*K-Sea T/B DBL 152 Incident*

# LONG-TERM MONITORING PLAN

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Approved by Unified Command on 26 DEC 2005

## OBJECTIVES:

- Track the movement and fate of submerged oil from the DBL 152
- Provide information that can be used for advance warning of potential impacts to Gulf Coast shorelines and other sensitive areas (e.g., Flower Garden Banks NMS).

## SUBMERGED OIL MIGRATION

Information on the movement of submerged oil from the DBL 152 collected to date indicates a general westward migration. Significant movement of submerged oil to the north, south and east has not been observed. Continued migration of submerged oil mainly to the west is anticipated.

## APPROACH

The movement of submerged oil will be monitored by deploying an array of sampling devices (see description below) designed to detect the presence of oil moving along or just above (within 1 m) the seafloor and within the water column. Because it is impractical to continuously monitor the entire area through which submerged oil may move, the monitoring approach is based on the concept of establishing and maintaining a clean (e.g., unoiled) perimeter just beyond the leading edges of the submerged oil field (SOF). However, since the location of the SOF is not static, it will be necessary to periodically reposition or add sampling devices. An adaptive management approach will be used to reconfigure the sampling array based on real-time evaluation of monitoring results by the field crew based on general guidance presented in this plan.

Specific details of the long-term monitoring are discussed below.

**Sampling Device:** The sampling device for long-term monitoring is very similar to the snare-filled crab pots already used to detect submerged oil. It will consist of two crab pots attached one on top of the other, with the bottom pot being weighted to maintain an upright position. Each pot will be loosely filled with white (first-run) snare. The crab pots will be rigged as shown in Figure 1.

A snare-filled cylinder (1 m high x 0.25 m in diameter) constructed of wire mesh will be suspended from the float to monitor for the presence of oil in the mid-water column. A cylindrical eel pot could also be used. The mid-water column sampler will be positioned at ½ the water depth. The bottom end will be weighted slightly to ensure the device remains vertical.

Each sampling device will be labeled with a unique identification code to facilitate data management.

**Initial Configuration of Sampling Array:** The initial configuration consists of an array of 30 sampling devices as shown in Figure 2. The sampling array will consist of two "rings" of sampling devices -- an inner ring and an outer ring. The inner ring will be located just beyond the leading edge of the SOF; the outer ring will be located some distance farther out. The inner and outer rings will be positioned to spatially "bound" the perimeter of the SOF. The intent is to position the outer ring far enough beyond the leading edge so that it will not be oiled between monitoring events based on the estimated rate of oil movement.

Sampling intensity will be greatest immediately west of the SOF in the direction of most-probable movement. Sampling intensity will be less to the north, south and east of the SOF.

The initial configuration of the sampling array is as follows:

*Northern, Southern & Eastern Array*: The inner ring will consist of 7 samplers placed at 2 nm intervals ½ to 1 nm out from the edge of the SOF. The outer ring will consist of 9 additional samplers placed 1 nm out from the inner ring. Outer ring samplers will also be spaced at 2 nm intervals and offset from inner ring samplers by 1 nm to create a staggered arrangement to minimize gaps.

*Western Array*: The inner ring will consist of 2 north-south rows of samplers. The first row will consist of 5 samplers located 1 nm west of the leading edge of the SOF. The second row will consist of 4 additional samplers placed 1 nm mile farther west. Within each row, samplers will be spaced at 1 nm intervals. Samplers in the first and second rows will be offset by ½ nm to minimize gaps. The outer ring will consist of a north-south row of 5 samplers at 1 nm spacing positioned 3 nm west of the first inner row (4 nm west of the SOF).

Target locations for initial sampler deployment will be determined using GIS mapping and then uploaded to a GPS unit aboard the monitoring vessel to facilitate navigation to the drop point.

