

The Aqueous Phosphorylation and Thiophosphorylation of Aminonucleosides

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Supplementary Information

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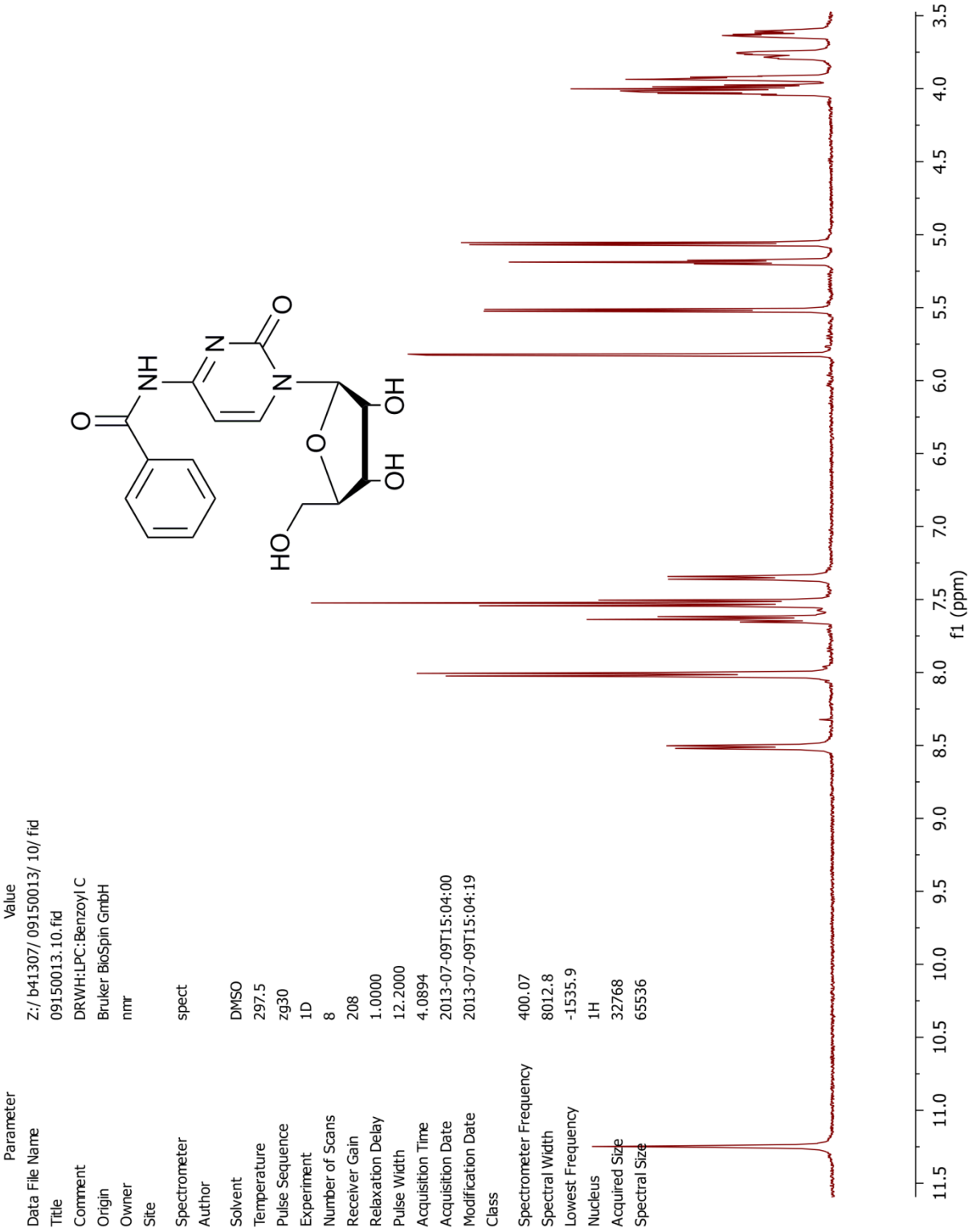
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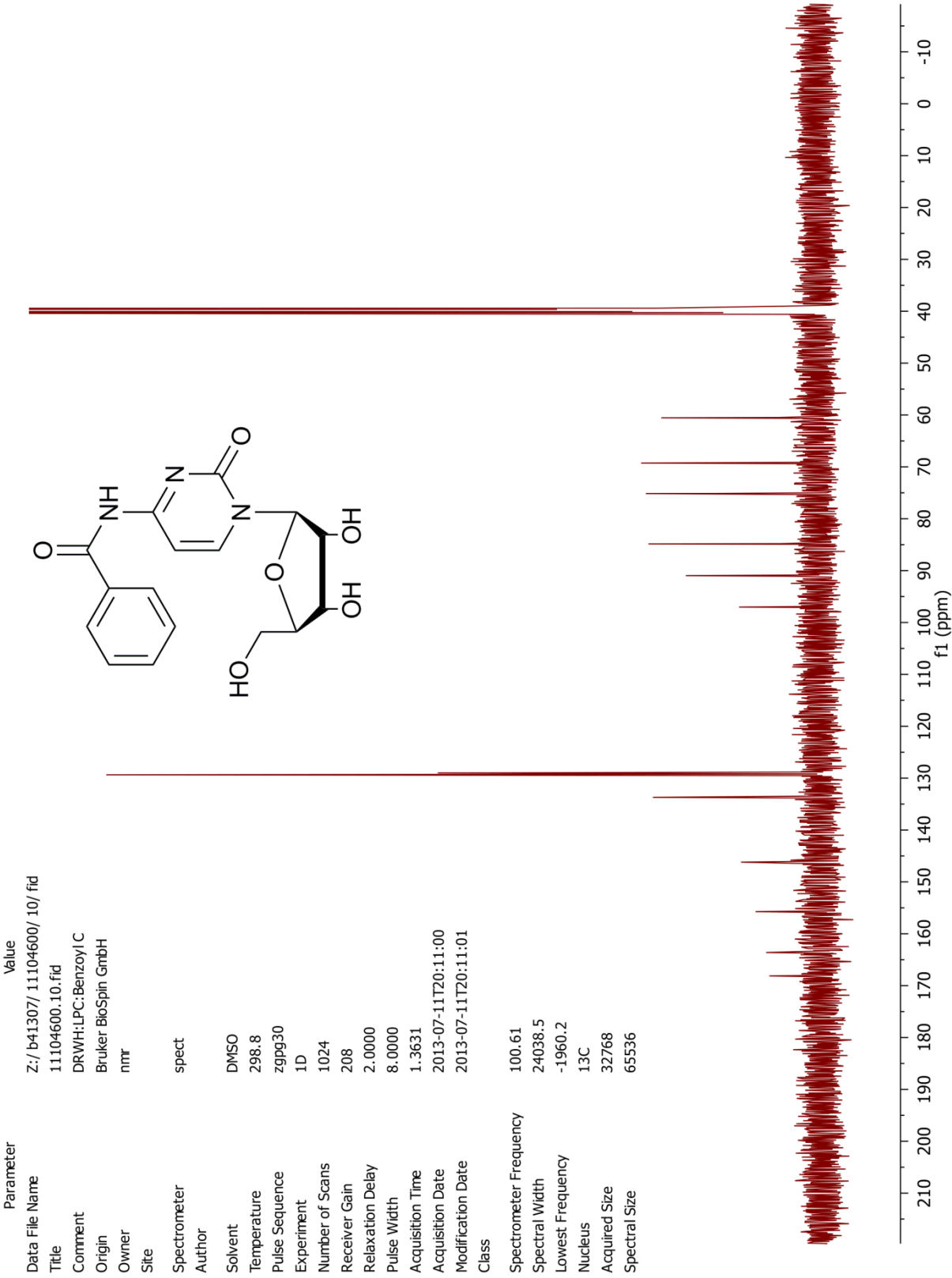
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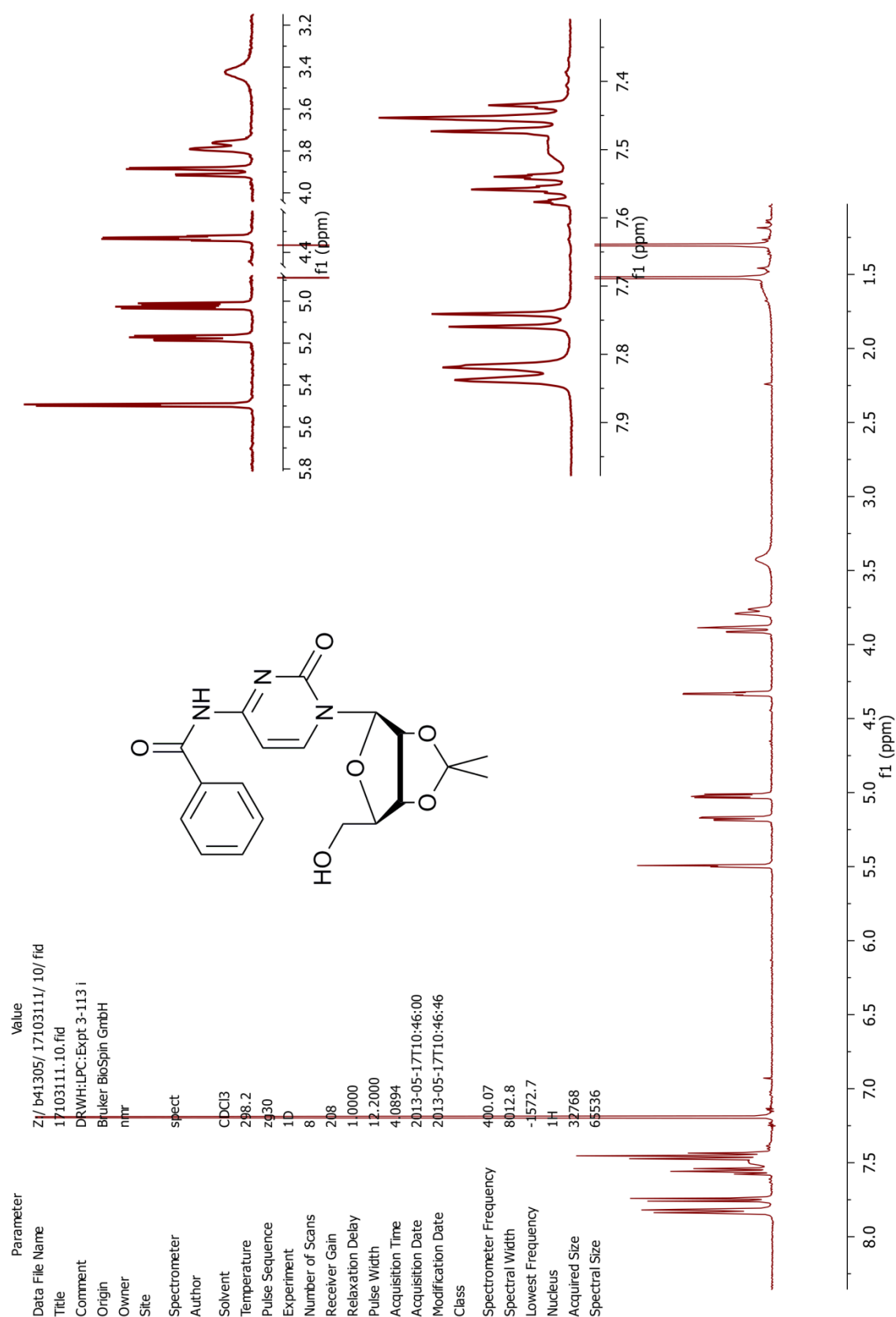
N4-Benzoylcytidine, ¹H NMR Spectrum



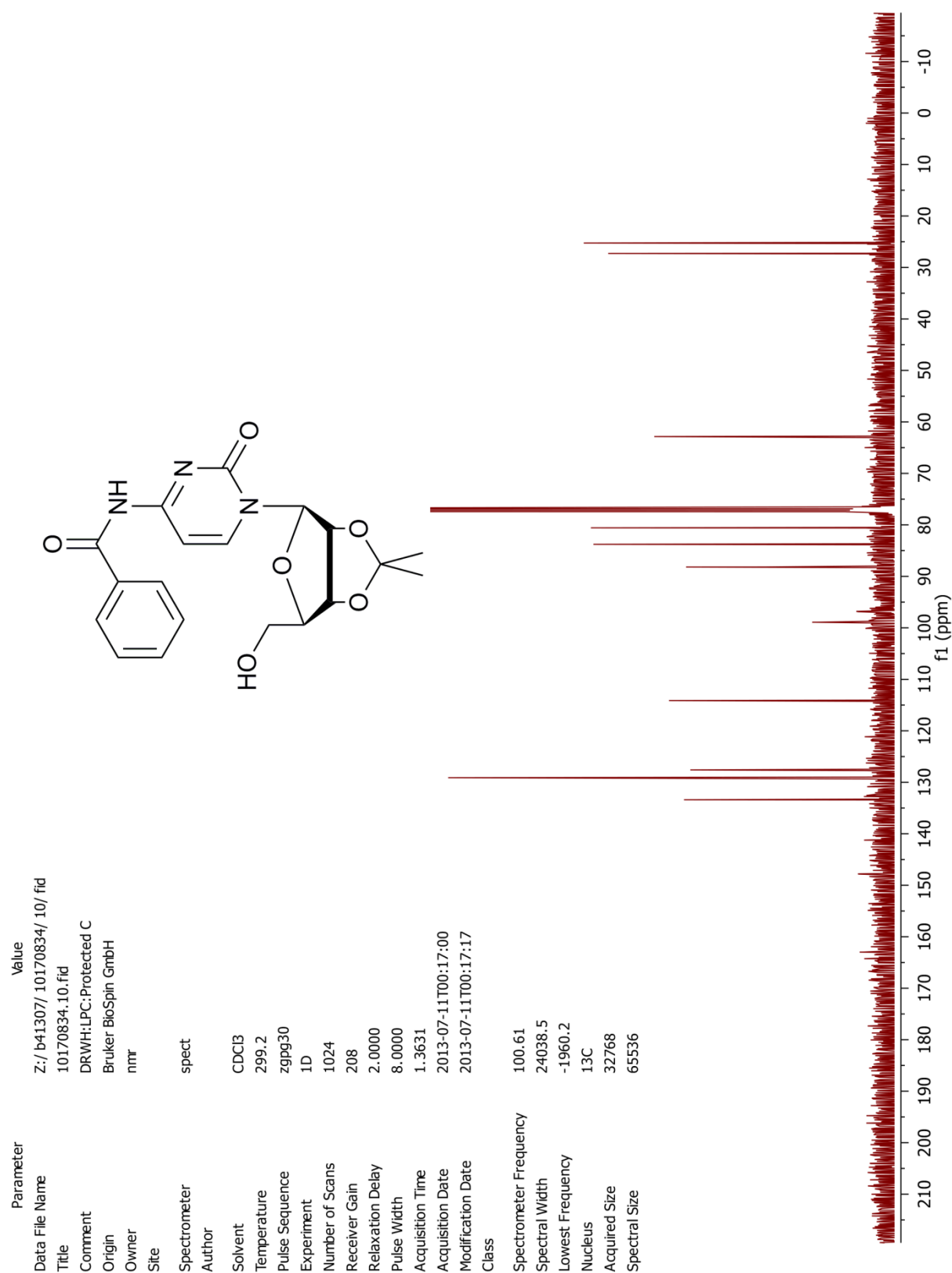
N4-Benzoylcytidine, ¹³C NMR Spectrum



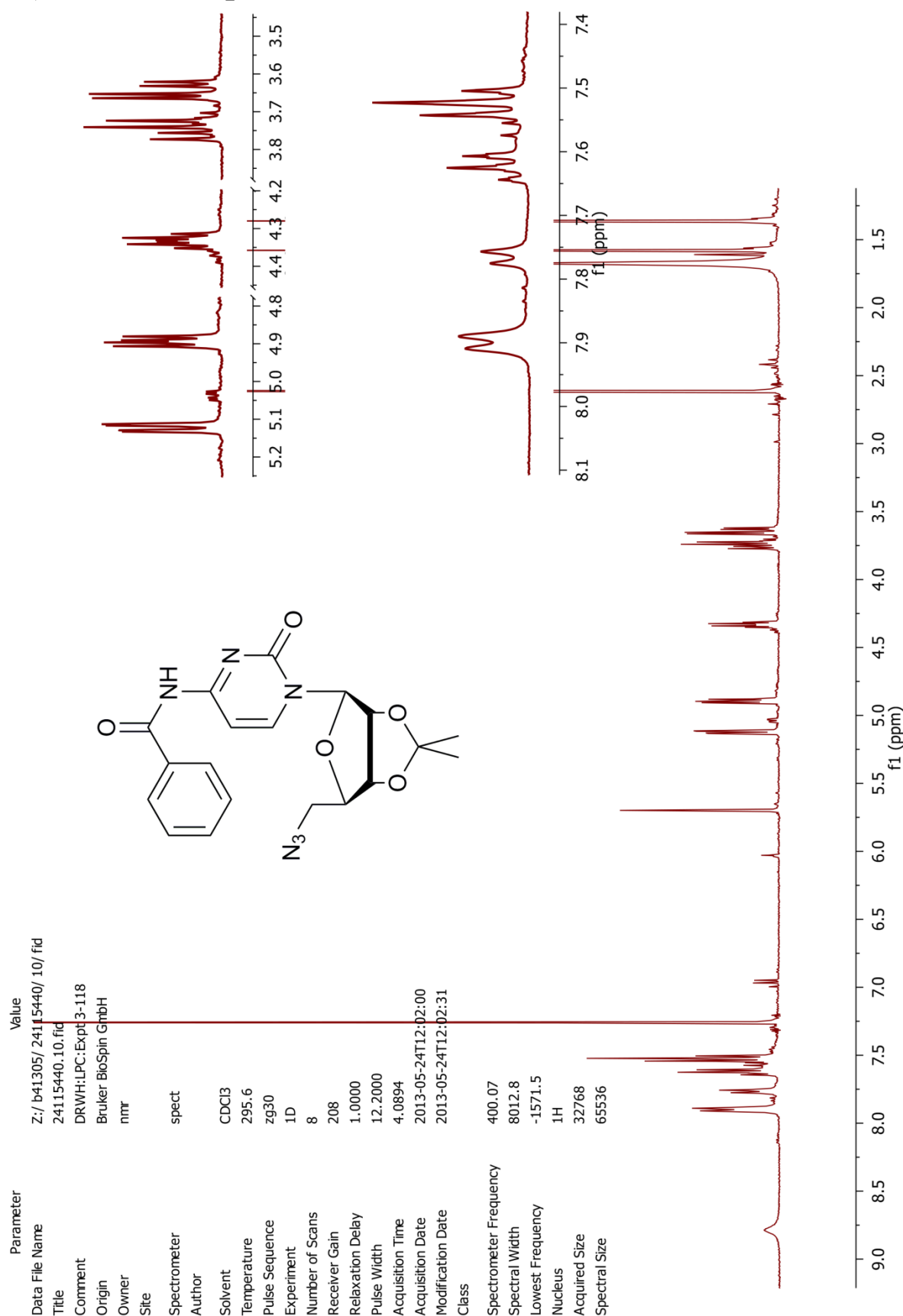
N4-Benzoyl-2,3-O-isopropylidenecytidine (**17**), ¹H NMR Spectrum



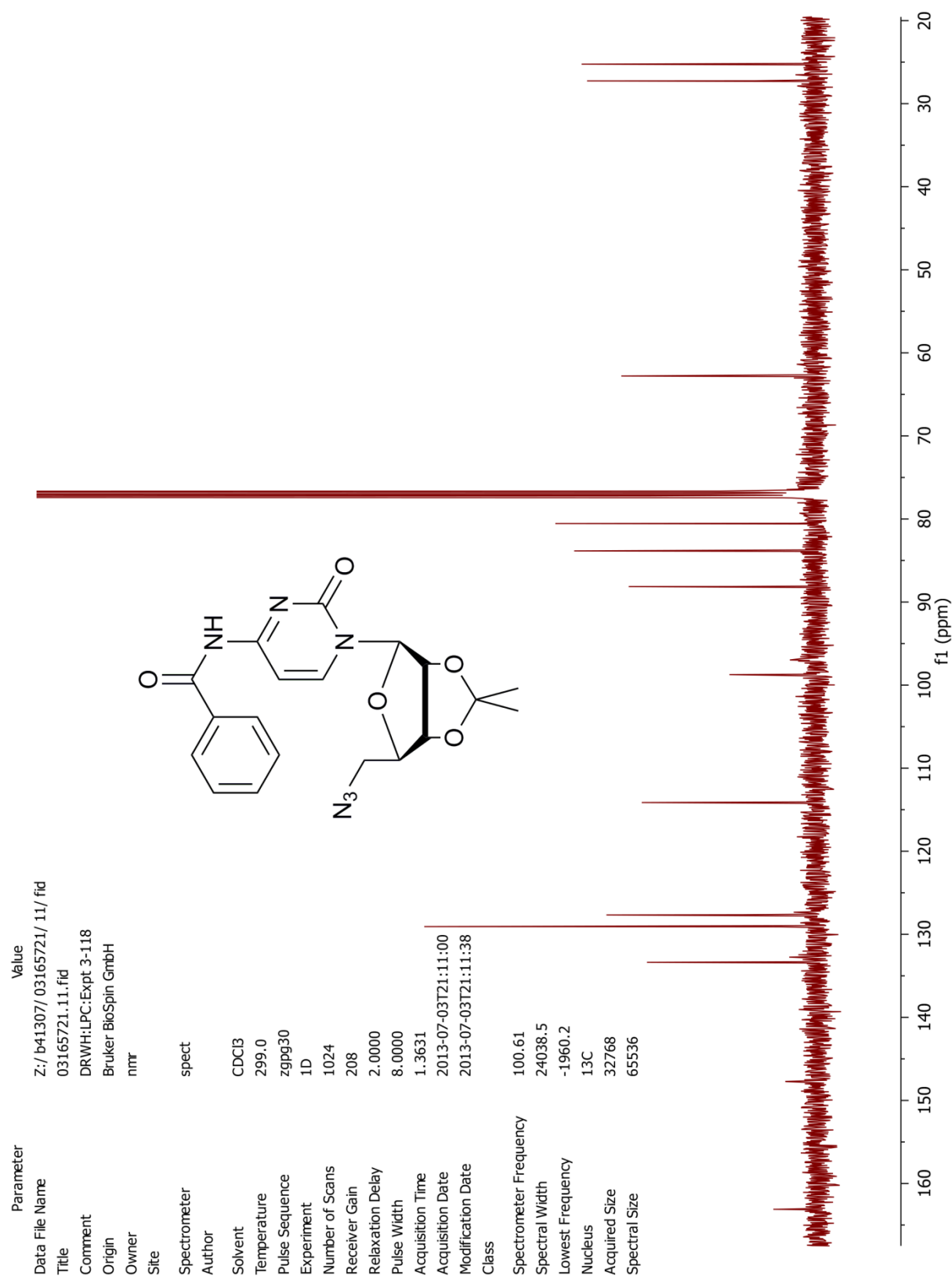
N4-Benzoyl-2,3-O-isopropylidenecytidine (**17**), ¹³C NMR Spectrum



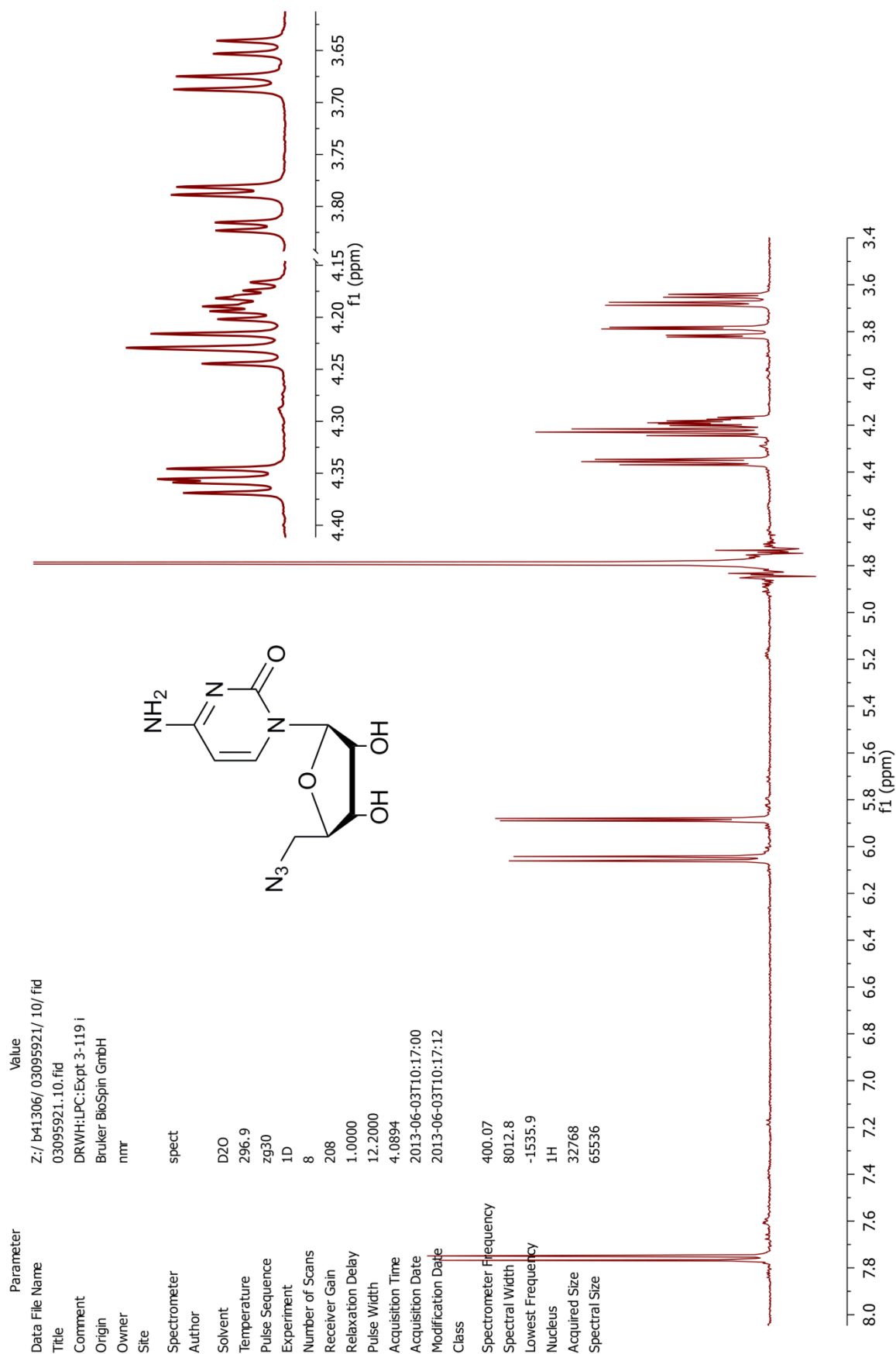
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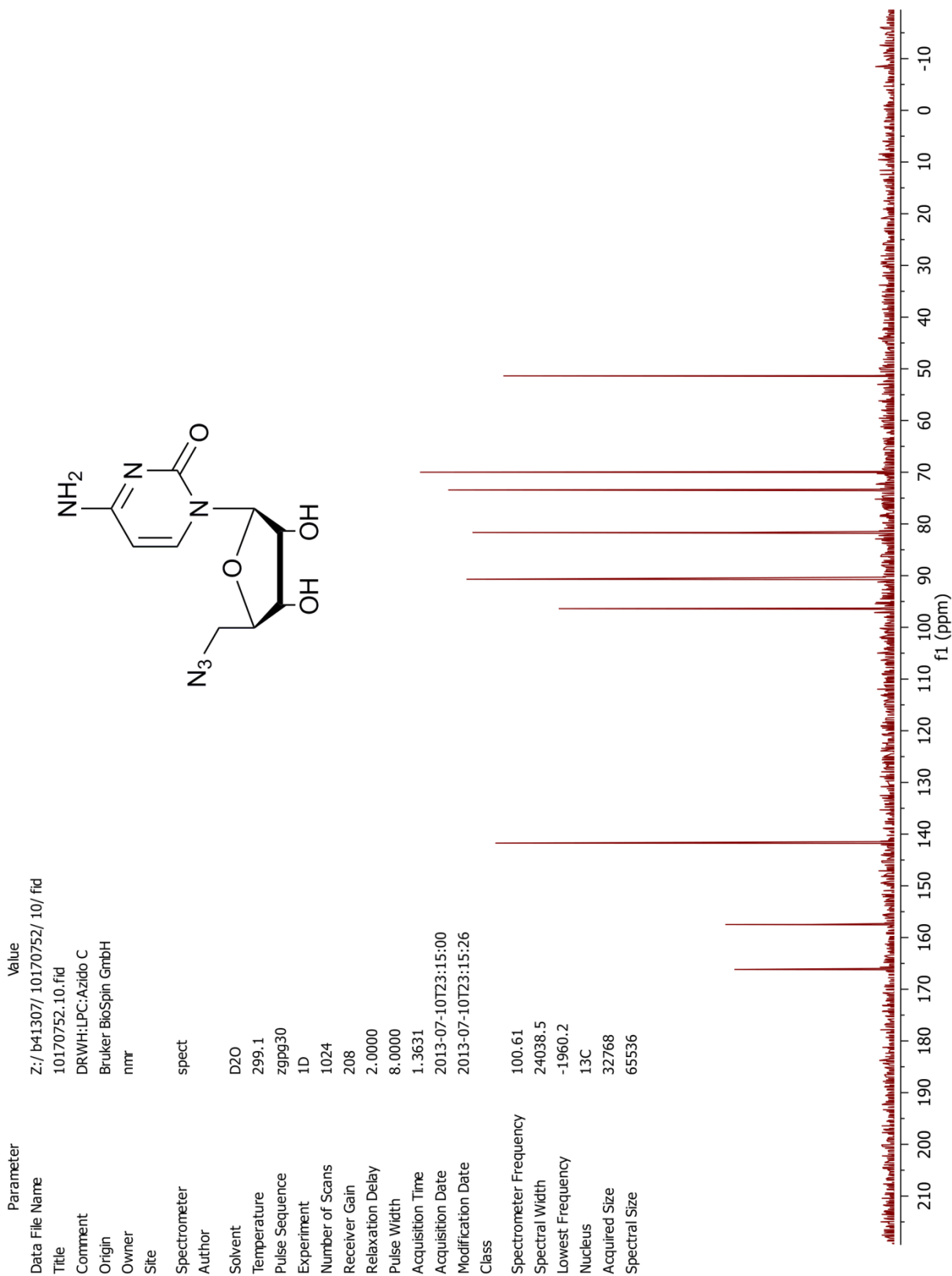
(18), ^{13}C NMR Spectrum



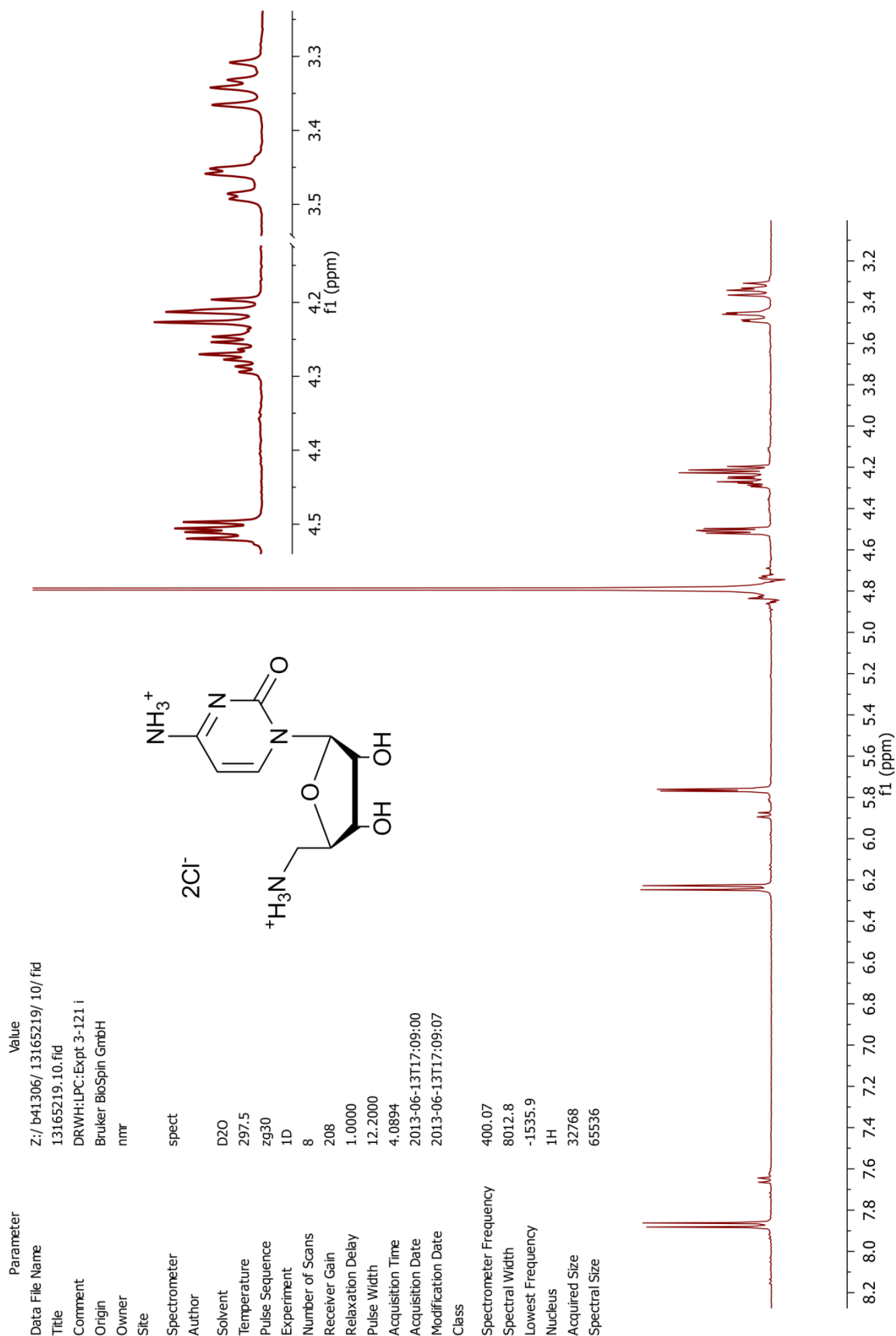
5'-Azido-5'-deoxycytidine (19), ¹H NMR Spectrum



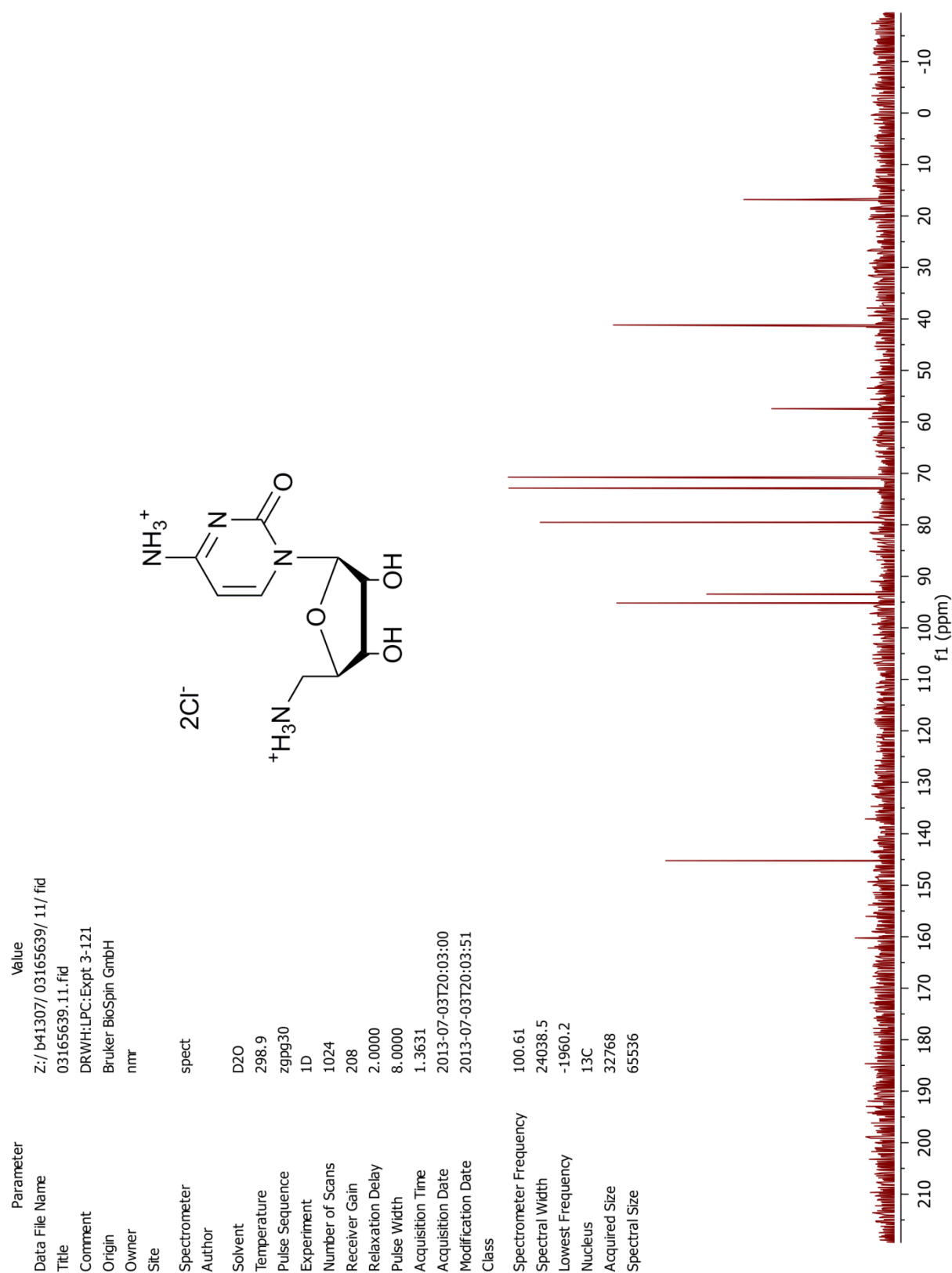
5'-Azido-5'-deoxycytidine (19), ¹³C NMR Spectrum



