joint Asset**





## Relationships

- Industry
- Universities
- DOD Labs
- DOE Labs
- Other Government:
  - Homeland Defense
  - DTRA
  - DARPA
  - NASA
  - DOT / FAA
  - Justice
  - Intelligence
  - State
  - Corps of Engineers





### Homeland Security



### UNIVERSITY OF MARYLAND



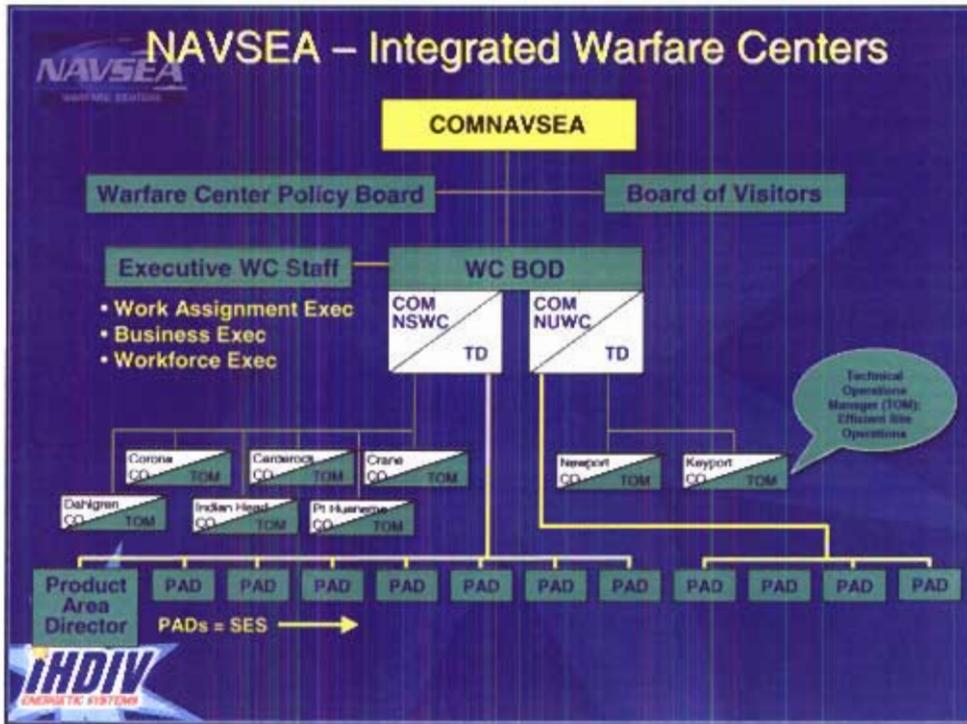

### PENNSTATE




## NAVSEA Warfare Center Product Area Alignment...

- **Ordnance is a designated NAVSEA Product Area (PA):**
  - Brings Crane, Dahlgren and Indian Head Energetics expertise and capabilities together under a single Product Area Director (PAD)
  - Ensures teaming and collaboration across the Warfare Centers
  - Responsibility to sustain required core competency in Energetics
  - Increase efficiency/effectiveness
    - Utilize best capability
    - Minimize overlap
    - Focus investments