**Procedure for Checking & Repositioning Samplers:** The sampling design is intended to eliminate (potentially) the need to check all samplers during each monitoring event depending on the results. Samplers with the highest probability of oiling between monitoring events should receive the highest priority for checking.

Depending on which samplers indicate oiling, it may be necessary to reposition the samplers. For purposes of this plan, repositioning of samplers will be triggered by the presence of oil on snares in greater than trace amounts, as indicated by oil droplets more than 2 cm in diameter (e.g., penny-sized) covering 10 percent or more of the snare.

Specific procedures for checking and repositioning samplers are outlined below:

*Northern, Southern & Eastern Arrays*: If inner ring samplers are unoiled, indicating that submerged oil has not reached these locations, then the corresponding outer ring samplers will not be checked and no samplers will be repositioned. Any missing inner ring samplers will be replaced. If time allows, outer ring samplers will be located but not retrieved. Missing outer ring samplers will be replaced as needed. If any inner ring

samplers are oiled, the inner ring samplers will be retrieved, photographed, sampled and refilled with clean snare and redeployed 1 nm beyond the outer ring. The outer ring samplers will then be checked to determine the extent of submerged oil movement.

*Western Array*: The second row of inner ring samplers will be checked first, followed by the first row. If both rows of inner ring samplers are unoiled, the outer ring samplers will not be checked and no samplers will be repositioned.

If any of the first row inner ring samplers exceed trace oiling, but the second row are unoiled or show trace oiling only, samplers will be repositioned as follows:

- All samplers from the first row will be retrieved, evaluated, refilled with clean snare (if needed) and redeployed 2 nm west of their original position (1 nm west of the second row inner ring samplers).

- All samplers from the outer ring will be retrieved and redeployed 1 nm west of their original position.

This "leap-frogging" maneuver will move the entire western array 1 nm to the west. The former second row of the inner ring will now become the first row.

If any second row inner ring samplers also exceed trace oiling, samplers will be repositioned as follows:

- All samplers from both the first and second row will be retrieved, evaluated and refilled with clean snare (if needed).

- Outer ring samplers will be retrieved to verify they are unoiled. If clean, they will be redeployed in the same position and will become the new first row of the inner ring.

- A second row of 4 samplers will be deployed 1 nm to the west with a ½ nm offset to create a staggered pattern. These two rows will comprise the new inner ring.

- The new outer ring of 5 samplers will be deployed 3 nm west of the first row of the inner ring.

- As the western sampling array moves away from the former barge location, additional samplers will be added to east-west trending inner and outer rings at 2 nm intervals as needed.

- Additional samplers will be added to the north and/or south ends of the western array inner and outer rings as needed if it appears that the leading edge of the SOF is widening. It may also be necessary to increase the spacing between samplers within individual rows.

- During each retrieval, snare material will be inspected to determine if silt, marine growth, etc. could be inhibiting oil adhesion thereby reducing the sampling efficiency of the device. If this is determined to be the case, old sorbent material will be replaced with fresh snare.

- Sampling devices will be monitored for fouling by marine growth (e.g., barnacles, algae, etc.), which lead to reduced water flow through the traps, weighing down of buoys and/or mid-column samplers to the point where they sink, and or increase in total weigh beyond the hoisting capacity of the line. If fouling becomes problematic for some or all sampling devices, marine growth will be removed, new samplers deployed, and/or traps and buoys will be treated with anti-fouling paint by an appropriately licensed individual.

- It is recognized that some modifications to this plan may be needed based on findings or unanticipated conditions in the field at the time of inspections.

In the unlikely event that both the inner and outer rings of either the western array or the northern, southern and eastern array are oiled, it will be necessary to relocate the leading edges of the SOF. This will be accomplished using V-SORS Light. Depending on the area, V-SORS Light trawls will be conducted along either east-west or north-south transects (perpendicular to the anticipated direction of movement) stepping out in 1 nm increments from areas known to contain submerged oil until no oil is encountered. At that point, the sampling array will be reestablished at the nearest clean grid nodes consistent with the initial configuration. Additional samplers will be added as necessary and/or the interval between samplers extended to maintain a manageable number. V-SORS trawls will be recovered at ½ to 1 nm intervals and evaluated for oil according to previously used procedures.