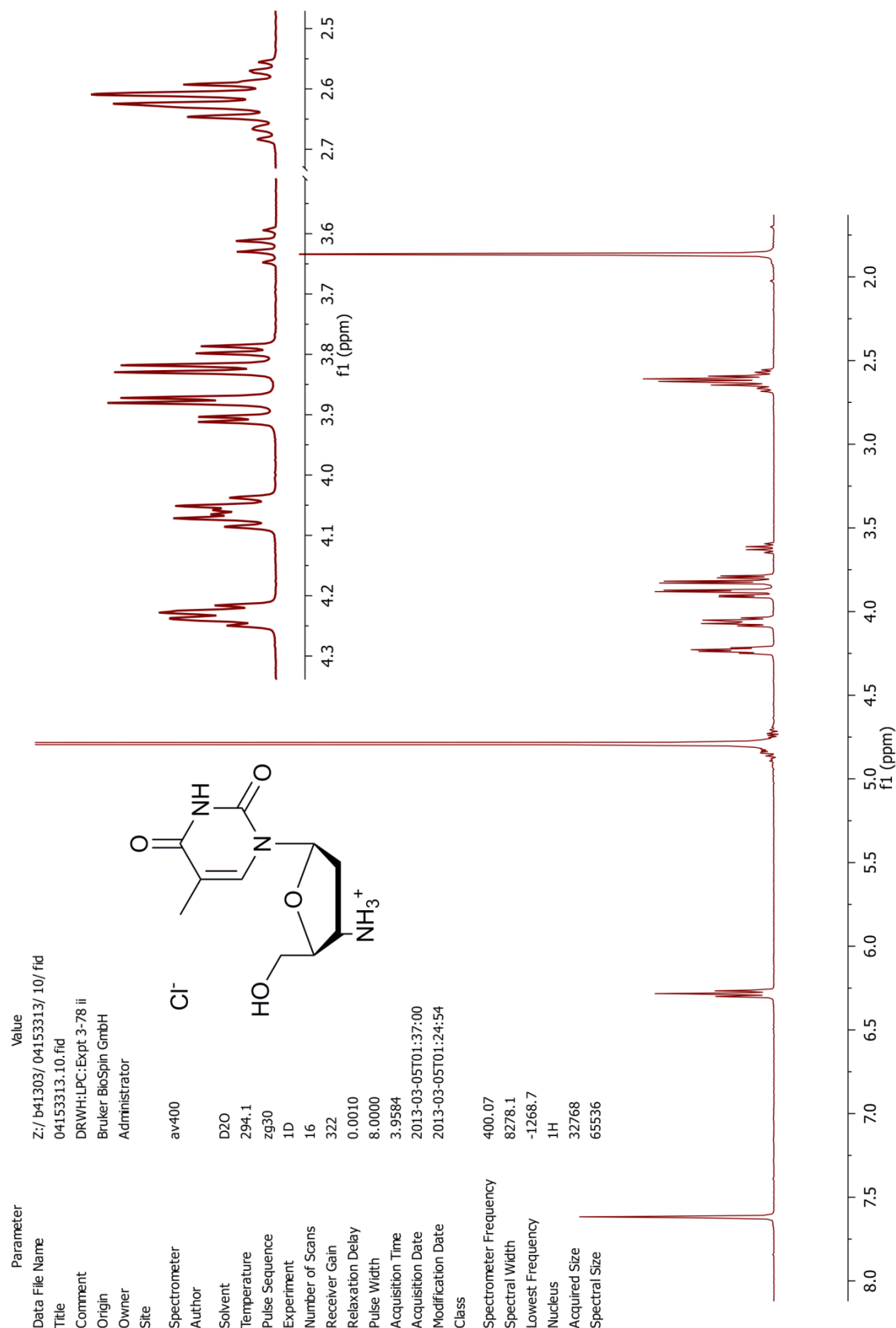
5'-Amino-5'-deoxycytidine (**20**), Dihydrochloride Salt, ¹H NMR Spectrum



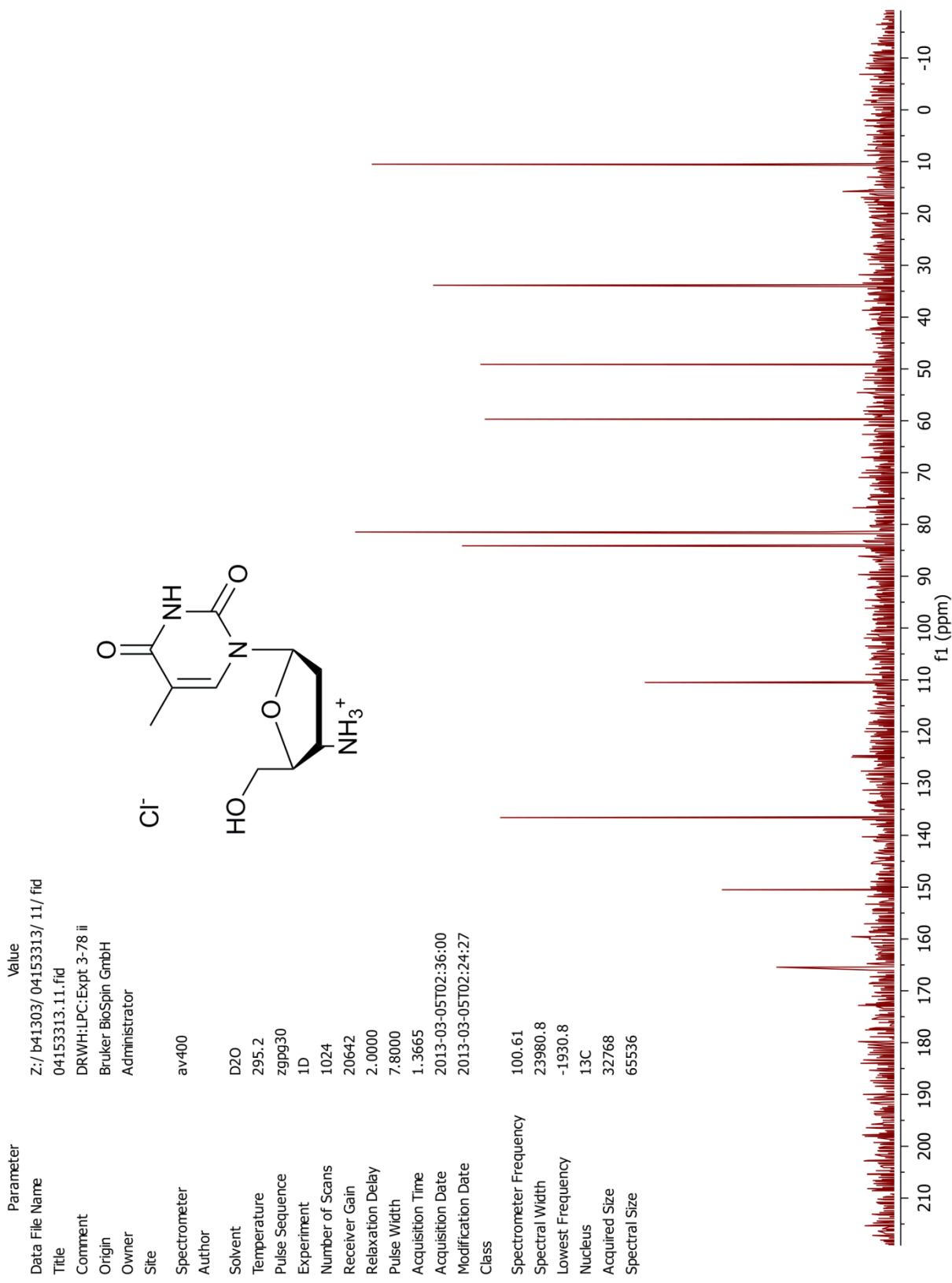
5'-Amino-5'-deoxycytidine (**20**), Dihydrochloride Salt, ¹³C NMR Spectrum



3'-Amino-3'-deoxythymidine, Hydrochloride Salt, ¹H NMR Spectrum (12)

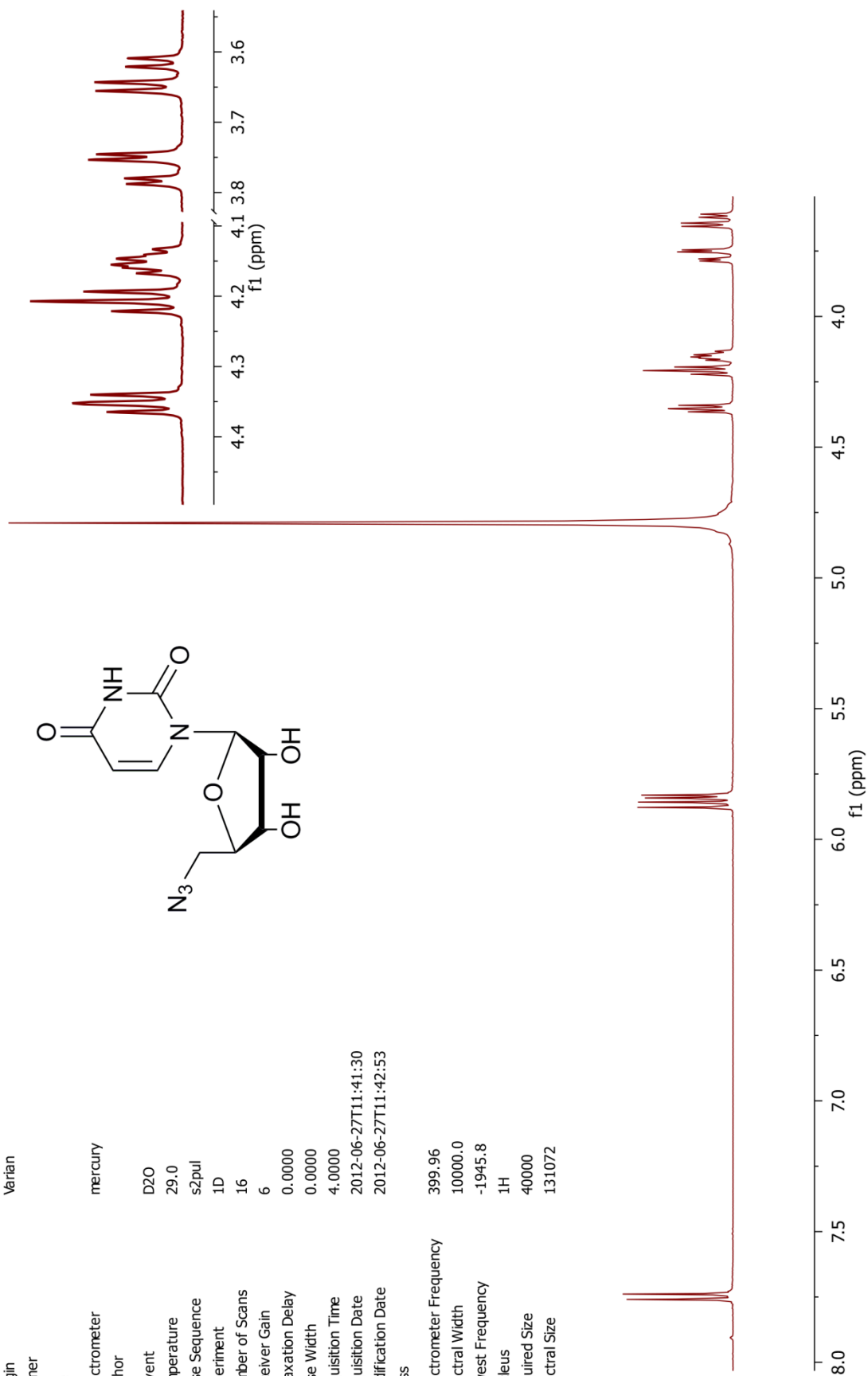
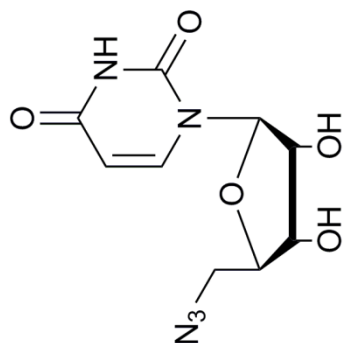


3'-Amino-3'-deoxythymidine, Hydrochloride Salt, ¹³C NMR Spectrum (12)

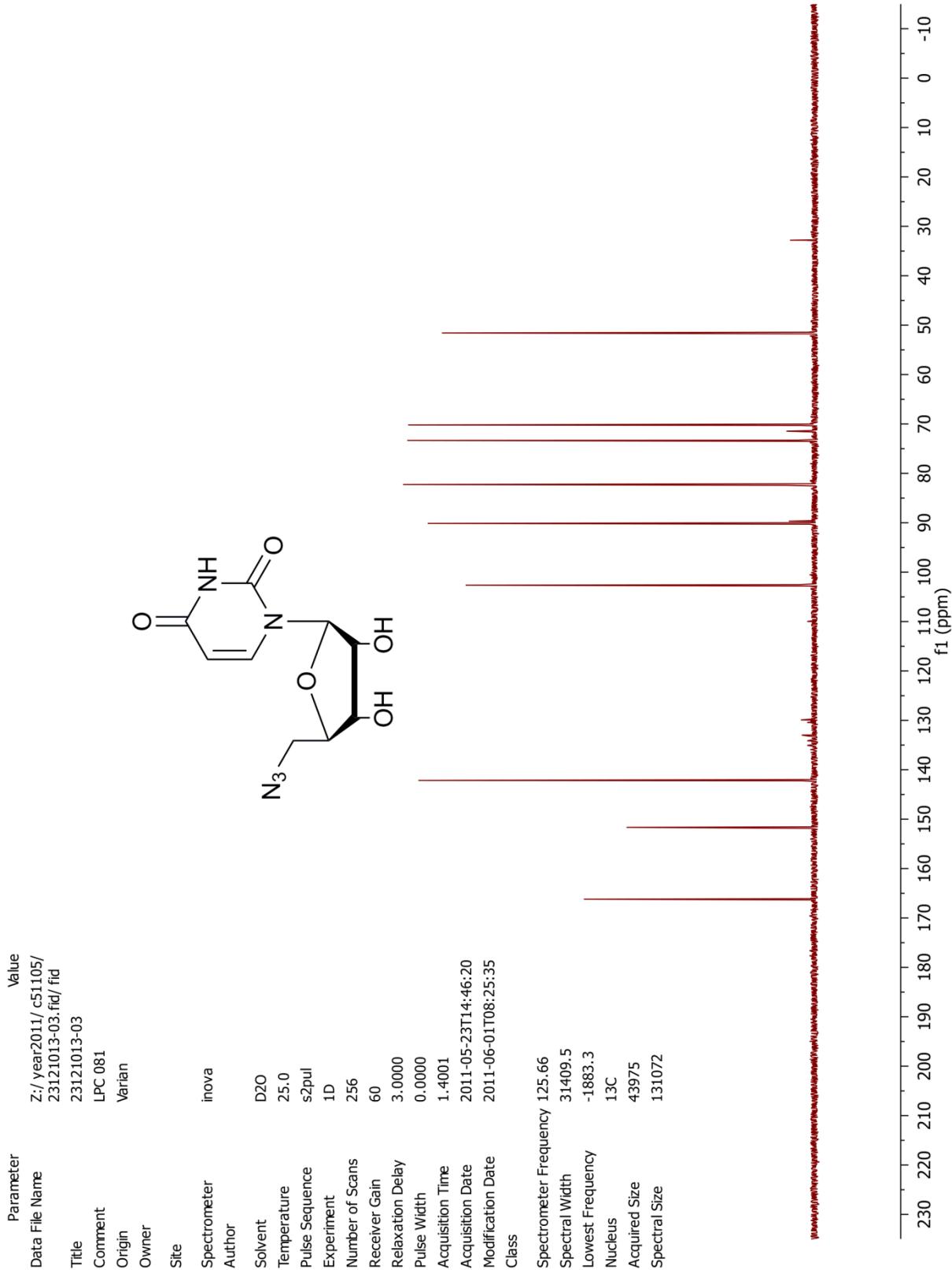


5'-Azido-5'-deoxyuridine (**14**), ¹H NMR Spectrum

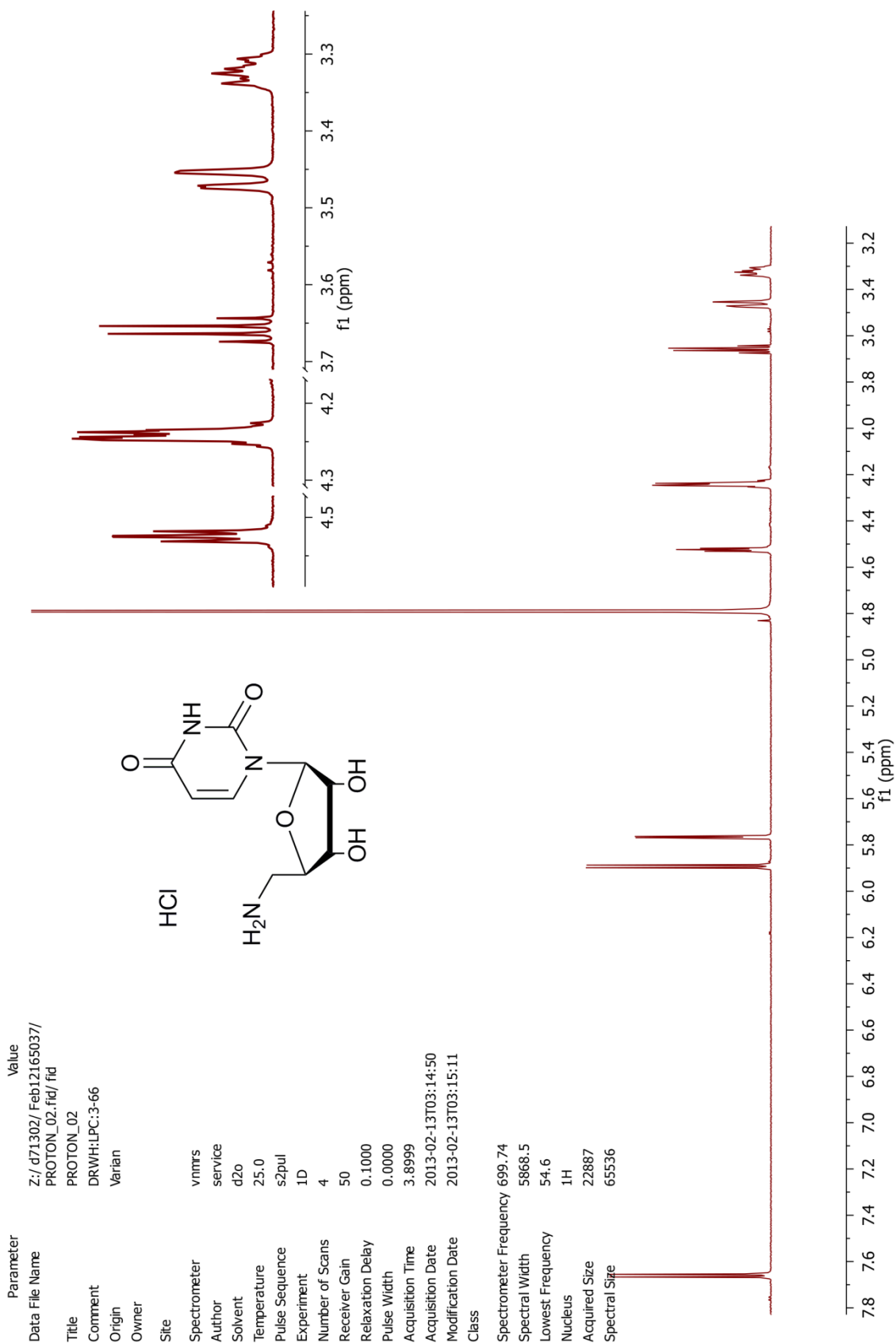
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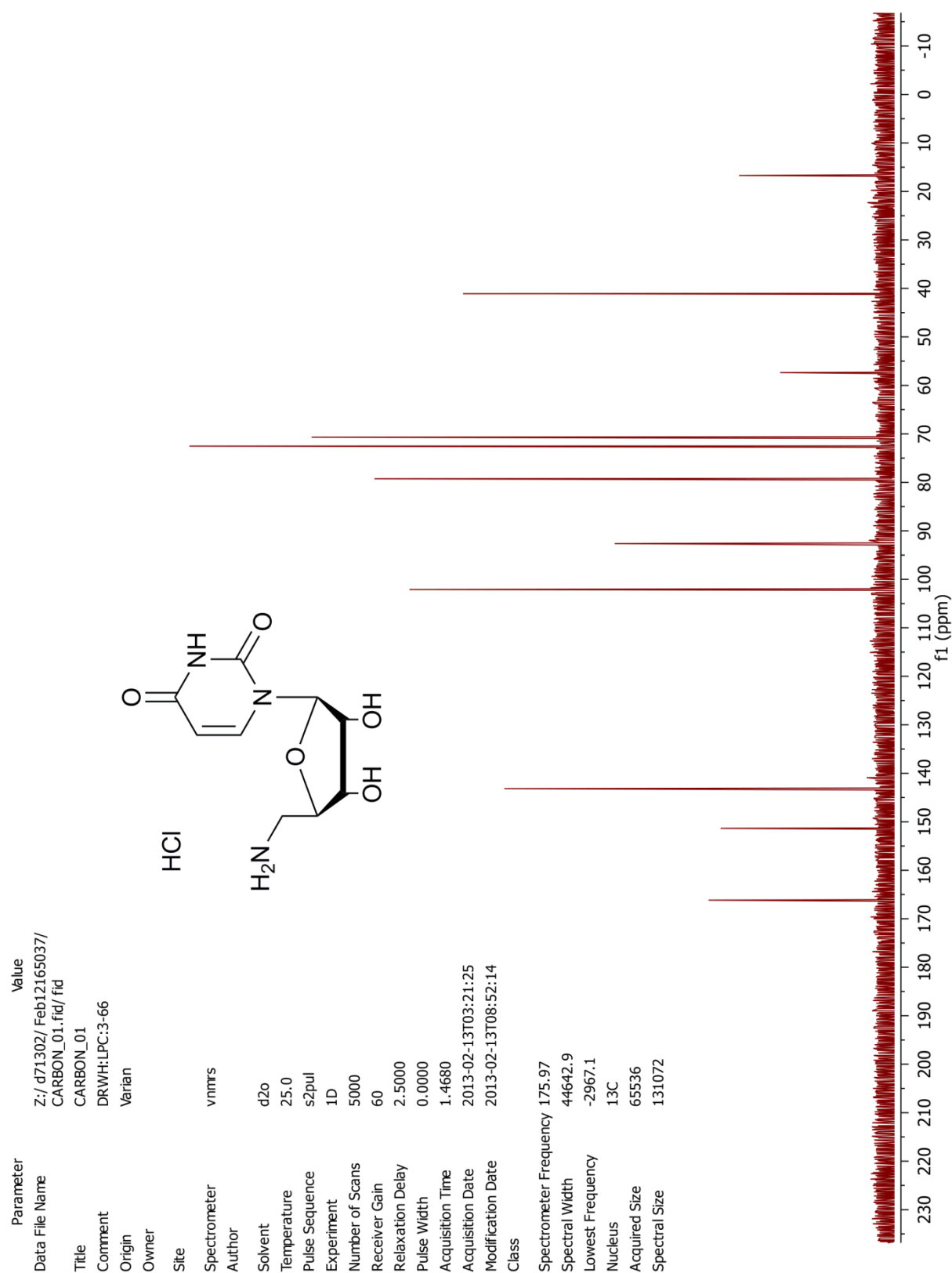
5'-Azido-5'-deoxyuridine (14), ¹³C NMR Spectrum



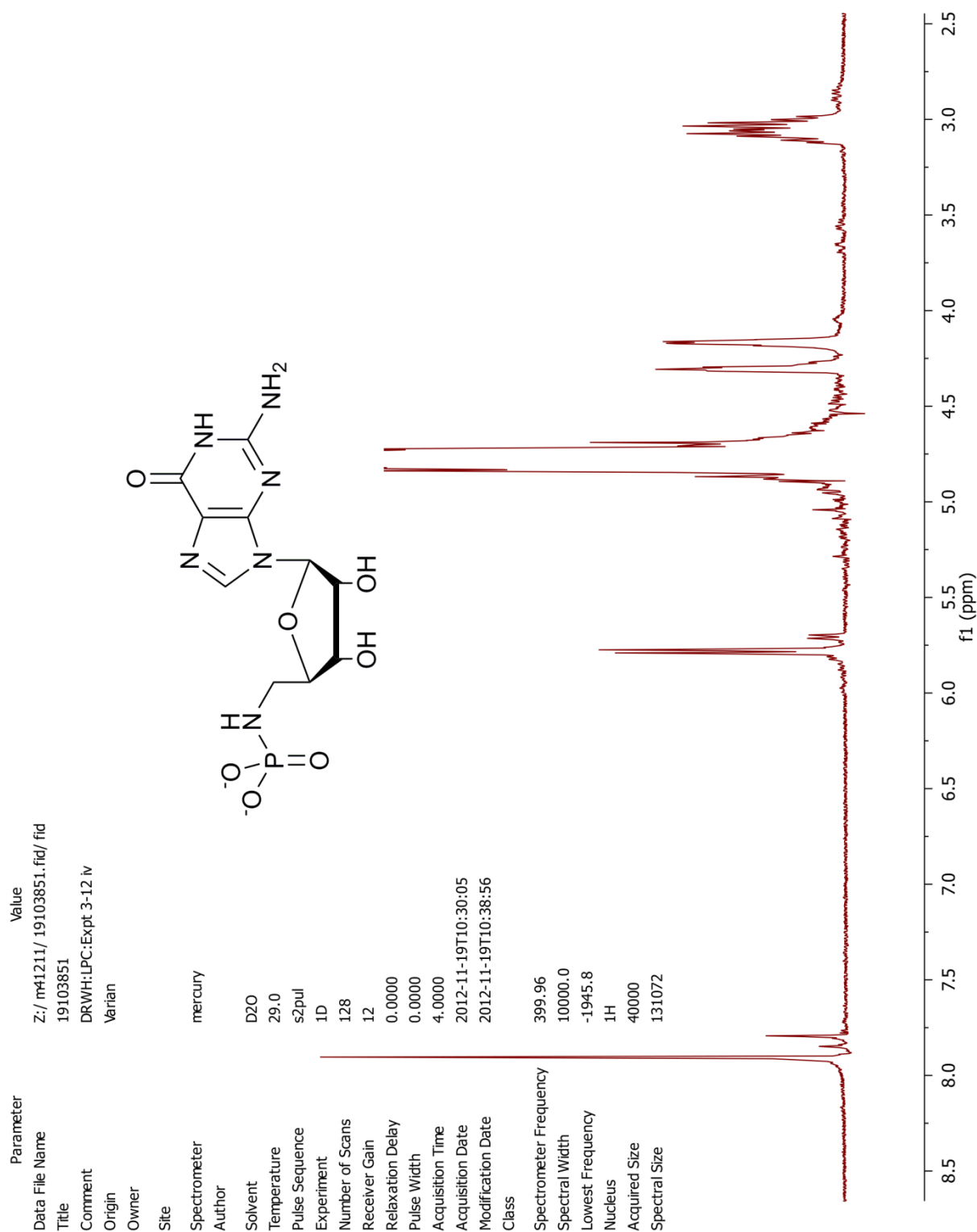
5'-Amino-5'-deoxyuridine (**15**), Hydrochloride Salt, ¹H NMR Spectrum



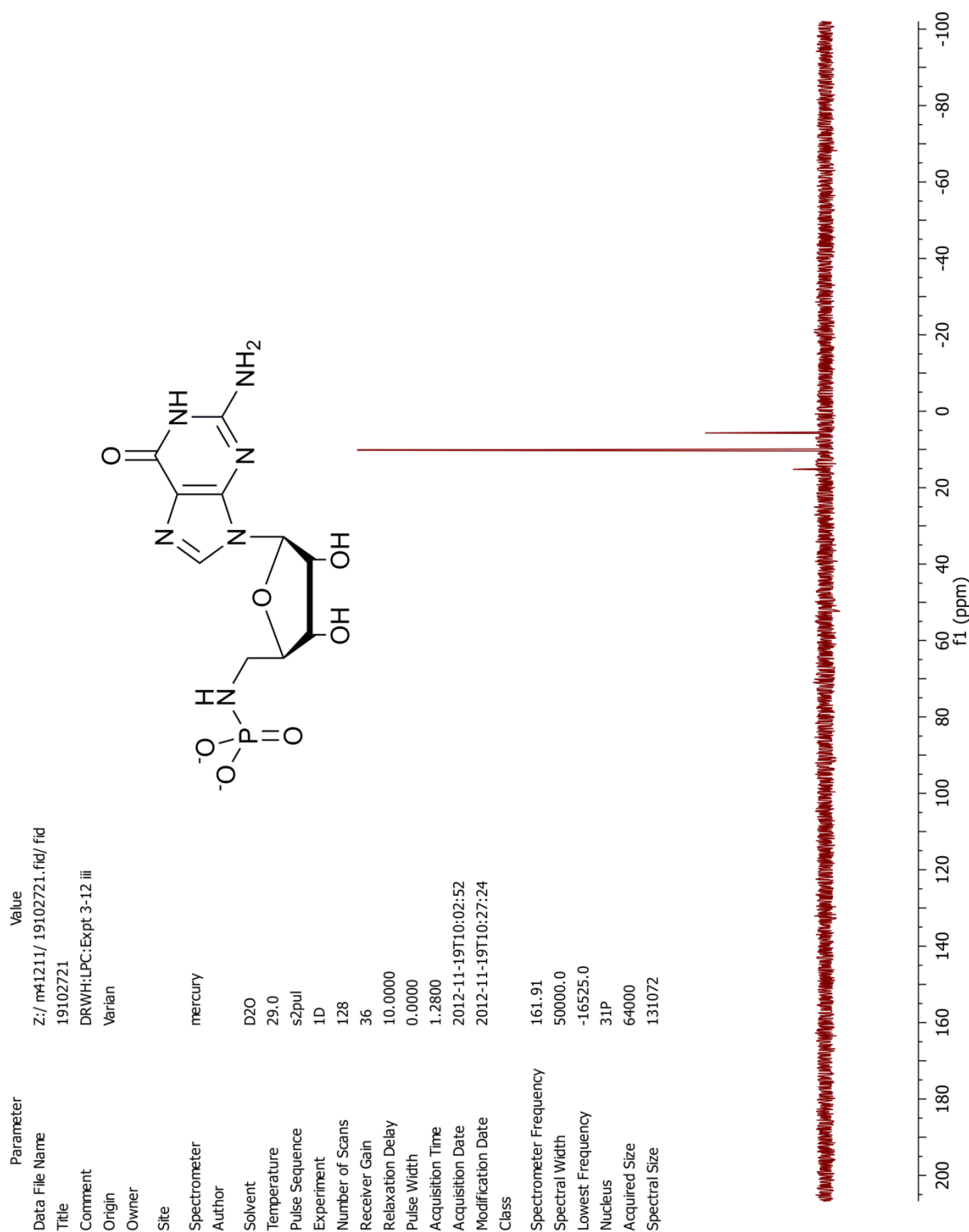
5'-Amino-5'-deoxyuridine (**15**), Hydrochloride Salt, ^{13}C NMR Spectrum



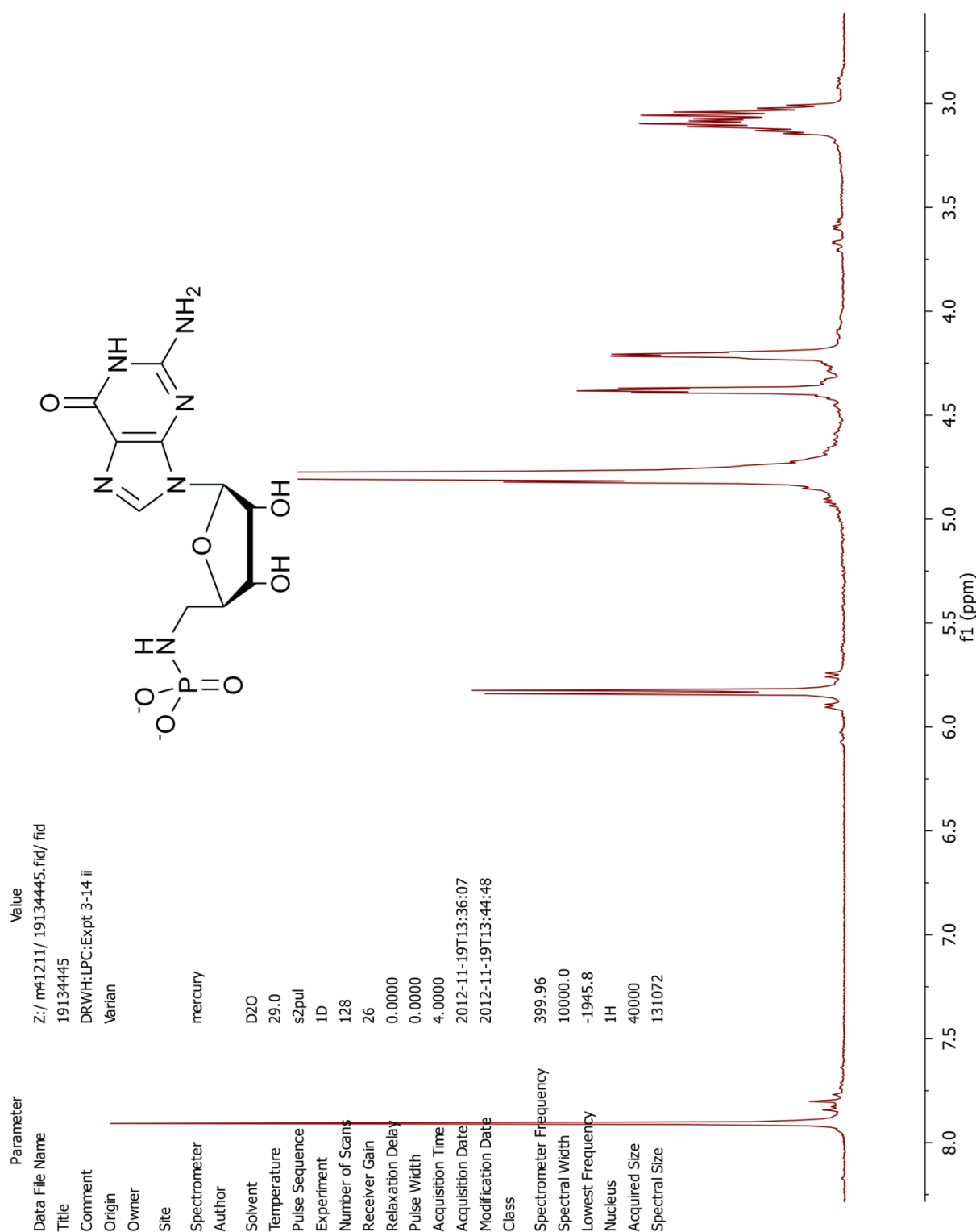
5'-Amino-5'-deoxyguanosine Phosphorylation with POCl₃, pH 11, ¹H NMR Spectrum



