

Chalmette, LA: First Katrina, Then the Oil...

**Scott Harris, PhD, MPH
Global Risk Manager
IESO, LLC
Lexington, KY**

Introduction

In August 2005, EPA Region 6 was “leaning forward” like many other agencies, preparing for Hurricane Katrina to hit New Orleans, LA (NOLA). Though not yet deployed by FEMA, EPA duties under ESF 10 were familiar and well laid out—respond to oil spills, leaks, orphaned containers, and other oil and hazardous substance releases from the hurricane. What was not expected was to be pressed into service leading urban search-and-rescue water operations in a hostile and unfamiliar environment. Shooting, looting, black water, sewage, brutal heat and humidity, gut-wrenching stench, decomposing human and animal bodies, as well as lack of food, potable water, fuel and hygiene all conspired to punish victims and would-be rescuers alike.

A few days into the operation, the Coast Guard reported a “huge” oil spill in Chalmette, St. Bernard Parish, LA, at the same time search-and-rescue teams were recovering oiled victims. Getting to the affected area and the suspected source required a coordinated and armed team to travel by vehicle and boat across unsecured and hazardous territory. The Murphy Oil USA facility in Meraux lost over one million gallons of crude, carried out of the failed containment area and into Chalmette by receding floodwaters. On top of the hurricane damage, thousands of homes and properties across more than a square mile were covered in oil. The 25-month cleanup was the largest and most complex in EPA Region 6 history, and required the coordinated effort of numerous federal, state and local entities, generated tens of thousands of samples, inspections, analyses and cleanups, and cost Murphy Oil over \$400 million, including class action litigation.

How It Works

The Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act) authorizes funding for relief activities by the Department of Homeland Security (DHS), which includes the Federal Emergency Management Agency (FEMA). Agencies are assigned specific Emergency Support Functions (ESFs) under the National Response Plan (NRP). There are currently 15 ESFs, ranging from Transportation (ESF 1) to External Affairs (ESF 15), with EPA the lead agency for responses to oil and hazardous materials under ESF 10 (DHS 2006).

When the President declares an emergency or disaster, responding agencies operate under the DHS/FEMA “umbrella.” FEMA requests support through an Action Request. If the receiving agency is able and willing to perform the requested service, FEMA issues a Mission Assignment, describing the nature and scope of the work requested, its priority, the funding amount approved, and related information. Think of these operationally as work orders or purchase orders.

EPA routinely prepares for and responds to hurricanes and related events. Typical efforts include review of facilities in the predicted storm path and potential vulnerabilities. Key agency personnel and contractors mobilize to the areas of concern prior to impact and position resources strategically to (1) survive the storm, and (2) have immediate access into the stricken areas as soon as possible. This Rapid Needs Assessment (RNA) puts personnel into helicopters, boats, planes or ground vehicles to look for chemical fires, spills, plumes, displaced storage tanks, oil slicks on rivers or other evidence of significant or threatened releases. Results are prioritized based on multiple factors, including potential impact to human health and the environment. RNA inspections are often the first reliable intelligence, as facility personnel have most often shut down operations and evacuated, and are unable to return to the area due to flooding or damage. If RNA observations indicate that a response is needed, EPA coordinates internal, state, local and/or facility resources to begin action.

A New Mission

EPA hurricane preparations began as usual well before the predicted August 29, 2005, landfall, with all response personnel braced for the worst. This was predicted to be a full Category 5 aimed directly at New Orleans, and FEMA had reportedly ordered 100,000 body bags for the expected casualties. At the last minute, she veered northeast, sparing the city from a direct hit. This was great news for New Orleans and Region 6 EPA but not so great for Mississippi and Region 4. It seemed that at least our RNA work would turn out to be routine, with no major releases or events.

News of levee failures and massive flooding came in almost immediately, and on August 30, 2005, EPA received a Priority 1 (Lifesaving) Action Request from FEMA (FEMA 2005):

EPA R6 will provide boats and crew to support critical life saving transportation from various hospitals and shelters in the New Orleans area. In addition to critical life saving transportation, boats and crews will provide critical life saving rescue of flood victims stranded and transport to safe location.