**Data Acquisition & Management:** Actual deployment and retrieval locations of sampling devices will be recorded with GPS. Upon retrieval, the mid-water column and benthic components of each sampling device will be visually inspected for the presence of oil and documented photographically. Degree of oiling will be qualitatively assessed according to the standards previously established for this incident. The submerged oil assessment job aid created for the V-SORS confirmation sampling may also be used. Data will be recorded on standardized data sheets (to be developed and submitted prior to initial deployment). Samples of oiled snare from both the mid-water column and benthic sampler components will be collected for potential fingerprinting analysis. These samples will be stored on wet ice or under refrigeration until shipped to the lab for archiving. All monitoring data will be entered into an electronic database to facilitate data management, manipulation and analysis. Monitoring results will also be mapped using GIS.

**Frequency & Duration:** TGLO has requested that long-term monitoring be performed for at least one year to track the movement and behavior of submerged oil during all four seasons. At present, it is difficult to determine the need for or utility of continuing long-term monitoring over this time frame. Therefore, consistent with the adaptive management approach, the frequency, duration and scope of long-term monitoring will be reviewed quarterly.

Initially, sampling devices will be checked twice per month (bi-monthly). The need to continue bi-monthly monitoring will be reevaluated by the stakeholders at the end of the first quarter (2006). Factors to be considered in determining the on-going need for long-term monitoring include, but are not necessarily limited to, direction and rate of oil movement (e.g., onshore vs. offshore), degree of oiling/droplet size and percent cover, physical and chemical weathering, practical and logistical considerations, and the value of monitoring data relative to cost.

If monitoring results indicate slow movement of submerged oil, the frequency of monitoring may be reduced. The responsible party may also elect to conduct surveys with a remotely operated vehicle (ROV) to visually asses oil remaining on the seafloor at various locations. If performed, the results of these or similar surveys will be used to determine the need for continued monitoring. Videos and results of these surveys will be shared with Unified Command.

**Ancillary Data Collection:** In addition to tending the array of submerged oil sampling devices, meteorological and oceanographic data reported by various sources will be compiled during the course of long-term monitoring. Data sources will include TABS Buoy A2 deployed near the former barge location, as well as other TABS buoys and National Data Buoy Center assets in the western Gulf of Mexico. Of key importance are the near-bottom and mid-water column current direction and velocity data provided by the Acoustic Doppler Current Profiler (ADCP) aboard the TABS A2 buoy. Information on sea state (wave height & dominant and average wave period) will be obtained from NDBC Station 42035 located 22 nm east of Galveston, TX and Station 42019 located 60 nm south of Freeport, TX. These ancillary data will be used to help better understand and potentially predict the movement of submerged oil in response to various environmental factors. The utility of ancillary data compilation and need to maintain the TABS A2 Buoy at its present location will be revisited upon completion of the first quarter of monitoring.

**Reporting:** Long-term monitoring results will be reported bi-monthly and quarterly to K-Sea, NOAA, the Unified Command, and other involved state or federal Trustees. Summarized results including maps showing submerged oil locations and sampler repositioning, summary tables, a brief narrative and any other relevant information will be distributed by email following each bi-monthly monitoring event. In addition, quarterly status reports providing more detailed discussion of long-term monitoring results will also be submitted. Any proposed changes to the scope, frequency or duration of long-term monitoring will be addressed in quarterly status reports. In-person meetings or conference calls to discuss monitoring results will be scheduled on an as-needed basis.