- # NAVSEA Warfare Centers Product Areas
- 
- Force Level Warfare Systems**
- Warfare Systems Analysis, Architecture and Requirements
  - Warfare Systems Engineering, Integration, T&E and Assessment
- Ships & Ship Systems**
- Ship Integration and Design
  - Hull Forms and Propulsors
  - Machinery Systems and Components
  - Structures and Materials
  - Environmental Quality Systems
  - Vulnerability and Survivability Systems
  - Signature and Stealing Systems
- Surface Ship Combat Systems**
- Air and Surface Surveillance and Detection Systems
  - Combat Control Systems
  - Engagement Systems
  - Electronic Warfare Systems
  - Combat Systems Engg. Integration, T&E & Assessment
- Littoral Warfare Systems**
- Mine Warfare Systems
  - Amphibious Warfare Systems
  - Special Warfare Systems
  - Diving and Life Support Systems
- Navy Strategic Weapon Systems**
- Targeting and Shipboard Subsystems
  - Missile and Re-entry Systems
  - Weapons System Level Analysis, Testing & Evaluation
  - Non-Nuclear Strategic Weapons Systems
- Ordnance**
- Warheads, Rockets, Ammunition & Other Ordnance Systems
  - Energetic Materials
  - Ordnance Safety, Logistics & Environmental Technology
  - Cartridge Actuated, Pyrotechnic, & Specialty Devices
- USW Command & Control Systems**
- Submarine Combat Systems
  - Submarine Boxer Systems
  - Submarine Imaging and Electronic Warfare
  - Submarine Communications
  - Surface USW
- USW Weapon & Vehicle Systems**
- Torpedoes
  - Unmanned Undersea Vehicles
  - Platform Defensive Systems
  - USW Launchers
  - Submarine Missile Launcher Integration
- USW Ranges, Analysis & Assessment**
- USW Ranges
  - USW Analysis
  - USW Operational Assessment
  - USW Integration
- USW Fleet Material Readiness**
- Depots
  - Obsolescence Engineering
- Homeland & Force Protection**
- Homeland Security and Measured Response Options
  - Force Protection and Chemical/Biological Defense Systems
  - Mission Assurance Capabilities
- Surface Warfare Logistics & Maintenance**
- Performance Based Logistics
  - Maintenance Engineering
  - Fleet Material Management
- IHDIV**  
ENERGETIC SYSTEMS



## Indian Head Energetics

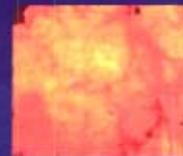
- Explosives and Insensitive Munitions
- Underwater Warheads
- Gun, Rocket, and Missile Propulsion
- CAD/PAD
- Energetic Chemicals
- Ordnance Evaluation
- Packaging, Handling, Storage & Transportation



## Explosives and Insensitive Munitions

- **Lead U.S. Lab for Explosives**
  - Over 70% explosives in service were developed by IHD
  - World leader in Underwater and IM Explosives
- **Home of Thermobarics for OEF & OIF**
- **Meeting future DOD requirements**
  - Hard target penetration
  - Smaller ordnance
  - "Dial-a-yield" ordnance

2003 NATO NIMIC Insensitive Munitions Award  
2000 ONR Dr. Arthur Bisson Prize for Naval Technology Achievement (success in transitioning Navy explosives to U.S. weapons)



**Reduced Cost and Development Cycle Time**



## Transitioned Explosives to Service Use

### NAVY Weapons

APOBS	SM-80 ERGM	LAW	STD Missile Initiator
ERGM	Hellfire Booster	JASSM Main Charge	
SLAM-ER	76MM Projectile	Harm	Tomahawk
MK50 Torpedo	JASSM Booster	MK98 MND	Quickstrike
RAW	APOBS	SABRE	LAW
5/54" Projectile	Hellfire	ERGM	SMAW NE
MK48-2 DFD	MK98 MNS	MLRS CARGO	JSOW/BLU-108
AMRAAM	SRAW 5"	MK24 DFD SEAL Weapon	
STD Missile	AMRAAM	MK50 Torpedo	Tactical Tomahaw
BLU-110, 111, & 116 GP Bombs			

### ARMY

Hellfire Booster	60MM Mortar	Hellfire Main Charge
Carl Gustaf	MLRS	

### AIR FORCE

AIM-9X Sidewinder	JASSM Main Charge	Hellfire (TB)
JASSM Booster	AMRAAM	BLU-118B
		GP Bomb Family

Livermore
  EGLIN
  China Lake
  Indian Head
  ARDEC



IHDIV Developed Over 70% of Explosives Transitioned to Service Use Since 1985



## Underwater Warheads

### Modeling & Simulation (DYSMAS)

- Predict ship hull damage
- Design next-generation "survivable" ship hull

### Canistered Countermeasure Anti-Torpedo

- Transitioning IHD warhead, explosive and fuze technology into acquisition
- First MEMS-based torpedo exploder
  - Reduced exploder size from 118 in<sup>3</sup> to 15 in<sup>3</sup>
  - Leveraging MANTECH to reduce exploder cost from \$20K to \$1K per unit

2003 ONR Cheapskate Award for Affordability



Underwater Shock Test



MEMS & ATMU SLAPPER DET



Only DOD R&D Capability for UW Warheads (Torpedo, Mine, Mine Countermeasures)