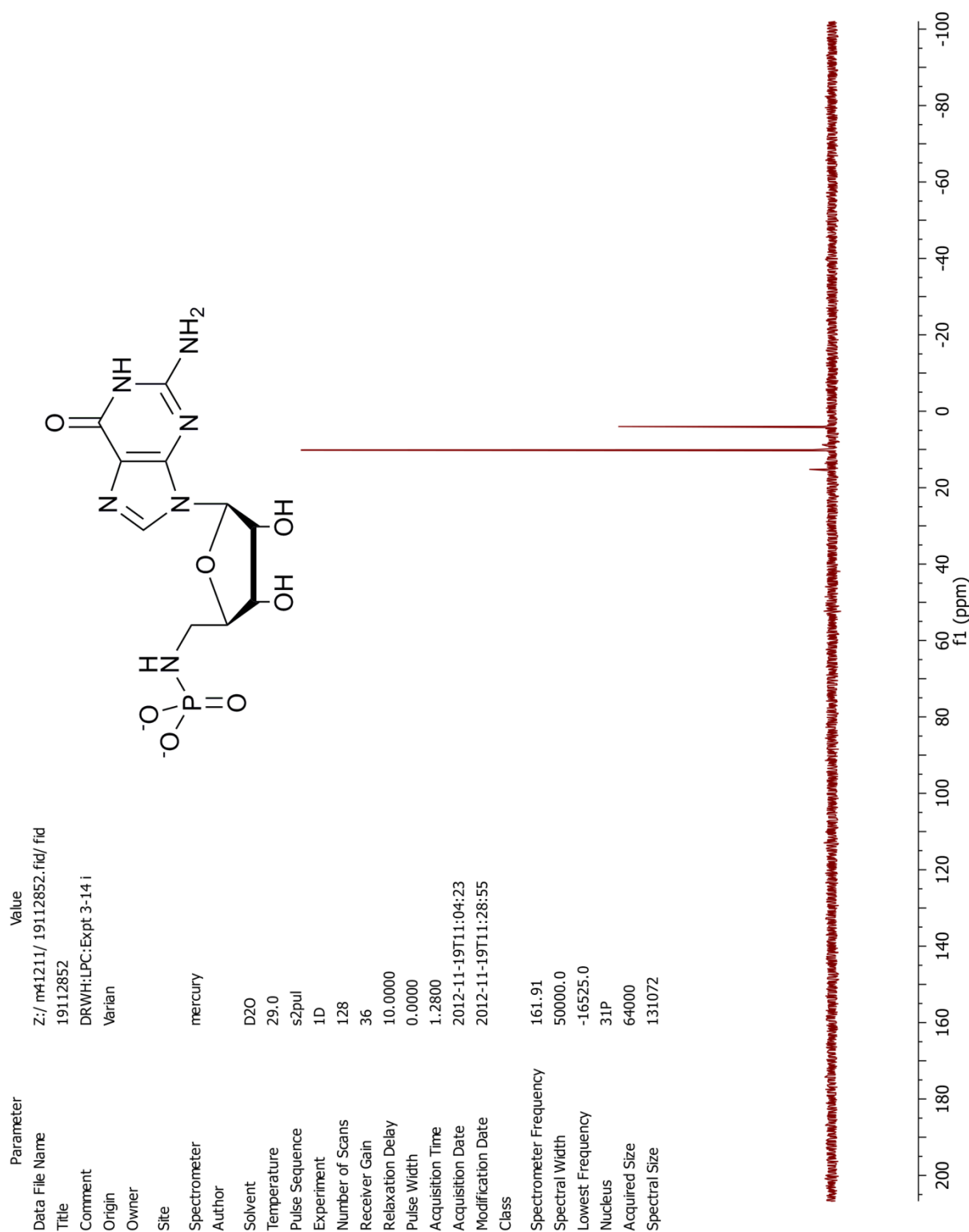
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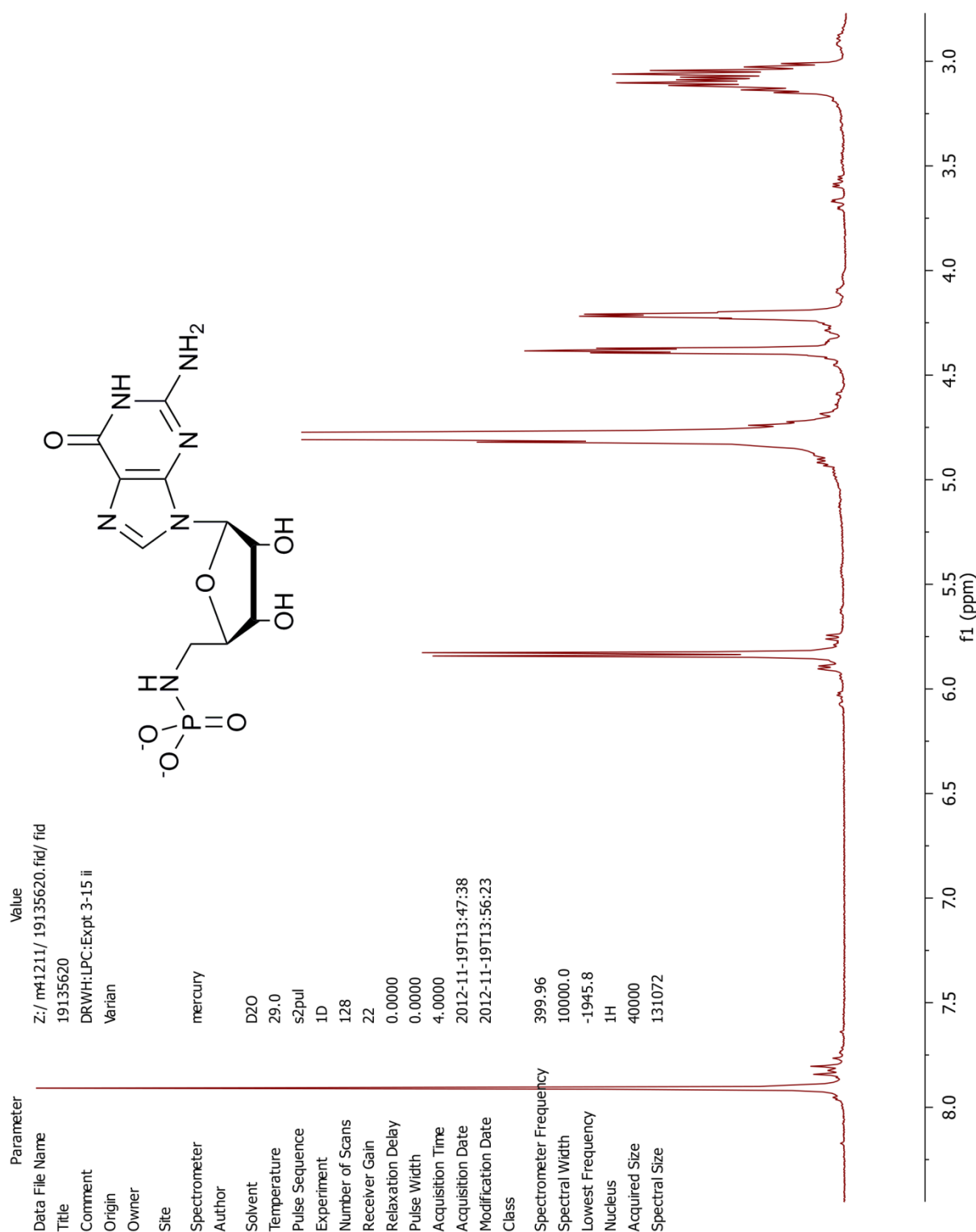
5'-Amino-5'-deoxyguanosine Phosphorylation with POCl₃, pH 11.5, ¹H NMR Spectrum



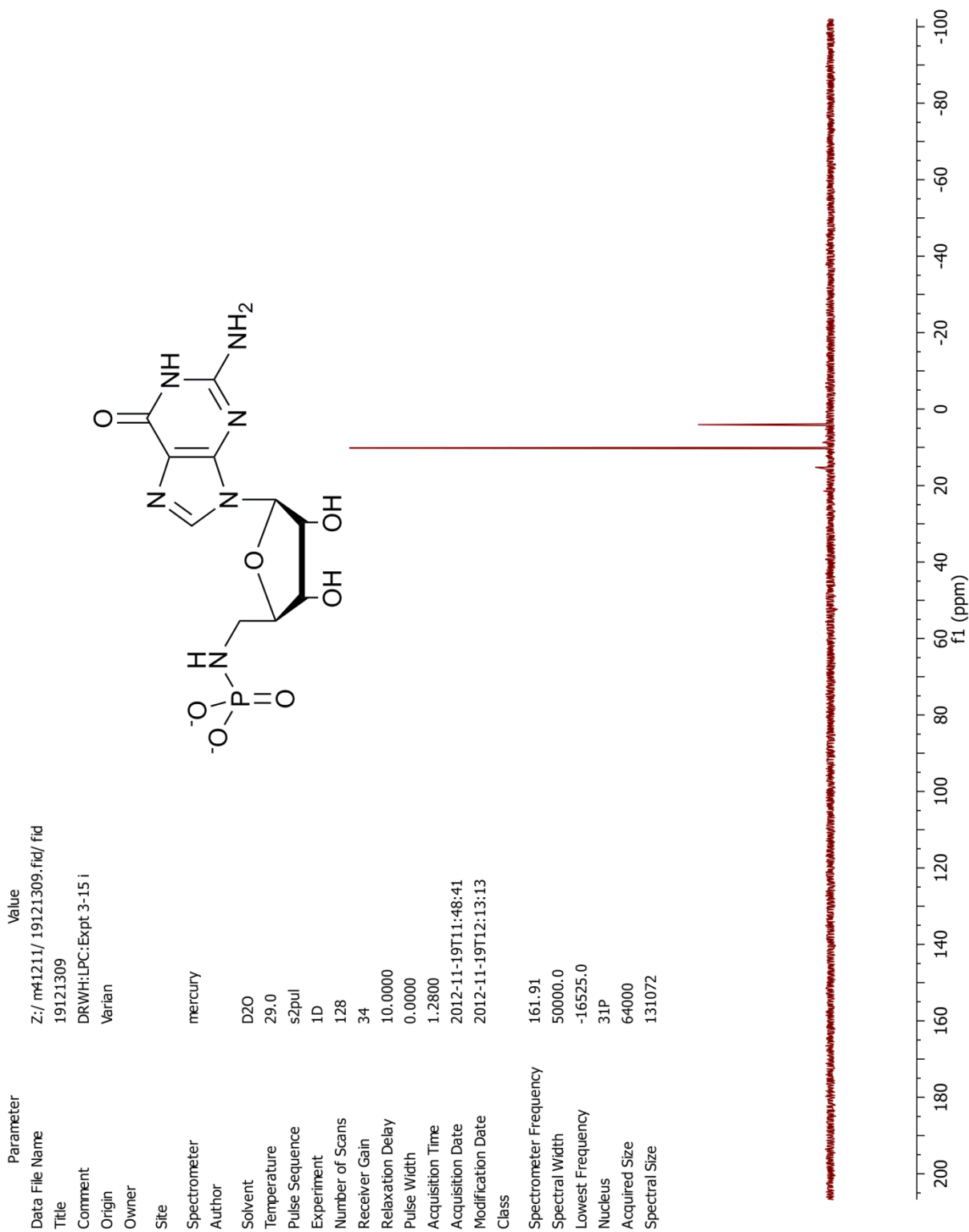
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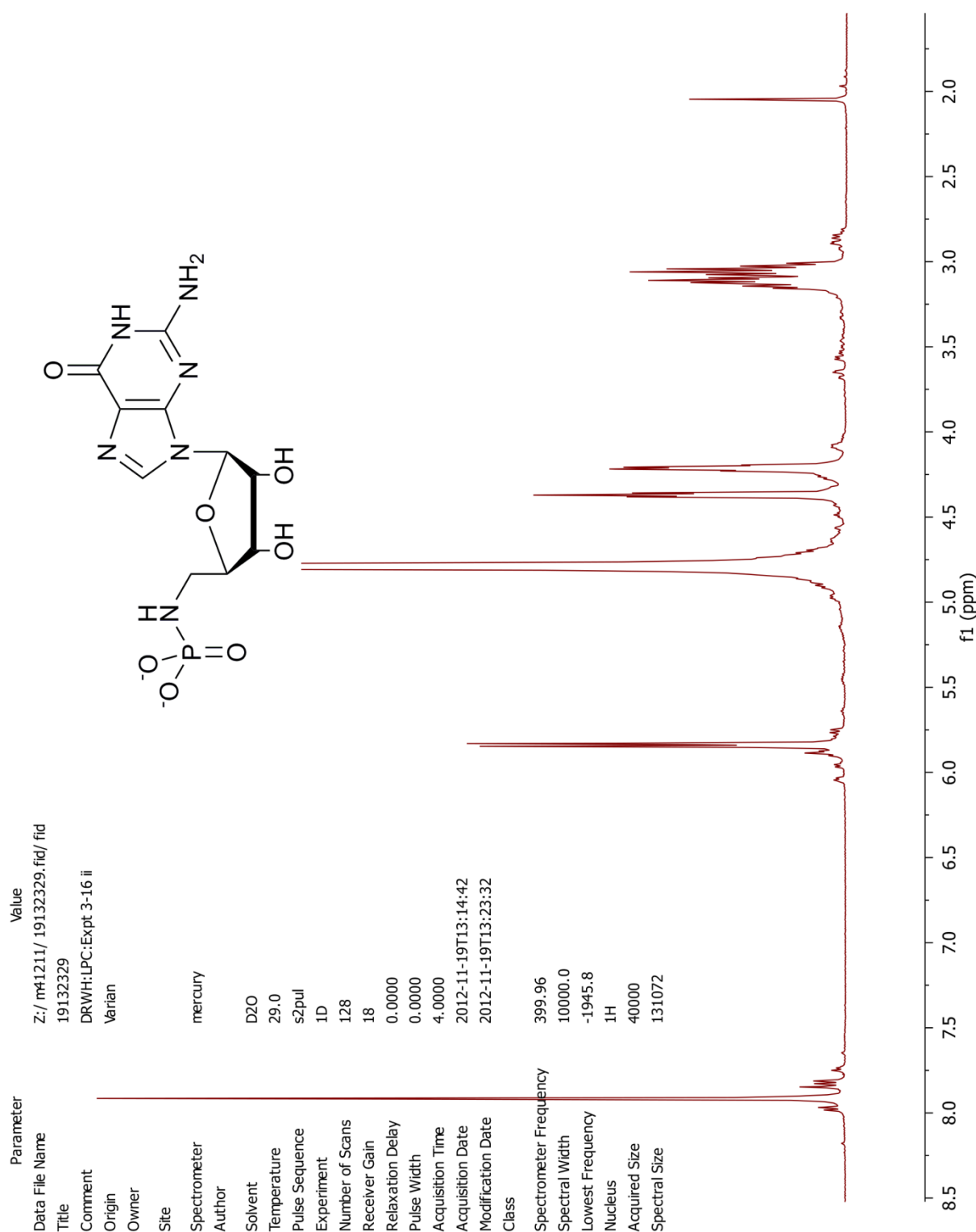
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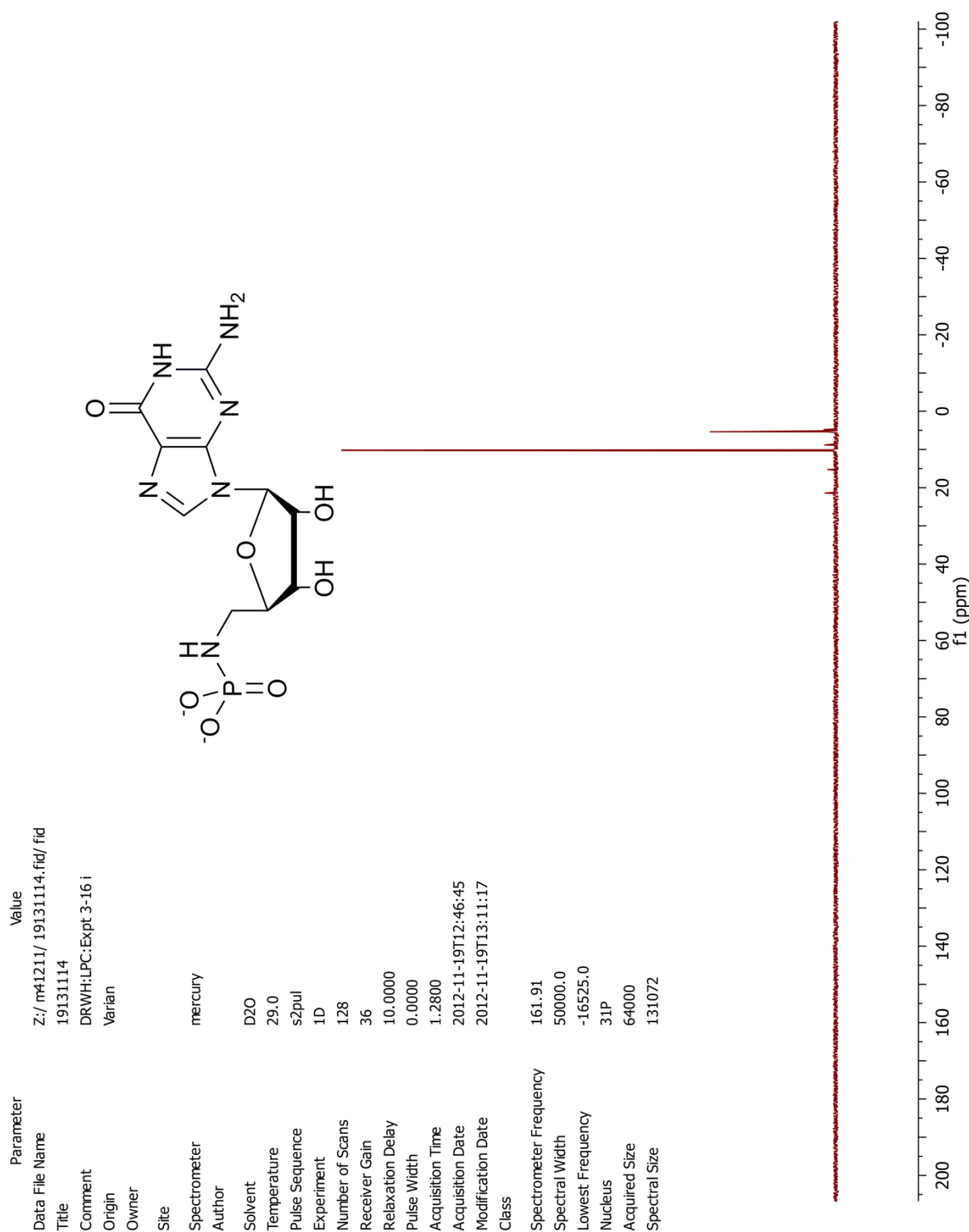
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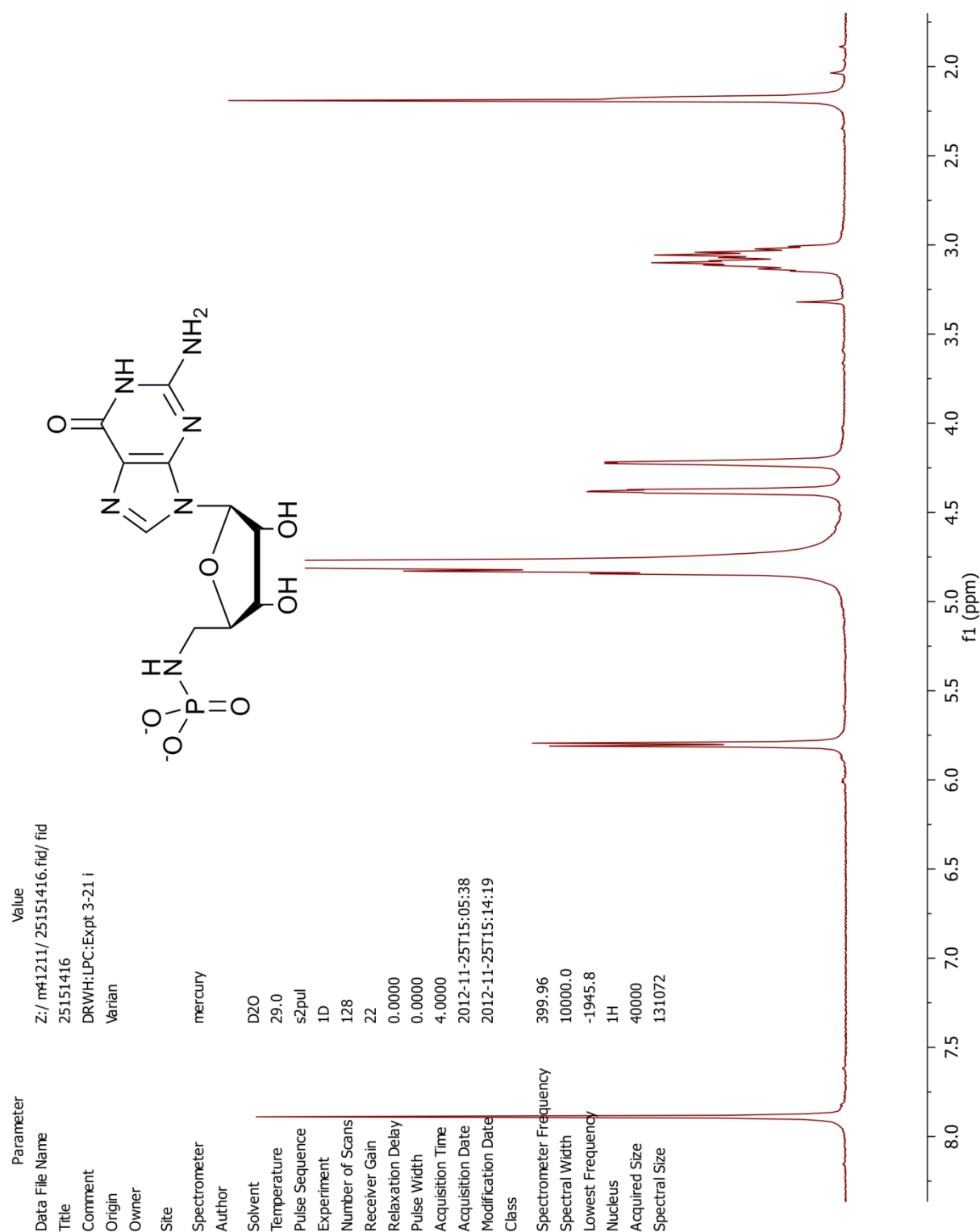
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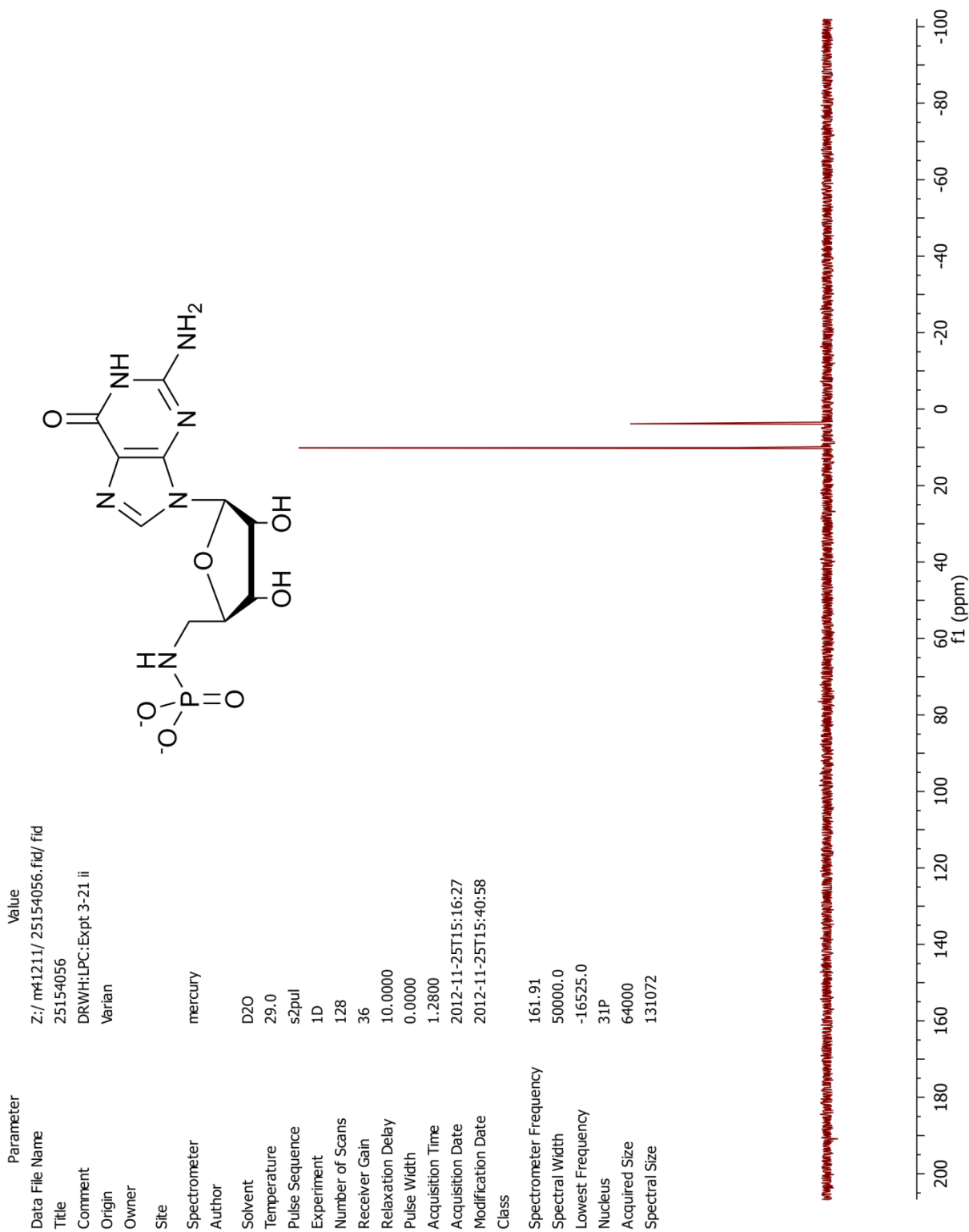
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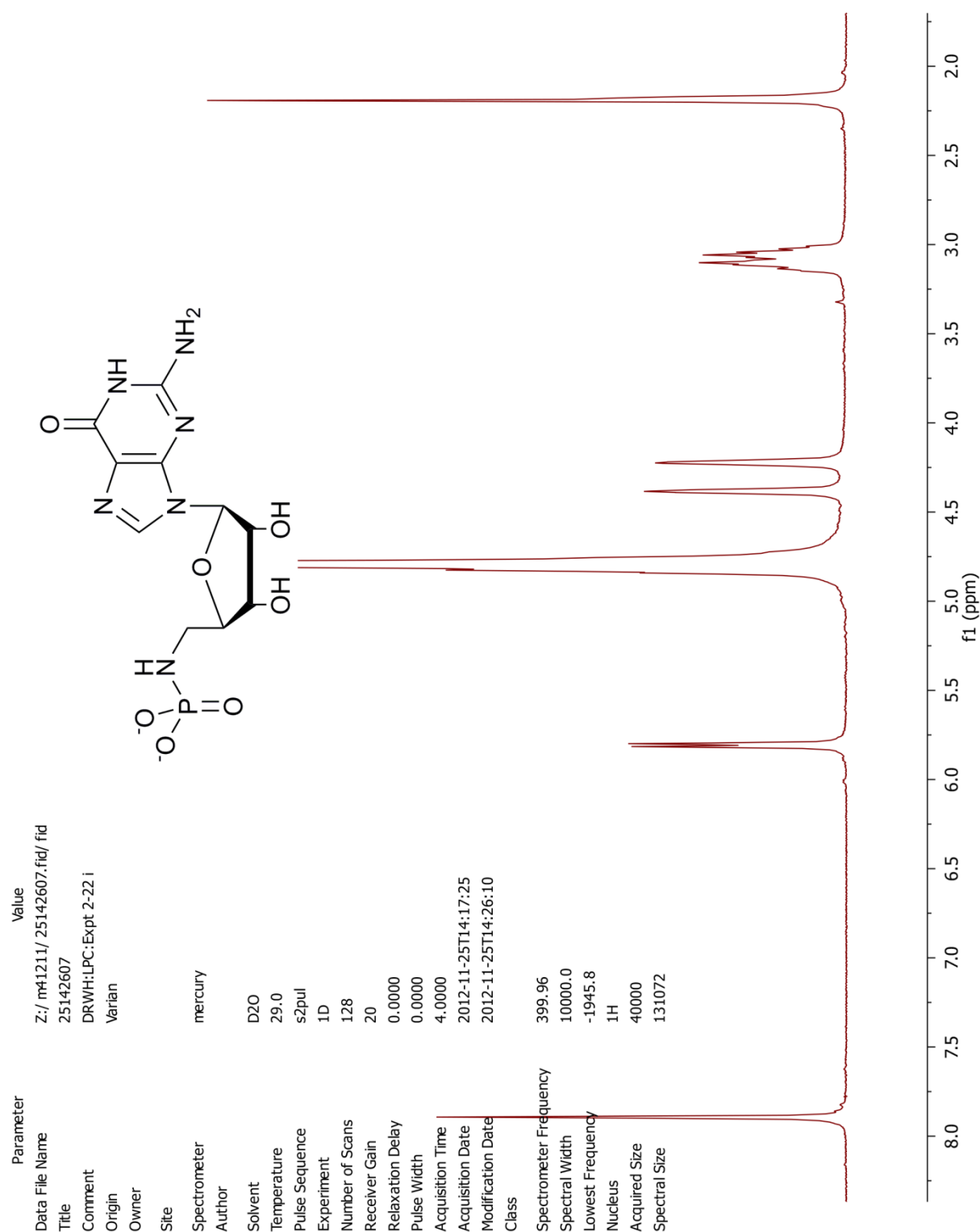
5'-Amino-5'-deoxyguanosine Phosphorylation with KPOCl_2 , pH 11, ^1H NMR Spectrum



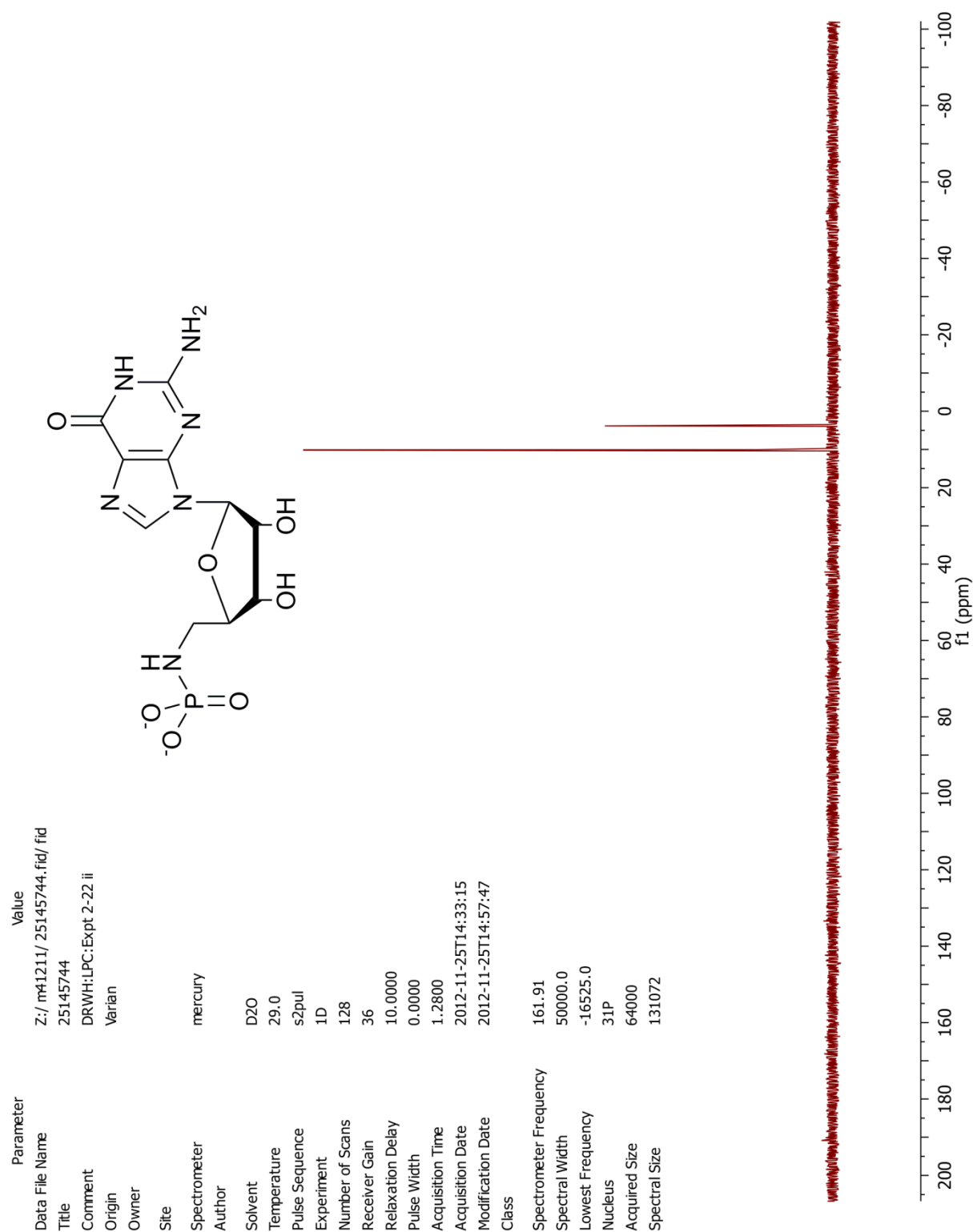
5'-Amino-5'-deoxyguanosine Phosphorylation with KOPOCl_2 ,
pH 11, ^{31}P NMR Spectrum



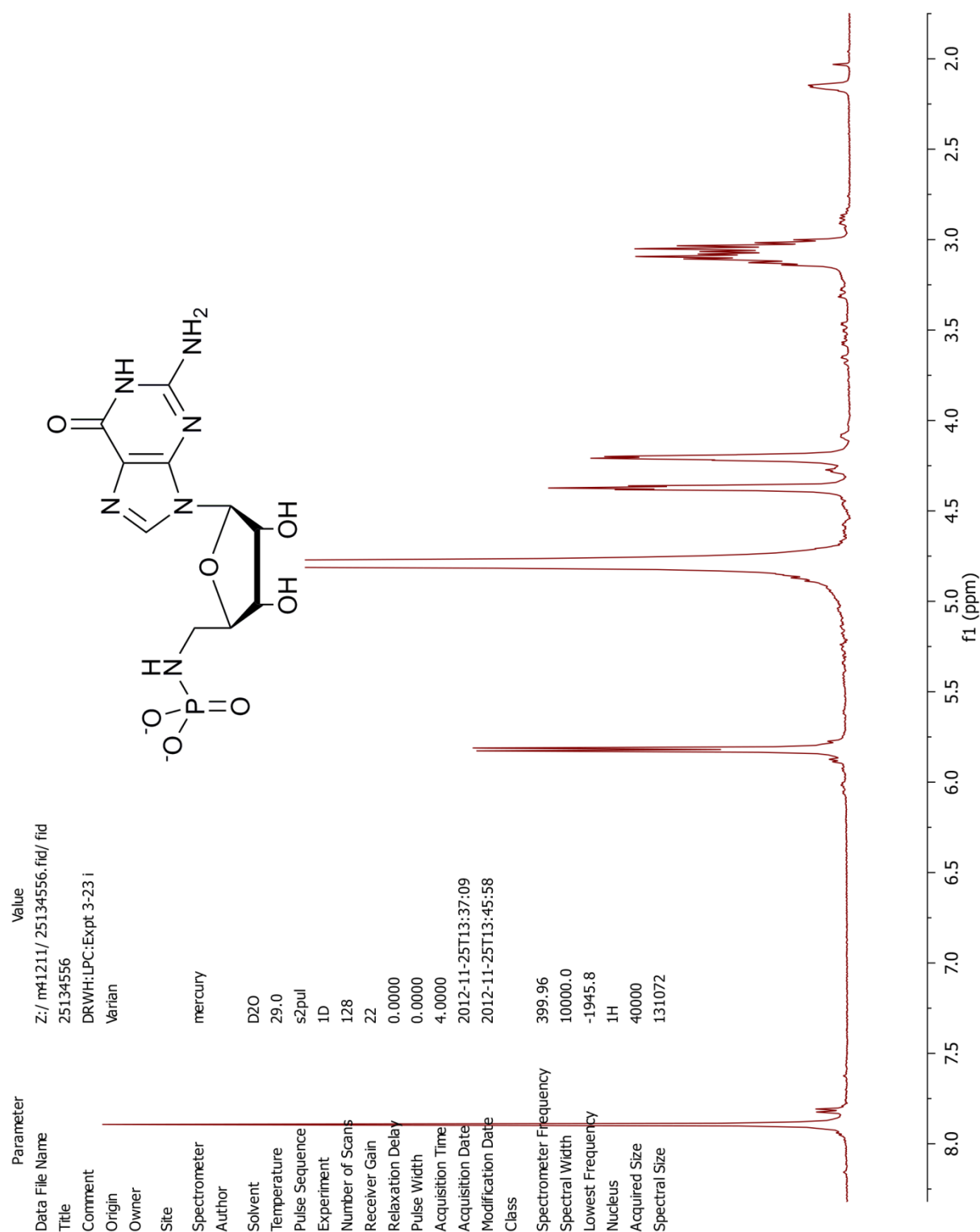
5'-Amino-5'-deoxyguanosine Phosphorylation with KOPOCl_2 , pH 11.5, ^1H NMR Spectrum



