

**BEFORE THE ENVIRONMENTAL APPEALS BOARD  
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
WASHINGTON, D.C.**

In re Russell City Energy Center	)	PSD Appeal No. 10-04
	)	
Russell City Energy Company, LLC	)	Robert Sarvey Reply Brief
PSD Permit Application No. 15487	)	
	)	
_____	)	

**REPLY BRIEF OF ROBERT SARVEY TO BAAQMD AND RCEC “RESPONSE TO  
PETITION FOR REVIEW”**

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## Table of Contents

I.	INTRODUCTION AND SUMMARY OF ARGUMENTS .....	2
II.	THE DISTRICT COMMITTED A CLEAR ERROR IN ESTABLISHING BACT LIMITS FOR STARTUP EMISSIONS FOR NO <sub>2</sub> .....	4
III.	THE AIR DISTRICT’S ELIMINATION OF OP-FLEX TECHNOLOGY AT STEP 2 OF THE BACT ANALYSIS WAS CLEARLY ERRONEOUS.....	8
IV.	AMMONIA EMISSIONS AND SECONDARY PARTICULATE.....	10
V.	BEST AVAILABLE CONTROL TECHNOLOGY FOR COOLING TOWER EMISSIONS .....	11
VI.	CONCLUSIONS.....	14

### **I. INTRODUCTION AND SUMMARY OF ARGUMENTS**

On May 19, 2010 the Board granted leave for petitioners to file reply briefs to the responses submitted by the BAAQMD (District) and the Russell City Energy Center (RCEC) to the petitions for review for the Russell City PSD permit. Petitioner would like to thank the Board for their patience with lay members of the public. Petitioner is grateful for the opportunity to clarify why the Russell City PSD permit should be remanded back to the BAAQMD.

The Bay Area Air Quality Management District failed to consider permit limits for the existing Delta Energy Center in its BACT analysis for the Russell City PSD Permit. As the record reflects, the Delta Energy Center permitted by the District and owned by Calpine<sup>1</sup> has consistently limited NO<sub>2</sub> emissions during cold starts to under 281 pounds since 2004.<sup>2</sup> A 300 pound cold start NO<sub>2</sub> limit was part of the Delta Energy Centers 2004 Major Facility Review

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<sup>1</sup> Calpine is the owner of the Delta Energy Center and the proposed Russell City Energy Center.

<sup>2</sup> Statement of Basis for Draft Amended Federal “Prevention of Significant Deterioration” Permit December 8, 2008 Page 45

permit issued on September 9, 2004.<sup>3</sup> As such the Delta Energy Center has achieved in practice a 300 pound cold start NO<sub>2</sub> limit since 2004. The Delta Energy Center utilizes the Westinghouse 501 F gas turbines which are the same model proposed for the RCEC. The Delta Energy Center utilizes SCR to control NO<sub>2</sub> emissions, as does the RCEC. Even though the same turbines and pollution control equipment are utilized for both projects the District has selected a cold start NO<sub>2</sub> BACT limit of 480 pounds for the RCEC which represents a 38% increase for cold start NO<sub>2</sub> emissions from a determination made in 2004 for the Delta Energy Center. A 300 pound limit is PSD BACT for the RCEC and the Board should remand the permit back to the District for a proper BACT limitation for cold start emissions for NO<sub>2</sub>.

The District eliminated the Op-Flex technology in Step 2 of its BACT analysis declaring that the technology was not currently available or feasible for the RCEC. The District's conclusion that the technology is not available or feasible is erroneous. The Op-Flex technology has been commercially available since 2005. The Op-Flex technology has been successfully utilized at the Palomar Energy Center in Escondido, California. The Op-Flex technology was specifically recommended by the CEC in its 2007 decision on the RCEC. The Op-flex technology has recently been installed at the Gateway Project located in the BAAQMD.