EPA accepted the request, and I received a call from our Regional Response Center (RRC) in Dallas asking me to lead the EPA operation. FEMA immediately upgraded the agreed-upon Action Request to a Priority 1 (Lifesaving) Mission Assignment (FEMA 2005), unprecedented for the EPA:

Provide critical air, ground, and water transportation as directed by FEMA for Hurricane Katrina in Louisiana.

On the Water

I headed for NOLA that afternoon, not really knowing what to expect, and connected with two EPA Region 7 (Kansas City) On-Scene Coordinators and my small group of contractors. We staged in a parking lot in Gonzalez for the night, collecting our thoughts and resources and trying to plan for something unbelievable. No one got any sleep, and we headed for the water at around 0500 hours. We had no real sense of the best place to start, and our only guidance from the police checkpoints was to keep going until there were no lights, and we saw water. That sounded useful until we discovered there were no lights for 40+ miles past Gonzalez, and there was water everywhere. We ended up at the I-10/I-610 split around daylight on August 31 and began working through the crowd of volunteers to hook up with the FEMA search-and-rescue Team Leader, part of a California group. The submerged ramps (Exhibit 1) made excellent launch and retrieval points, and we were on the water after about three hours.



Exhibit 1. These are the I-10/I-610 ramps (on 8/30/05) that will serve as initial search and rescue entry and recovery points.

There were stranded people everywhere, and it was obvious that we needed many more boats and much more support. We pulled hundreds off the water that day (Exhibit 2), but the logistics were terrible. Travel distances were increasing. The heat and humidity were brutal. Reports of shooting and fires were coming in from all over. We had almost no communications beyond visual. None of our people knew New Orleans, and certainly not with it under water. A woman we had just rescued said she saw one of my men shot in the head by a boat-hijacker. After a frantic search, our crew and boat were recovered intact hours later when the boat was caught sneaking into the return point, with the new pilot trying to disappear into the crowd. It turned out to be a NOLA firefighter who jacked our boat at gunpoint and stranded my crew on a levee. He said he needed our boat to rescue firefighters from their flooded station. Apparently the rescued woman saw a different person killed and his boat taken. Again, this was good news for us, not so good for someone else. It was a rough first day for everyone, and worse for those who spent another night on the water or trapped in attics.



Exhibit 2. This is the initial water search and rescue recovery point at I-10/I-610.

It took only a day or so for the water to turn black. The stench was relentless, and the sun, heat, and humidity punished everyone, rescuers and victims alike. Denials by various government agencies and remotely located spokespersons aside, shooting, looting, raping and killing were not in short supply. We had no force protection, and our people were operating at very high risk to their lives. The FEMA operation ran out of fuel within about two days, and was having no luck getting more. Thanks to my excellent Emergency and Rapid Response Services (ERRS) lead, Jim Cromwell, who saw this coming, we got our own just in time. At that point EPA had the only fuel available, and had to supply everyone from FEMA to the police for about two days. We lost only one tanker to armed “looters,” uniformed officers in a Parish Sheriff’s car.

A “Huge” Oil Spill

At the 0500 Operations briefing on September 3, 2005, a Coast Guard representative reported that two of his men had observed a “huge” oil spill in Chalmette, Saint Bernard Parish, and our search-and-rescue teams in that area were reporting “oiled” victims. Although the source was reportedly the Murphy Oil facility located in the adjacent town of Meraux (pronounced “Mee-ro”), RNA flyovers of the facility on August 30, 2005, found no oil, only a submerged facility (Exhibit 3) (Franklin 2005).



Exhibit 3. This photo from the 08/30/05 RNA flyover shows no oil from the damaged tank (red circle). The eventual direction of flow into Chalmette is shown by the red arrow.

The best way to get eyes on the release quickly was a helicopter and, though in very short supply, I was able to requisition one for a brief overflight of the area. I temporarily transferred leadership of the EPA operation and traveled to the chopper pad. Luke Gatlin, from the EPA Superfund Technical Assessment and Response Team (START), accompanied me. Our pilot never appeared, and we learned eventually that he was killed on his motorcycle on his way to us. Plan B meant traveling by truck and boat, but the route was suspect and through unsecured areas.