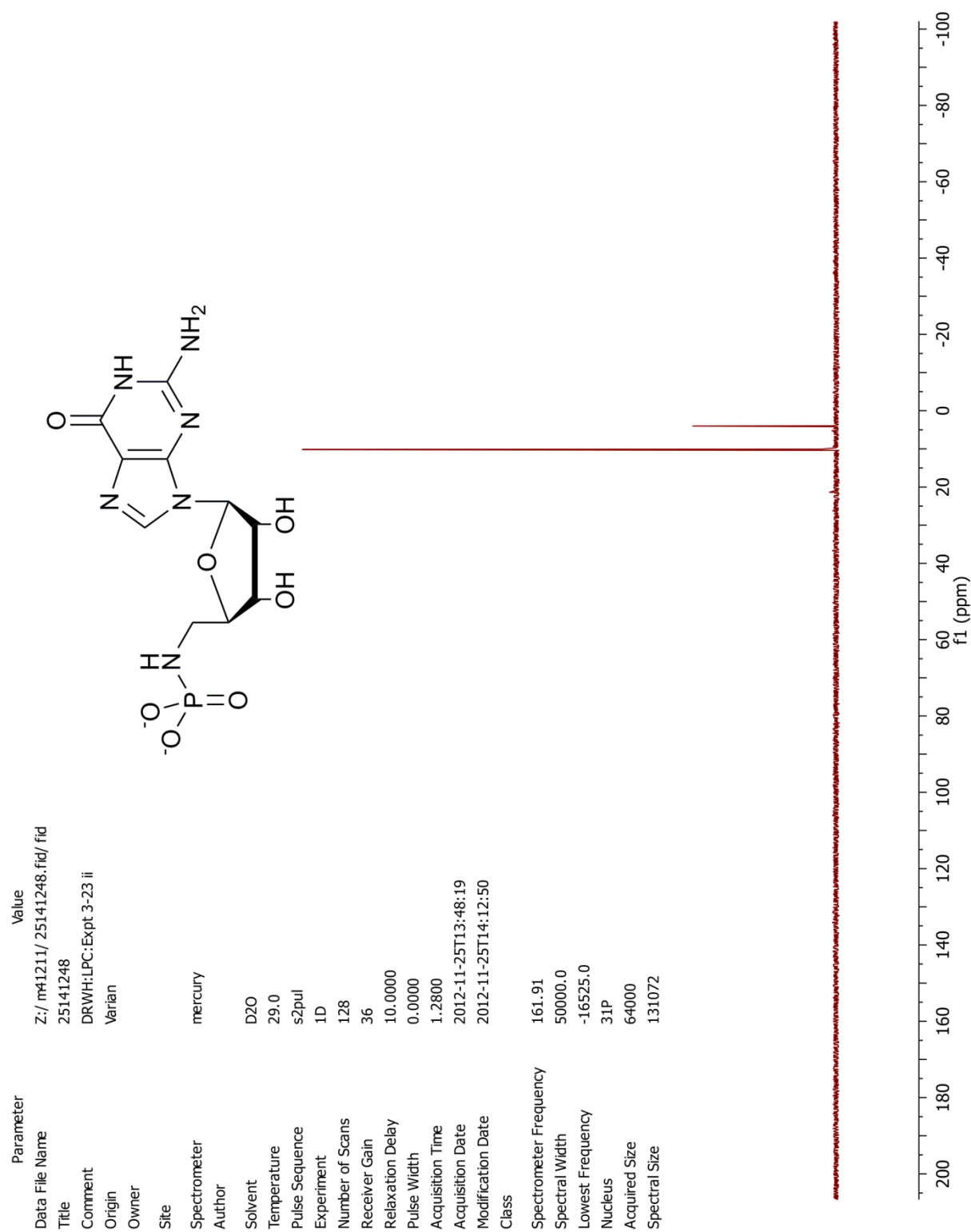
5'-Amino-5'-deoxyguanosine Phosphorylation with KOPOCl_2 , pH 11.5, ^{31}P NMR Spectrum



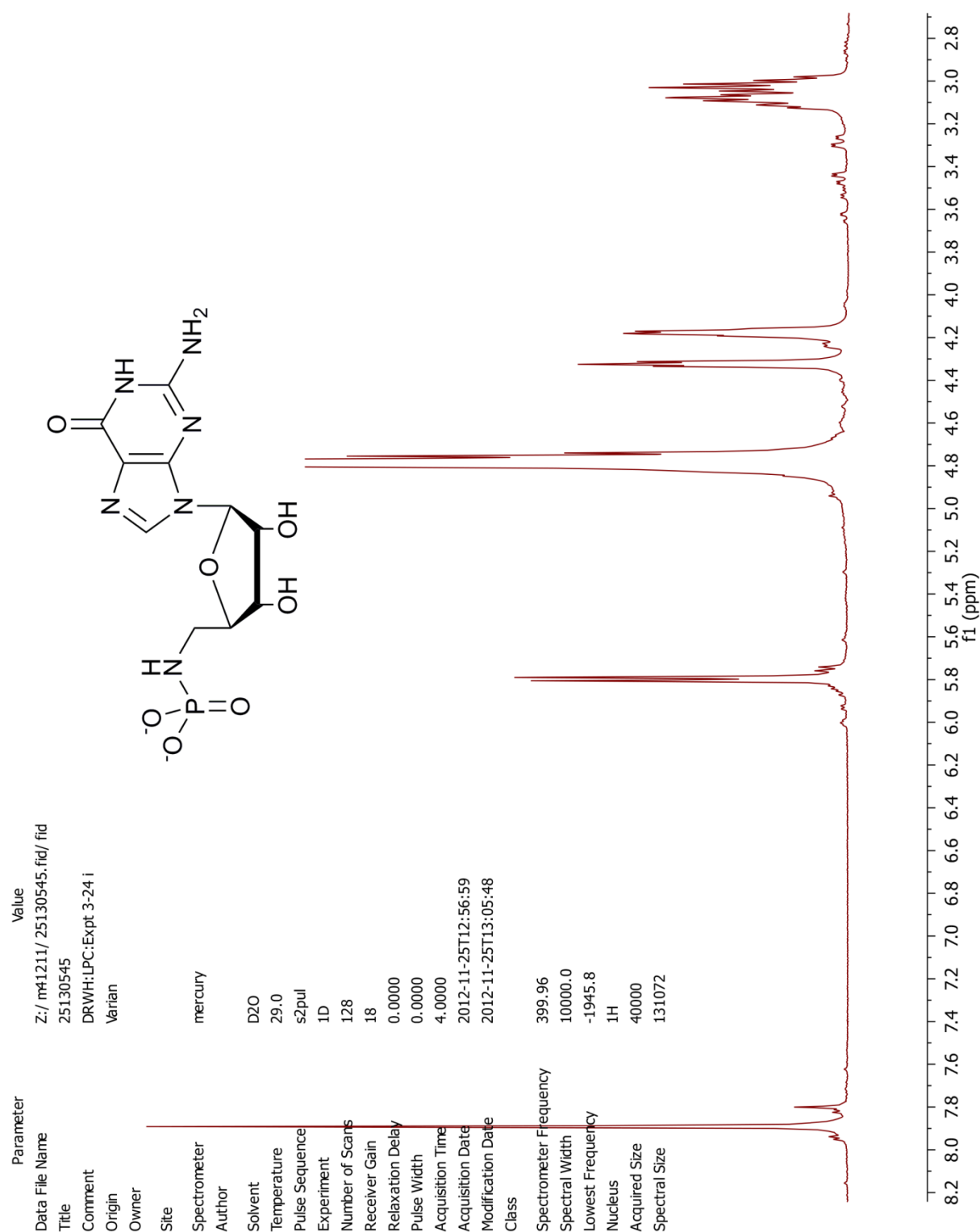
5'-Amino-5'-deoxyguanosine Phosphorylation with KOPOCl_2 , pH 12, ^1H NMR Spectrum



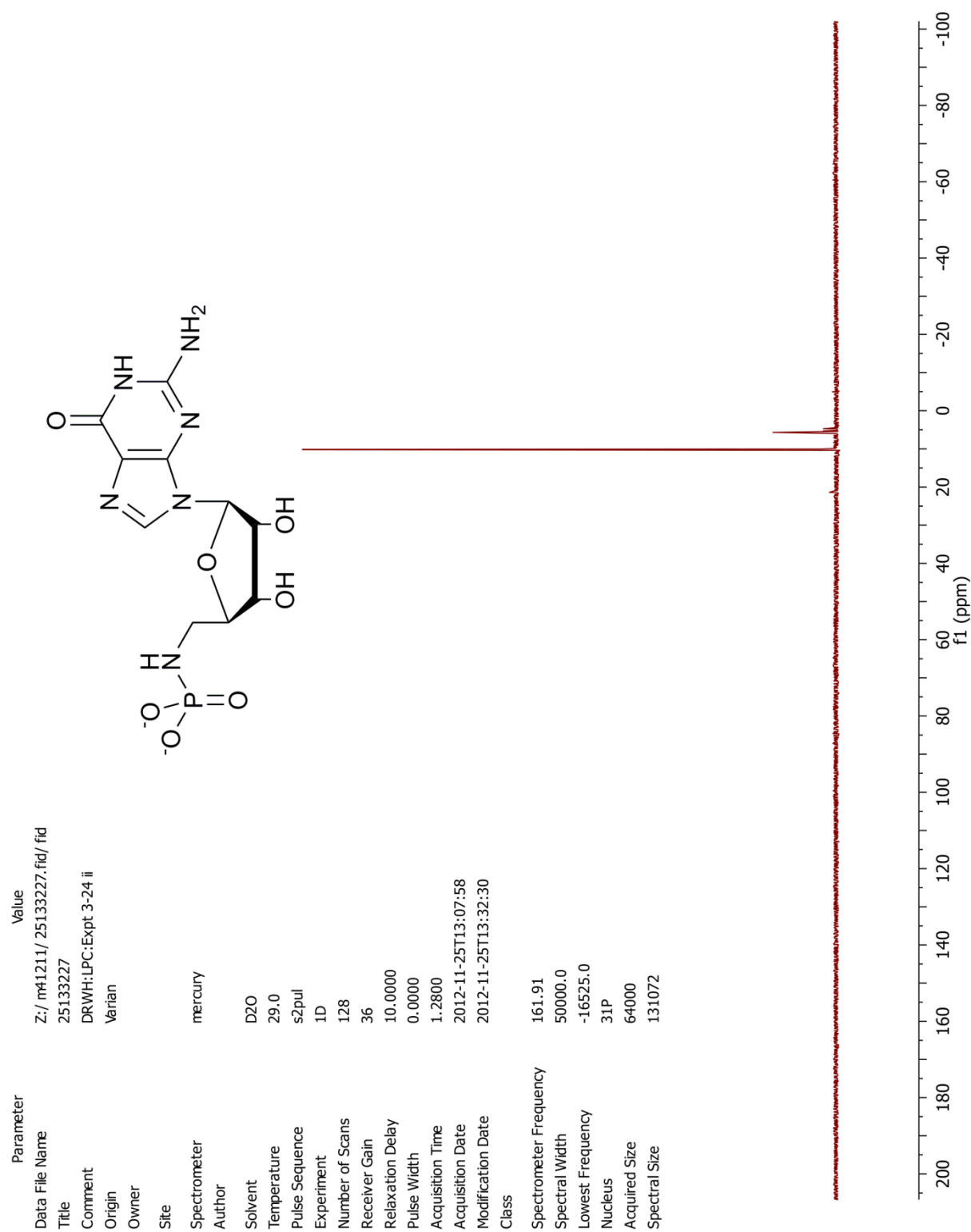
5'-Amino-5'-deoxyguanosine Phosphorylation with KPOCl_2 , pH 12, ^{31}P NMR Spectrum



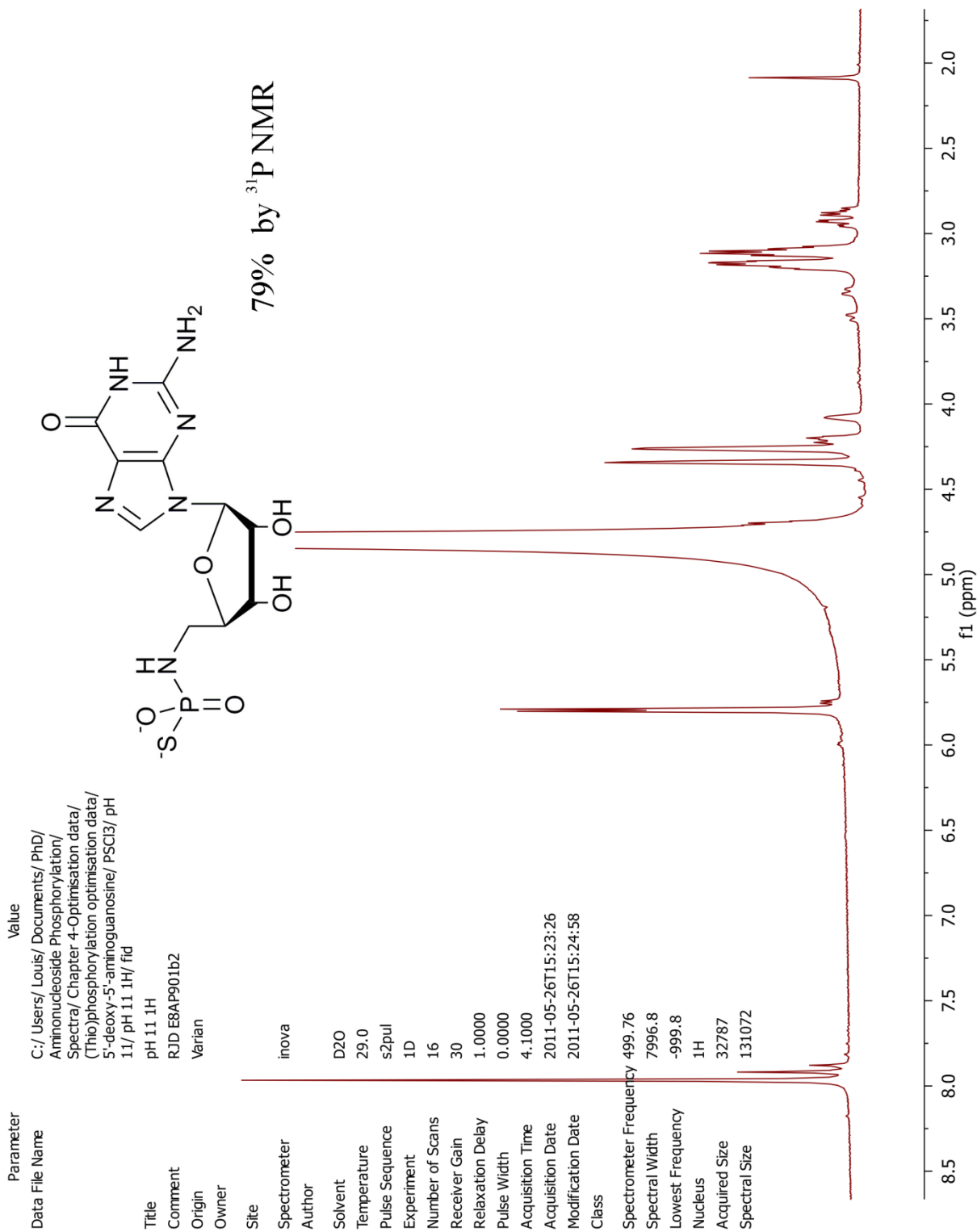
5'-Amino-5'-deoxyguanosine Phosphorylation with KPOCl_2 , pH 12.5, ^1H NMR Spectrum



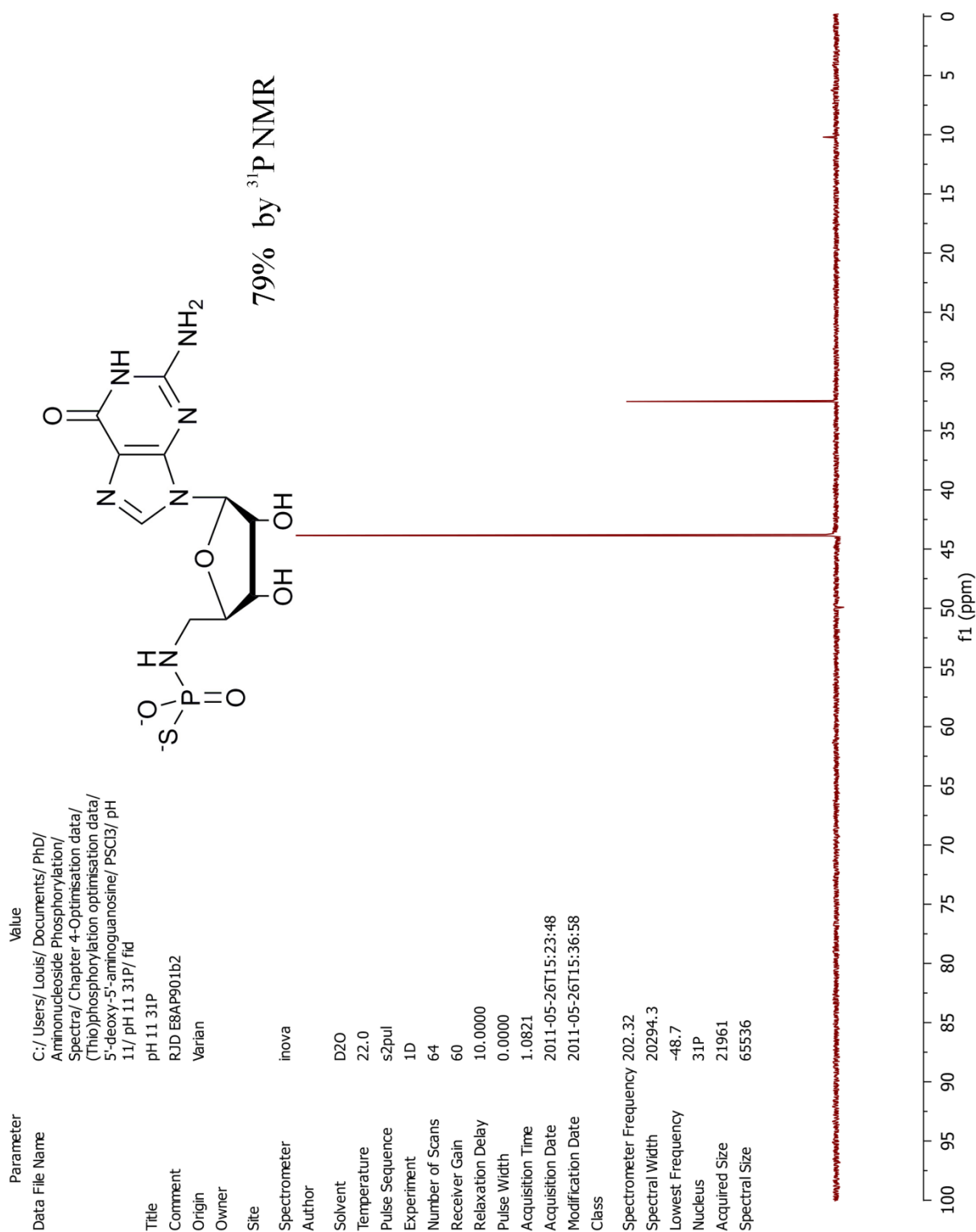
5'-Amino-5'-deoxyguanosine Phosphorylation with KOPOCl_2 , pH 12.5, ^{31}P NMR Spectrum



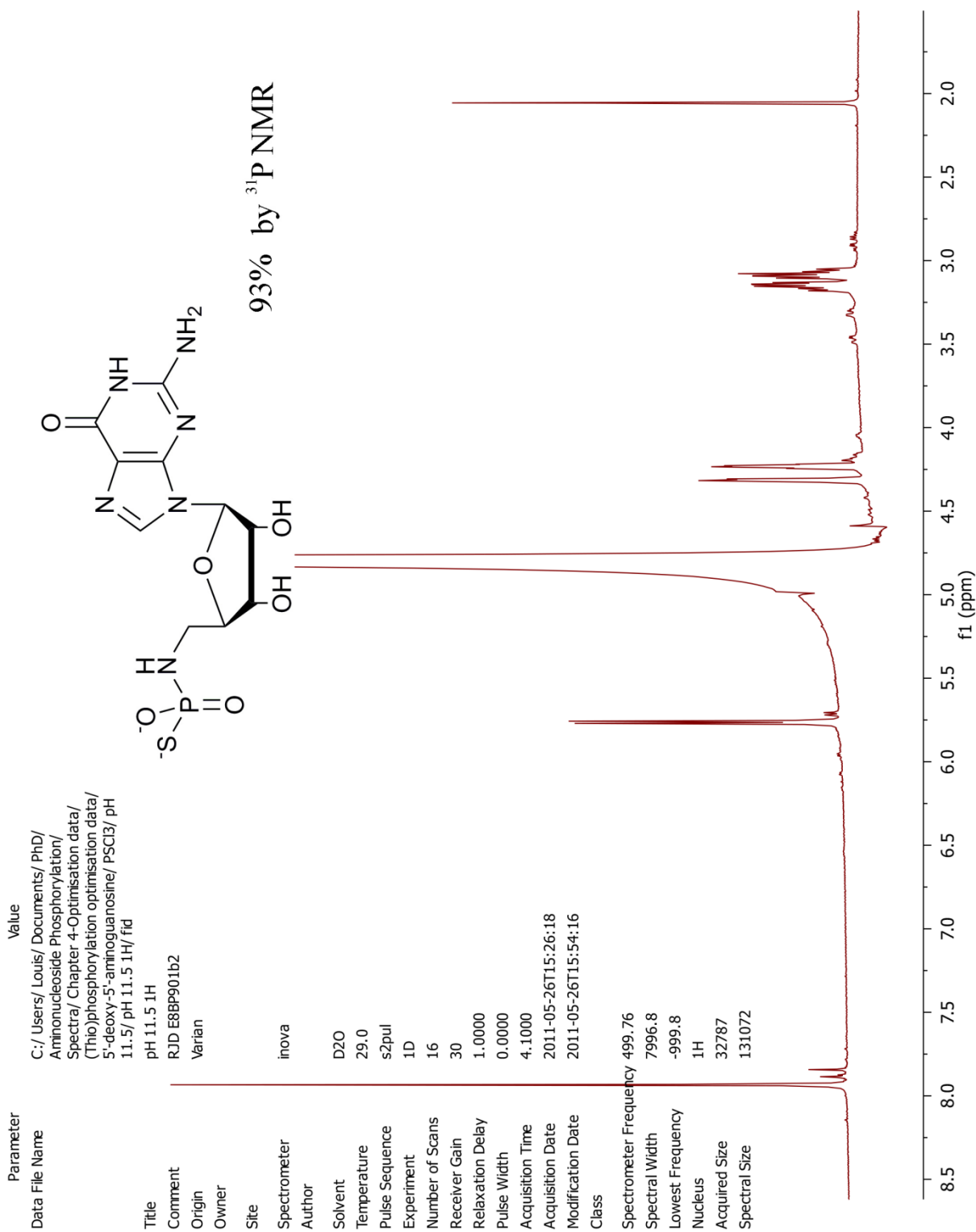
5'-Amino-5'-deoxyguanosine Phosphorylation with PSCl₃, pH 11, ¹H NMR Spectrum



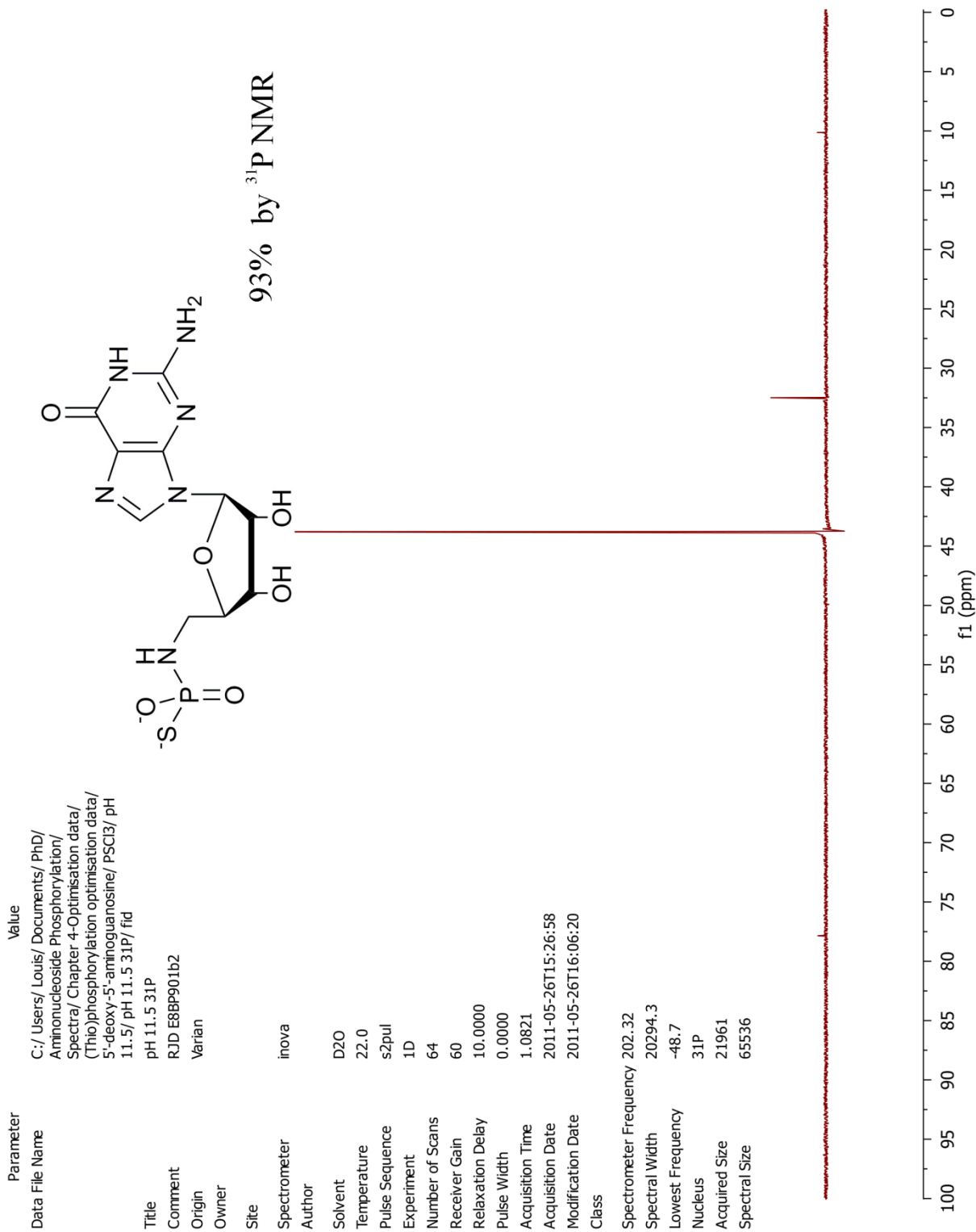
5'-Amino-5'-deoxyguanosine Phosphorylation with PSCl_3 , pH 11, ^{31}P NMR Spectrum



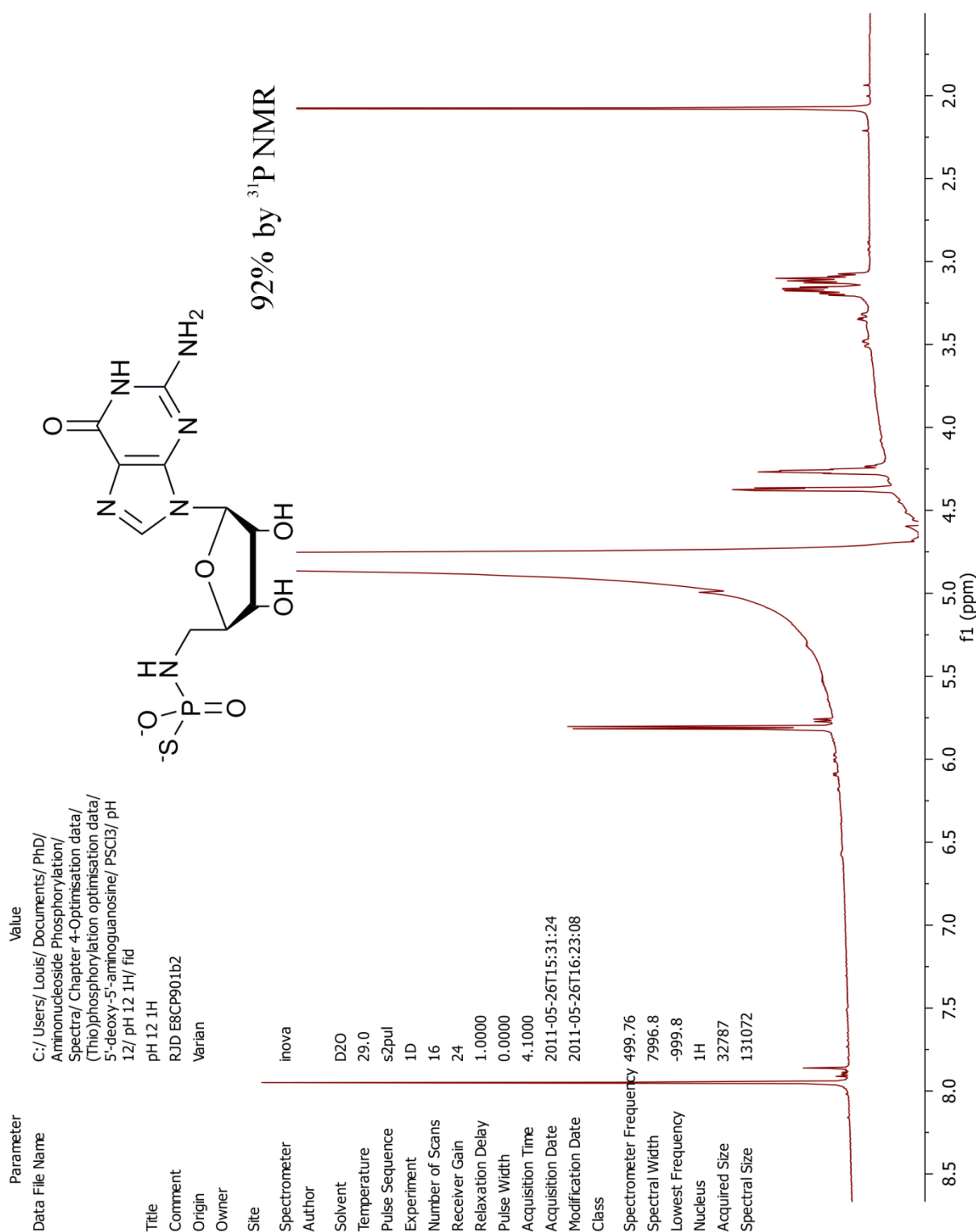
5'-Amino-5'-deoxyguanosine Phosphorylation with PSCl_3 , pH 11.5, ^1H NMR Spectrum



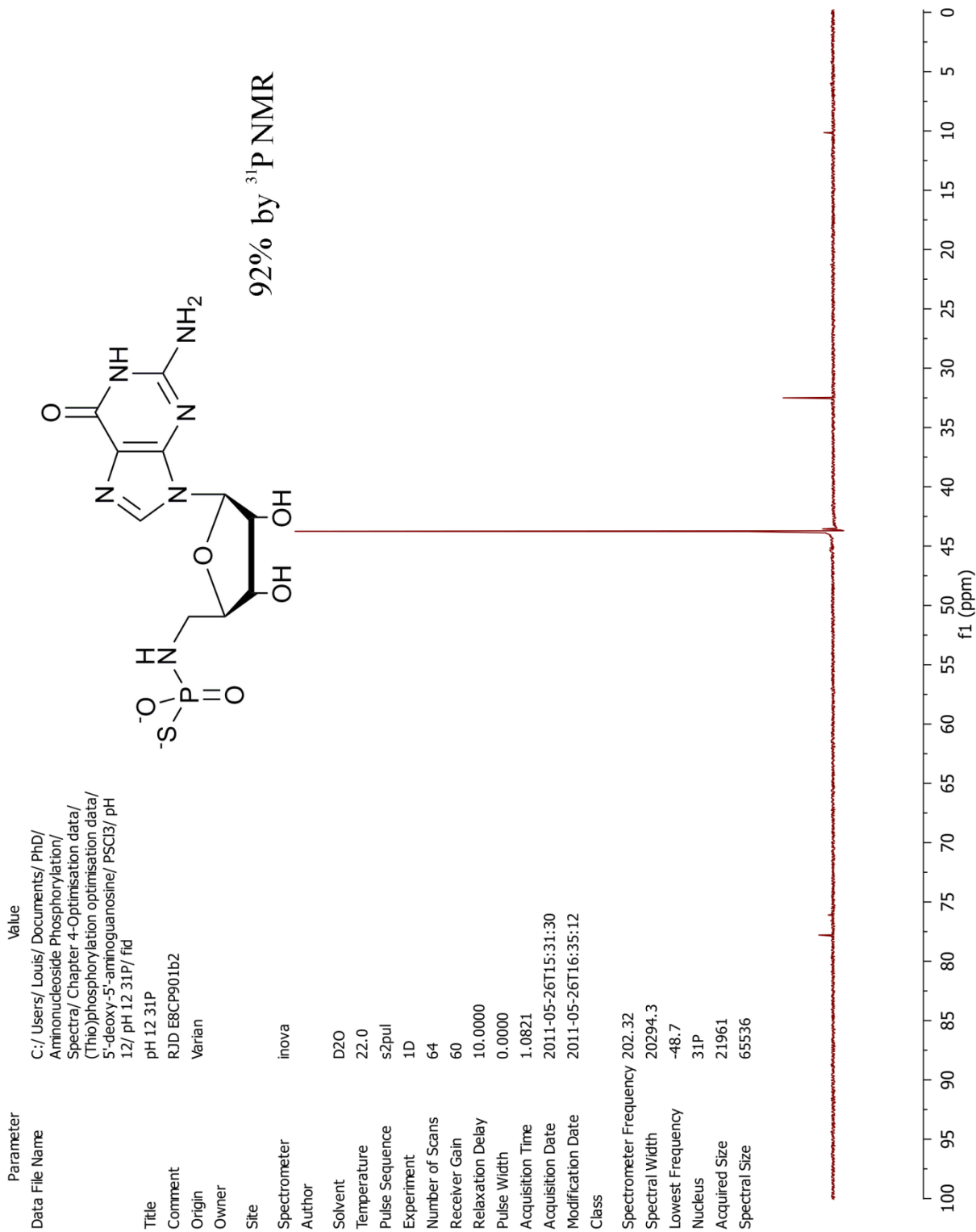
5'-Amino-5'-deoxyguanosine Phosphorylation with PSCl₃, pH 11.5, ³¹P NMR Spectrum



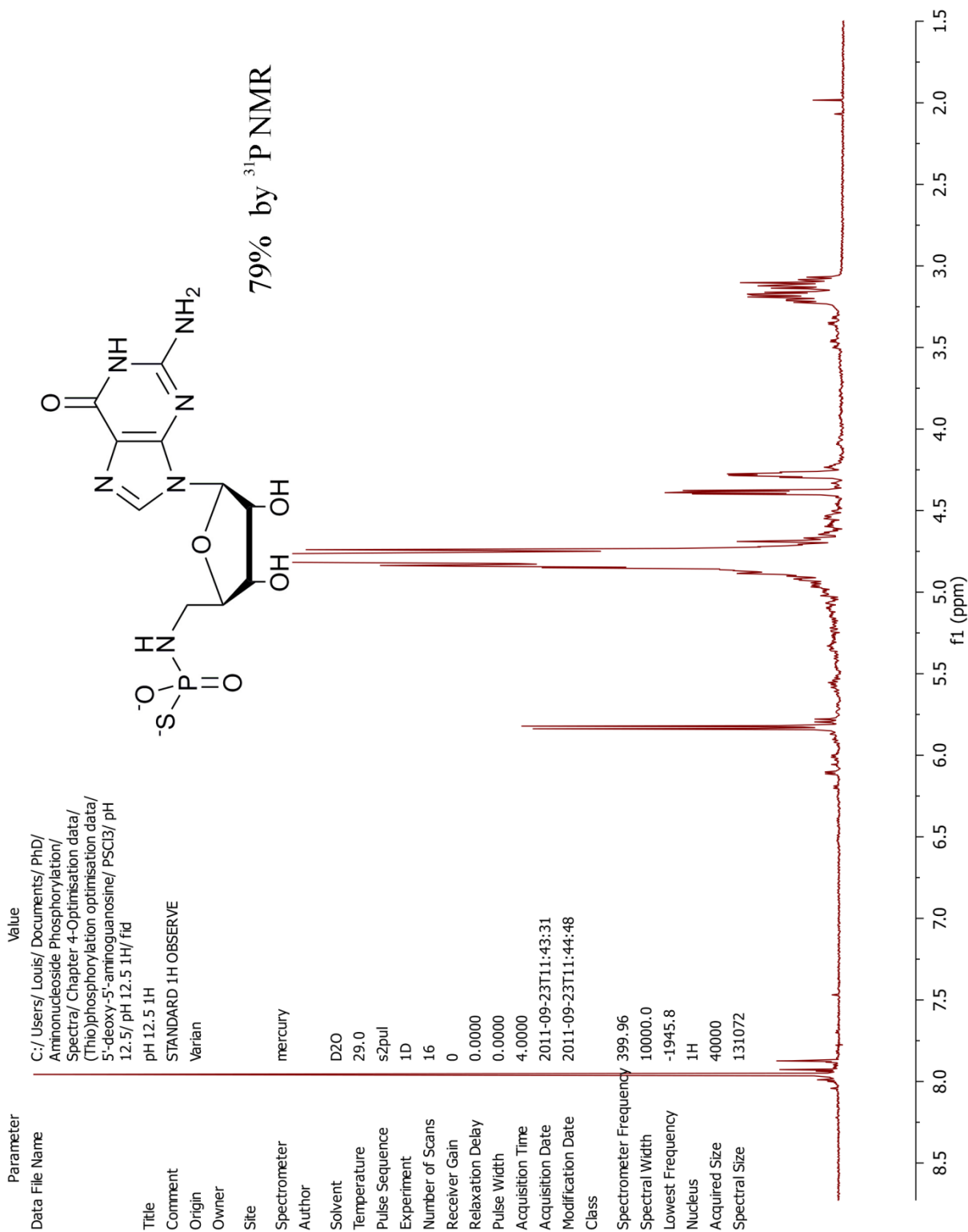
5'-Amino-5'-deoxyguanosine Phosphorylation with PSCl_3 , pH 12, ^1H NMR Spectrum