The District's BACT analysis should have included an analysis of achievable ammonia slip limits and selected the lowest limit achievable. The District's new PM 2.5 study, introduced after the close of the public comment period concludes that ammonia emissions are the only precursor that would significantly lower formation of secondary PM 2.5. The study emphasizes

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<sup>3</sup> [http://www.baaqmd.gov/~media/Files/Engineering/Title%20V%20Permits/B2095/B2095\\_2004-09\\_sigrev\\_02.ashx](http://www.baaqmd.gov/~media/Files/Engineering/Title%20V%20Permits/B2095/B2095_2004-09_sigrev_02.ashx) Page 55 Condition 23

that the reduction of other precursor emissions is ineffective at controlling secondary formation of particulate matter. The project has the potential to emit 120 tons per year of ammonia.

The Districts BACT analysis fails to consider a dry cooling alternative. A dry cooling alternative has numerous benefits which include: reduction of over 9 tons of particulate matter per year, elimination of visible plumes which affect aviation at the Hayward Executive Airport, and it allows for the continued use of recycled water from the Hayward wastewater treatment plant to be used for wetlands restoration and other beneficial uses.

**II. THE DISTRICT COMMITTED A CLEAR ERROR IN ESTABLISHING BACT LIMITS FOR STARTUP EMISSIONS FOR NO<sub>2</sub>**

As both respondent BAAQMD<sup>4</sup> and real party in interest RCEC<sup>5</sup> recognize, my appeal asserts that the District should have required a NO<sub>2</sub> limit for cold starts much lower than the 480 pound BACT limit proposed by the District. Specifically the District should have adopted NO<sub>2</sub> emission limits for startups similar to the Delta Energy Center permit limits. The Delta Energy Center employs the same turbines that will be utilized at the RCEC and the same pollution control equipment.<sup>6</sup> As the District detailed in the table below from the Statement of Basis, the

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<sup>4</sup>BAAQMD Response to Sarvey Petition 10-04 Page 13

BAAQMD should have adopted the Delta Energy Centers NO<sub>2</sub> emissions limit as BACT. The highest emissions of NO<sub>2</sub> for the Delta Energy Center . . . were 281 pounds per startup 40% less than the RCEC permit. . . . Even though the Delta Energy Center data demonstrated that its maximum cold start emissions were 281 pounds which provided a 40% compliance margin, the District still failed to adopt lower NO<sub>2</sub> startup emission limits. in establishing BACT limits for NO<sub>x</sub> emissions during Cold starts.”

<sup>5</sup> Russell City Energy Company, LLC’s Response to Petition for review of Robert Sarvey Page 23.

“In particular, “[e]ven though the Delta Energy Center data demonstrated that is maximum cold start emissions were 281 pounds which provided a 40% compliance margin, the District still failed to adopt lower NO<sub>2</sub> startup emission limits.

<sup>6</sup> Delta Energy Center is a wholly owned subsidiary of Calpine Corporation as is the Russell City Energy Center.

Delta Energy Center has achieved lower NO<sub>2</sub> emission rates for startups for a substantial period of time.<sup>7</sup>

Date	Unit	Duration (min)	Total NOx (lbs)	Total CO (lbs)
5/23/2004	1	269	262	3225
5/22/2005	2	231	281	8288
4/17/2006	1	86	152	1202
5/16/2006	2	108	189	3198
4/28/2007	1	175	156	7298
6/5/2008	3	123	119	2599

Over a four year period from 2004 to 2008 the highest total NOx emissions during a cold startup have been 281 pounds which is 41 % lower than the emission limit adopted by the BAAQMD for a project which utilizes the same turbines and the same pollution control equipment as the RCEC. This fact alone warrants the lower NOx limit for startups.

As the district states in its response to my petition, **“A BACT review should necessarily take into account what limits have been established in other recent permits for similar facilities, which provide presumptive evidence that such a limit will be achievable for the facility under review.”**<sup>8</sup>

In September of 2004 the BAAQMD issued a Major Facility Review Permit for the Delta Energy Center that has a 300 pound cold start up NO<sub>2</sub> emission limit to comply with PSD

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<sup>7</sup> Statement of Basis for Draft Amended Federal “Prevention of Significant Deterioration” Permit December 8, 2008 Page 45

<sup>8</sup> BAAQMD Response to Petition 10-04 Page 19  
The 1990 Draft NSR Manual states, “the applicant should use the most recent regulatory decisions and performance data for identifying the emissions performance level(s) to be evaluated in all cases.”

