

GCI TECH NOTES©

GCI 的工艺摘要

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This is part of a series of GCI Tech Notes focusing on the early development of the hazardous waste fuels programs during the early 1980s. I was hired as the facility manager for the first commercial hazardous waste operation at a cement plant in early 1980. Many of the developments in storage, processing, testing and use of hazardous waste fuels were the result of work done at a handful of plants in the early and mid 80's. Look for issues to include topics on storage, lab testing methods, processing and the impact of HWF on cement product quality and production.

这是一系列 GCI 专业摘要中的一部分, 关注于上世纪 80 年代早期发展利用危险废物燃料的过程。本人于 80 年代初被聘为项目经理, 为一家水泥厂建立 [美国] 第一个作商业用途的、危险废物燃料的处理设施。许多有关储存、加工、测检和使用危险废物燃料 [措施] 的发展是于 80 年代早期和中期, 在为数不多的几家 [水泥] 厂子里实践中得出的结果。回顾一些遇到的问题; 包括储存、化验室测试的方法、操作过程等, 以及危险废物燃料对水泥产品的品质和生产方面的影响。

当初危险废物燃料使用于水泥窑的经济与竞争

Economics and Competition for Hazardous Waste Fuel in Cement Kilns – The Early Years

By David Gossman, Gossman Consulting, Inc.

In early 1980 the temporary facility set up by Systech at General Portland Cement in Paulding, Ohio began routine operation shortly after I was hired. I began the process of equipping and starting up an onsite testing lab, staffing the facility and developing the analytical testing methods. General Portland started construction of the permanent facility and Systech hired Joe Durczynski to perform the marketing and sales function on a full time basis. Joe and I worked closely with each other and even cross-trained each other.

1980 年初 Systech [公司名] 于聘用我之后不久, 设在俄亥俄州, 保尔定地方的通用水泥厂内的临时设施就开始正常地运作起来。我开始购置设备、建立现场的化验室、招聘人员和发展分析测试的方法。稍后通用水泥开始建造永久的设施, 并委 Systech 聘用了 Joe Durczynski 全职进行市场开发和销售。Joe 与我紧密合作并且互相交流学习。

As part of the start-up of that project Systech had estimated that the entire Midwest generation of hazardous wastes suitable for a cement kiln fuel program was 10 million gallons of which we would target getting 50%. The initial plan was a facility with 4 on-site employees and one sales person providing 5 million gallons per year to the cement plant – talk about underestimating a market!

The real struggle was with the market conditions during that start-up phase when there were no waste combustor regulations. RCRA was just coming into force and there was a huge energy recovery loophole built into the EPA regulations. Prior to RCRA, materials that would eventually become part of hazardous waste fuel programs were routinely dumped or burned in open pits. Solvent recovery operations often had pits on the “back lot” to accumulate still bottoms. These were sometimes burned and other times simply covered up when they got full. More than one facility eventually had to deal with the ground water problems that these practices produced, and more than one of these facilities burned to the ground with large and explosive fires sending 55-gallon drums exploding hundreds of feet into the air.

Even after the start of RCRA the better run solvent recycling operations would take their still bottoms down to a high viscosity paste consistency and load it hot into 55 gallon drums where it would set up and then be land-filled. It took a lot of salesmanship to convince them that it was a better idea to leave the bottoms more fluid and send them to a cement plant.

在那个项目的开始时 Systech 曾经估计在整个东西部产生的，适合作水泥窑燃料的危险废物会有一千万卡伦 [美国的液体单位 Gallon] 而我们的目标是去拿它的 50%。初步的计划是设施内用 4 个雇员，和一个业务员，每年供应该水泥厂 5 百万卡伦 – 那个说法是低估了这个市场。

真正的竞争是与当时的市场情况，在那个开始的阶段，还没有燃烧废物的法规。RCRA [美国环保法规 “资源节约和回收”] 还是刚出台，美国的环保法规里存在着巨大的漏洞。于 RCRA 出台之前，那些物料最终可以成为危险废物燃料的一部分，是经常被随意抛弃或在地下挖个大坑让它燃烧。溶剂的回收单位通常是在后院里挖些坑储存那些底脚沉淀物，有些会让它燃烧掉，还有些人将填满了的坑简单地遮盖了事。不止一家厂子由于这种做法带来的后果，最终需要处理地下水的问题，还有不止一家厂子他们的设施被大火烧尽且发生巨大的爆炸，把好多 55 卡伦的油桶抛上百尺高空。

就算是 RCRA 出台之后，一些比较好的溶剂回收单位会将那些底脚沉淀物弄成由高粘度的浆状物，加热后灌到 55 卡伦的油桶里，冷却后把它填埋。我们的营业员要花不少口舌令他们相信，更好的办法是把那些废溶剂保持在液体状态送到水泥厂去。

Because of the loopholes in the RCRA regulations at that time a great deal of hazardous waste was finding its way into outlets where the waste was used instead of expensive fuel oil. The largest of these was the Cadence program providing hazardous waste, labeled ChemFuel, to steel mills in the Midwest. The Cadence program depended on quality control performed at the blending facility. It was transferred directly into heated tanks of No. 6 fuel oil at the steel mills where it was burned in high temperature but reducing conditions in the steel furnaces. In 1986, when EPA closed the energy recovery loophole in RCRA the steel mills pulled out of the business and Cadence switched their program to providing material to cement kilns. An EPA stack test performed at one of the steel mills required the test crew to wear supplied air systems because of the high levels of CO at the sampling location. I have never been able to get EPA to release a copy of those stack test results.