A Coast Guard Maritime Safety and Security Team (MSST), whose escort mission that day had been cancelled, solved our security and transportation problem. They were armed, willing, and able to get us to Murphy Oil. We traveled to a U.S. Corps of Engineers facility on the Mississippi River, and were met by the rest of the MSST and their boat. Loading up and heading downriver, the trip was truly surreal (a word I use almost never): warehouses and piers burning, ships the size of buildings rolled and tossed ashore, debris of every shape and description, a brilliant shining sun, the smell and taste of smoky river spray, the roar of boat engines, wind in our faces and uniformed men (and one woman) carrying pump shotguns, automatic weapons and holstered sidearms, all in 3-D and at full throttle.

First Contact

It seemed like only a few minutes until we arrived at the destroyed Algiers Ferry. Having secured our landing point, and with us waiting safely on board, one of the MSST escorts headed up the ramp to recon and procure transportation. He returned a few minutes later driving a Volkswagen Jetta (silver as I recall), with the seats and trunk packed full of cases and bags of dog food and dog biscuits. Two MSST members remained at the boat, while the other four loaded us into the VW. It was quite a sight. Luke and I were in the back seat with two MSSTs in the front, and two more in the trunk riding backwards, guns poking out everywhere. It reminded me of a scene from some end-of-the-world movie.

We journeyed east, looking for oil and the Murphy Oil facility, and eventually found our way into Chalmette. Somewhere along Judge Perez Drive, we came onto a landscape covered in oil (Exhibit 4). Not just a little oil; it was everywhere and accompanied by the strong smell of crude. Toward the refinery, oil was standing on increasingly deep water, and it was obvious that our little VW “war wagon” was going no farther. We headed back into town and found an Operations Center of sorts at the courthouse. Along with local government personnel were many stranded residents and their pets, which made good use of our carload of pet food.



Exhibit 4. Looking toward the Murphy refinery, this is oil-covered Judge Perez Drive as discovered by our recon team on September 3, 2005.

At the Site

We found the sheriff and other response personnel, briefed them on our mission, and began a search for a more suitable vehicle to attempt to reach the Murphy Oil facility. Within an hour or so a military “deuce and a half” rolled to a stop at our location, with the uniformed driver indicating that he was our ride. My group loaded into the tarp-covered rear of the vehicle with a bottle of water and a sandwich each, the first edible food we had seen since yesterday. We tried eating on the way, but the sticky heat and the stench of oil, sewage and hurricane sludge was just too much.

Our big 2.5 slogged through feet of muck and water for what seemed like miles before arriving at the entrance to the Murphy Oil facility (Exhibit 5). It was obvious that the facility was wrecked, and the oil had indeed originated there. We entered and found our way to what looked like the maintenance shop, where a group of employees were busy grilling, working, and talking. It must have been quite a sight when our big green truck rolled in, and what followed next would have been even stranger. The fully armed MSST deployed from the rear of the vehicle and secured our perimeter. The team leader returned to the truck and in a loud, clear voice announced, “Dr. Harris, we’re good to go.” It remains the most dramatic entry of my career.



Exhibit 5. This is the Murphy entrance as seen by the recon team on September 3, 2005.

The senior Murphy official onsite briefed me on the incident and their activities. Tank 250-2, a 250,000-barrel tank holding approximately 85,000 barrels of mixed Arabian crude when the

storm hit, had leaked an unknown amount of oil, which escaped through the failed containment dike. Exactly how much and how far it went remained a mystery. Visual inspection to that point indicated that the affected area might cover square miles of roads and properties, but we could not access enough of the perimeter to be sure. Following standard EPA practice, I directed Murphy to secure the affected tank, identify the extent of the release, develop a reliable estimate of the amount released, begin recovery operations, and report back to me as soon as possible. To their credit, Murphy officials had already reported the spill to the National Response Center (NRC 2005).

Our driver informed me that his front right tire was leaking heavily, and we had to leave immediately or risk being stranded. We made our way back to the VW, then to the ferry landing and our waiting Coast Guard boat. Luck is a funny thing. Along the way, at the exact moment that one of the MSST members leaned in to say something to me, a large tree branch crashed through and shattered on the metal rib holding the tarp where his head had been a split second earlier. He was not injured, but absolutely would have been killed had he not moved. We boarded our waiting boat and reconned several miles along the Mississippi River, but saw no signs of the Murphy oil spill there. Late that afternoon we made it safely back to our camp at "Firebase Zephyr" in Metairie, where I resumed leading the EPA search-and-rescue operation.