regulations.<sup>9</sup> The District and the RCEC failed to consider this fact in the BACT analysis for start up and shut down NO<sub>2</sub> emissions for the RCEC.<sup>10</sup> The District clearly erred in that it propounded the limit for the Delta Energy Center in 2004 and then failed to consider it in the BACT analysis for the RCEC in 2010.<sup>11</sup> The Districts analysis focused on the NO<sub>x</sub> cold start permit limit set for the Metcalf Energy Center and ignored the permit limit that the District established for the Delta Energy Center in September of 2004. The 300 pound start up limit for NO<sub>x</sub> has been permitted, and as evinced by the Statement of Basis in the table above that limit has been achieved for at least four years,<sup>12</sup> which is a reasonable time period to demonstrate compliance. This establishes this emission rate as the “the maximum degree of reduction of each pollutant” that “is achievable for such facility.”

The Delta Energy Center utilizes the same turbines and pollution control systems proposed for the RCEC. The plain terms of the statute require that the “emission limitation” selected as BACT be based on “the maximum degree of reduction of each pollutant” that “is achievable for such facility.” CAA § 169(3), 42 U.S.C. § 7479(3); *cf.* 40 C.F.R. Agency guidance specifically states that “[i]n the absence of a showing of differences between the proposed source and previously permitted sources achieving lower emissions limits, the permit agency should conclude that the lower emissions limit is representative for that control alternative.” NSR Manual at B.24. § 52.21(b)(12). The District has not shown differences

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<sup>9</sup> [http://www.baaqmd.gov/~media/Files/Engineering/Title%20V%20Permits/B2095/B2095\\_2004-09\\_sigrev\\_02.ashx](http://www.baaqmd.gov/~media/Files/Engineering/Title%20V%20Permits/B2095/B2095_2004-09_sigrev_02.ashx) Page 43 Condition 23 PSD

<sup>10</sup> The Delta Energy Center was permitted by the BAAQMD and is owned by Calpine who also owns the RCEC. Both parties knew of the Delta Permit Limit and cannot claim they were unaware of the Delta Permit limit.

<sup>11</sup> Petitioner hopes the oversight was unintentional see RCEC Exhibit 22 Pages 8-15 Roberts Sarvey comments on Additional Statement of Basis.

<sup>12</sup> See BAAQMD Regulation 2-2-206 BACT

between the RCEC and the Delta Energy Center in this permitting record. As such the Board should remand the permit back to the BAAQMD to arrive at a proper PSD BACT limit for Cold start up for NO<sub>x</sub> emissions which is represented by the Delta Permit limit of 300 pounds of NO<sub>x</sub> per cold start.

The District defends its 480 pound cold start limit by claiming that it must provide a reasonable margin for compliance so the facility can meet its permit limits over the life of the facility. The District's argument fails because the Delta Energy Center has a 300 pound permit limit which it has achieved in practice, and that limit is 38% lower than the 480 pound cold start limit set for the RCEC.

Even if the Board were to accept a reasonable compliance margin as an excuse to not adopt a lower limit achieved in practice, the District's proposed 480 pound limit represents a 38 % compliance margin which is unprecedented. The District points to previous EAB decision where projects were granted safety margins. The district cites, "*Newmont*, 12 E.A.D. at 59-64 (upholding a BACT limit that was established based on a control efficiency of 66.5%, even though there was evidence that under the best circumstances the technology could achieve a control efficiency of 80-90% (a safety margin of 17-26%)); *In re Kendall New Century Development*, 11 E.A.D. 40, 53 (approving a BACT limit of 25 ppm CO where there was evidence in the record that another facility was achieving 20 ppm CO (a safety margin of 25%); *Knauf II*, 9 E.A.D. at 15 (upholding 25% safety factor based on the degree of variability in the underlying manufacturing process)." The largest margin that the District uses as an example to defend its 38% compliance margin is 25%, which is considerably less than the 38% margin represented by the BAAQMD approved Delta Energy Center permit limit of 300

pounds of NO<sub>2</sub> per cold start. As previously stated, the District's compliance margin is so large that it makes the standard, which is 300 pounds, unrecognizable as a permit limit.