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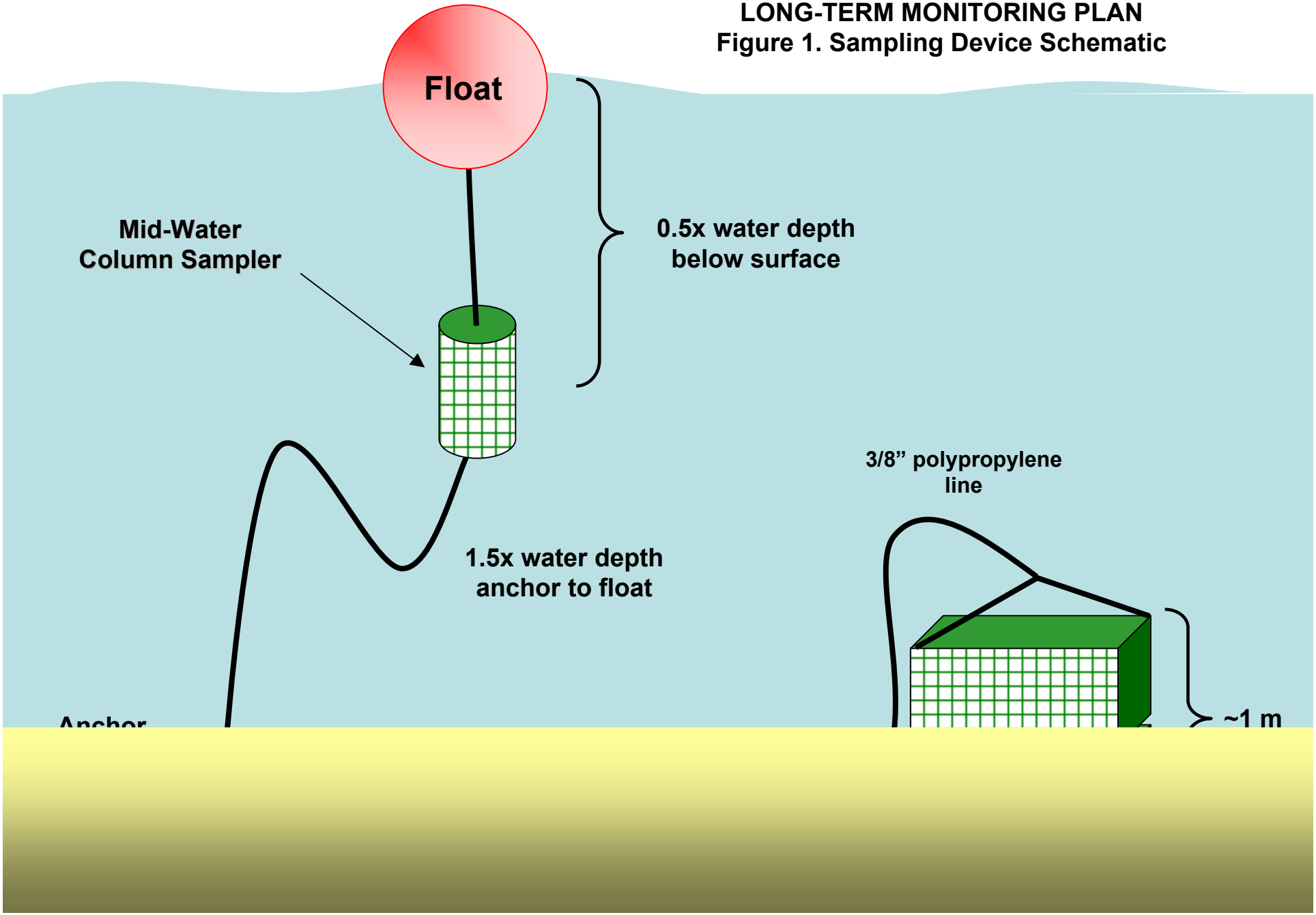
**Figure 1. Sampling Device Schematic**