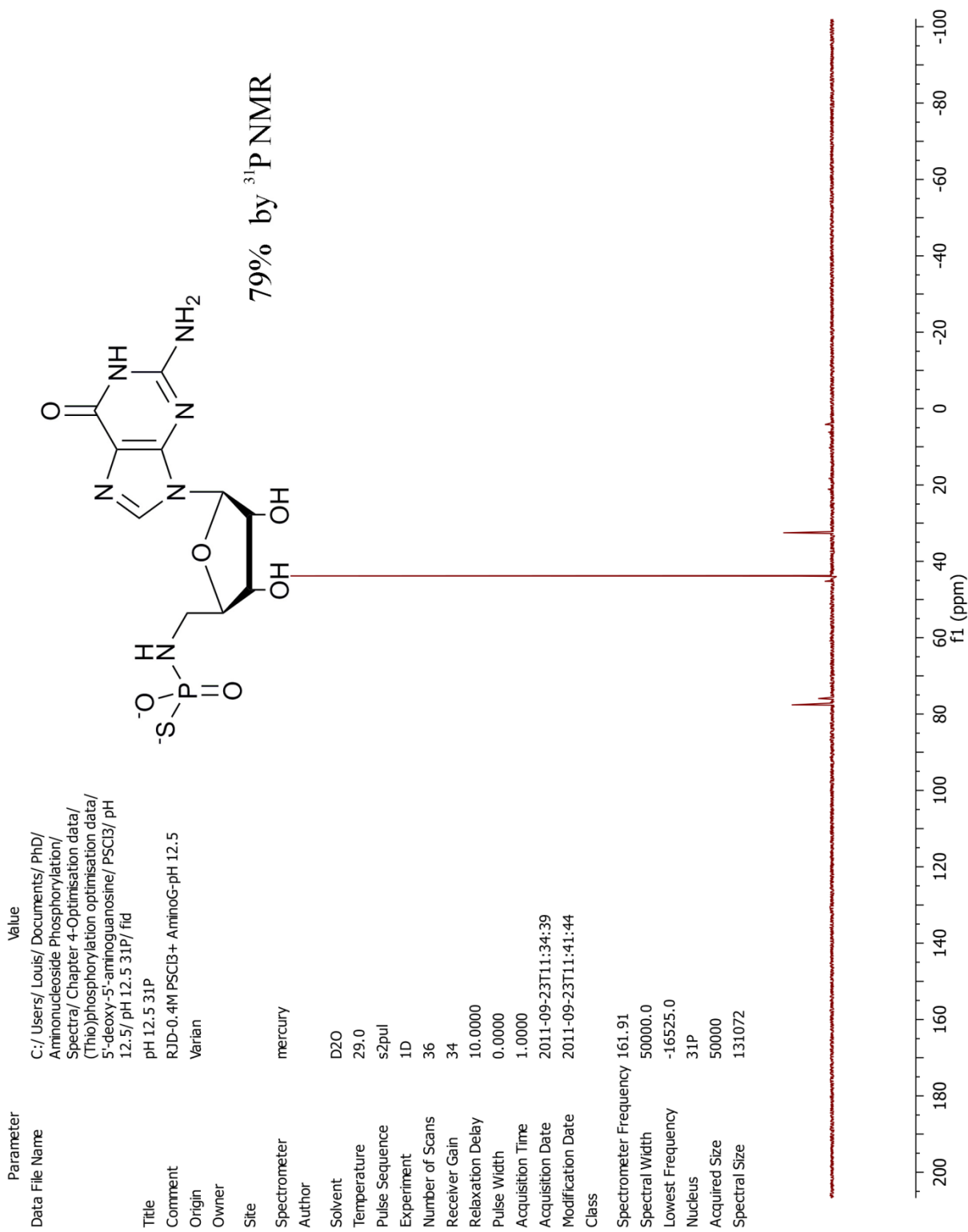
5'-Amino-5'-deoxyguanosine Phosphorylation with PSCl₃, pH 12, ³¹P NMR Spectrum



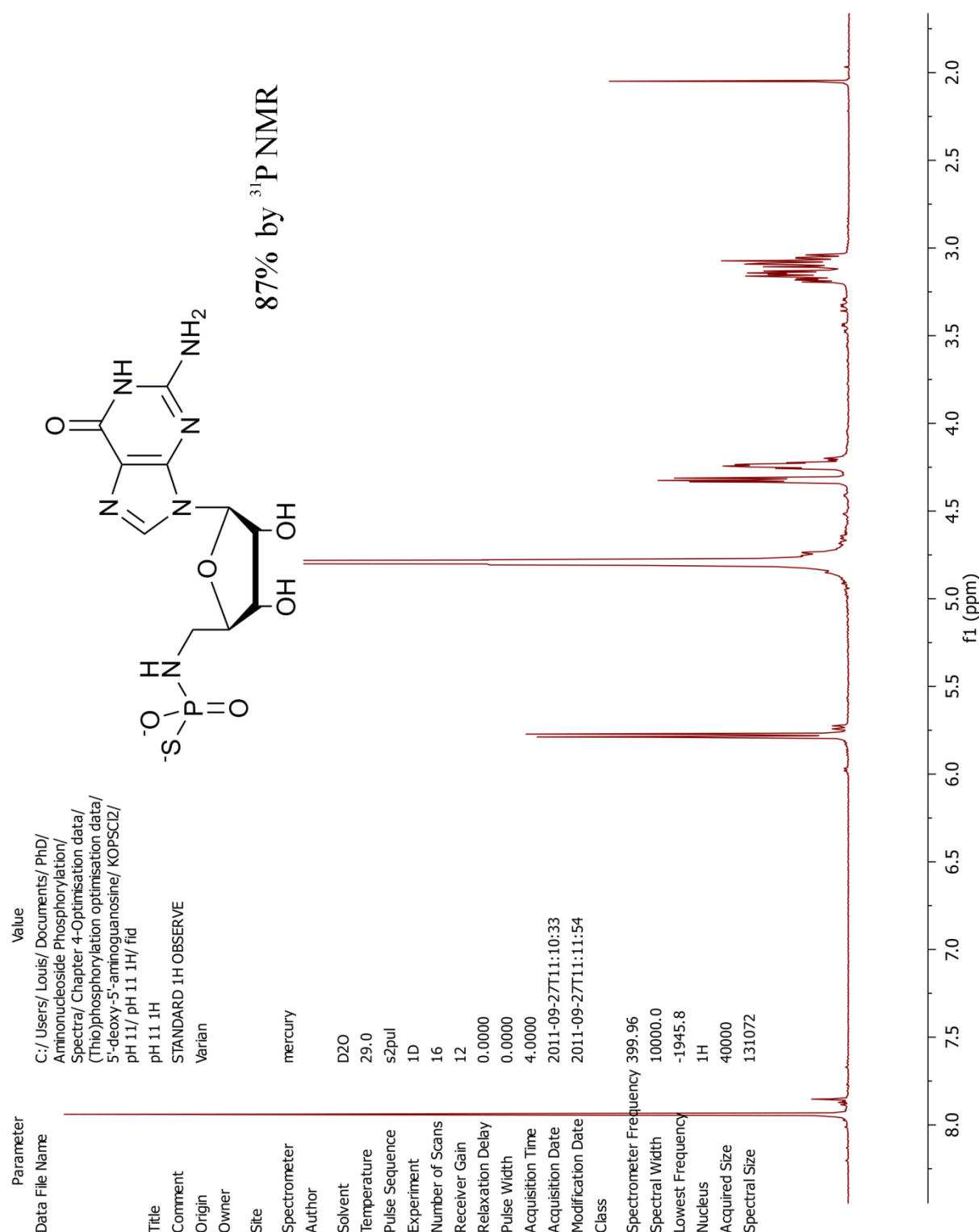
5'-Amino-5'-deoxyguanosine Phosphorylation with PSCl_3 , pH 12.5, ^1H NMR Spectrum



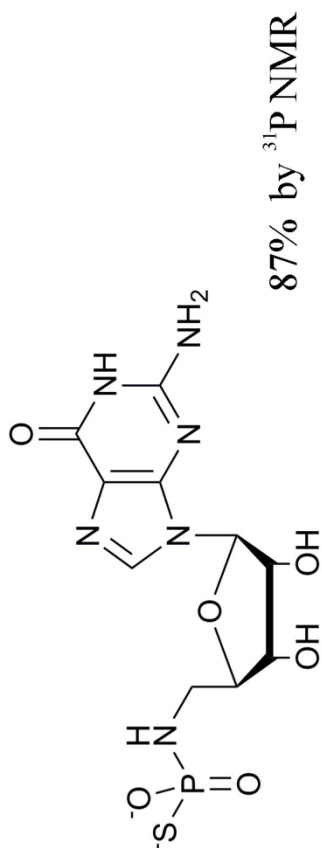
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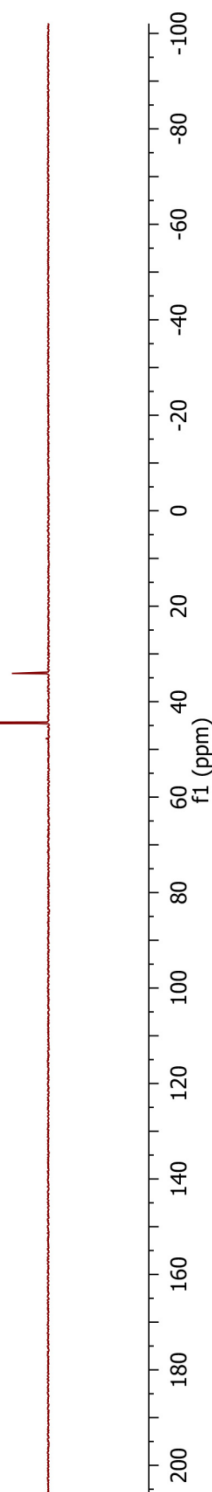
5'-Amino-5'-deoxyguanosine Phosphorylation with KOPSCl₂, pH 11, ¹H NMR Spectrum



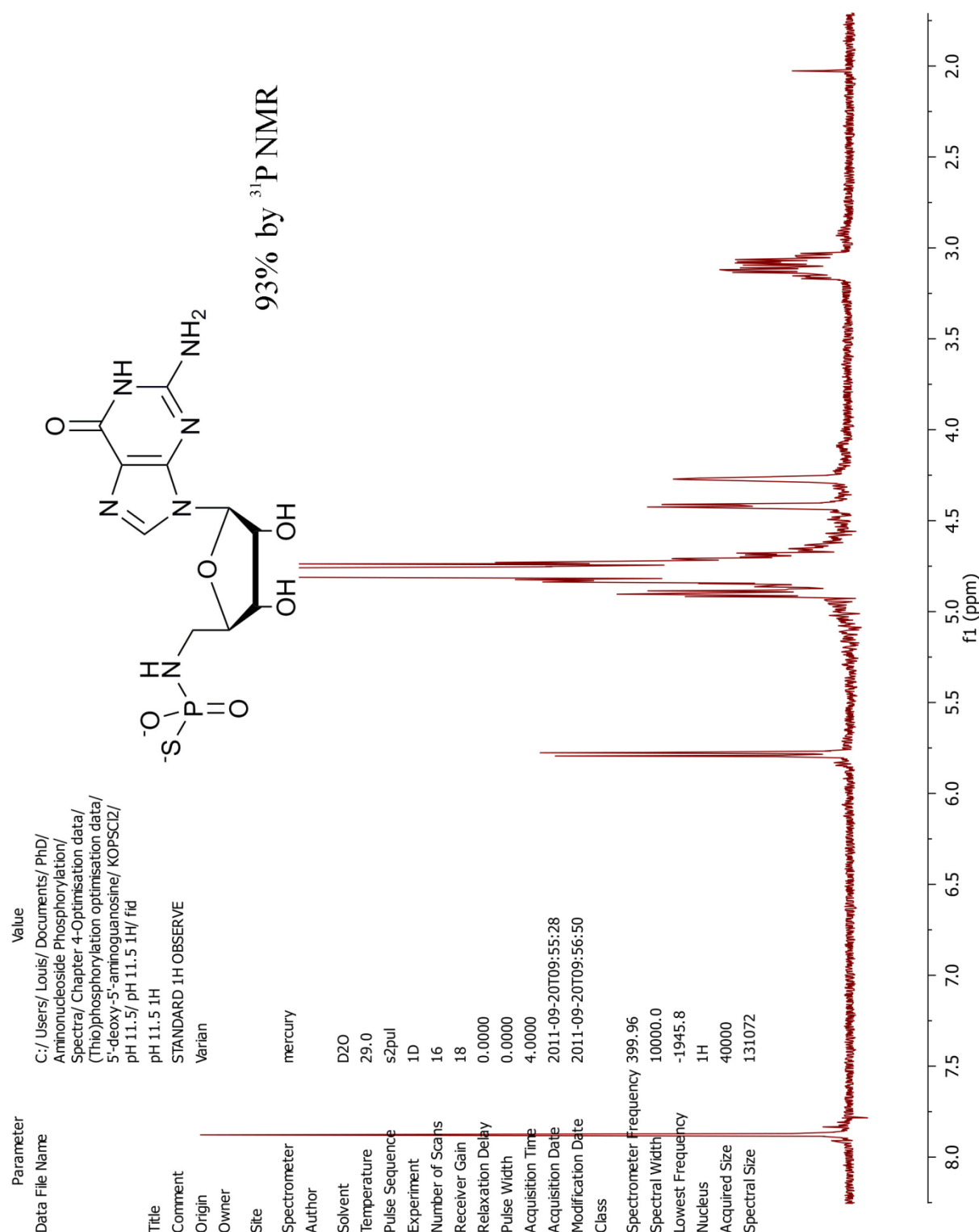
5'-Amino-5'-deoxyguanosine Phosphorylation with KOPSCl₂,
pH 11, ³¹P NMR Spectrum

87% by ^{31}P NMR

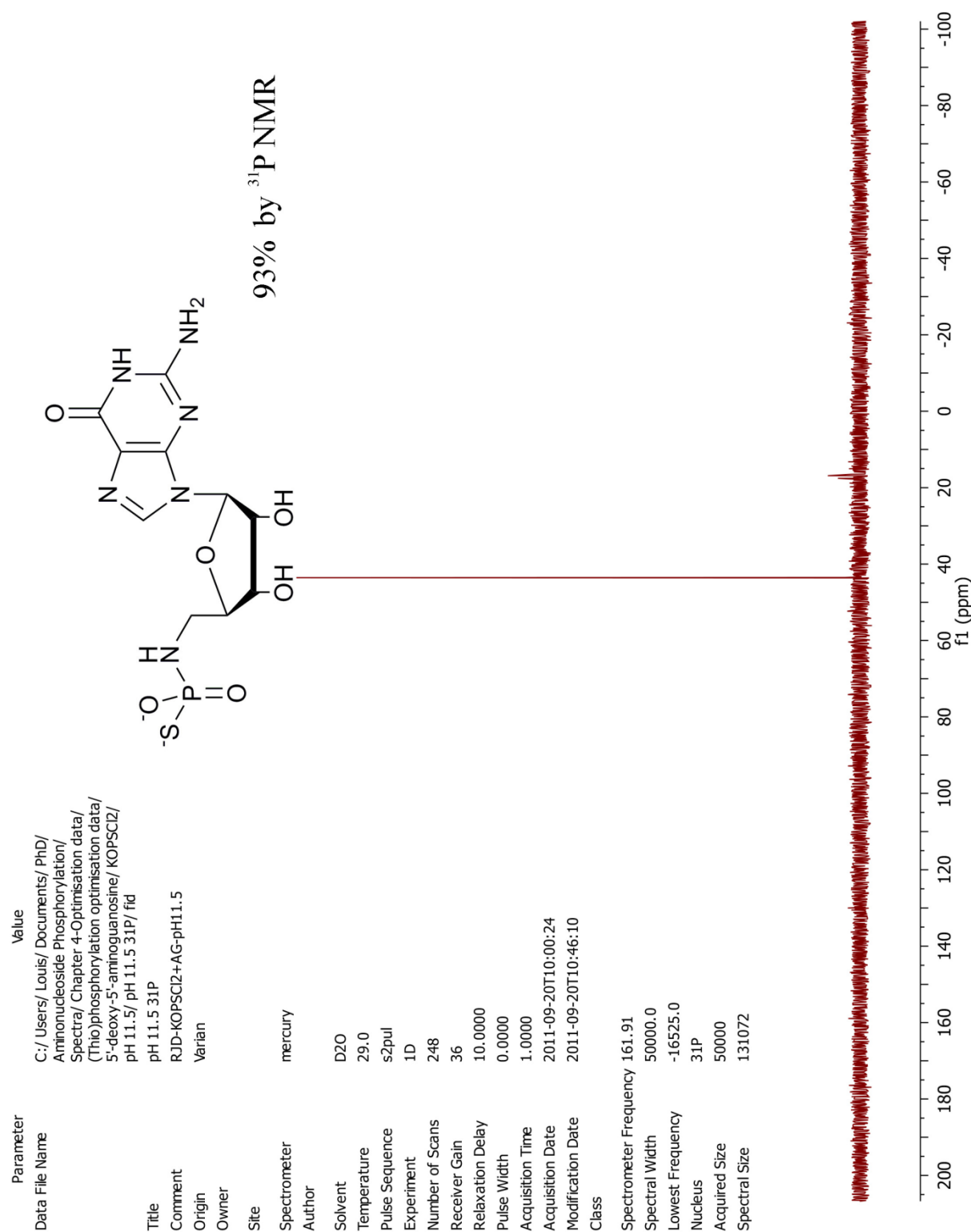
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Owner	
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Author	
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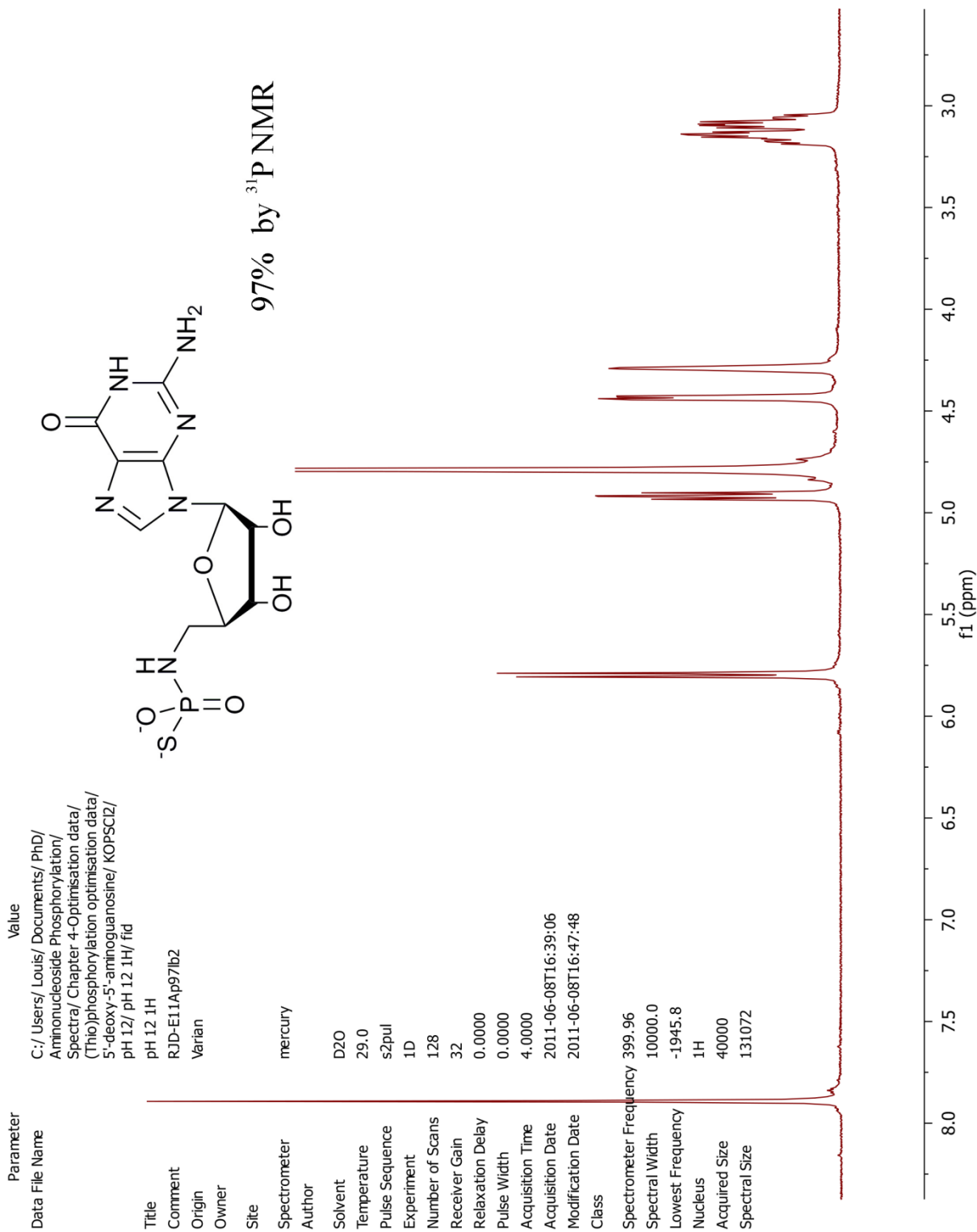
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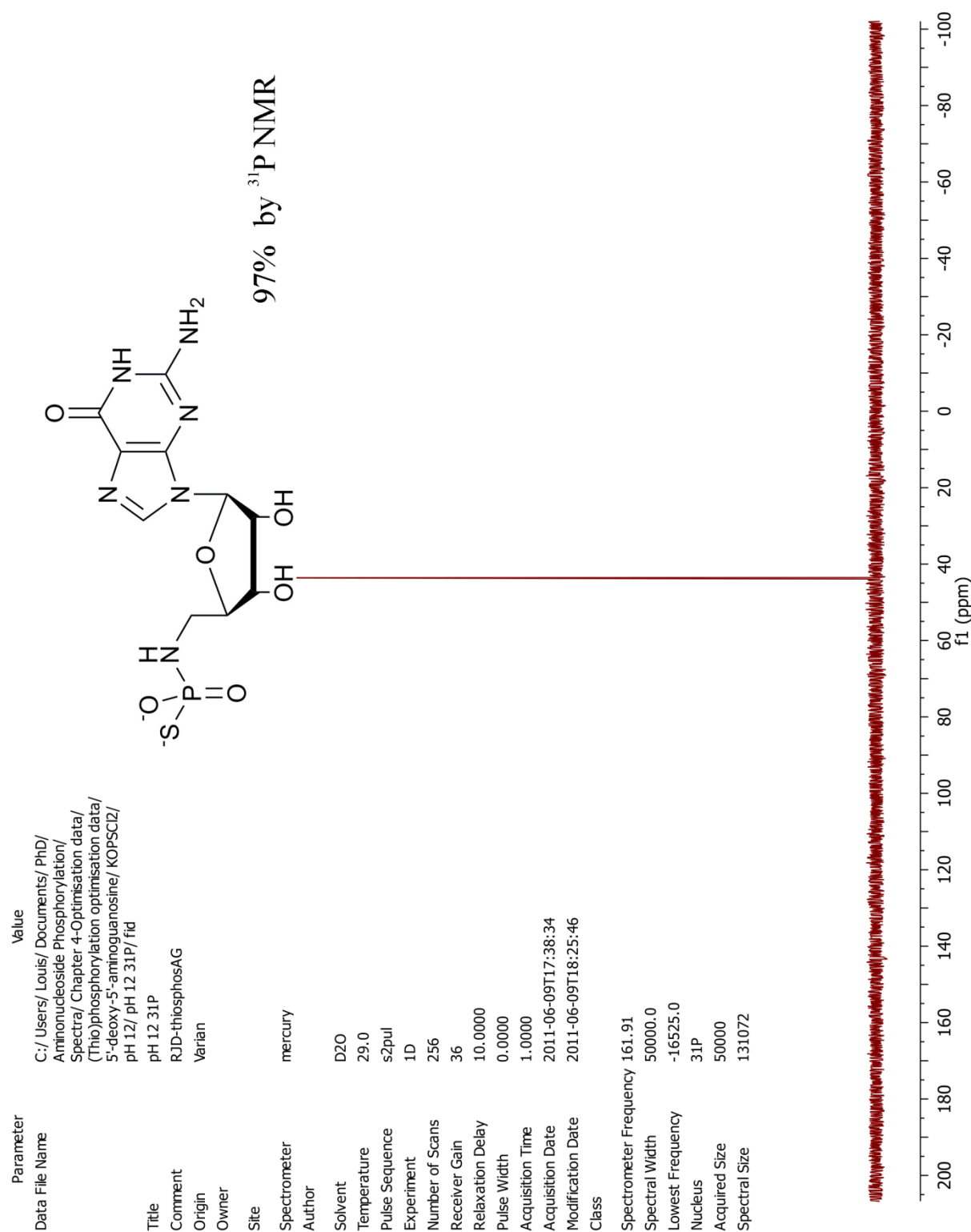
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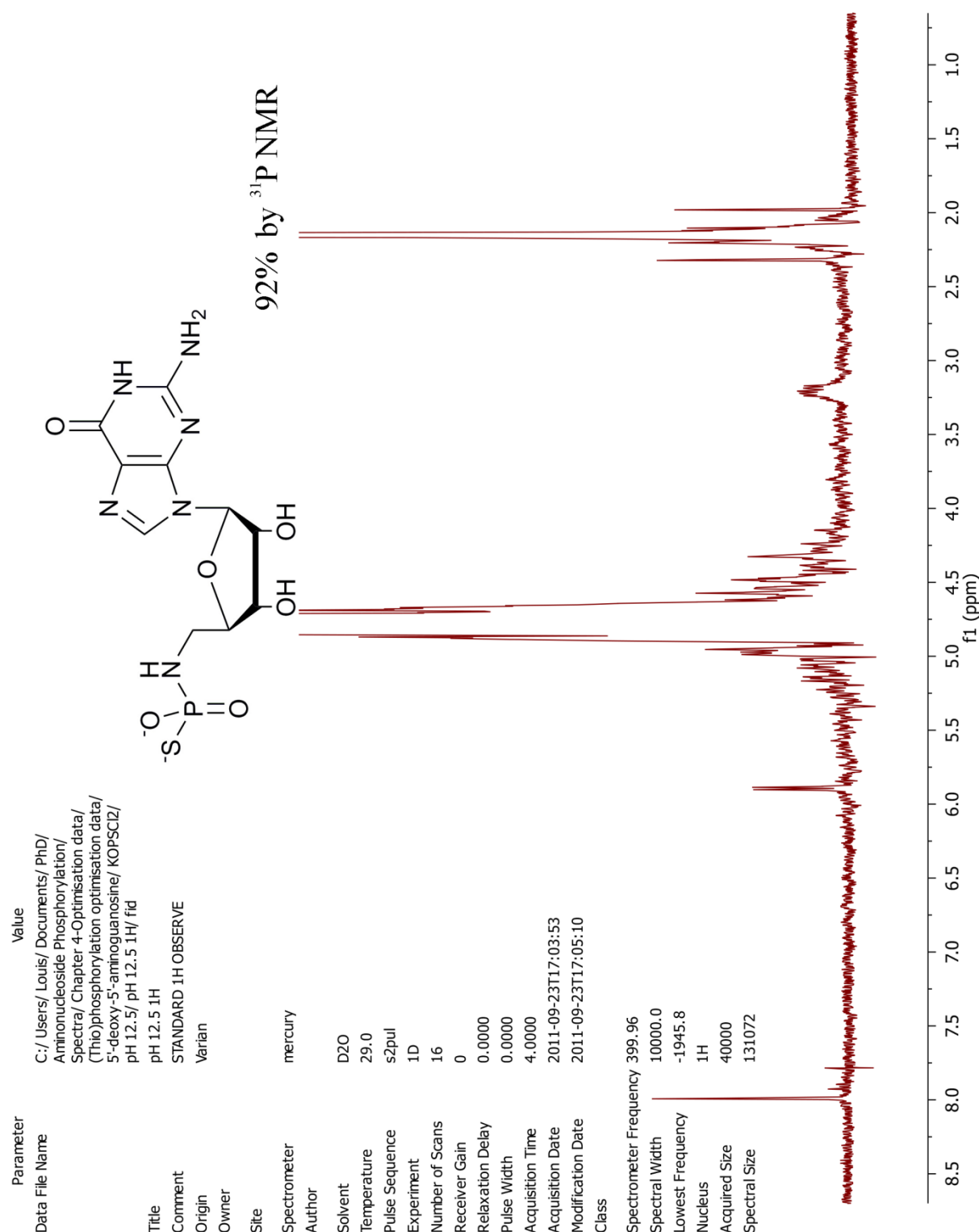
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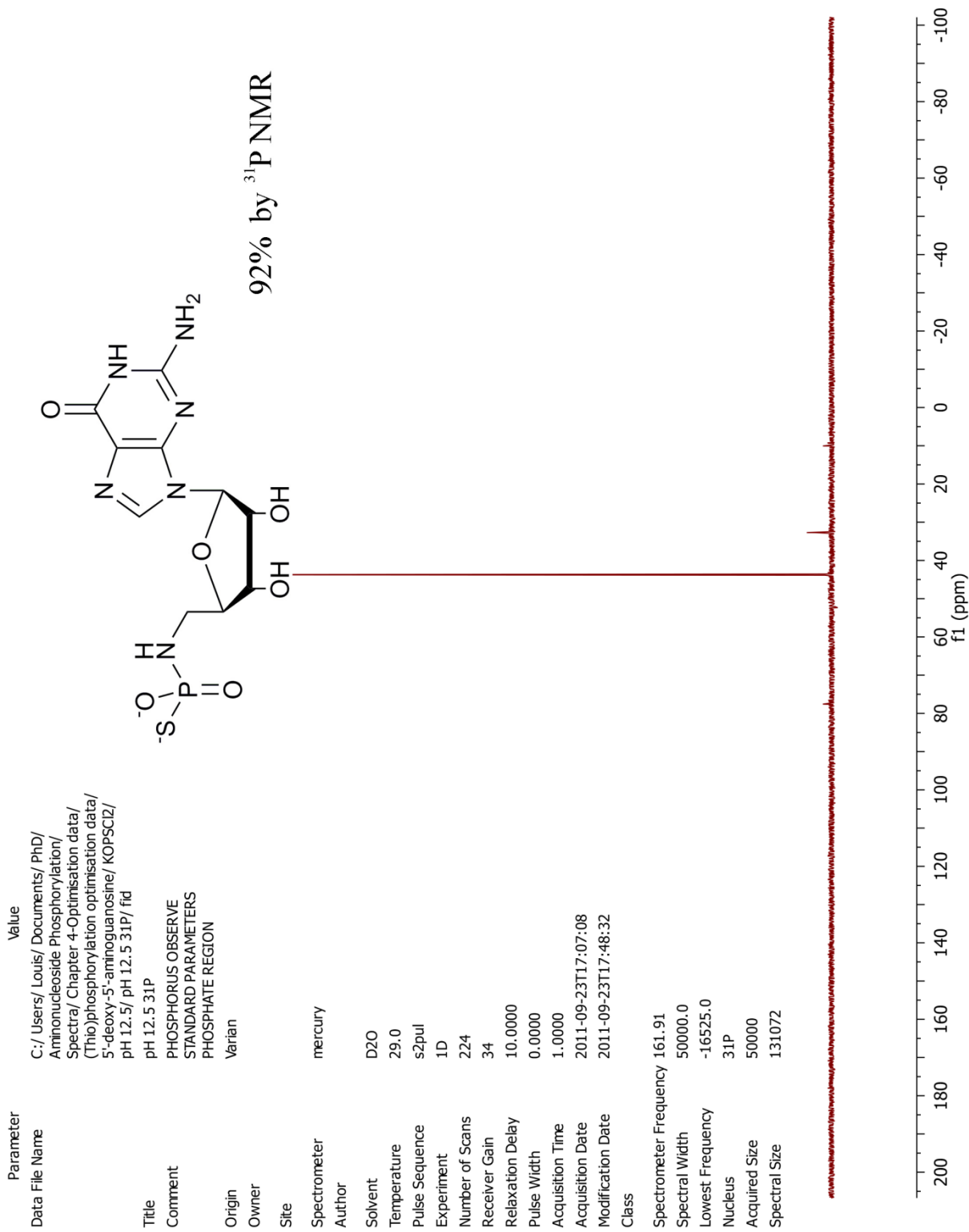
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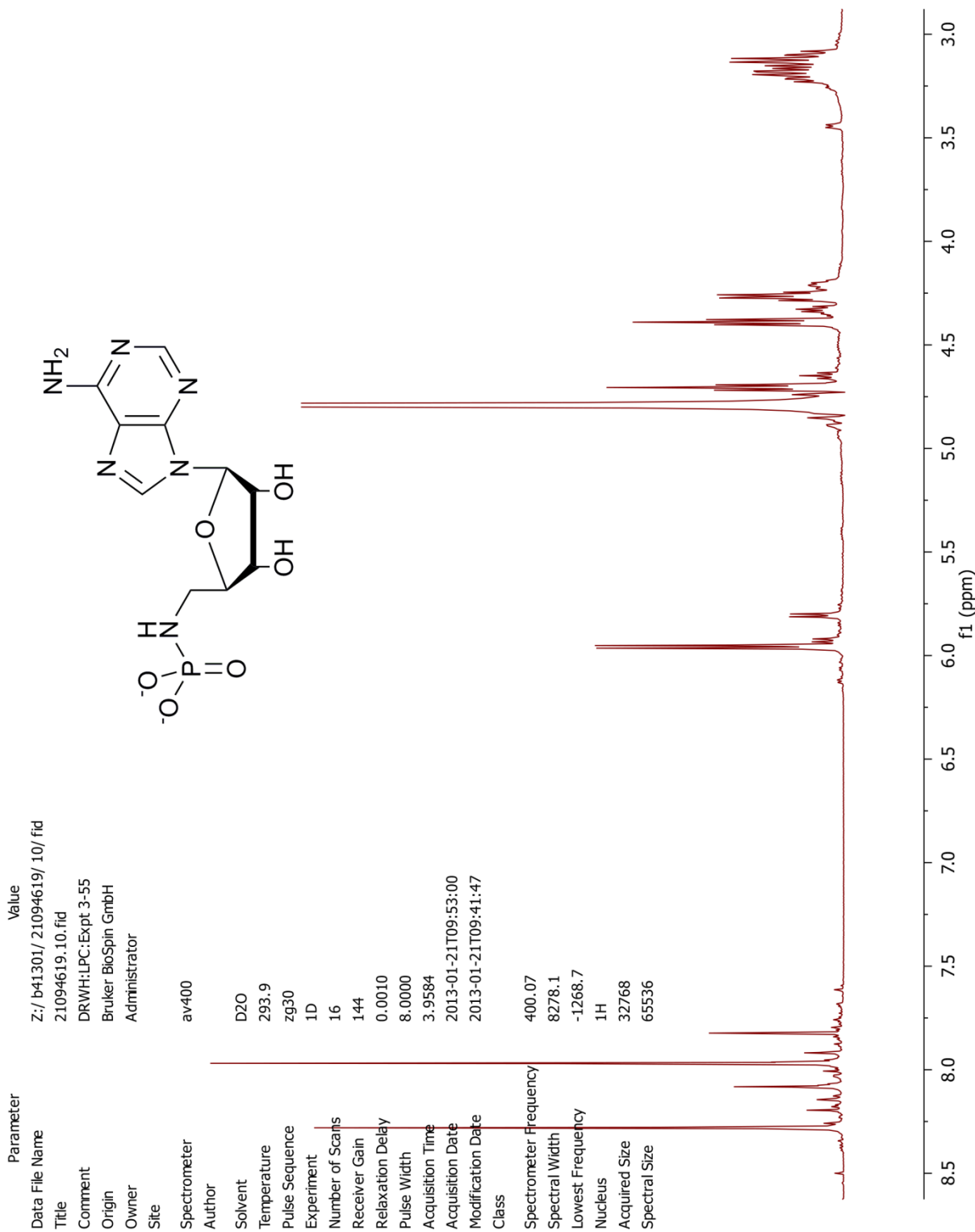
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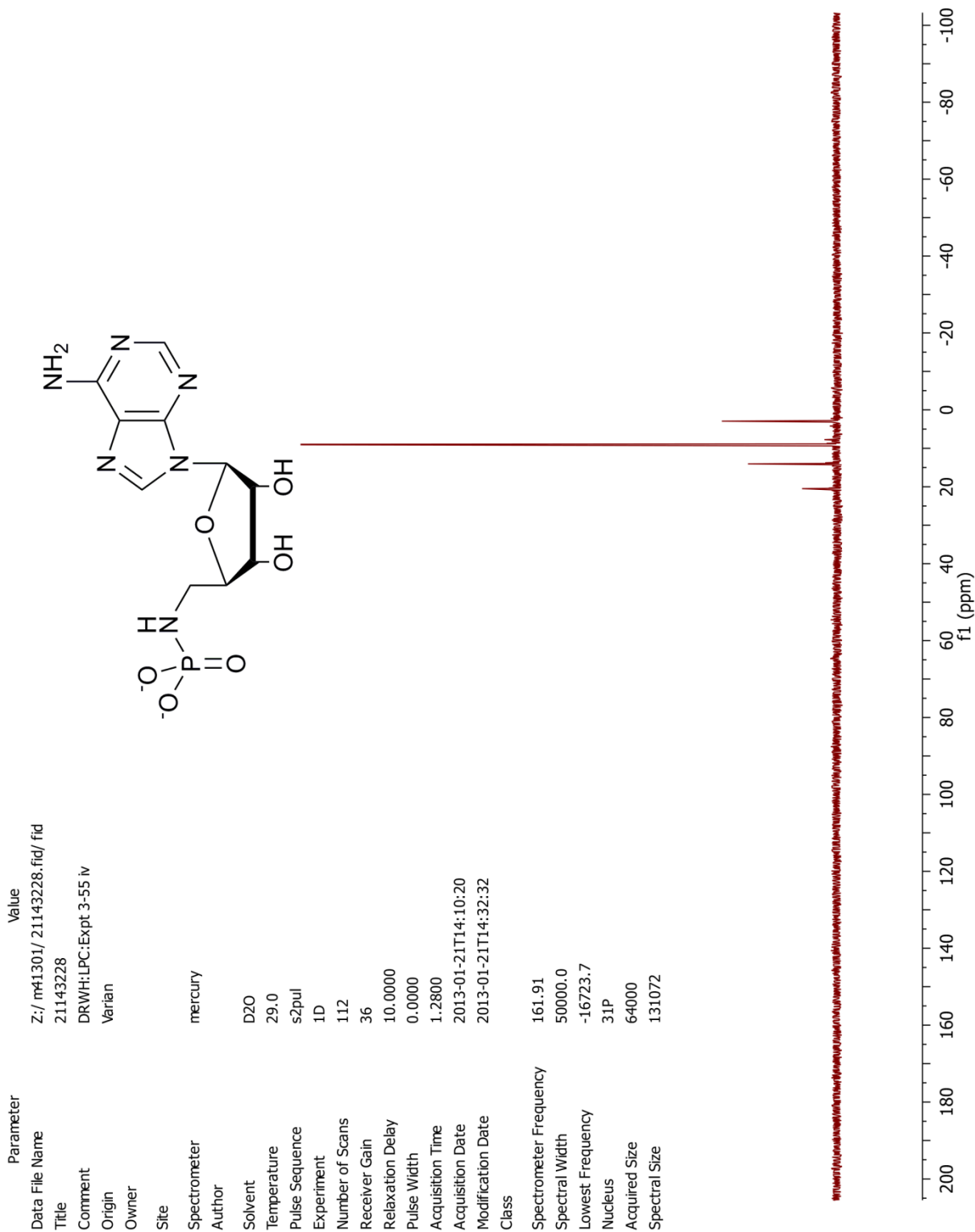
5'-Amino-5'-deoxyguanosine Phosphorylation with KOPSCl₂,
pH 12.5, ³¹P NMR Spectrum