### **III. THE AIR DISTRICT'S ELIMINATION OF OP-FLEX TECHNOLOGY AT STEP 2 OF THE BACT ANALYSIS WAS CLEARLY ERRONEOUS**

The District in its BACT analysis chose to eliminate the Op-Flex technology at step 2 of its BACT review. "In summary, the Air District looked to manufacturer guarantees,<sup>13</sup> to actual data from similar facilities, and to permitting actions by other agencies, but has not found sufficiently strong evidence to conclude that turn-down technologies such as OpFlex are technically feasible at this time for control of start-up emissions."<sup>14</sup>

Petitioner provided adequate documentation that the OP-Flex technology is a feasible technology that has demonstrated great success in reducing start up emissions at the Palomar Facility in Escondido.<sup>15</sup> The OP-Flex technology has been offered commercially by GE since 2005 so it is certainly a feasible technology and is commercially available.<sup>16</sup> The Op-Flex technology is recommended by the CEC decision on the Russell City Energy Center to reduce

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<sup>13</sup> "lack of a vendor guarantee by itself does not present sufficient justification that a control option or an emissions limit is technically infeasible." 1990 Draft NSR Manual Page B. 20

<sup>14</sup> Statement of Basis for Draft Amended Federal "Prevention of Significant Deterioration December 12, 2008 Permit Page 42

<sup>15</sup> RCEC Exhibit 19 In general, a commercially available control option will be presumed applicable if it has been or is soon to be deployed (e.g., is specified in a permit) on the same or a similar source type. 1990 NSR Manual Page B. 18

An available technology is "applicable" if it can reasonably be installed and operated on the source type under consideration. A technology that is available and applicable is technically feasible. 1990 Draft NSR manual Page B.17

Deployment of the control technology on an existing source with similar gas stream characteristics is generally sufficient basis for concluding technical feasibility barring a demonstration to the contrary. 1990 Draft NSR manual Page B.18

<sup>16</sup> <http://news.thomasnet.com/companystory/GE-Energy-Announces-New-Startup-Improvements-For-Gas-Turbine-And-Combined-Cycle-Applications-471615> Two key concepts are important in determining whether an undemonstrated technology is feasible: "availability" and "applicability." As explained in more detail below, a technology is considered "available" if it can be

Continued on the next page



start up emissions so it is even been recommended in a project specific manner.<sup>17</sup> The Op-Flex technology has been installed by PG&E at the Gateway Generating Station located in the BAAQMD in response to a consent decree. The District is fully aware of the installation of Op-Flex technology at the Gateway Facility since it was installed in response to the District's failure to properly administer the PSD permit for the Gateway Project. The District even used results from the Op-Flex product evaluation to justify lowering the hot start NO<sub>2</sub> limits for RCEC from 125 pounds to 95 pounds but concluded it was infeasible for the RCEC.<sup>18</sup>

The 1990 NSR Manual requires that, “[a] demonstration of technical infeasibility should be clearly documented and should show, based on physical, chemical, and engineering principles, that technical difficulties would preclude the successful use of the control option on the emissions unit under review.”<sup>19</sup> The District’s BACT analysis failed to clearly establish that the Op-flex technology is not available or applicable to the RCEC and its elimination of the technology in step 2 of the BACT analysis was improper. The permit should be remanded back to the District to properly evaluate the Op-Flex Technology in the BACT analysis.

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obtained by the applicant through commercial channels or is otherwise available within the common sense meaning of the term. 1990 Draft NSR manual Page B.17

<sup>17</sup> California Energy Commission Decision Russell City Energy Center Page 77 <http://www.energy.ca.gov/2007publications/CEC-800-2007-003/CEC-800-2007-003-CMF.PDF> “Should the Applicant change its mind, Condition AQ-SC10 holds open the option to use fast start technology, in which case the Applicant would be relieved from the restrictions of AQ-SC7 and AQ-SC8, as well as the simultaneous start-up prohibition of AQ-SC9, discussed below.”