## Gun, Rocket, and Missile Propulsion Engineering

- **Navy's gun propulsion laboratory**
  - NSFS propellant
    - Doubles launch energy
    - Extends stand-off distance from 13 to 60 miles
    - Lower barrel erosion
- **Aircraft rockets and JATO engines**
  - First HERO-safe 2.75" rocket motor for tri-service use
- **Missile propulsion engineers**
  - Standard Missile
  - Tomahawk
- **5" Zuni Rocket program**
  - Cost and cycle time reduction



## Cartridge Actuated Devices (CAD) Propellant Actuated Devices (PAD)

- **Devices for:**
  - Escape Systems
  - Weapons Development
  - Missile Staging
  - Fire Extinguishing
  - Crew Egress
  - other Safety Systems (e.g., Air Bags)
- **Joint Program supporting USN, USAF, US Army, other DoD, NASA, State Department, and over 50 FMS countries**
- **Life Cycle Commodity Program Manager**
  - 3100 items
- **Lean Manufacturing and Reengineering**



David Packard Excellence in  
Acquisition Award Winner for Innovation



## Energetic Chemicals

- **Research and scale-up of energetic materials**
- **Forensic energetic evaluations**
  - EMNA – Navy rep for Blue Team
- **Sole world producer of Otto Fuel**
  - Biazzi/Moser Nitration Plants
  - Agile Chem Facility – Consolidating 2 plants to 1
- **Unique chemicals for weapon systems**
  - Explosive ingredients
  - Propellant ingredients



**IHDIV is the only source  
for high-risk energetic chemicals**



## Guaranteeing the Warfighter's Safety and Effectiveness

- **Quality Evaluation** (Result of aging and service-use)
  - Safety
  - Reliability
  - Performance
- **NAVSEA**
  - Standard Missile
  - Gun propellants
  - Undersea weapons
  - Mine countermeasure systems

(Results feed design, acquisition, and maintenance/logistics)
- **NAVAIR**
  - Aircraft rockets
  - JATOS
  - CAD/PADs
  - Tomahawk (Functional Ground Test)
- **SSP MK4/MK5 RVs**



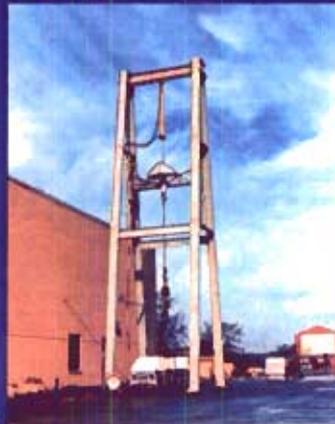
**Ensuring a safe and reliable ordnance stockpile**



## Packaging, Handling, Storage and Transportation

- PHS&T of ordnance
  - Design
  - Test/Qualify
  - Prototype
  - Follow on Support

2002/2004 WorldStar and AmeriStar Packing Awards for Strapless Bomb Pallet/AMRAAM Handling Beam



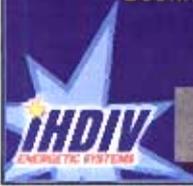
## Weapons Simulation

**Ensure operational readiness of U.S. and Allied Forces**

- Unique equipment required to certify and maintain platform weapons systems
  - Missile simulators / trainers
  - Weapons system test / diagnostic / training equipment
- Training systems required to maintain warfighter proficiency
  - Integrated Maritime Portable Acoustic Scoring & Simulator (IMPASS)



SM2 BLK II Launch



Critical link between Indian Head's energetics and safe effective deployment of the resulting high-tech weaponry



## Energetics Manufacturing Technology

One of ten (only Government) ONR MANTECH Centers of Excellence

- Develop/Improve energetic manufacturing technologies
- Scale-up and transition to industry
- Solve energetics manufacturing problems for industry/PMs
- Improve producibility, affordability, availability and safety
- Provide sole source, back up & emergency supplier
- Provide rapid response to military needs
- Reduce manufacturing cost of energetic materials



We do what energetics industry can't or won't do



## Rapid Response for OEF & OIF



- BLU-118/B Thermobaric Bomb for tunnel defeat capability in 67 days
- Thermobaric Shoulder-Launched Multipurpose Assault Weapon (SMAW-NE) in 9 months
- Accelerated production of CAD/PAD aircrew ejection rocket motors
- Test/Certify explosive detection devices (with EODTECHDIV)
- Ultrasonic-test inspection of Sparrow rocket motors