An Emerging Picture

Following our site visit and their response activities, Murphy Oil was able to report that approximately 25,000 barrels (about 1,050,000 gallons) of crude had leaked from the damaged tank. Storm surge flooding the containment area floated the tank off its pad and moved it about 33 feet to the east. The leading edge settled into the soil, opening the tank near the bottom of the crumple zone (Exhibit 6). The moving tank dragged its large supply line, opening several feet of the containment wall (Exhibit 7), and receding waters carried the oil outward through the breach. Preliminary estimates put the impact area at approximately one square mile and 1,800+ homes and businesses oiled (Weston Solutions, Inc. 2007).

I managed the incident remotely through regular contact with Murphy officials while continuing my search-and-rescue duties. Eventually able to connect Murphy officials to the Coast Guard Area Command, I formally disengaged as the response lead on September 08, 2005, via email to Murphy and EPA (Harris 2005).

Recovery Actions

Under an Interagency Agreement (IAG) between EPA and FEMA, the Murphy oil spill response was a part of Mission Assignment 3 (Reconnaissance of State and Federally Regulated Facilities, Removal and Disposal of Hazardous Materials: Activity I Environmental Sampling-Murphy Oil). An October 8, 2005, Memorandum of Understanding (MOU) between the Coast Guard and EPA formalized the Coast Guard's lead for response activities, oversight and enforcement. They would manage all activities related to waterways, and EPA would be responsible for long-term remediation and cleanup of land, residential areas, and non-commercial waterways (Weston Solutions, Inc. 2007).

Streets and other hard surfaces were sanded and scraped. Booms in canals minimized release via waterways. Free product was recovered from contained areas, canals, ditches, and anywhere else it had pooled or been trapped. The Coast Guard transitioned the operational lead back to the EPA in October 2005, reporting recovery of approximately 70% (~17,500 barrels) of the released

oil, much of it from the Murphy secondary containment areas and nearby canals, and estimating by modeling that up to 25% evaporated (Weston Solutions, Inc. 2007).



Exhibit 6. This is the “crumple zone” leak.



Exhibit 7. The oil escaped through this failed section of containment berm.

Setting Up for the Long Haul

After a brief rotation to other hurricane duties, I returned to support the EPA remediation effort at Murphy. As part of that, on November 10, 2005 I issued a “Notice of Federal Interest” (NFI) letter to the President of Murphy Oil (Harris 2005). The NFI is a formal notice by EPA to a responsible party (RP) of a release of oil in violation of the Clean Water Act, potential penalties, EPA oversight and RP liability, and expectation for taking appropriate action.

Long-term remediation actions required the coordinated efforts of EPA, the Louisiana Department of Environmental Quality (LDEQ), the Agency for Toxic Substances and Disease Registry (ATSDR) and the Louisiana Department of Health and Hospitals (LDHH). A variety of challenges included cleanup of public areas and roads, returning schools to service, interior and exterior sampling and cleaning, “gutting” of homes, yard excavation and replacement, and on-going canal cleanup and boom maintenance. Of course, the fundamental question behind all of this was “How clean is clean enough?”

EPA was to perform oversight of all investigative activities conducted by Murphy and their contractors, including witnessing and documenting all sampling, cleaning, and remedial activities, and obtain 10% splits of all sediment samples. Analysis (independent of Murphy Oil’s) would follow the LDEQ Risk Evaluation/Corrective Action (RECAP) standards, which specifies a limit of 650 mg/kg for Diesel Range Organics (DRO) and 1,800 mg/kg for Oil Range Organics (ORO), along with a “no visual oil present” criterion. EPA would inspect all sites in the release area where FEMA trailers for displaced residents would be placed, and conduct an inspection for any site proposed for final closure, with LDEQ having the final sign-off for completions (LDEQ 2009, Weston Solutions, Inc. 2007).

Complicating the process were competing areas of suspected contamination. Initial rough visual surveys were followed by detailed analytical and house-to-house visual inspections. Shortly after the spill, residents and others filed 28 class action suits against Murphy Oil, consolidated as *Patrick Joseph Turner, et al v. Murphy Oil, USA, Inc.* Murphy and EPA (Exhibit 8) both identified impact areas of approximately one square mile, though not identical, while the lawsuit plaintiffs proposed a 2.5 square mile area (Weston Solutions, Inc. 2007). Chemically “fingerprinting” the Murphy oil allowed site-by-site confirmation and the exclusion of non-Murphy oil released from vehicles, service shops, and oil handling facilities.