<sup>18</sup> “[I]n particular, the District noted that the preliminary data from Palomar showed emissions of up to 75 pounds (discounting the 145-pound apparent outlier), and that it was reasonable to establish an additional safety margin given that the highest data point seen in the preliminary data may not necessarily be the highest startup that the facility will ever experience during its entire lifetime. *See id.* On this basis, the District determined that the 95-pound hot startup NO<sub>2</sub> limit satisfied the BACT limit. *See id.* at 100-01.”

BAAQMD response to petition for Review 10-04 Page 19.

<sup>19</sup> *New Source Review Workshop Manual* (draft Oct. 1990) (“NSR Manual”) Page B. 7

#### IV. AMMONIA EMISSIONS AND SECONDARY PARTICULATE

After the close of the comment period the District in its response to public comments revealed that it had evaluated a draft study of secondary particulate formation in the BAAQMD.<sup>20</sup> The draft study performed by the District concluded, “*[r]educing ammonia emissions by 20 percent (around 15 tons/day) was the most effective of the precursor emissions reductions. Secondary PM2.5 levels were typically reduced 0-4 percent, depending on location, with an average around 2 percent. Reducing NOx and VOC emissions by 20 percent (around 250 tons/day total) was relatively ineffective. Reducing sulfur containing PM precursor emissions by 20 percent (around 16 tons/day) typically had a small impact on Bay Area PM2.5.*”<sup>21</sup> The study concluded that besides eliminating direct PM2.5 emissions the only reduction in precursor emissions that was effective in reducing secondary particulate were ammonia emissions reductions. The study also states that, “Livermore, Concord, San Jose, and Vallejo have 24-hour PM 2.5 design values at or near the NAAQS exceedance threshold of 35 µg/m<sup>3</sup>.”<sup>22</sup> With those conclusions it appears that any secondary formation of PM 2.5 would be significant.

The August 3, 2009 Additional Statement of Basis states that, “the Air District concludes that the Federal PSD BACT requirement does not require an analysis of ammonia slip emissions, as would be required if ammonia slip was demonstrated to be a precursor to Particulate Matter formation and that it would be emitted in significant amounts.” The District Draft PM 2.5 study

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<sup>20</sup> The District and RCEC claim that the study was part of the administrative record and yet the study was not referenced or disclosed before Feb

<sup>21</sup> BAAQMD Draft PM2.5 Modeling Report Page  
[http://www.baaqmd.gov/~media/Files/Engineering/Public%20Notices/2010/18404/Footnotes/PM-data-analysis-and-modeling-report\\_DRAFT.ashx](http://www.baaqmd.gov/~media/Files/Engineering/Public%20Notices/2010/18404/Footnotes/PM-data-analysis-and-modeling-report_DRAFT.ashx)

concludes that ammonia emissions are the only significant precursor in the BAAQMD. The RCEC has the potential to emit over 120 Tons per year of ammonia. The Board should remand the permit back to the District to evaluate a lower ammonia slip limit for the RCEC.

V. **BEST AVAILABLE CONTROL TECHNOLOGY FOR COOLING TOWER EMISSIONS**

The project proposes to use treated wastewater from the adjacent Hayward wastewater treatment plant. The use of wastewater to cool the RCEC will generate 9.4 tons of particulate matter per year. The largest PM-10 concentration from the project will be a direct result of the project's use of recycled water.

Without question the dry cooling alternative provides the greatest reduction in cooling tower emissions. “[T]he Air District agrees that dry cooling systems are preferable in general from a criteria air pollution perspective because they do not have the particulate emissions that can result from wet cooling.”<sup>23</sup> With that admission it is hard to defend the failure of the District to consider dry cooling in the top down BACT analysis. The District replies in its response to comments which were issued after the public comment period expired that dry cooling was not included in the BACT analysis because it would redefine the source and the ancillary impacts would have eliminated dry cooling anyway. Both of these arguments fail because the public was never given an opportunity to address these excuses because the excuses were proffered after the close of the comment period.