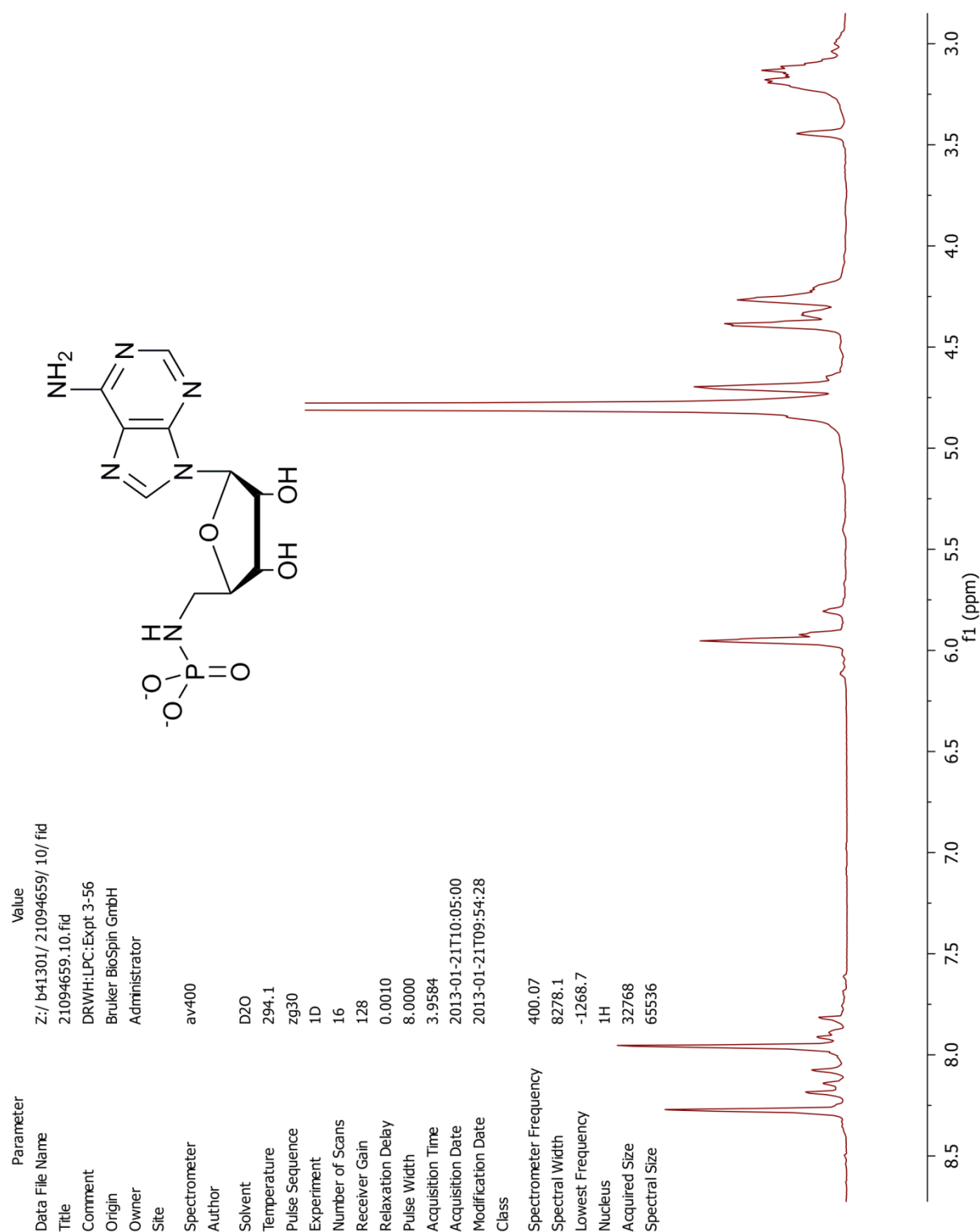
5'-Amino-5'-deoxyadenosine Phosphorylation with POCl₃, pH 12, ¹H NMR Spectrum



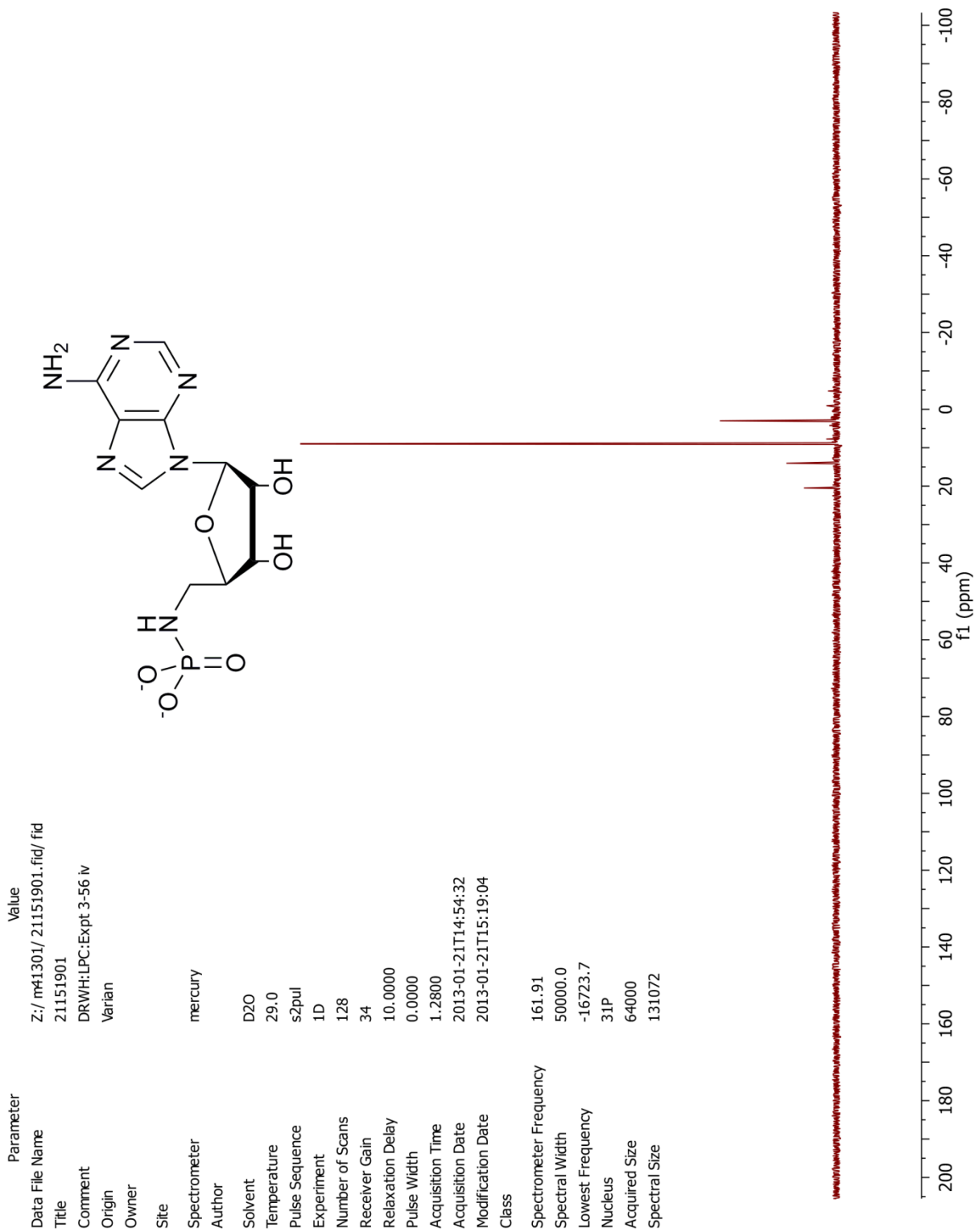
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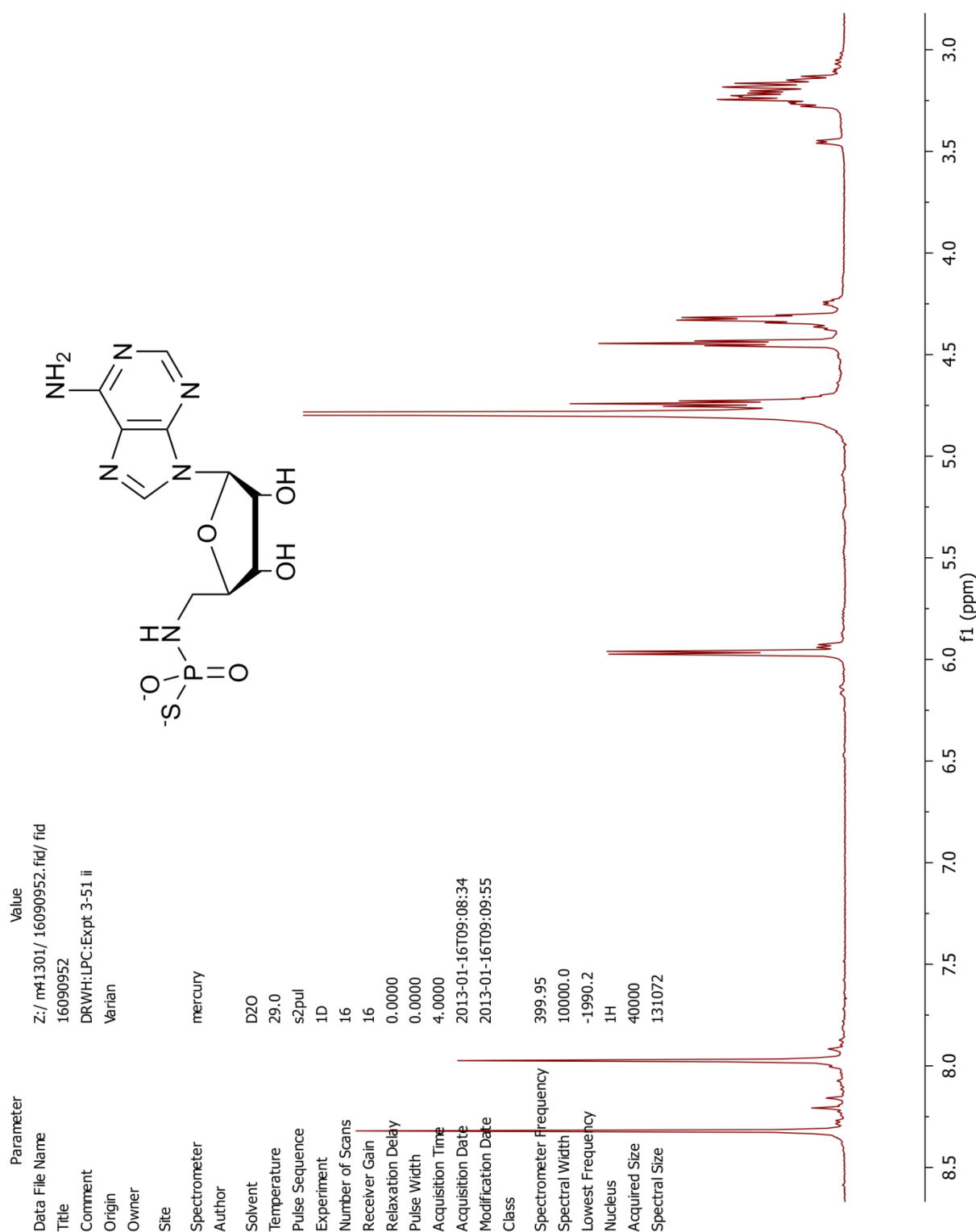
5'-Amino-5'-deoxyadenosine Phosphorylation with KOPOCl_2 , pH 12, ^1H NMR Spectrum



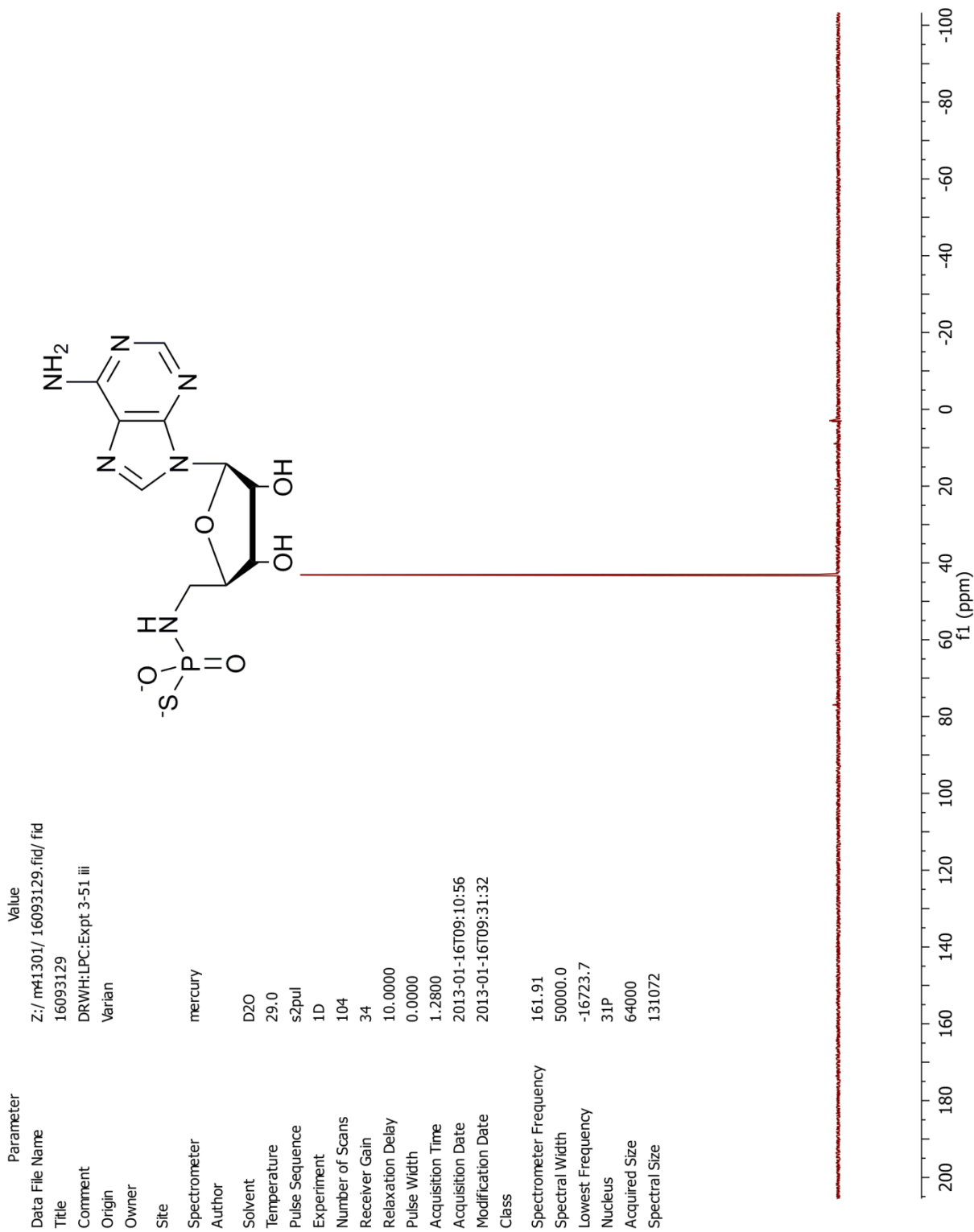
5'-Amino-5'-deoxyadenosine Phosphorylation with KOPOCl_2 ,
pH 12, ^{31}P NMR Spectrum



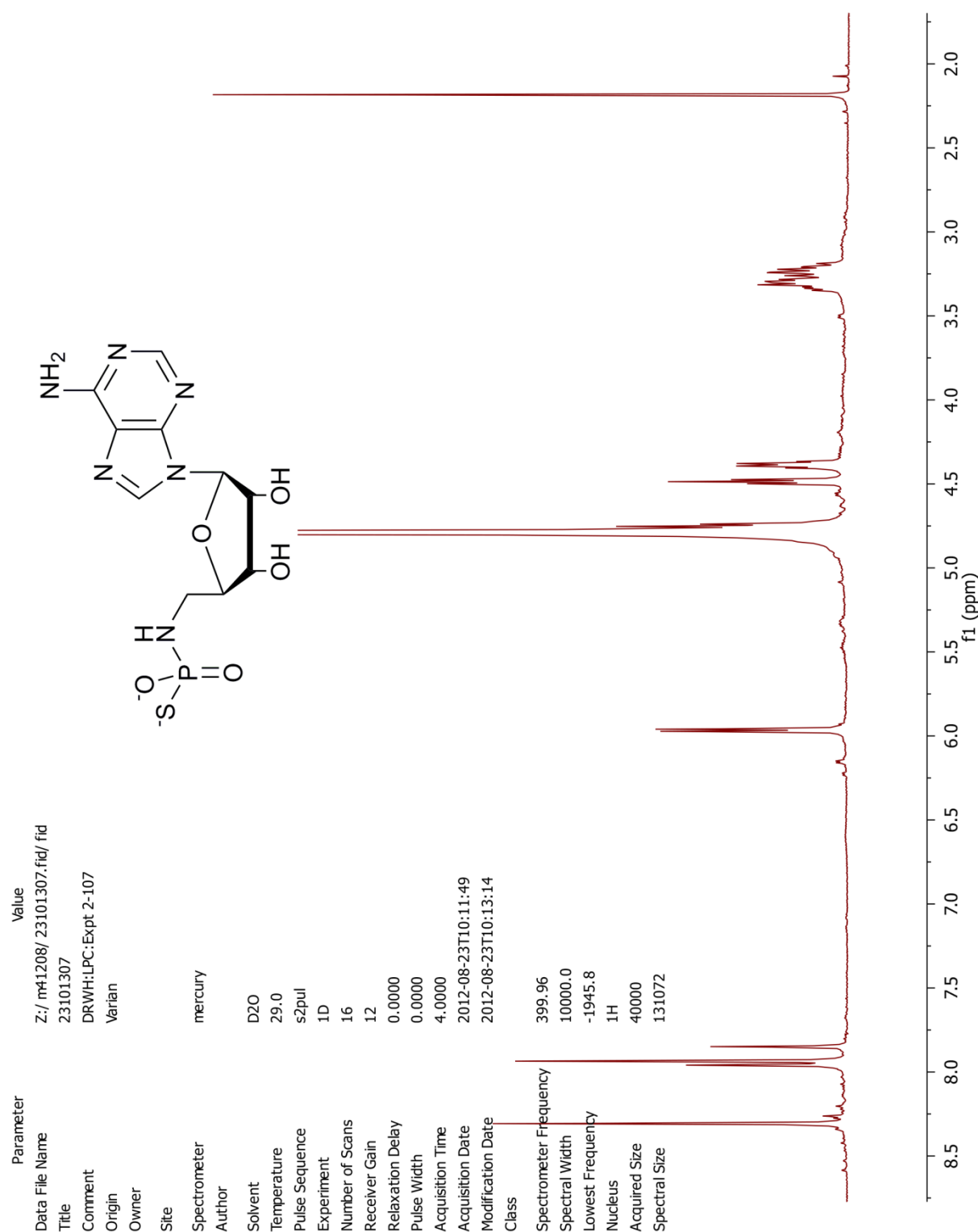
5'-Amino-5'-deoxyadenosine Phosphorylation with PSCl_3 , pH 12, ^1H NMR Spectrum



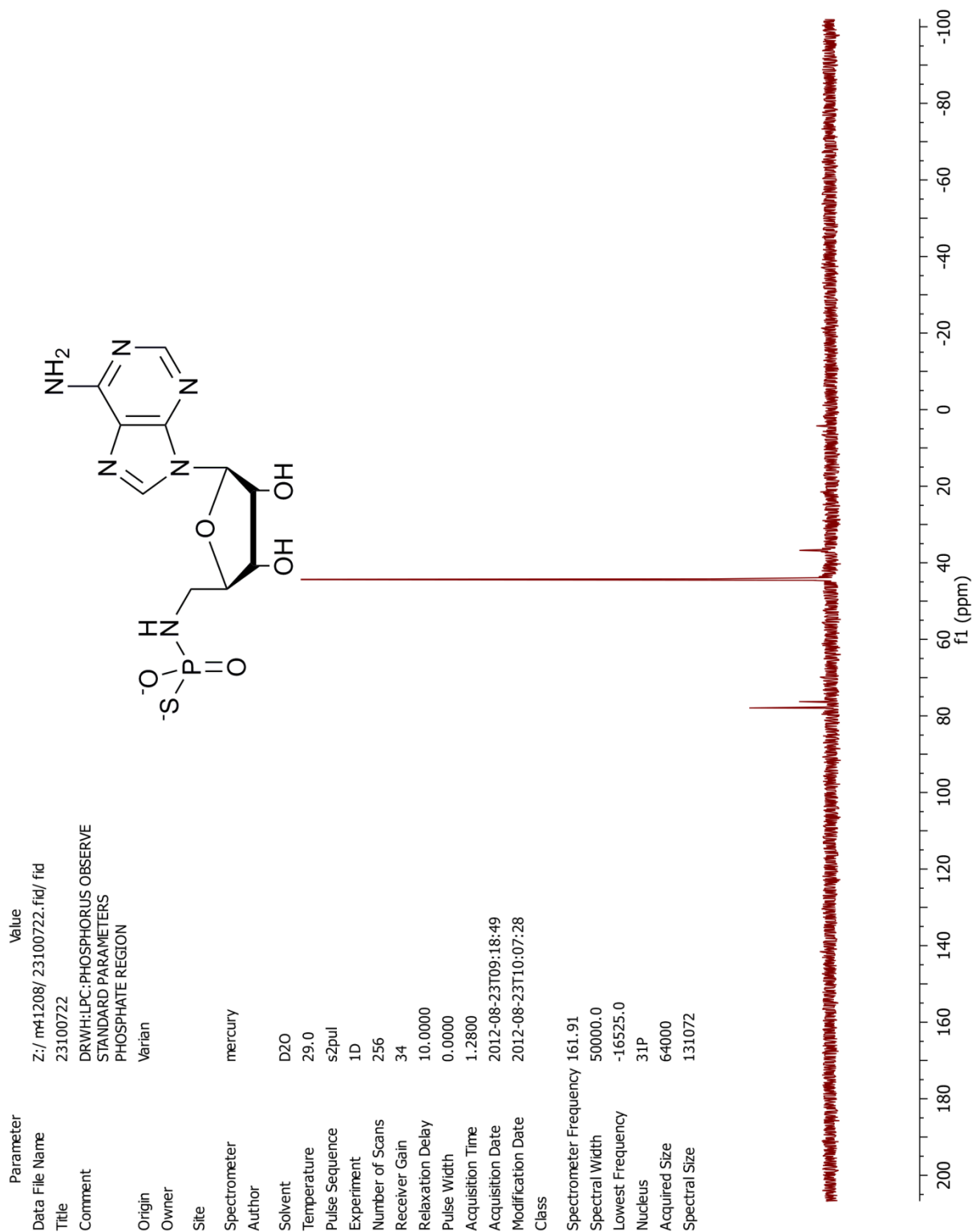
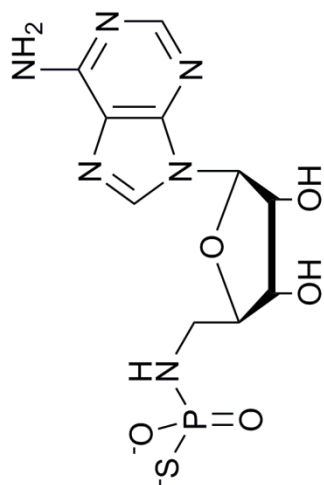
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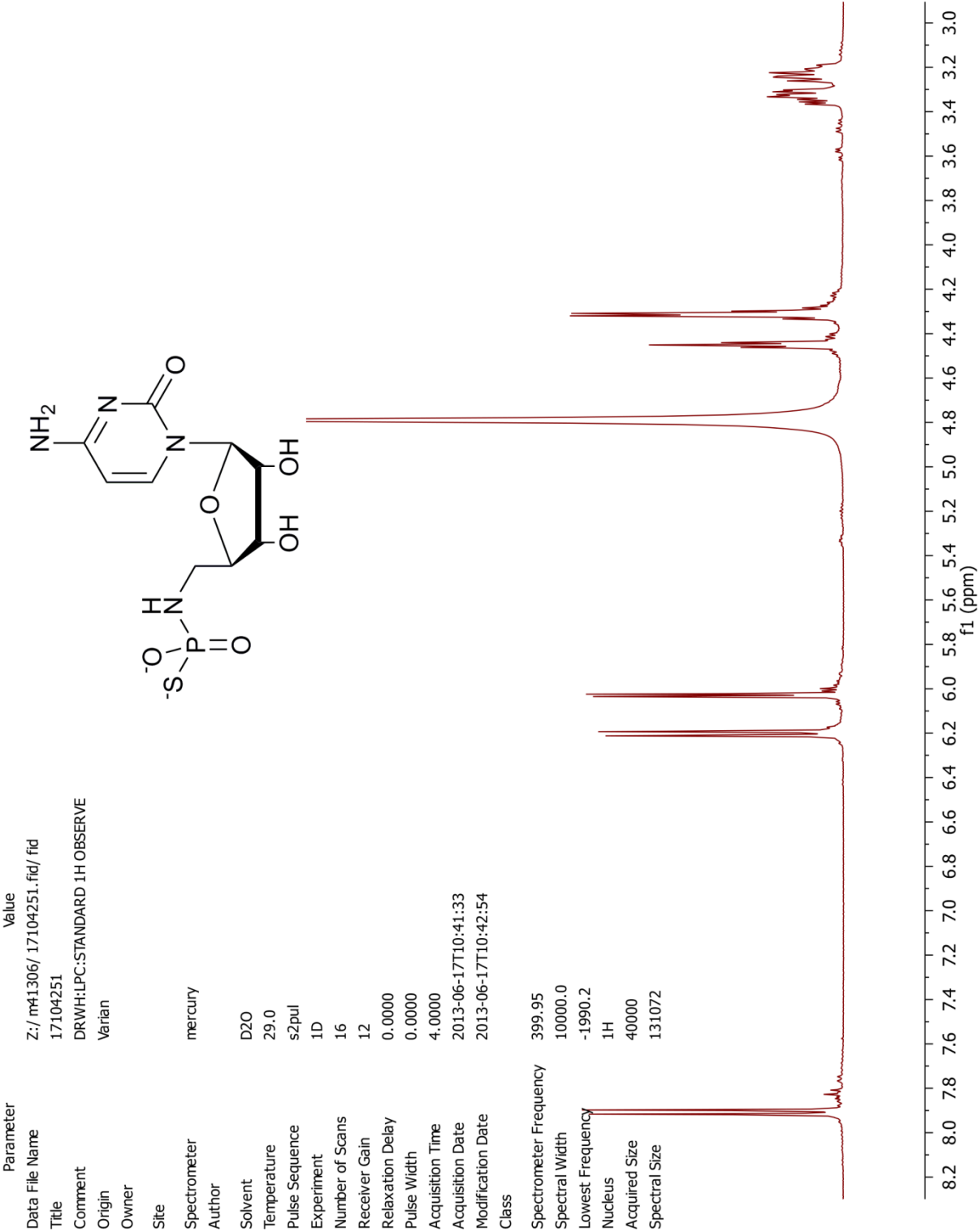
5'-Amino-5'-deoxyadenosine Phosphorylation with KOPSCl₂, pH 12, ¹H NMR Spectrum



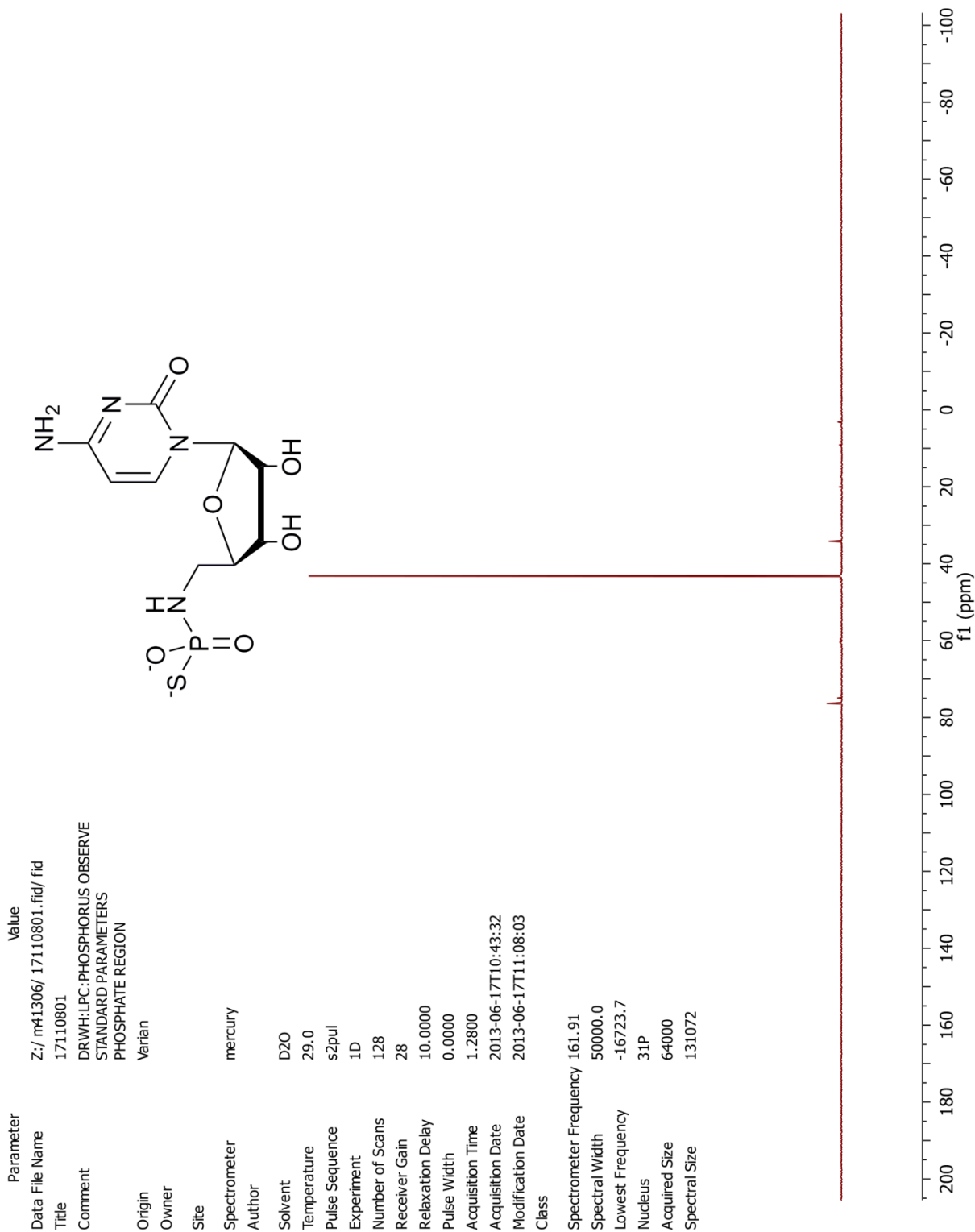
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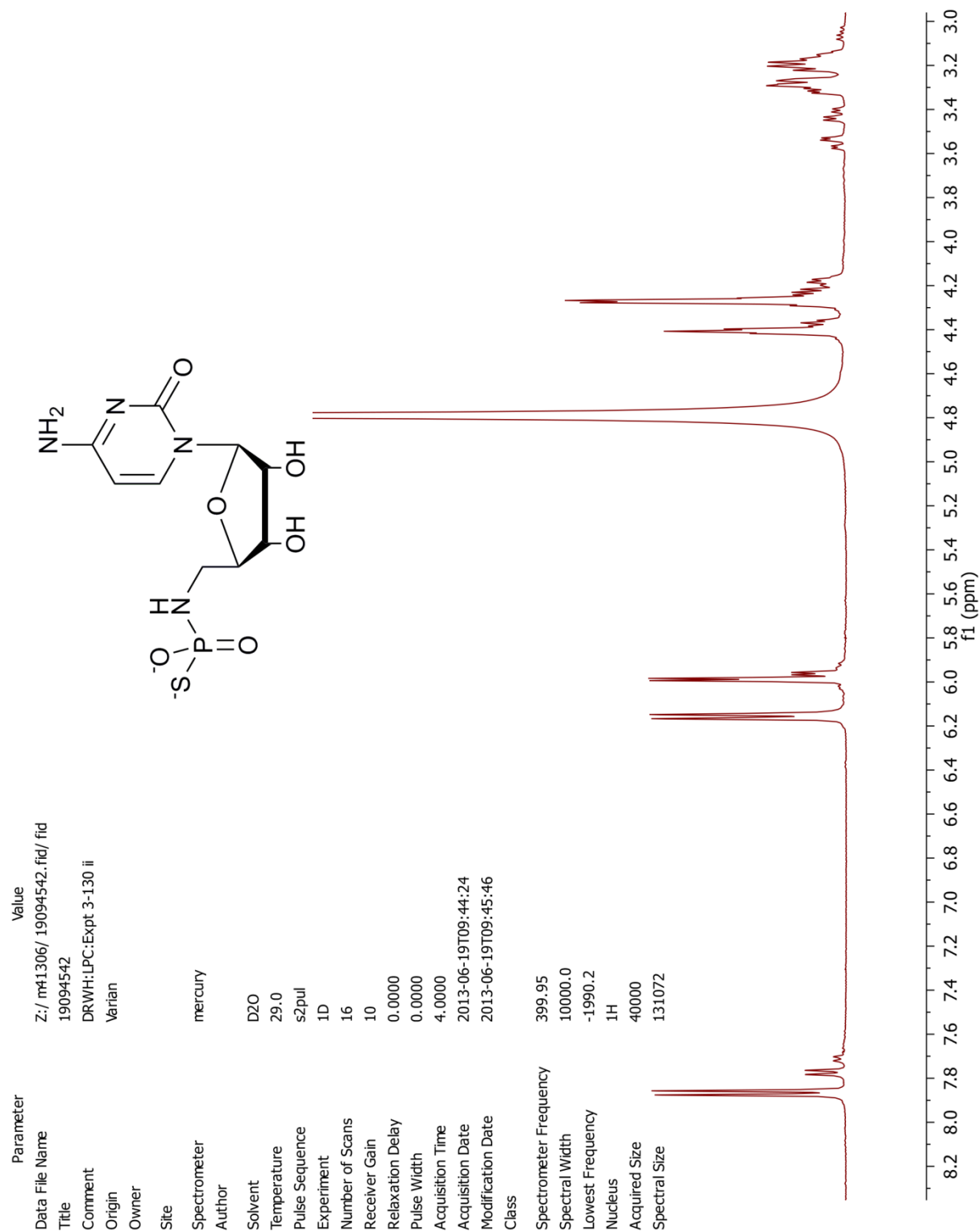
5'-Amino-5'-deoxycytidine Phosphorylation with PSCl_3 , pH 12, ^1H NMR Spectrum



