

THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today  
(1) was not written for publication in a law journal and  
(2) is not binding precedent of the Board.

Paper No. 33

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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Ex parte JERRY A. PARTRIDGE

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Appeal No. 1996-4171  
Application 07/762,298<sup>1</sup>

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ON BRIEF

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Before WILLIAM F. SMITH, JOHN D. SMITH and HANLON,  
Administrative Patent Judges.

JOHN D. SMITH, Administrative Patent Judge.

DECISION ON APPEAL

This is an appeal pursuant to 35 U.S.C. § 134 from the  
final rejection of claims 1-7 and 10-18, all the claims in the  
application. The subject matter of the claims on appeal is

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<sup>1</sup>Application for patent filed September 19, 1991.

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directed to a method of removing heavy metal ions from a particularly defined waste stream which contains complexing anions through the use of a chelating resin containing amino-phosphonic groups.

Representative Claim 1 is reproduced below:

1. A method for removing heavy metal ions from a waste stream containing a plurality of complexing anions selected from the group consisting of sulfates, nitrates, fluorides, chlorides and carbonates, the method comprising;

providing a chelating resin containing amino-phosphonic groups for capturing the heavy metal ions,

contacting the resin with the waste stream to reduce the heavy metal ions concentration to less than 1 ppm,

eluting the resin by contact with a sequestering agent and,

regenerating the resin for another cycle.

Prior art references relied upon by the examiner as evidence of obviousness are:

Eccles, British Patent Application No. GB 214411A, published February 27, 1985.

Purolite Technical Data Publication (Purolite), S-950 Macroporous Aminophosphonic Chelating Resin<sup>2</sup>

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<sup>2</sup> This reference was made of record by appellant through an information disclosure statement filed September 19, 1991

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Appealed claims 1, 4, 6, 7, 10, 11 and 15-18 stand rejected under 35 U.S.C. § 103 as being unpatentable over Eccles.

Appealed claims 2, 3, 5 and 12-14 stand rejected under 35 U.S.C. § 103 as being unpatentable over Eccles in view of Purolite.

We cannot sustain the stated rejections.

#### BACKGROUND

The subject matter on appeal relates to a method for selectively removing heavy metal ions such as uranium ions from an aqueous waste stream containing complexing anions to reduce the level of heavy metal ion concentration in the waste stream to less than 1 ppm (appealed claim 1) and preferably less than 0.1 ppm (appealed claims 10 and 18). These "sub-ppm levels" are achieved by contacting the waste stream with an ion exchange resin containing amino-phosphonic functional groups that are used to capture the heavy metals from the

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and considered by the examiner on December 9, 1991. A publication date has not been associated with this reference. In view of our disposition of the issues raised by the examiner's rejections in this appeal, it is not necessary for us to return the application to the examiner to determine the publication date of the reference.

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stream (specification, page 2, lines 21-25). Thereafter, the ion exchange resin is eluted by contact with a sequestering agent such as ammonium fluoride to release the captured heavy metal (see the representative Equation II release reaction in the specification at page 3, line 19), followed by the step of regenerating the ion exchange resin for another cycle (see the representative equation III regeneration reaction in the specification at page 3, line 21). Significantly, as stated above, appellant's process advantageously selectively reduces the concentration of heavy metal ions in a complexing agent containing waste stream to sub-ppm levels. In contrast, appellant emphasizes that in the prior art, there were no known "[c]ommercial processes which will reduce the concentration of a heavy metal such as uranium to sub-ppm levels on a plant process scale from such solutions. Even conventional strong acid or weak acid cation resins are not effective if complexing anions are present above a few hundred ppm in concentration." See the specification at page 1, lines 29-34.