**NAVSEA**  
NAVAL SEA SYSTEMS COMMAND

## Three Energetics-Related Advanced Concept Technology Demonstrations

- **Thermobaric Weapons**  
(2002, sponsored by PACCOM)
- **Agent Defeat Warhead**  
(2002, sponsored by US Central Command)
- **Advanced Technology Ordnance Surveillance (ATOS)**  
(2001, sponsored by EUCOM)

Cave entrance  
Bomb entering cave and detonated (initial fireball)  
Cave entrance-post detonation  
Vulcan Fire

**IHDIV**  
INTEGRATED HYBRID DEFENSE SYSTEMS

**Developing Transformational Technologies**

**NAVSEA**  
NAVAL SEA SYSTEMS COMMAND

## Swoosh and Boom experts!

Novel Energetics  
Nano Materials

**IHDIV**  
INTEGRATED HYBRID DEFENSE SYSTEMS



## BRAC 2005 Recommendations for IHD

CAPT Joseph N. Giaquinto  
Commanding Officer

Presented by: Dr. Thomas Russell

22 July 2005



## Agenda

- Recommendation for IHD
- Personnel Impacted
- BRAC Recommendations
- Other Issues
- Conclusion



## Personnel Impacted

Geographic Sites	Gaining	Losing	Net Gain (Loss)
Naval Weapons Station, Yorktown, VA		179 (49)	(179)
Naval Weapons Station, Seal Beach, CA		71 (24)	(71)
Naval Weapons Station, Earle, NJ		63 (63)	(63)
Indian Head Division, NSWC, Indian Head, MD	42	137	(95)

The number in red ( ) indicates IHD's share per COBRA data

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## Realign Yorktown Detachment W&A RDAT&E and relocate to IHD

- Number of positions potentially affected: 49 per scenario input (current staffing is 52)
- Our understanding of the recommendation is to fully realign Yorktown Detachment
- Implementation challenges
  - To the extent that people do not relocate, technical expertise will need to be rebuilt
  - Maintaining Navy's unique organic capabilities that currently exist at Yorktown

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## Realign Yorktown Detachment W&A RDAT&E and relocate to IHD

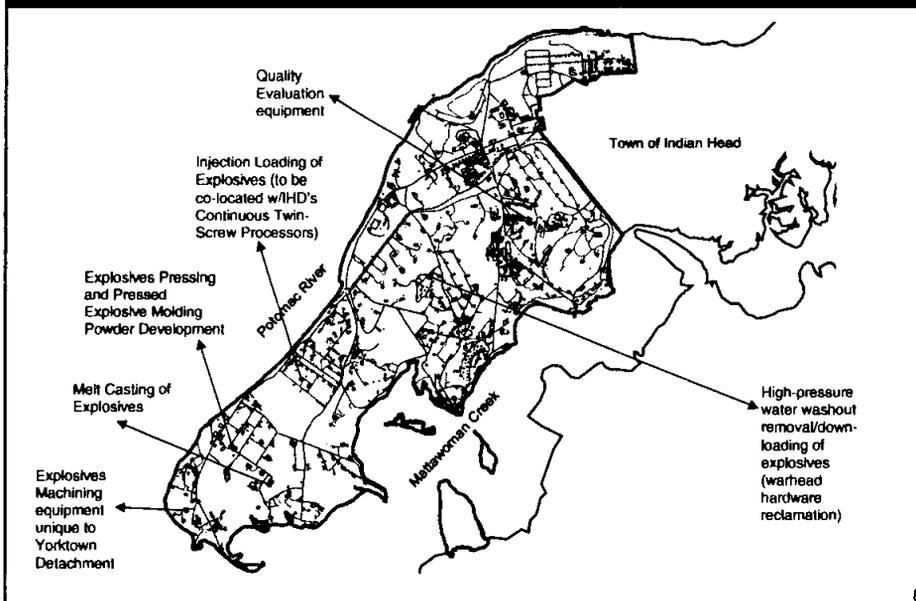
- Implementation challenges (con't)

Capability currently at Yorktown	Capability planned for movement to IHD per COBRA	Existing Capability at IHD
Melt cast processing	No	No
Pressed explosive molding powder development	No	No
Explosives pressing capability	Yes	No
Castable plastic bonded explosive processing	No	Yes
Explosive injection loading	No	No
High-pressure water washout removal/downloading of explosives	No	No
Specific explosive machining capability	No	No
Category II magazine storage	No	Yes
Quality evaluation	Yes	No