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<sup>22</sup> Draft PM2.5 Modeling Report Page E-1

[http://www.baaqmd.gov/~media/Files/Engineering/Public%20Notices/2010/18404/Footnotes/PM-data-analysis-and-modeling-report\\_DRAFT.ashx](http://www.baaqmd.gov/~media/Files/Engineering/Public%20Notices/2010/18404/Footnotes/PM-data-analysis-and-modeling-report_DRAFT.ashx)

<sup>23</sup> Response to comments page 87 February 4, 2010 Public comment period closed.

There are essentially no excuses for not including dry cooling in the BACT analysis. It is certainly the number one control alternative as even the District admits.<sup>24</sup> Even if these excuses had been advanced before the end of the public comment period the excuses have no merit. First, the District claims that including dry cooling in the BACT analysis would be redefining the source. Besides that explanation coming after the close of the comment period, dry cooling would not redefine the source. The source would still be a combined cycle natural gas electrical generating facility. The top-down process provides that all available control technologies be ranked in descending order of control effectiveness. The PSD applicant first examines the most stringent--or "top"--alternative. That alternative is established as BACT unless the applicant demonstrates, and the permitting authority in its informed judgment agrees, that technical considerations, or energy, environmental, or economic impacts justify a conclusion that the most stringent technology is not "achievable" in that case.<sup>25</sup> Dry Cooling clearly should have been included in the BACT analysis as the number one control option. Later in the BACT analysis the dry cooling option could have been eliminated if the District or the applicant demonstrated that technical considerations, or energy, environmental, or economic impacts justified a conclusion that the dry cooling technology was not "achievable".

Next, the District claims that even if it would have included dry cooling as a control option it would have eliminated it due to ancillary impacts. While this might have been so, the District never reached step four of the BACT analysis because it failed to include the top control alternative in the analysis. This approach defeats the purpose of the BACT analysis because the

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<sup>24</sup> Response to comments page 87 February 4, 2010

<sup>25</sup> 1990 Draft NSR Manual Page B.2

top control alternative needs to be included in the list of options in the BACT analysis so the public can respond to these assertions.

For example, the District cites the fact that the Dry Cooling option would consume a portion of the RCEC's electrical output and therefore the project would emit more greenhouse gases and criteria pollutants to supply the electricity needed for the dry cooling option. But the district fails to consider the amount of energy that the water treatment facility that treats the wastewater for the cooling tower would consume. The District fails to quantify and consider the energy necessary to transfer the water from the water treatment plant and the energy and environmental impacts and solid waste impacts of the Zero Liquid Discharge System. The District failed to consider the environmental impacts from the construction of the water pipeline through the sensitive habitat. All these issues could have been fully vetted with a proper BACT analysis by the District rather than explaining their actions after the close of the comment period.

Another example would be the District's excuse that the use of reclaimed water would prevent discharge of treated wastewater into the Bay. Had the District given the public an opportunity to respond, the public could have pointed out that water from the wastewater treatment plant has been used to restore the Hayward Marsh shoreline wetlands for the many years.<sup>26</sup> There are much higher uses for reclaimed water from the Hayward Wastewater Treatment Plant than power plant cooling.

Another example is the cooling towers' visibility impacts on aviation activities at the Hayward Executive Airport. A dry cooling system would have no visible plume or any aviation impacts.

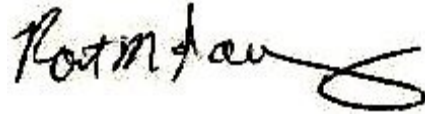
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<sup>26</sup> <http://baynature.org/places/hayward-regional-shoreline>

**VI. CONCLUSIONS**

For all the reasons outlined above the Board should remand the permit back to the BAAQMD.

Respectfully Submitted,

A handwritten signature in black ink, appearing to read "Robert Sarvey", written in a cursive style.

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Robert Sarvey

**Certificate of Service**

I, Robert Sarvey , certify that copies of the foregoing ROBERT SARVEY REPLY BRIEF  
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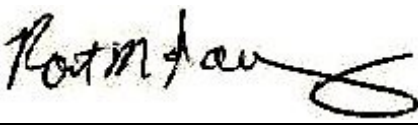
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