THE REJECTIONS UNDER 35 U.S.C. § 103

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The examiner relies on Eccles to establish that the claimed method as defined by appealed claims 1, 4, 6, 7, 10, 11, and 15-18 would have been obvious to one of ordinary skill in the art. Eccles teaches a process for the removal of heavy metals from a nitric acid raffinate which is usually discarded (page 1, lines 11-12; page 2, lines 27-30). Eccles' process uses a commercially available chelating aminophosphonic resin to remove the heavy metal thorium from the waste stream (page 1, lines 19-30). According to Eccles, this process "is advantageous in its ability to remove small quantities, in the parts per million range, of such [heavy] metals" (page 2, lines 27-29). Eccles, however, makes no mention of reducing the concentration level of the heavy metal to a sub-ppm level.

In applying this reference, the examiner recognized that Eccles does not teach the claimed limitation of reducing the heavy metal ion concentration to less than 1 ppm (examiner's answer, page 3). With respect to this deficiency in Eccles and in reference to appellant's claims, the examiner stated that "[t]he exact heavy metal ion concentrations of the

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untreated and treated streams are not seen to materially affect the overall results of the recited process, or to produce any new and unexpected results; and are therefore deemed to be obvious matters of choice" (examiner's answer, pages 3-4). In effect, in his stated rejection, the examiner erroneously read the claimed concentration limitation of "less than 1 ppm" out of the claims. However, every limitation in a claim must be considered in resolving the obviousness of a claimed invention as a whole within the meaning of 35 U.S.C. § 103. See Uniroyal, Inc. v. Rudkin-Wiley Corp., 837 F.2d 1044, 1052, 5 USPQ2d 1434, 1439-40 (Fed. Cir. 1988)(a structure created from the combined teachings of the prior art references "would, in any event, fall short of the invention" defined by the claims).

In his brief at pages 5 and 6, appellant presents detailed arguments explaining why the experimental data presented in Figure 2 of Eccles demonstrates that the Eccles process is not viable for removing heavy metals from a waste stream to sub-ppm levels. Accordingly, while appellant implicitly concedes that there may be a suggestion for using an amino-phosphonic resin material for removing thorium ions

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from an acidic waste stream to sub-ppm levels, appellant emphatically asserts that Eccles provides no reasonable expectation of success for the removal of heavy metal ions to levels of below 1 ppm from waste streams containing diverse complexing agents. See the brief at page 7, last paragraph. In an apparent response to these arguments, the examiner asserts that because Eccles "clearly teaches removing 'small quantities, in the parts per million range' of heavy metals from a waste liquor", Eccles's process "is capable of achieving the recited degree of purification". See the answer at page 5. However, the examiner makes no reference to any other specific objective evidence or persuasive reasoning in support of this conclusion regarding the removal capability of the Eccles prior art process. Moreover, the examiner has ignored appellant's specific arguments that the Eccles Figure 2 data demonstrates that the process is not viable for removing heavy metals from a waste stream to sub-ppm levels as claimed herein. To establish a prima facie case of obviousness, it is well settled that "[b]oth the suggestion and the expectation of success must be founded in the prior art[emphasis added]." In re Dow Chemical Co., 837 F.2d 469,

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473, 5 USPQ2d 1529, 1531 (Fed. Cir. 1988). Based on the above, it is apparent that the examiner has not met his burden of establishing a prima facie case of obviousness for the subject matter defined by appealed claims 1, 4, 6, 7, 10, 11, and 15 through 18. Since the examiner has not applied the "secondary reference" to Purolite in a manner which remedies the basic deficiencies of the stated rejection based on Eccles, it logically follows that no prima facie case of obviousness has been established for the subject matter defined by appealed claims 2, 3, 5, and 12 through 14.

The decision of the examiner is reversed.

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No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

REVERSED

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WILLIAM F. SMITH	)	
Administrative Patent Judge	)	
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	)	
	)	BOARD OF PATENT
JOHN D. SMITH	)	
Administrative Patent Judge	)	APPEALS AND
	)	
	)	INTERFERENCES
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ADRIENE LEPIANE HANLON	)	
Administrative Patent Judge	)	

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