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## Proposed Placement for Incoming Yorktown Capabilities



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## Realign Earle Detachment W&A Packaging RD&A and relocate to Picatinny Arsenal

- Number of positions potentially affected: 63 per scenario input (current staffing is 70)
- Areas for clarification
  - Recommendation refers solely to “W&A packaging RD&A”. Earle Detachment performs W&A packaging and handling, storage & transportation (PHS&T) RD&A
  - Recommendation was made as part of a larger recommendation that creates a “Specialty Site for Guns and Ammunition” at Picatinny
    - Earle Detachment performs only 2 work-years in gun & ammo packaging, handling, storage and transportation

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## Realign Earle Detachment W&A Packaging RD&A and relocate to Picatinny Arsenal

- Implementation challenges
  - Maintaining existing capability to support the Fleet:
    - Rapid access to ships and loading/unloading operations
    - Rapid access to Military Sealift Command facilities such as CONREP facility, forklift training course, and simulated ship cargo hold
    - Rapid access/interaction with the Atlantic Ordnance Command Detachment Earle’s lean pilot program
  - To the extent that people do not relocate, technical expertise will need to be rebuilt

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## Realign IHD Gun and Ammunition RD&A and relocate to Picatinny Arsenal

- Number of positions potentially affected: 43 per scenario input
- Areas for clarification
  - Recommendation states RD&A but scenario data calls collected RDAT&E
  - The COBRA input was extracted from a scenario that moved all RDAT&E functions out of IHD and that did not take into account the recommendation to establish IHD as an “energetics center”
    - All IHD gun & ammo work is on energetics (propellants, propulsion components, etc.) for large caliber ammo

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## Realign IHD Gun and Ammunition RD&A and relocate to Picatinny Arsenal

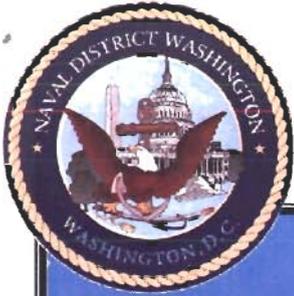
- Implementation challenges
  - To the extent that people do not relocate, technical expertise will need to be rebuilt
  - If gun energetics is included in the realignment, additional costs will be required to replicate the unique IHD capabilities at Picatinny