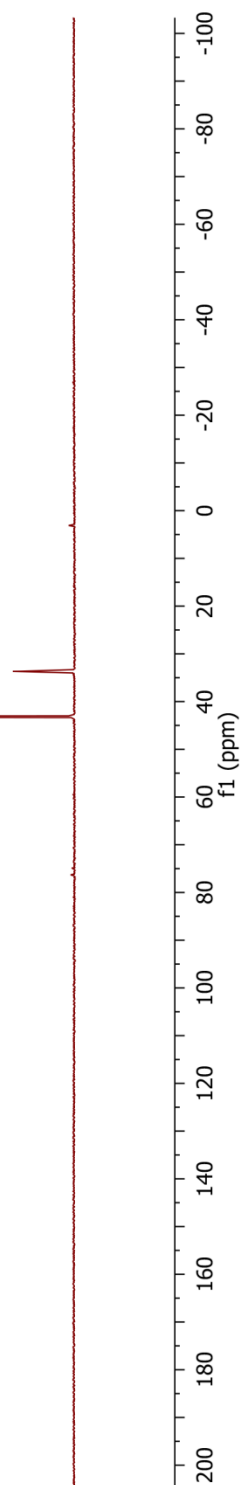
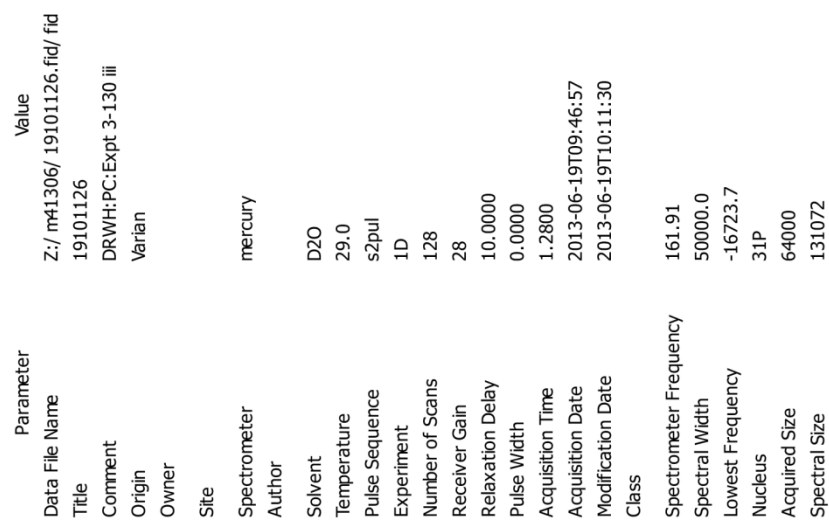
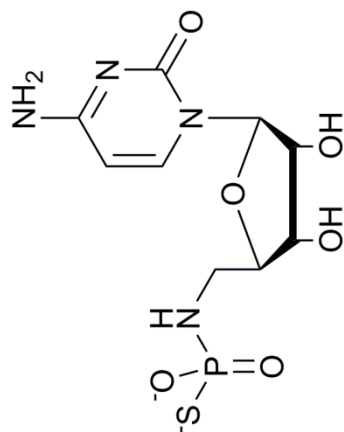
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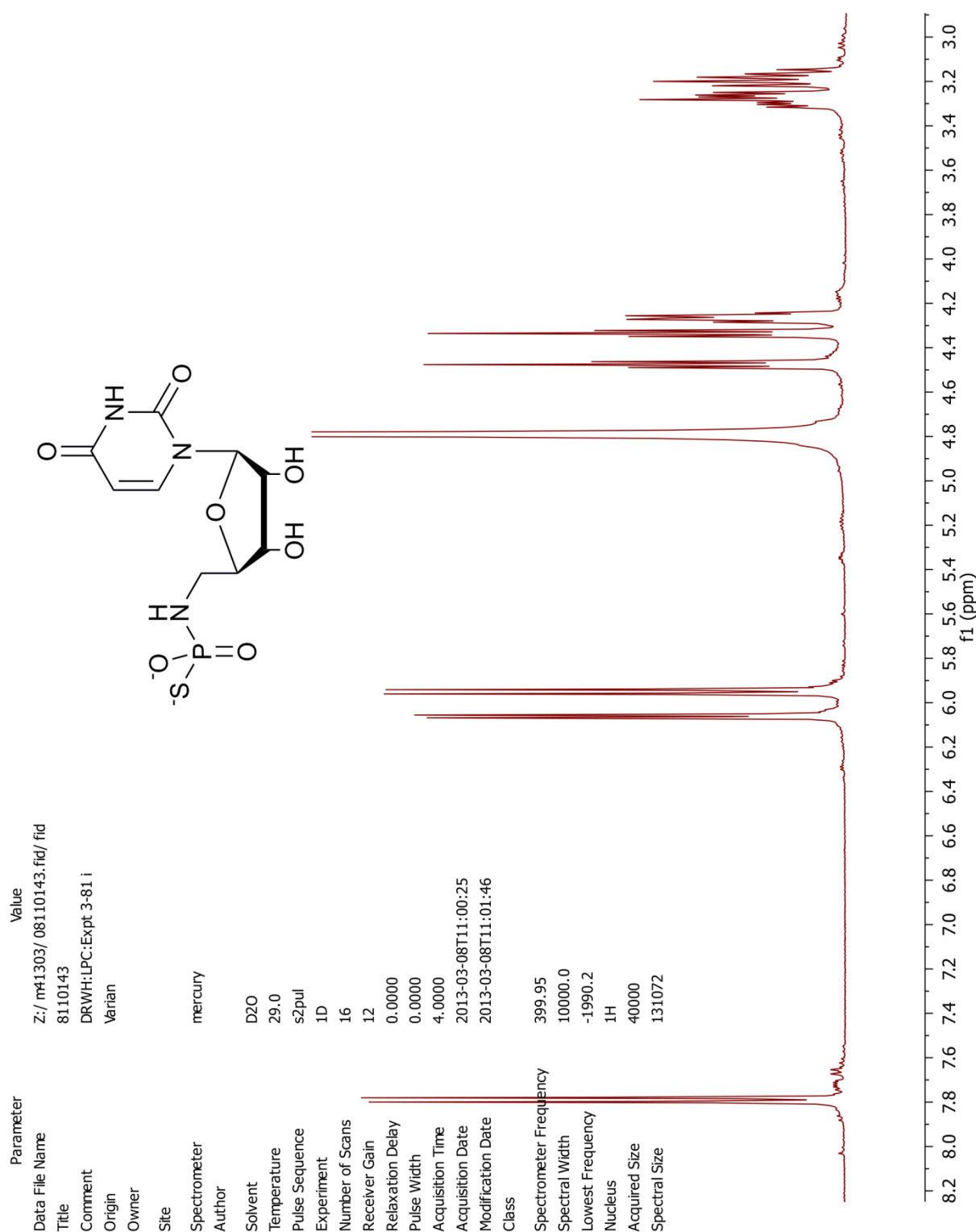
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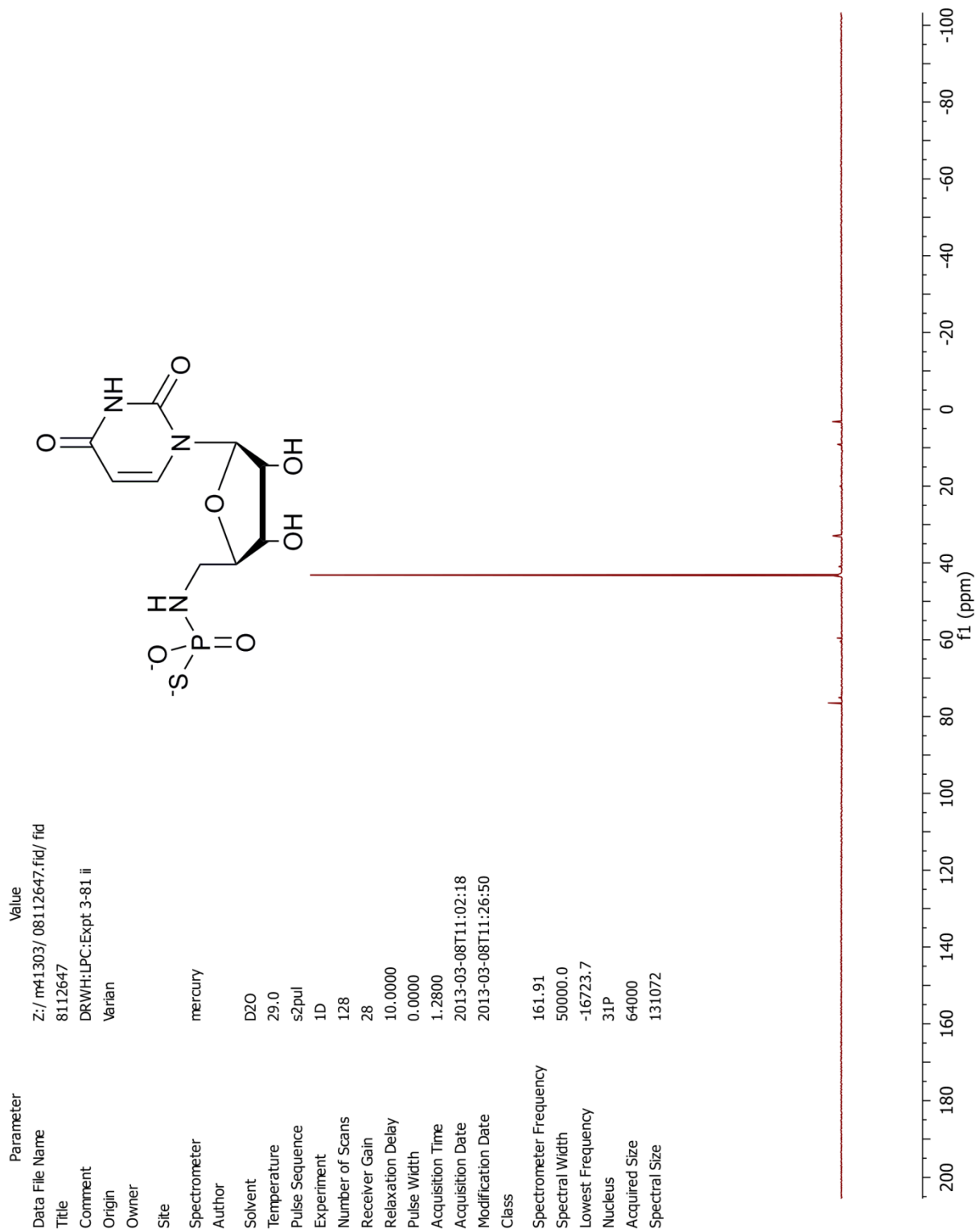
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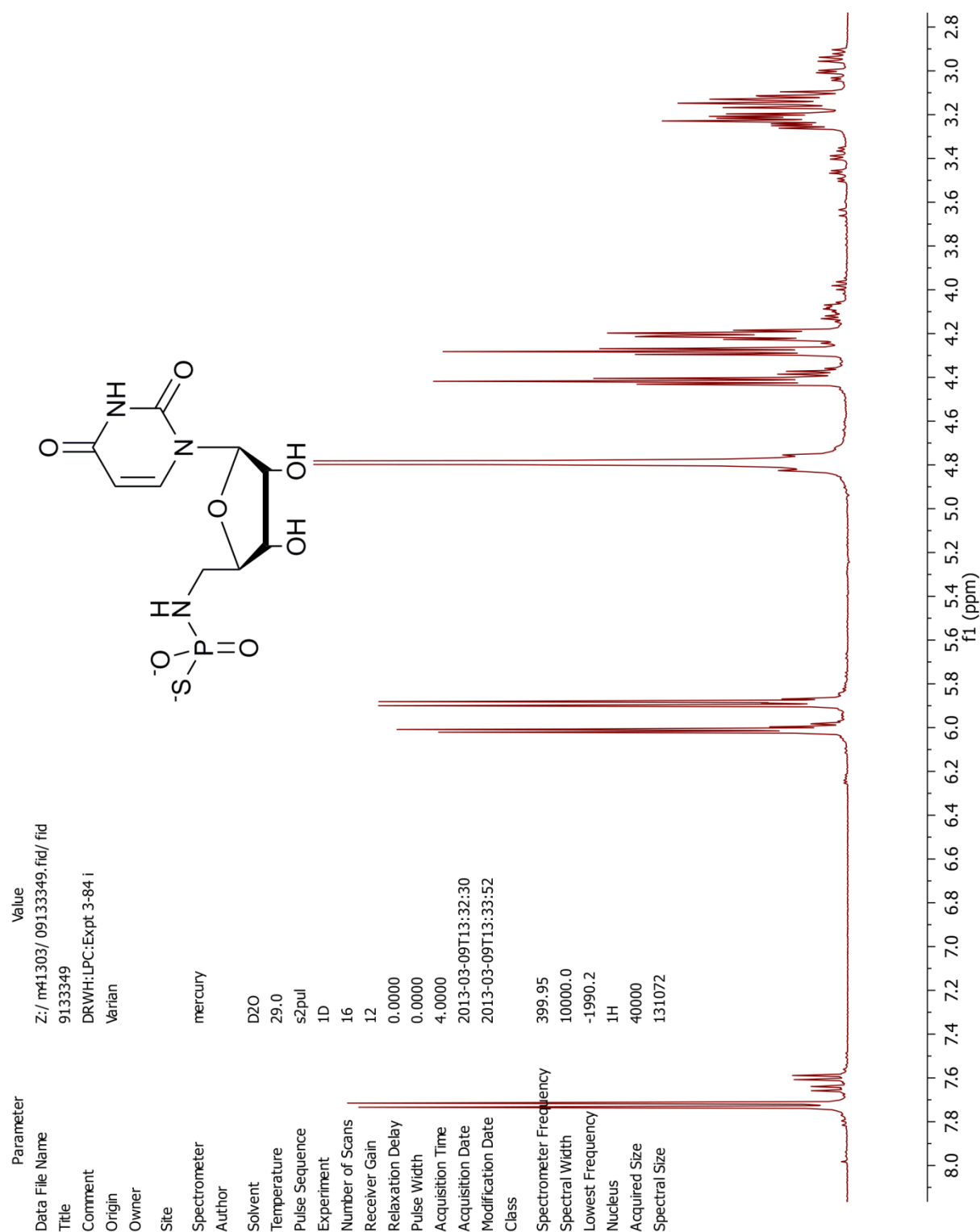
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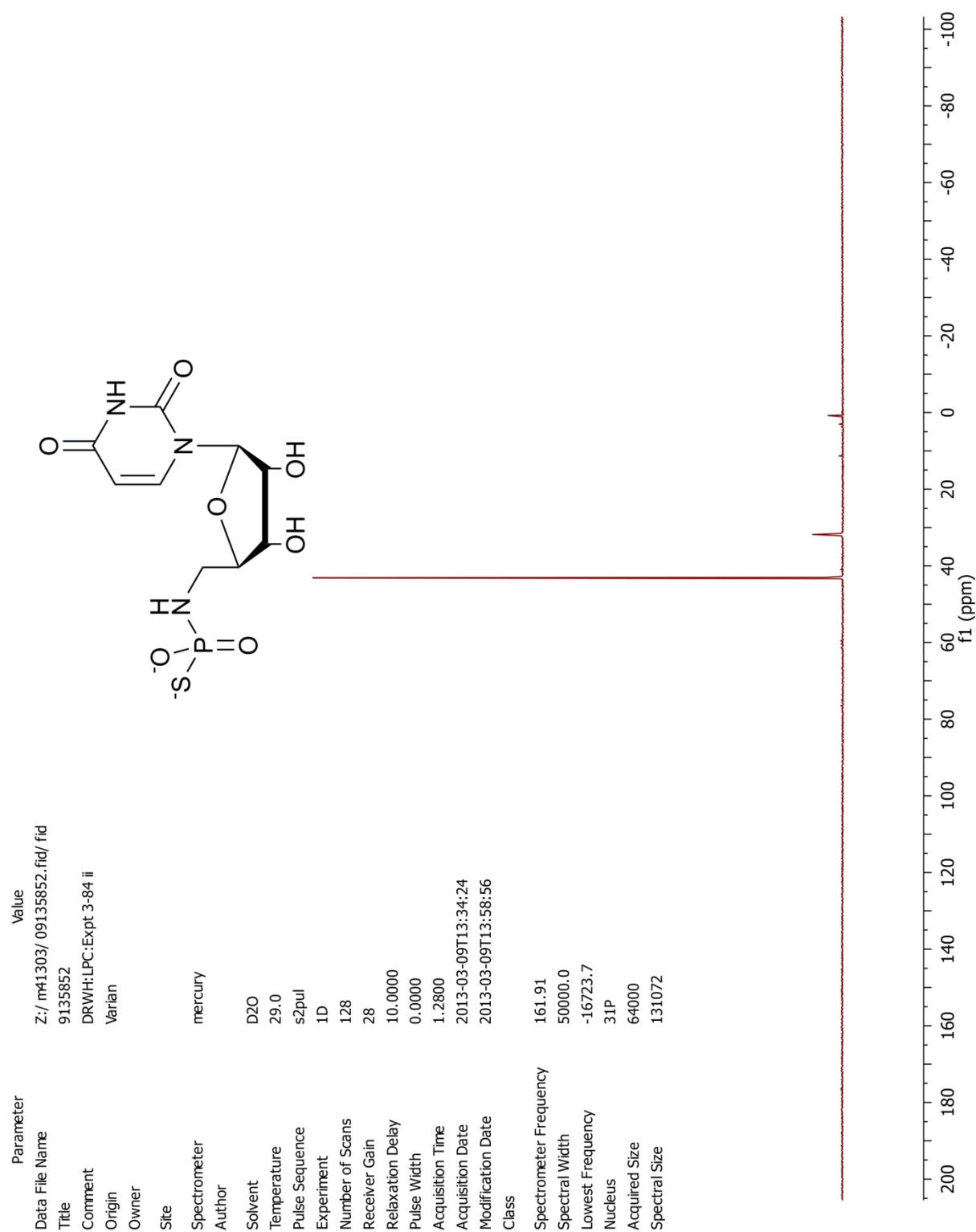
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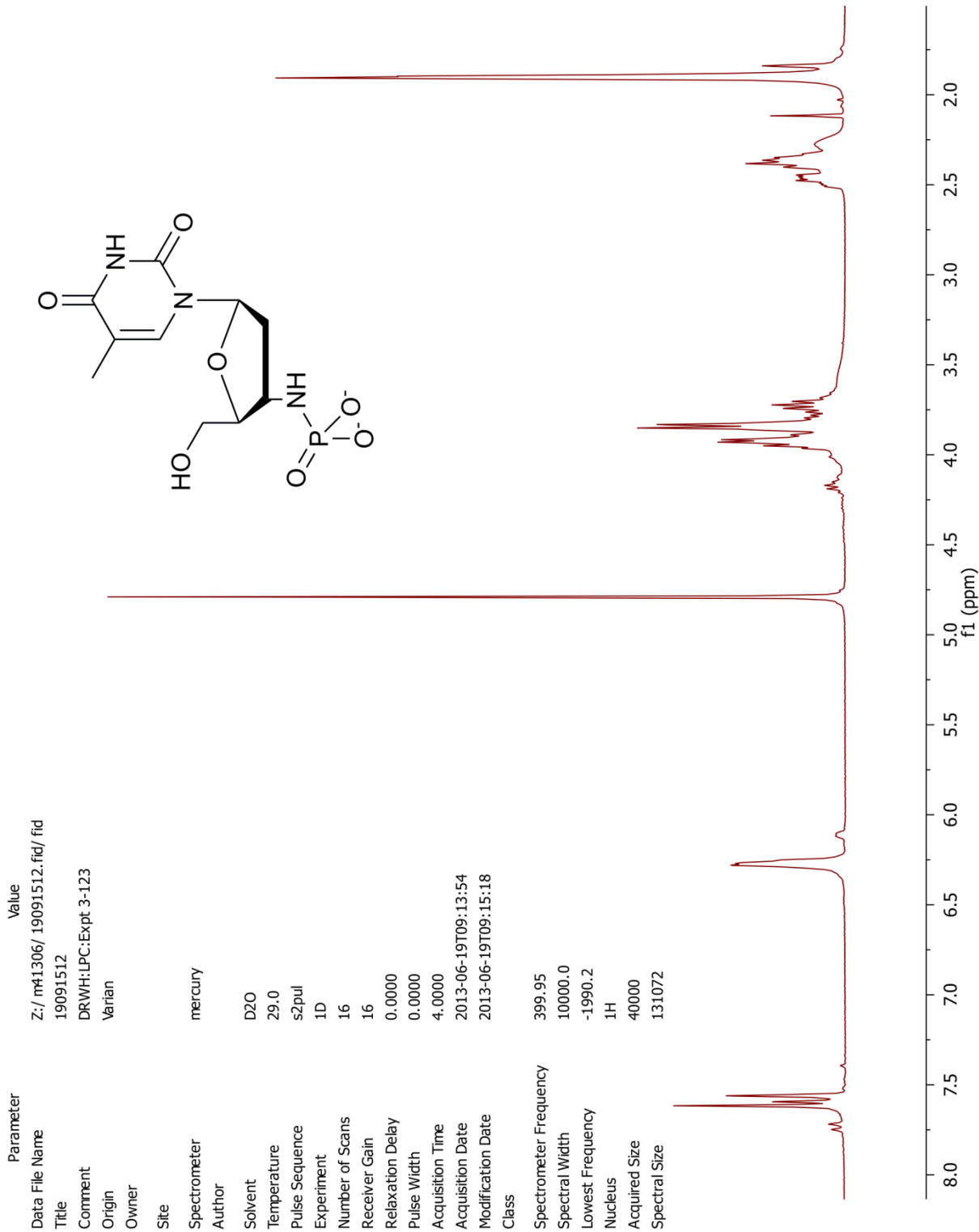
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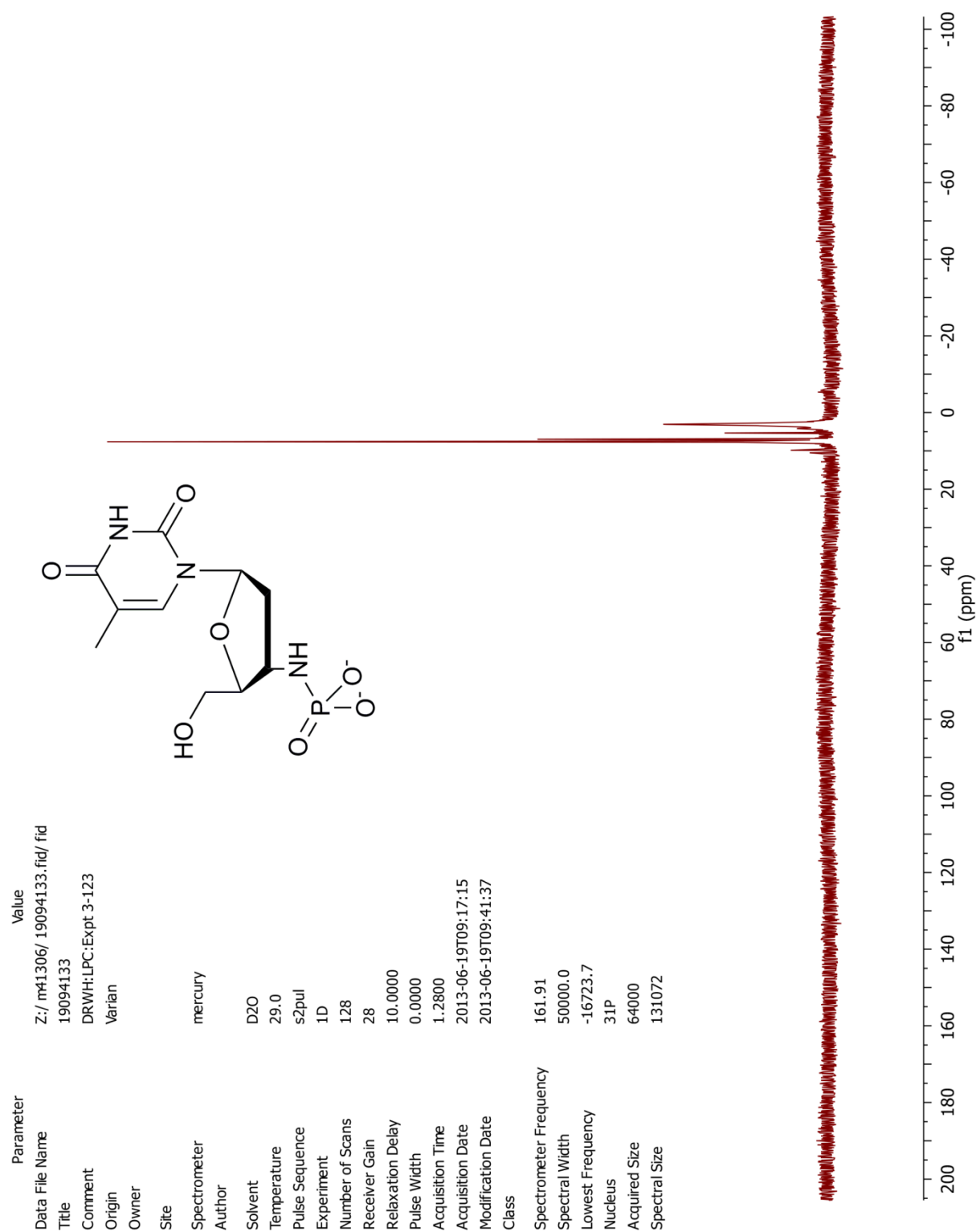
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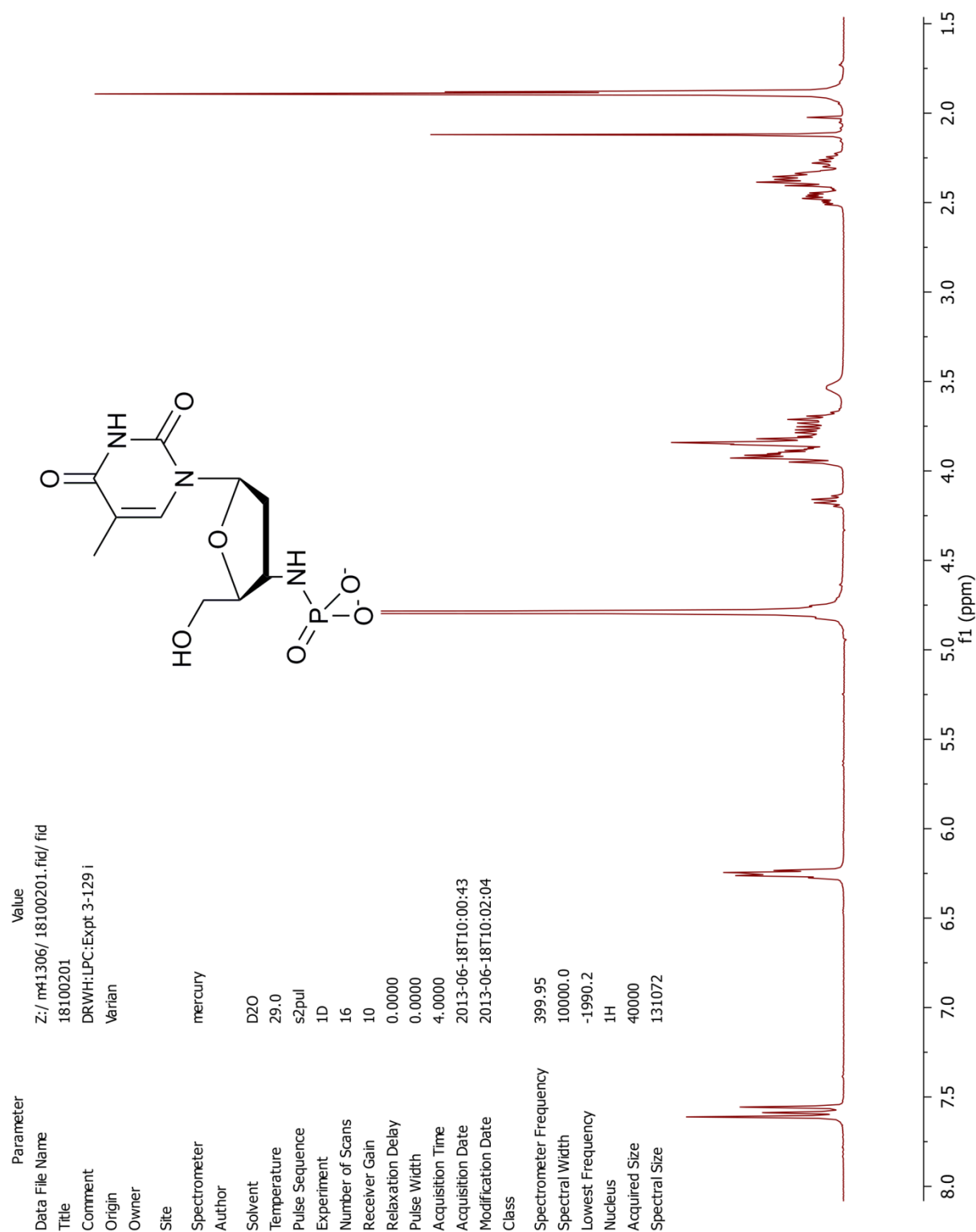
3'-Amino-3'-deoxythymidine Phosphorylation with POCl₃, pH 12, ¹H NMR Spectrum



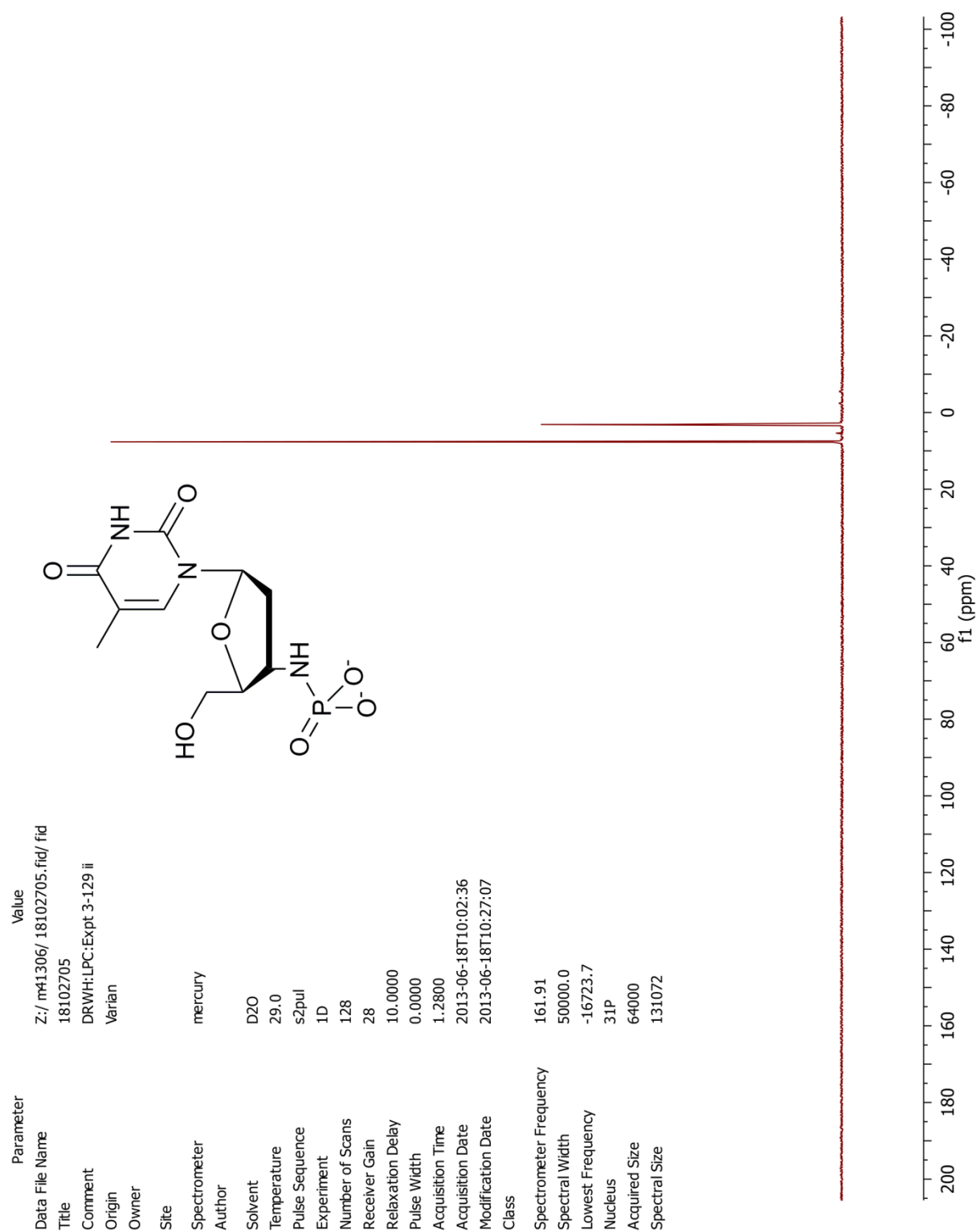
3'-Amino-3'-deoxythymidine Phosphorylation with POCl₃, pH 12, ³¹P NMR Spectrum