Other more illegitimate “blenders” were highlighted in an evening news cast of “20/20” as part of an investigative report. Cameras showed hazardous waste being delivered to blending facilities and then shipments of “fuel oil” coming out. The material was tracked to boilers heating apartment buildings in major cities and to boiler fuel being used on ships. No wonder we had trouble getting some blenders to pay our \$.05-.10/gal processing fee! When asked about their testing program one blender showed us how he always sampled each load, poured a small amount out on the paved truck bay and lit it with a match to make sure it burned and was “good fuel.”

因为那时候 RCRA 法规有好多漏洞，很多危险废物可以找到出路，用作燃料代替昂贵的燃油。其中最大的一家叫做 Cadence 计划，把贴上“ChemFuel”的危险废物供应给[美国]中部的炼钢厂。Cadence 计划供应的危险废液是依赖一家调配设施进行质量控制，然后把它直接送到炼钢厂加热的六号燃油库，在那里于高温下燃烧，但是用于高炉时却是原来的状态。1986 年时[美国]环保当局阻塞了 RCRA 里能源回收的漏洞，炼钢厂子就不再买了，Cadence 转变了他们的计划，供应那些废液给水泥厂。环保当局在其中一家炼钢厂进行烟囱测试时，测试人员需要配备上氧气筒，因为在取样现场有高度的一氧化碳。可惜我没能从环保局那里取得一份烟囱测试的副本。

其他还有更多的所谓“调配者”在一次在旁晚的“20/20”的电视新闻的调查报告中被揭发。报道的相机追踪那些危险废液被送到调配设施后被当作燃油卖出去，跟踪之下发现那些物料被送到大城市里的公寓作为取热的锅炉燃料，还有作为船舶用的燃油。怪不得我们要他们付每卡伦 5 分至一角[美金]加工费为他们处置那些废料遇上了不少困难！我们问他们的测试方法，其中有一个调配者做给我们看；他每次从一批废料里取出小量倒在卡车停泊场的混泥土地上，然后用火柴点着它，肯定它会燃烧那就算是“好的燃料”。

In one of the more unusual competitive situations we ran into, the Paulding facility on two occasions had low-level fly-bys of unmarked black helicopters. They were close enough that we could see someone in the cockpit taking pictures. Another “competitor” we ran into in Nebraska was making cat litter out of clay in a small old kiln – he was also burning hazardous waste as fuel. That was enough to make you think twice about buying cat litter at that time. Other waste burning operations included aggregate driers located at asphalt plants. It is hard to imagine what the stack test results for such facilities might have looked like had anyone bothered.

Even with the increased liability to generators and the beginning of the superfund* program to clean up old contaminated sites it was amazing to sometimes hear what generators had to say about their treatment/disposal options. One corporate level representative for a big three auto manufacturer in Detroit said that they had dug up waste before and they would dig up waste again – they would still use the lowest bidder for getting rid of their waste.

Even after we moved out of the Midwest and started the first and only facility to burn hazardous waste in California we ran into the same competitive pressures from landfills. In California at that time liquid organic hazardous wastes were disposed of by backing the truck up to a municipal waste landfill, opening the valve and letting the material pour out onto and soak into the “ground” – and that was legal at the time! It sure made it hard to compete and obtain the revenue to run a good quality control program for hazardous waste fuel use in a cement kiln. Of course, now all the hazardous waste fuel in California is shipped all the way to Kansas or other Midwest locations.

在众多不寻常的竞争情况中，曾经有一次在保尔定设施的上空，我们看到有一架无标记的黑色的直升机出现，两次飞得很低，我们可以清楚地看到有人在机舱里照相（想是要观察我们怎样使用危险废液）。另外一个“竞争者”在 Nebraska 州是用粘土生产猫屎便盘里用的干燥剂，他是用一个陈旧的小土窑来焙干，以危险废液作燃料。那会令您在下次购买那些干燥剂时有所顾忌[因为可能有残留毒性]。其他燃烧废液的行业包括沥青厂内的干燥机等。你不难想象那些设施的烟囱排放测试会有怎么糟，但却没人理会。

就算是增加了对废物产生者的罚则和赔偿基金计划【注】为了整治旧的污染的场地，有时候惊讶地听到废物产生者对他们的处理/处置废物的说法。Detroit 的三家大的汽车厂的其中一位高层代表说；他们以前曾经把废物挖出来，他们还会再次把它挖出来，但是他们还是给投标最低者来处理他们的废物。

就算我们搬迁离中西部之后，于 California 州设立第一个、也是唯一一个危险废物的处置设施，我们也同样地受到填埋废物的压力。当时在加州液体的有机危险废物处置使用罐车运到市政的填埋场，在那里打开阀门任由废液流出来让“土壤”吸干 – 那时是合法的行为！那当然是难以与他们竞争，因为我们的做法是经营一个有优良的质量控制，可供应水泥窑使用的废物燃料的方案。当然现在所有在加州产生的危险废物都得送到远在 Kansas 或其他在中西部的处置设施。

It is sometimes hard to imagine all the changes that we have undertaken in the hazardous waste fuel/cement kiln industry on the operations side. It is even harder to imagine the difficulty of selling the early program to waste blenders and generators given the competitive pressures that existed at that time. It certainly makes selling these services today look a lot easier in comparison.

有时候真难想象所有这些转变是我们进行利用危险废物燃料作水泥窑的燃料所造成的。更难想象的是当时向废物调配者和废物产生者推广最初的方案（利用废物作水泥窑的燃料）的难度。相比之下现在推广这些服务要容易得多

【注】 U.S. Superfund Program Pioneers Hazardous Waste Remediation. Corporate polluters pay for more than 70 percent of cleanup costs. 美国特级基金，公司污染者须负担 70%的清洁费用

Please contact David Gossman at 847-683-4188 or by e-mail at dgossman@gcisolutions.com for additional information – or if you have memories to share.

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