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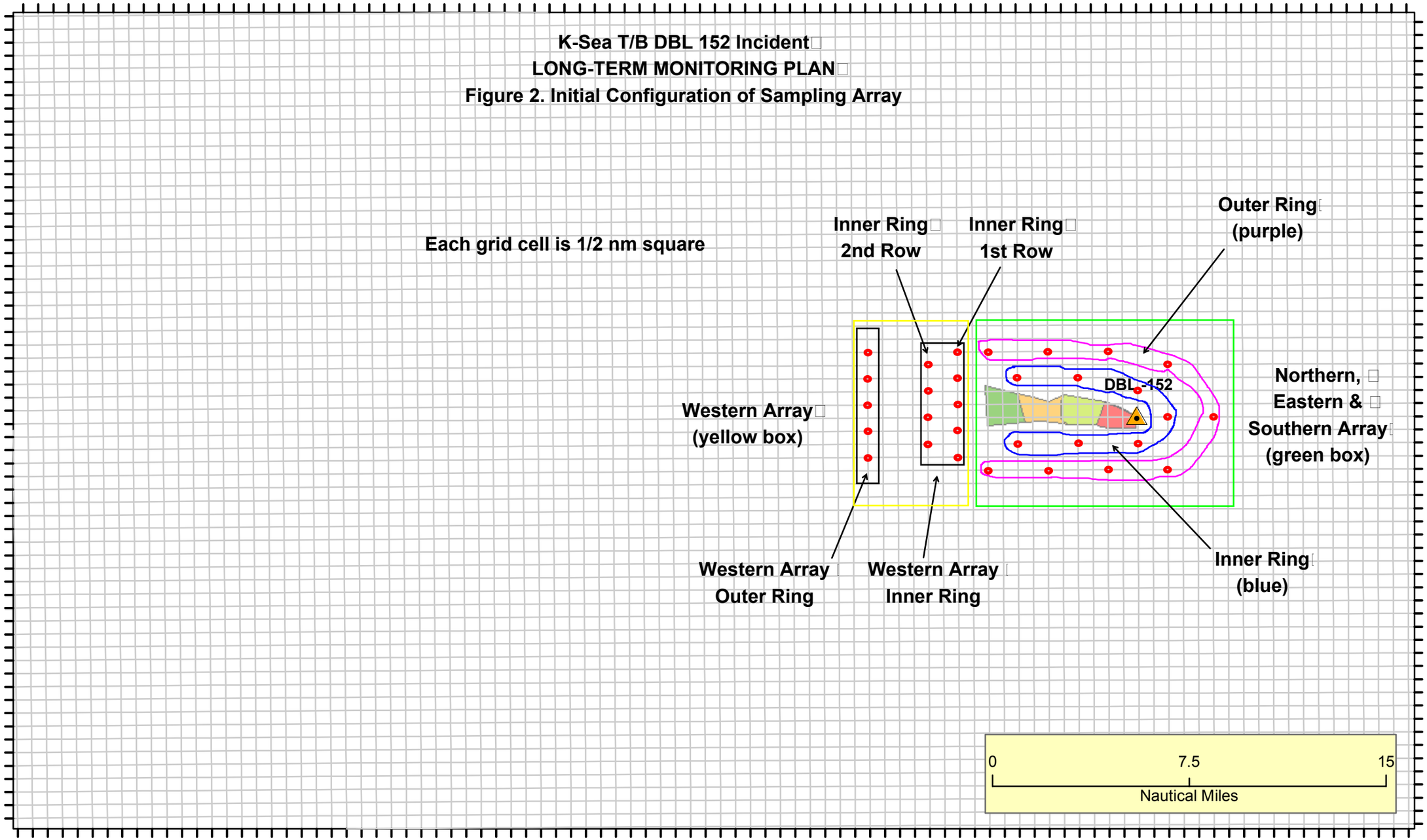
Figure 2. Initial Configuration of Sampling Array