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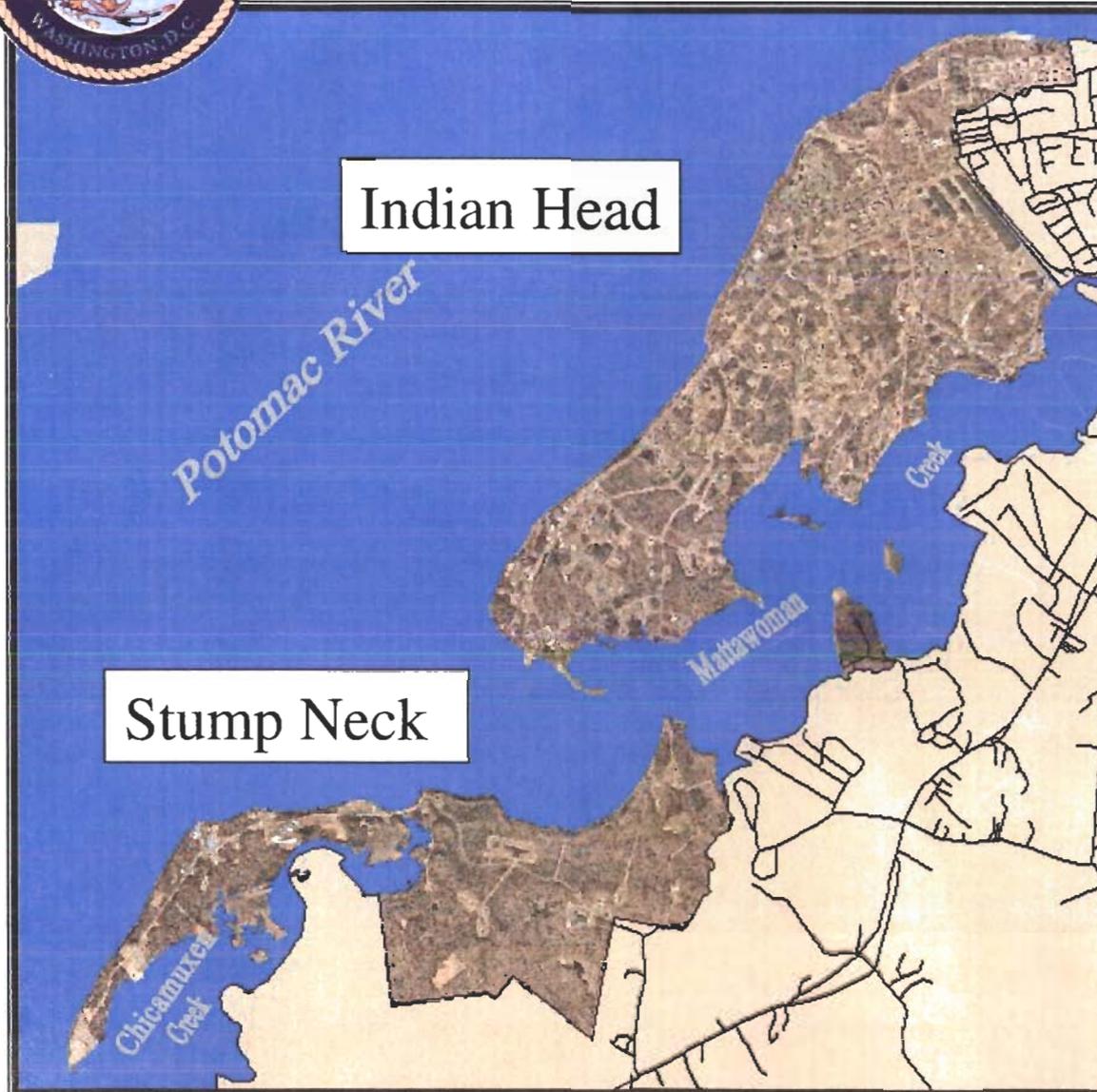


## Realign IHD Non-Energetic W&A to China Lake

- Number of positions potentially affected: 94 per scenario input (current workload at 68)
- Non-Energetics Weapons Engineering
- Implementation challenges
  - To the extent that people do not relocate, technical expertise will need to be rebuilt



# Indian Head & Stump Neck Sites



## LAND:

	<u>Acres</u>
• Indian Head	1,961
• Stump Neck	<u>1,224</u>
• Total Acres	3,185

## INFRASTRUCTURE:

- Industrial Complex
- 1,730 Facilities
- \$1.2B PRV
  - \$430M Mission
  - \$408M PWC
  - \$343M NDW
- 5.8 MSF
  - 2.6 MSF Mission
  - 0.75 MSF PWC
  - 2.5 MSF NDW
- 127 Miles of Roads
- Utilities-Steam, Electricity, Potable Water, River Water, Sewage, & Compressed Air



# Indian Head / Stump Neck Tenants



## NAVSURFWARCEN Indian Head Division (NSWC IH)

- Energetics from concept through production, to operational deployment.



## Naval Explosive Ordnance Disposal Technology Division (EODTECHDIV)

- Single manager of EOD Technology and Training for DOD.



## USMC Chemical Biological Incident Response Force (CBIRF)

- Consequence management through agent ID, search & rescue, emergency medical care.



## NAVSEA Logistics Center Atlantic (SEALOG)

- Life-cycle logistics support products and information technology.



## Naval Ordnance Safety & Security Activity (NOSSA)

- DoN authority in explosives safety and ordnance environmental compliance.



## Joint Interoperability Test Command (JITC)

- JSC certifier of DOD IT and National Security Systems interoperability requirements.

# ***What is “Energetics?”***

- **Defined as, “...explosives, propellants, pyrotechnics, reactive materials, related chemicals and fuels, and their application in propulsion systems and ordnance...” \***
- **Includes bombs, warheads, mines, fuzes, countermeasures, flares, obscurants, safe-arm devices, arming-firing devices, unguided rockets, missile rocket motors, ramjets, gas generators, gun projectiles and propelling charges, and cartridge and propellant actuated devices.**

\* From the signed Navy Energetics Leadership Board (NELB) and Energetics IPT (EIPT) charters