During all of this, EPA maintained an active community relations effort through parish council and public meetings, by staffing the FEMA Disaster Recovery Center and 800-numbers that took thousands of calls, working in neighborhoods, churches and schools, and handing out fact sheets, flyers and updates to over 4,000 residents (Weston Solutions, Inc. 2007).

Access Problems

Initial attempts to locate property owners were hampered by the inability to locate displaced owners and residents. Further, a federal judge ruled that Murphy could have no contact with any property owners in the potentially affected area unless the owner had settled their claim or opted out of the suit. Murphy could not approach owners. The owners had to approach Murphy and request action. Property access for Murphy contractors performing sampling and investigation was restricted to only those owners not suing.



Exhibit 8. This map illustrates the zones (light to heavy) of Murphy oil contamination identified by EPA.

The Privacy Act hampered information sharing. St. Bernard Parish needed to contact owners and negotiate demolition, waste disposal, and other logistical issues, and wanted EPA’s files on homeowners’ identities, addresses and sampling data. However, since the parish was not legally bound to hold this information as confidential, data trading was precluded, creating a great deal of redundant and inefficient effort.

Property Cleanups

Phase 1 required property owners to call Murphy Oil and request a cleanup. If the property was in or near the EPA-delineated impact area, Murphy obtained a signed access agreement to enter and sample. Wipes and sediment samples were screened against the RECAP values to determine whether cleanup was needed. If so, the owner granted cleanup access for Murphy to wash and decontaminate the home exterior.

Phase 2 required the homeowner to “gut” the home interior at their own cost, with the exception of 66 homes gutted by Murphy contractors where sampling indicated Murphy oil components above RECAP (Weston Solutions, Inc. 2007). “Gutting” a home is a process likely unfamiliar to those not experienced with hurricanes and floods. Everything in the home is stripped to a foot or so above the water line -- carpet, drywall, insulation, wood floors, everything

down to the wall studs and concrete slab. Many homes were submerged to the roofline. All of the debris, muck, mud, furniture and appliances came out to the curb, with Murphy responsible for picking up and disposing of only the oily portion, a necessarily subjective segregation. After this grueling task, the homeowners called Murphy to request interior cleanup, granting a second access agreement.

Murphy crews power-washed interior and exterior home surfaces to “visually clean” with some homes requiring two cleanings. Other exterior items that required washing included garages, driveways, sidewalks, fences, utility poles, pools, and air conditioners. If oil was still visible, but would not transfer when wiped with a white paper towel, it was considered not to present a dermal hazard. This was mainly a problem with porous surfaces such as cinder blocks. Spent cleaning solutions and rinse water were contained, collected and disposed by Murphy contractors. At one point Murphy had 26 crews totaling over 400 persons and equipment conducting cleanup activities (Weston Solutions, Inc. 2007).

With home remediation completed, attention turned to the yards. If above RECAP, identified contaminated soil was excavated and replaced. Vehicles and boats were collected, drained of fluids and disposed by U.S. Corps of Engineers contractors.

The process was necessarily fragmented, since many homeowners could not be located or did not return immediately, or in some cases ever, preventing cleanup crews from moving through affected areas in an efficient manner. This “island hopping” resulted in oiled homes within cleaned areas and clean homes within still-oiled neighborhoods. In other cases, owners were considering demolition and wanted to delay decision on cleanup. Many had no homeowner insurance and, since Murphy was liable only for the “oil portion” of the damage, still had no viable home after the cleanup was completed, and no way to pay for flood-related repairs. Others held off doing anything, awaiting the outcome of the lawsuit.

Properties where owners refused cleanup by Murphy, even following settlement of the class action suit, were resampled to determine whether natural attenuation had reduced contamination to allowable levels. Results were mixed, with some sites needing no further action and others requiring only partial cleanup (Weston Solutions, Inc. 2007).

Closure

The December 9, 2005, ATSDR Health Consultation (Weston Solutions, Inc. 2007) concluded:

Concentrations of oil-related chemicals in sediment and soil samples from most properties are below ATSDR [risk] comparison values and LDEQ RECAP Standards for petroleum products. Short-term or long-term exposures to such sediments do not pose a public health hazard. However, other potential health hazards such as indoor mold and structural damage should be evaluated prior to re-occupying those properties

and that

Concentrations of petroleum products in sediment and soil samples from some properties exceed LDEQ RECAP Standards. Remediating such properties to the RECAP Standards would be protective of public health for re-occupancy.

LDEQ conducted a final inspection of each property, with signoff by EPA and LDEQ that cleanup was satisfactory. Owners received a letter stating that the specific property was “affected

by the oil spill but meets regulatory standards and, therefore, is available for unrestricted use for its intended purpose.” All of this information was made available on an LDEQ website to facilitate access by displaced and remotely located owners (Weston Solutions, Inc. 2007).

Through a separate effort, LDEQ determined that the area shallow groundwater was unaffected by the spill and, with all other remediation complete, on August 3, 2009 concluded (LDEQ 2009):

The area affected by the Murphy Oil Spill subsequent to Hurricane Katrina has been assessed and remediated in accordance with residential standards established by applicable state law and regulation. The removal action achieved the standards established by LDEQ under RECAP, and is protective of human health and the environment.

The threat of future occurrences like this one were reduced by including a buyout program to establish a greenbelt/buffer zone around the Murphy facility as part of the \$330,000,000 settlement approved in 2007 (Weston Solutions, Inc. 2007).

The Numbers

Twenty-five months of concerted effort by everyone involved, and the largest oil spill sampling effort ever undertaken by EPA Region 6, brought the Murphy Oil project to a close. Table 1 summarizes relevant statistics (Weston Solutions, Inc. 2007).

Total	Activity
28,232	Interior and exterior air instrument readings and/or samples
2,017	Structures inspected for demolition/condemnation
6,500	Structures inspected for remediation
5,499	Properties sampled
15,057	Wipe/composite oil fingerprint samples
6,167	Interior and/or exterior wipe samples
12,875	Interior and/or exterior soil/sediment samples
3,595	Oiled addresses that required remediation of some kind
3,351	Exteriors cleaned
1,462	Interiors cleaned
157	Average properties per month cleaned
1,016	Yards cleaned and/or replaced (includes 148 with at least some natural attenuation)
3,700+	Joint Murphy/EPA property cleanup verification inspections
1,000	Debris piles inspected
400,925	Cubic yards of oiled debris removed
\$97M	Spent by Murphy Oil on remediation
\$330M	Awarded to plaintiffs in the class action suit against Murphy

Table 1. This is a summary of Murphy Oil spill statistics by activity.

Parting Thoughts

The Murphy Oil incident remains the largest oil spill response undertaken by EPA Region 6, a region that includes Texas and Louisiana, and with considerable experience with oil spills. If they say it's a big spill, it is. This major release into a populated area during hurricane recovery efforts is unique in the experience of any response agency of which I am aware.

So many “lessons learned” apply here: big, partially-filled oil tanks float when submerged; containment structures fail when large pipes going through them are wrenched by the attached floating tanks; “how clean is clean” is far more complicated than it seems; a million gallons of oil goes a long way; unbelievable things happen with shocking regularity in chaotic and high-intensity environments; many act heroically when faced with the sorts of adversity hinted at in this paper, while others fail spectacularly; lack of information can kill you; luck matters; coordination with smart, dedicated professionals makes it work; an “act of God” is only the finishing blow to a series of bad decisions, poor design and other doomed set-ups by humans; take with you what you need; help may or may not come, and often not when and in the form you expect. Perhaps most of all, you are your own best chance for a good outcome—everyone else is just trying to get there.

Emergency planners spend a great deal of time planning for “big” events, or at least we should. Our best and most enduring advice on that comes from circa 500 B.C. in *The Art of Warfare* (Sun-Tzu):

Do not depend on the enemy not coming; depend rather on being ready for him.

This paper offers only a brief treatment of the Murphy Oil spill and the related Hurricane Katrina events that led us there and kept us there. It cannot possibly capture the complexity and enormity of the effects on, and the efforts put forth by, all involved. I have named only a few of the characters, but to all of them I offer my enduring gratitude and respect for saving and improving the lives of countless others and my own more than once. They worked tirelessly, without complaint, and expecting nothing in return.

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