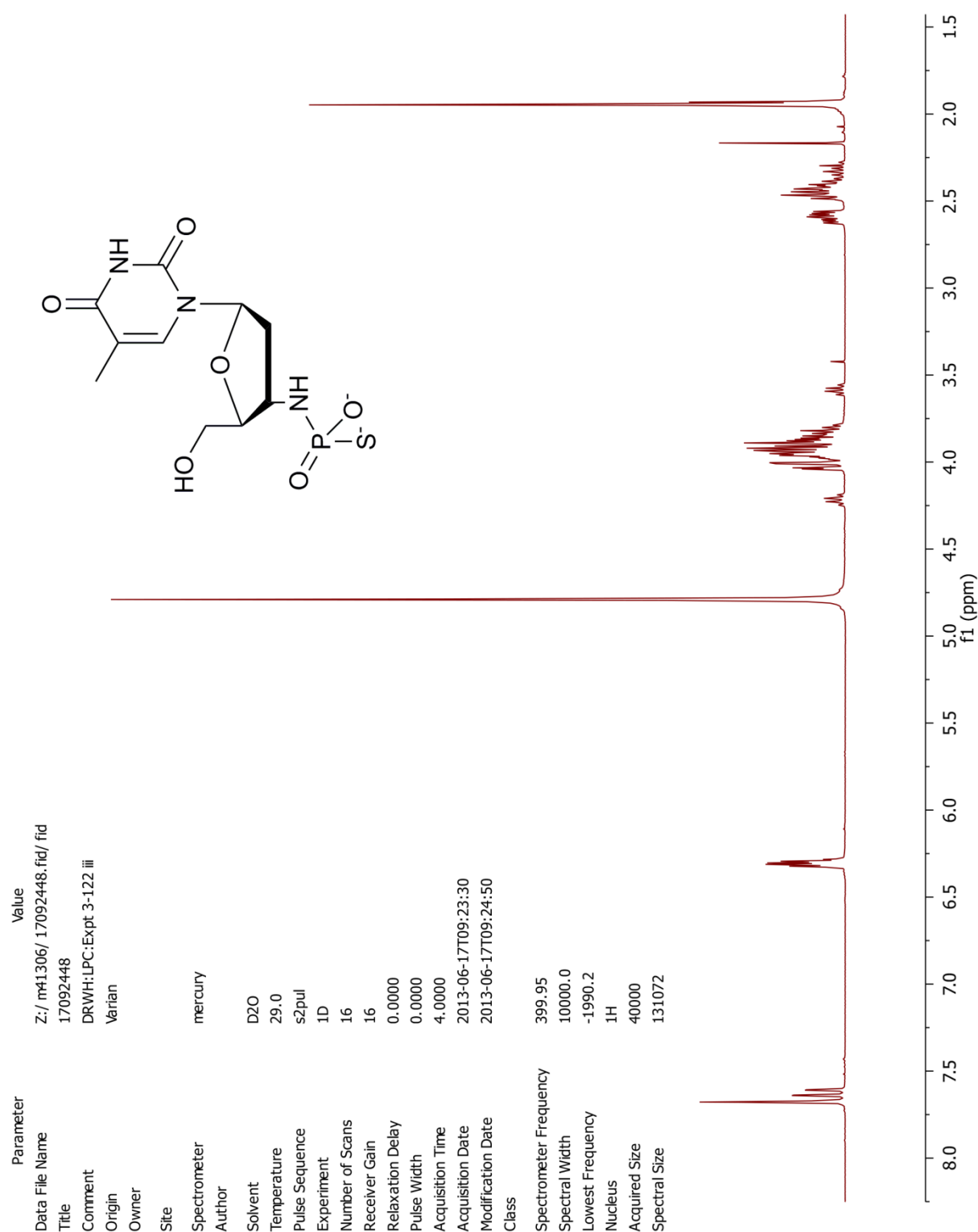
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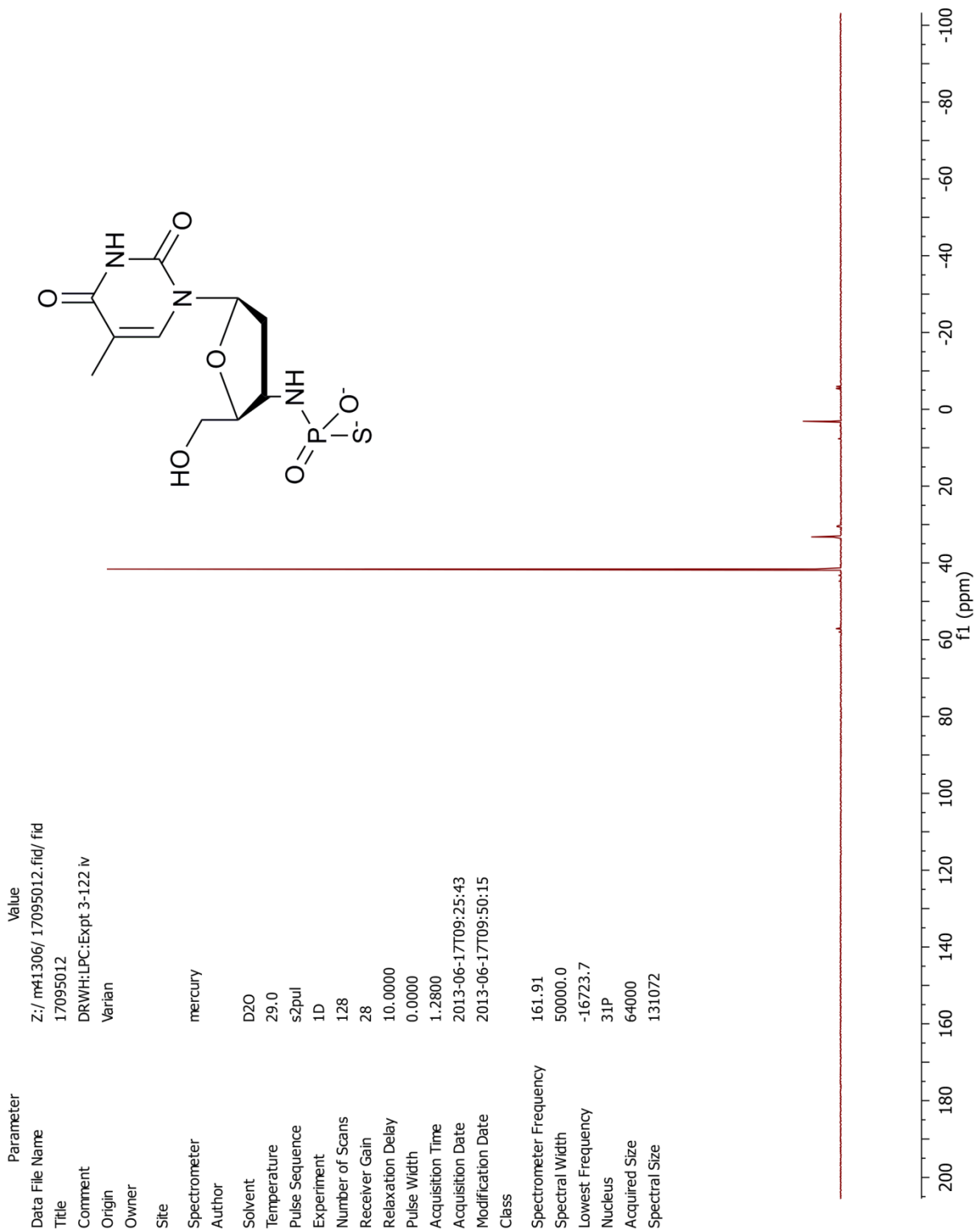
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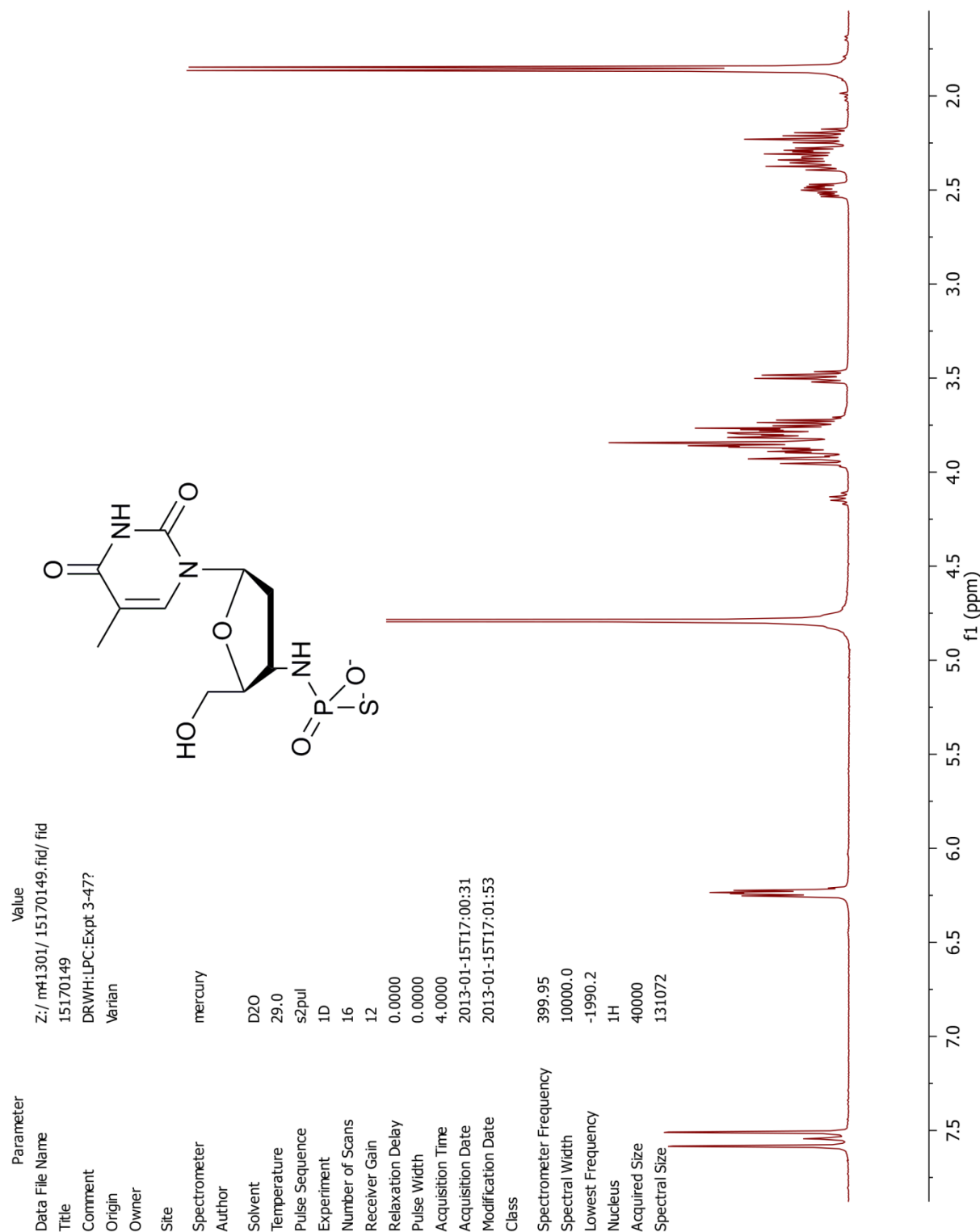
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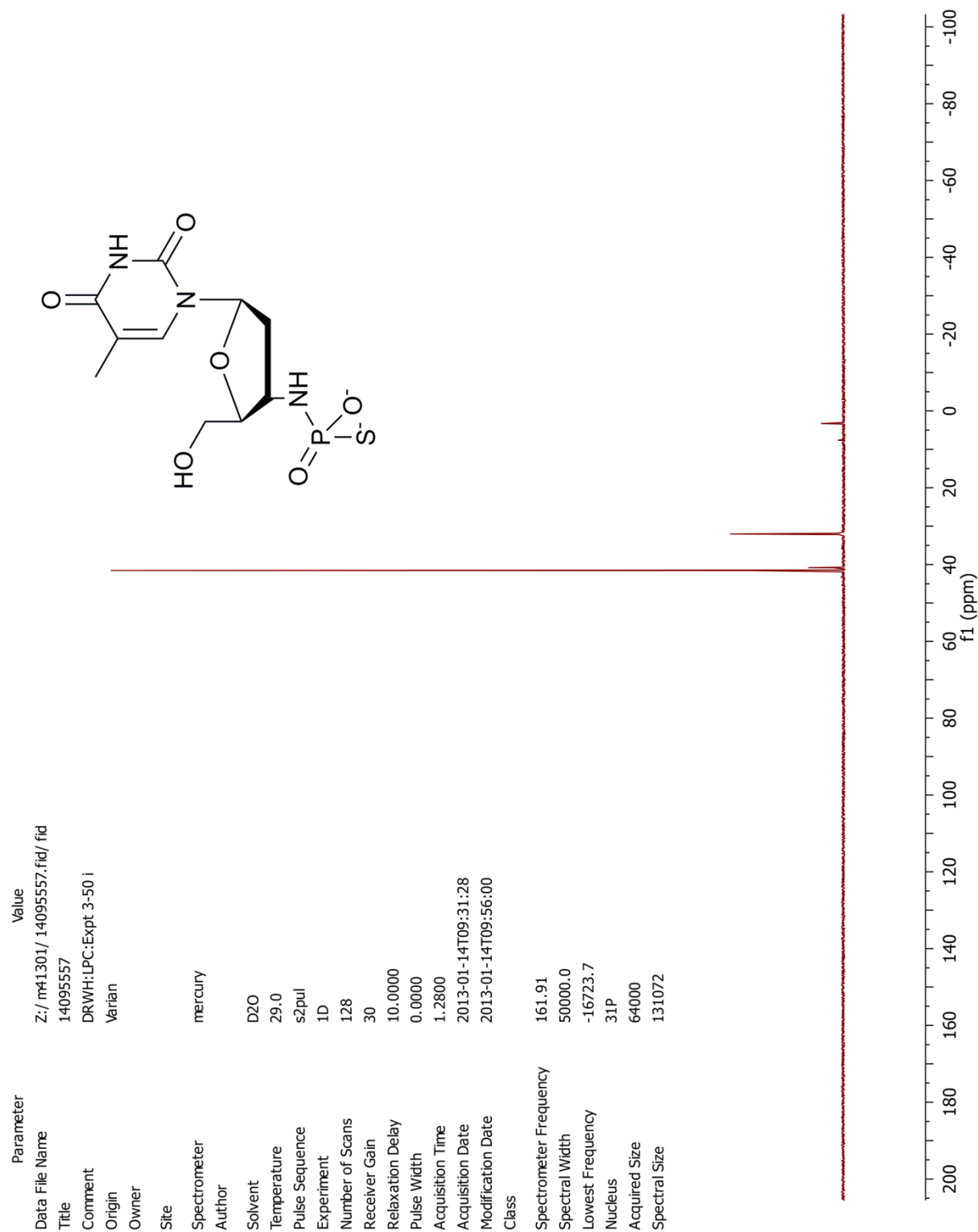
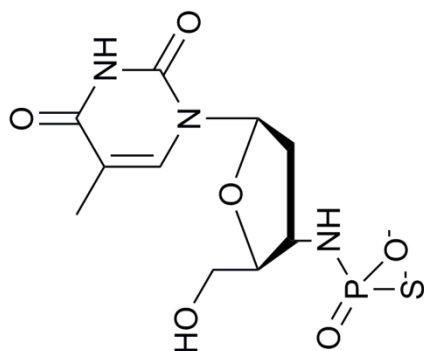
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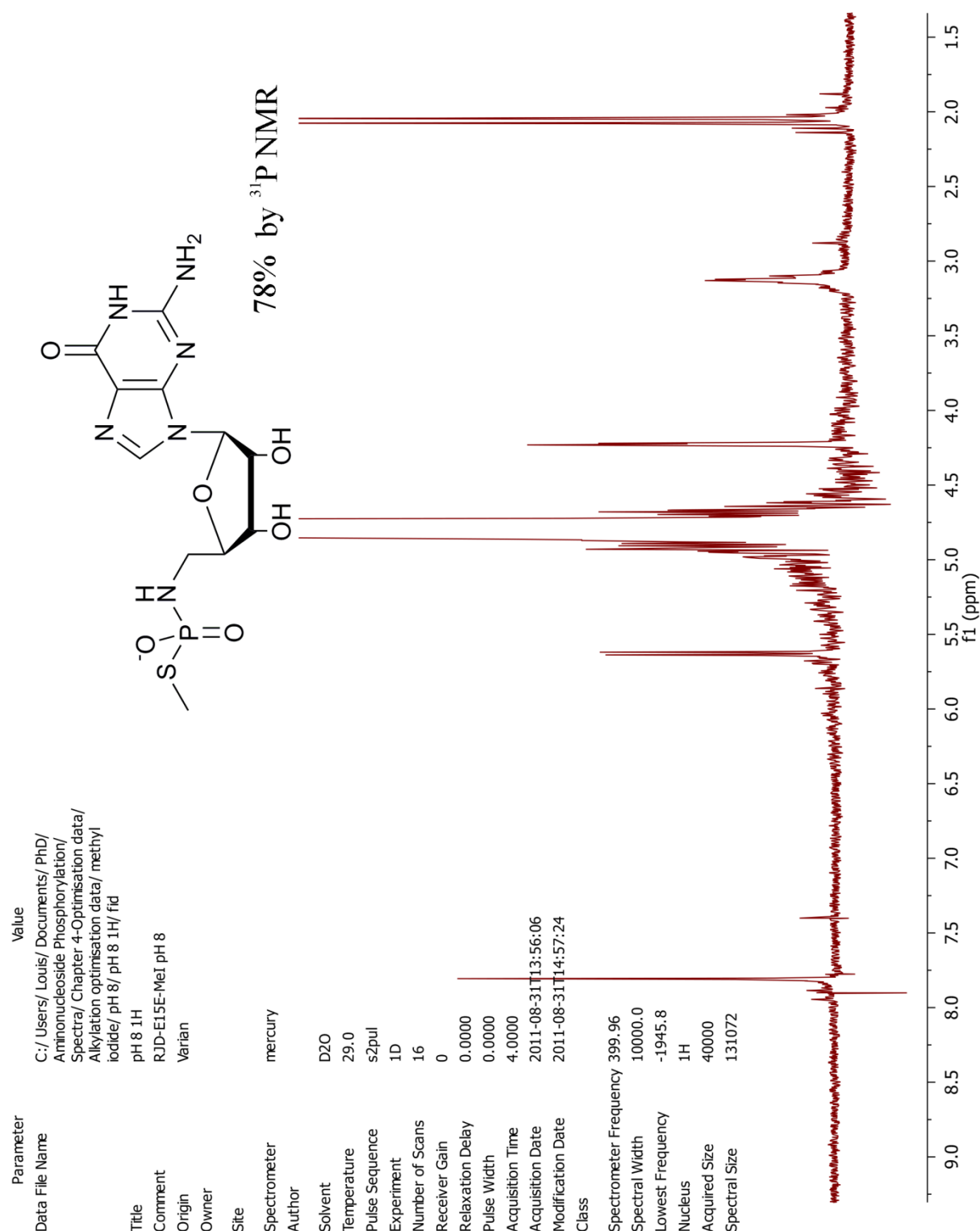
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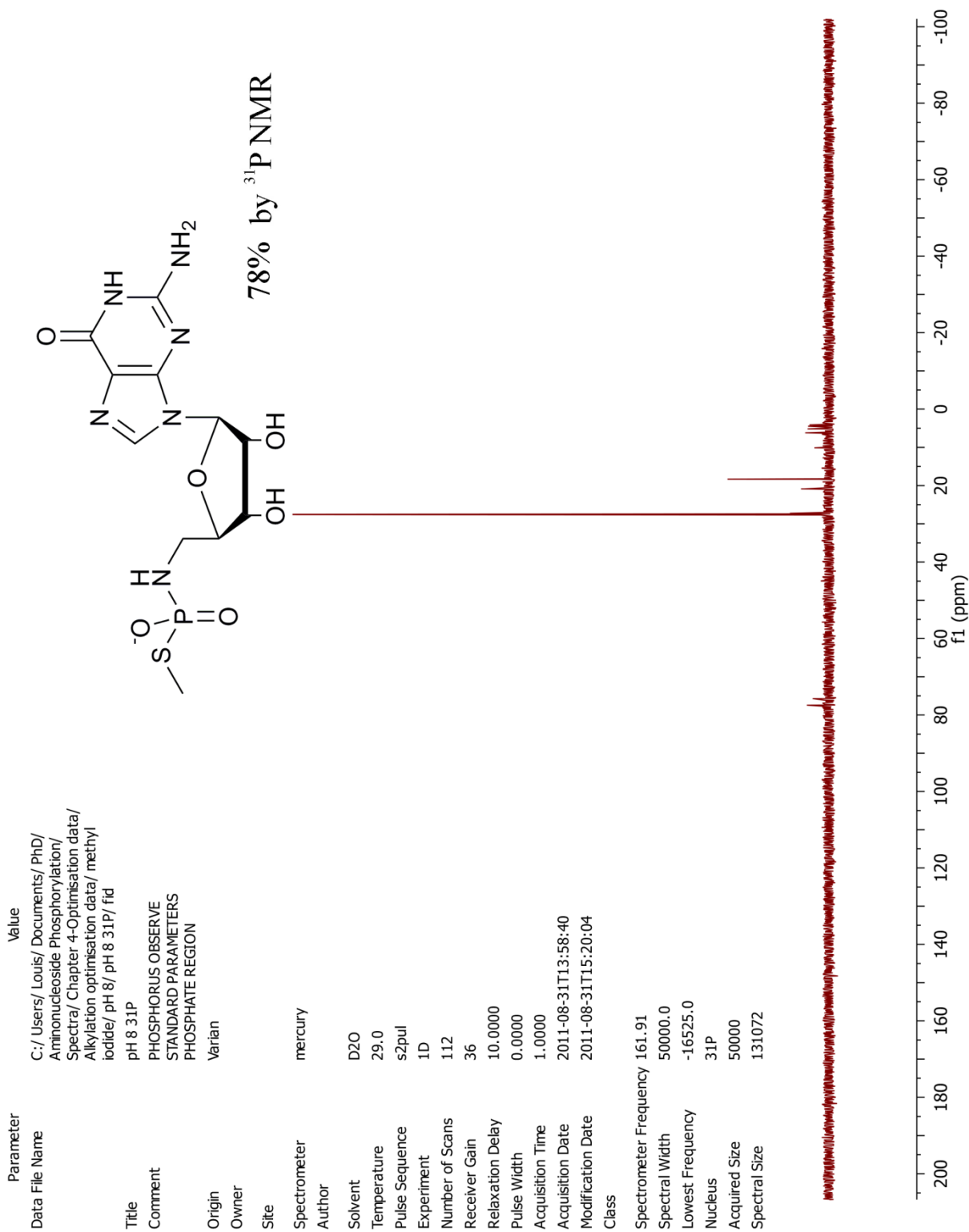
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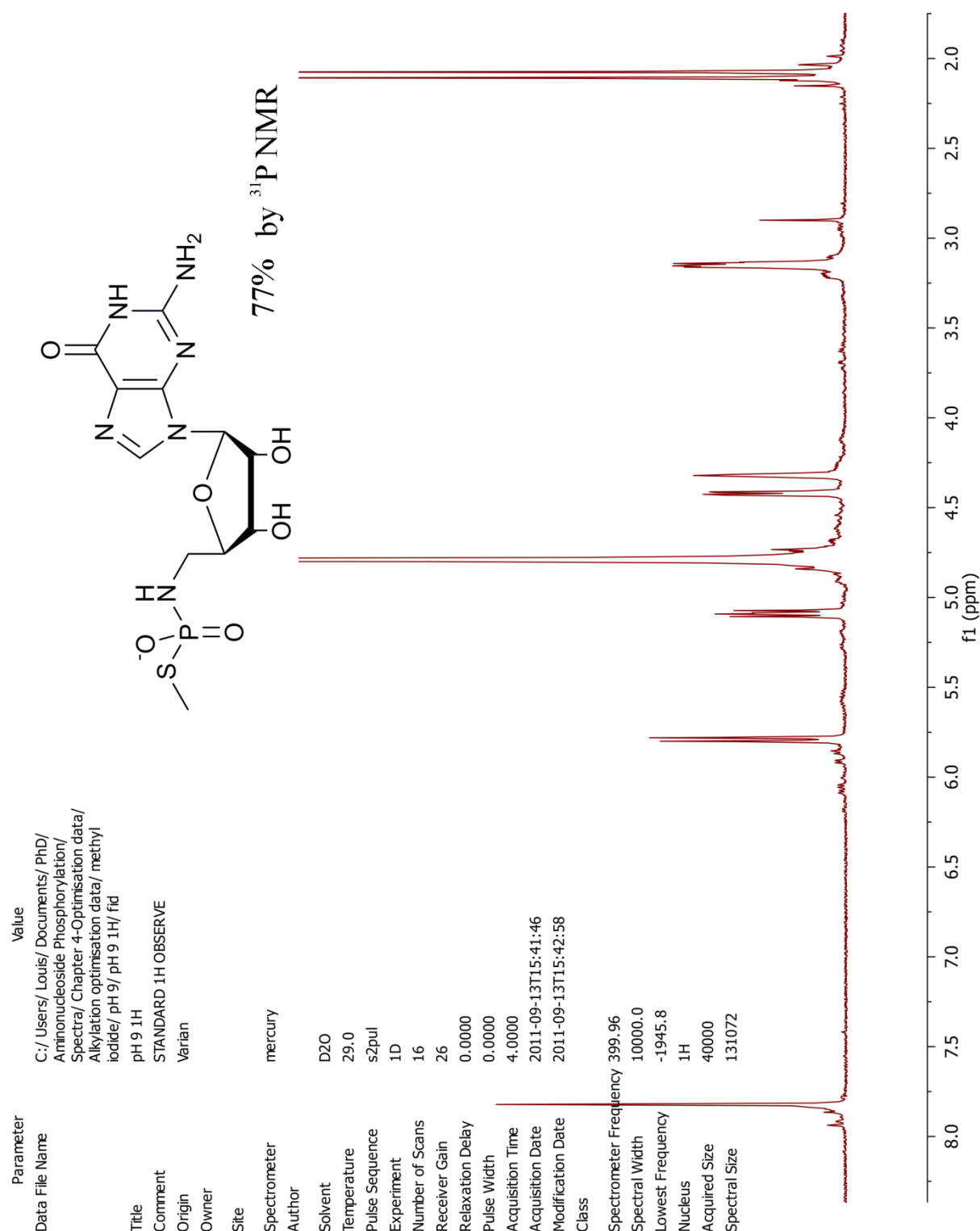
5'-Deoxyguanosine-5'-N-thiophosphoramidate Alkylation with Methyl Iodide, pH 8, ¹H NMR Spectrum



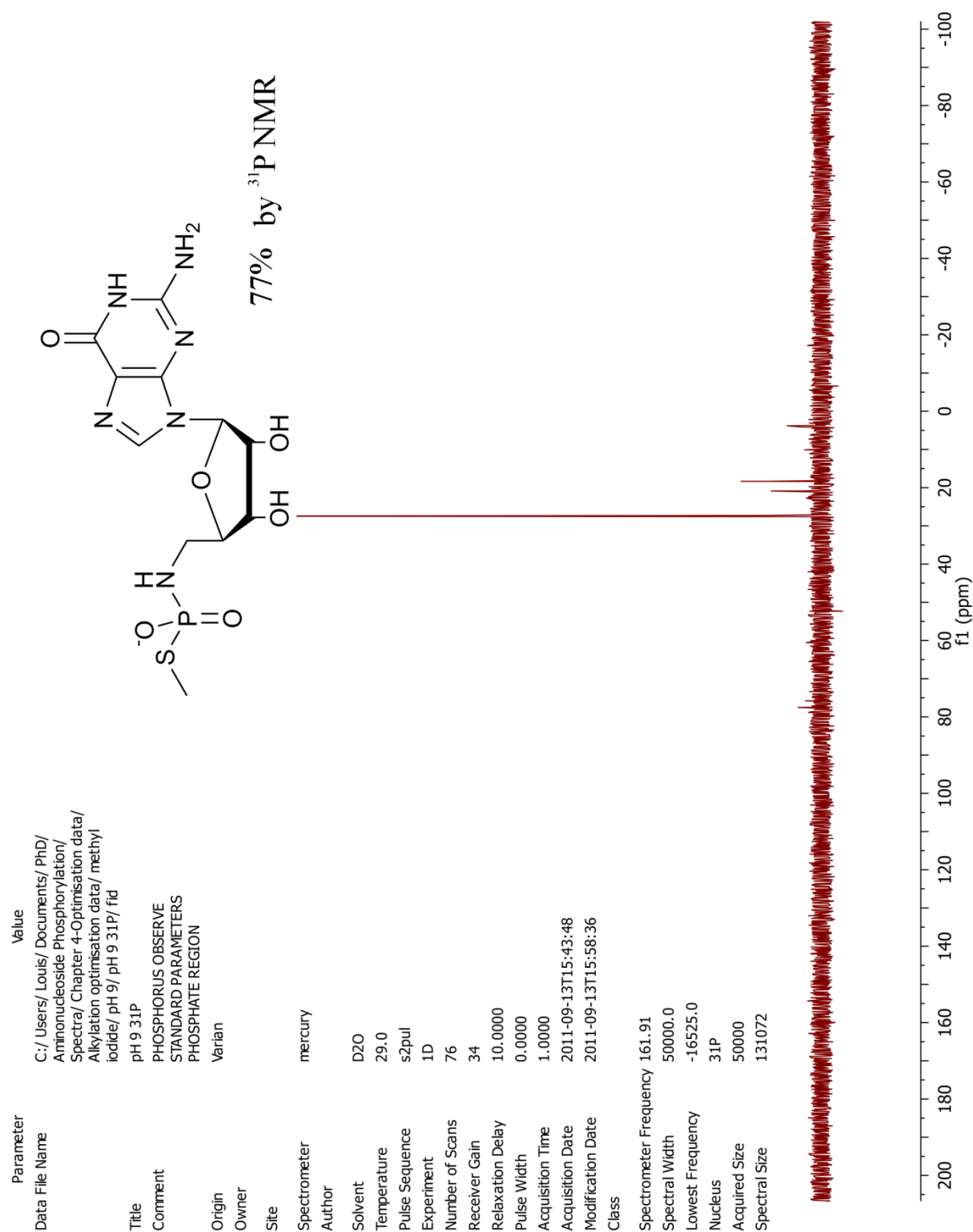
5'-Deoxyguanosine-5'-N-thiophosphoramidate Alkylation with Methyl Iodide, pH 8, ³¹P NMR Spectrum



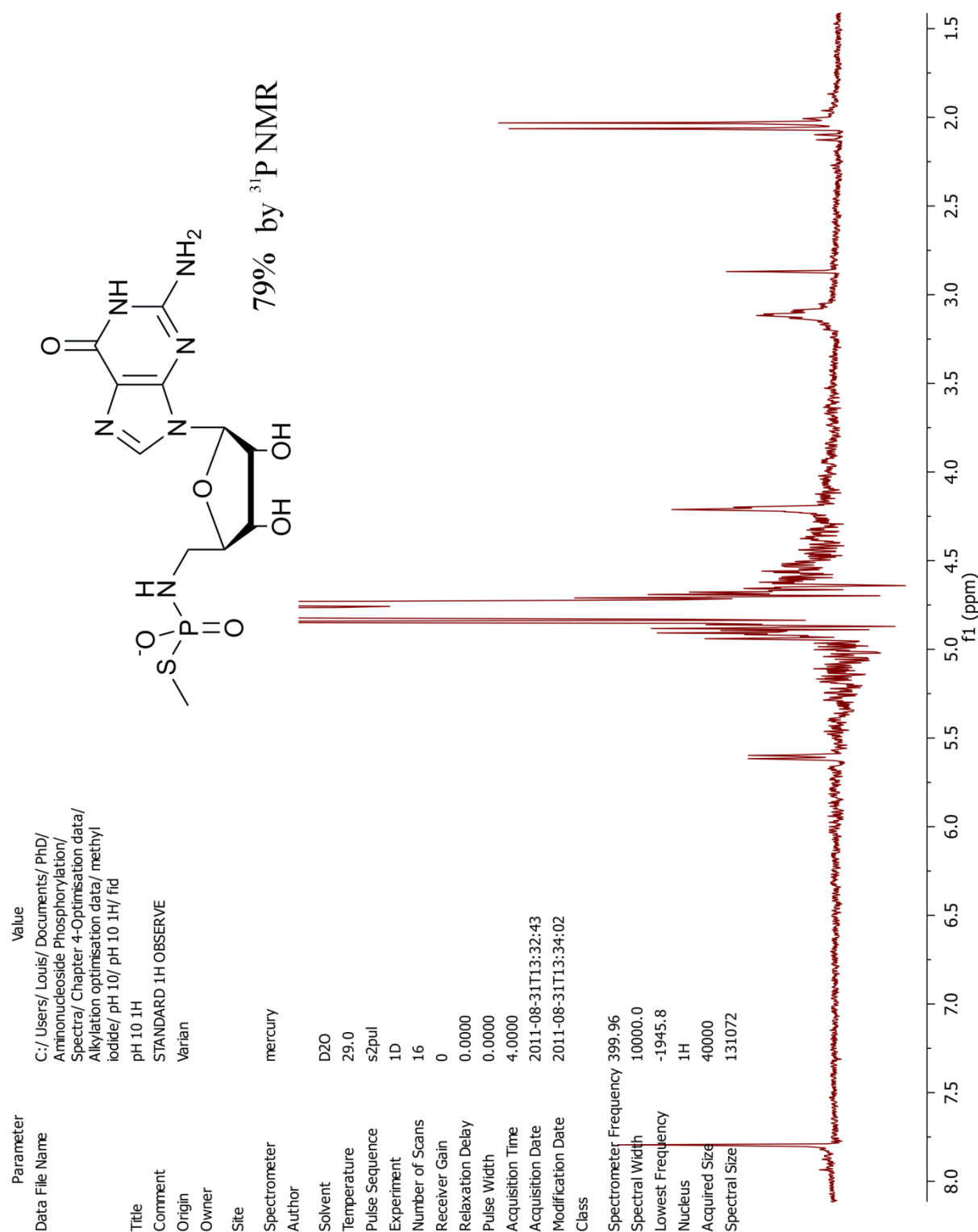
5'-Deoxyguanosine-5'-N-thiophosphoramidate Alkylation with Methyl Iodide, pH 9, ¹H NMR Spectrum



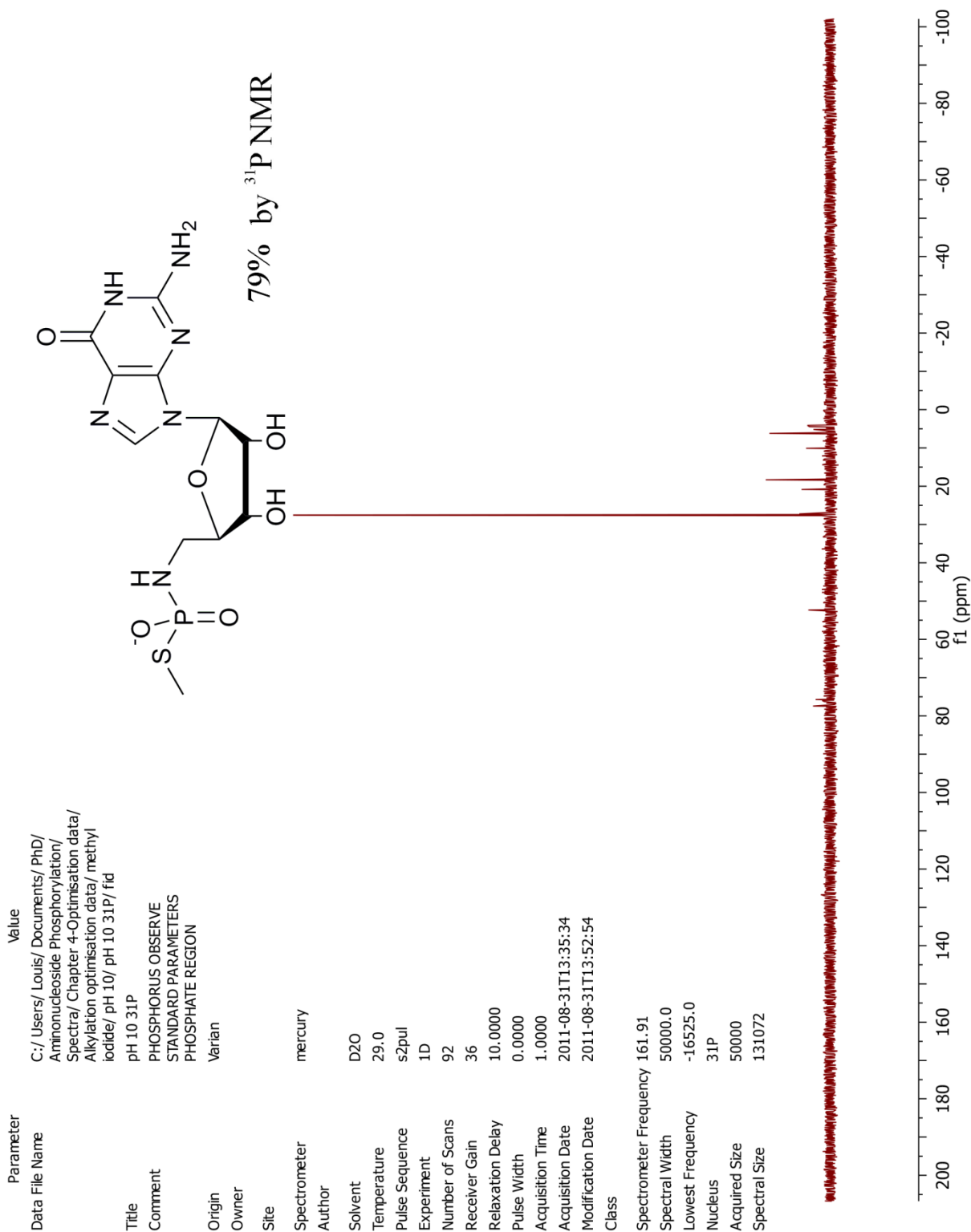
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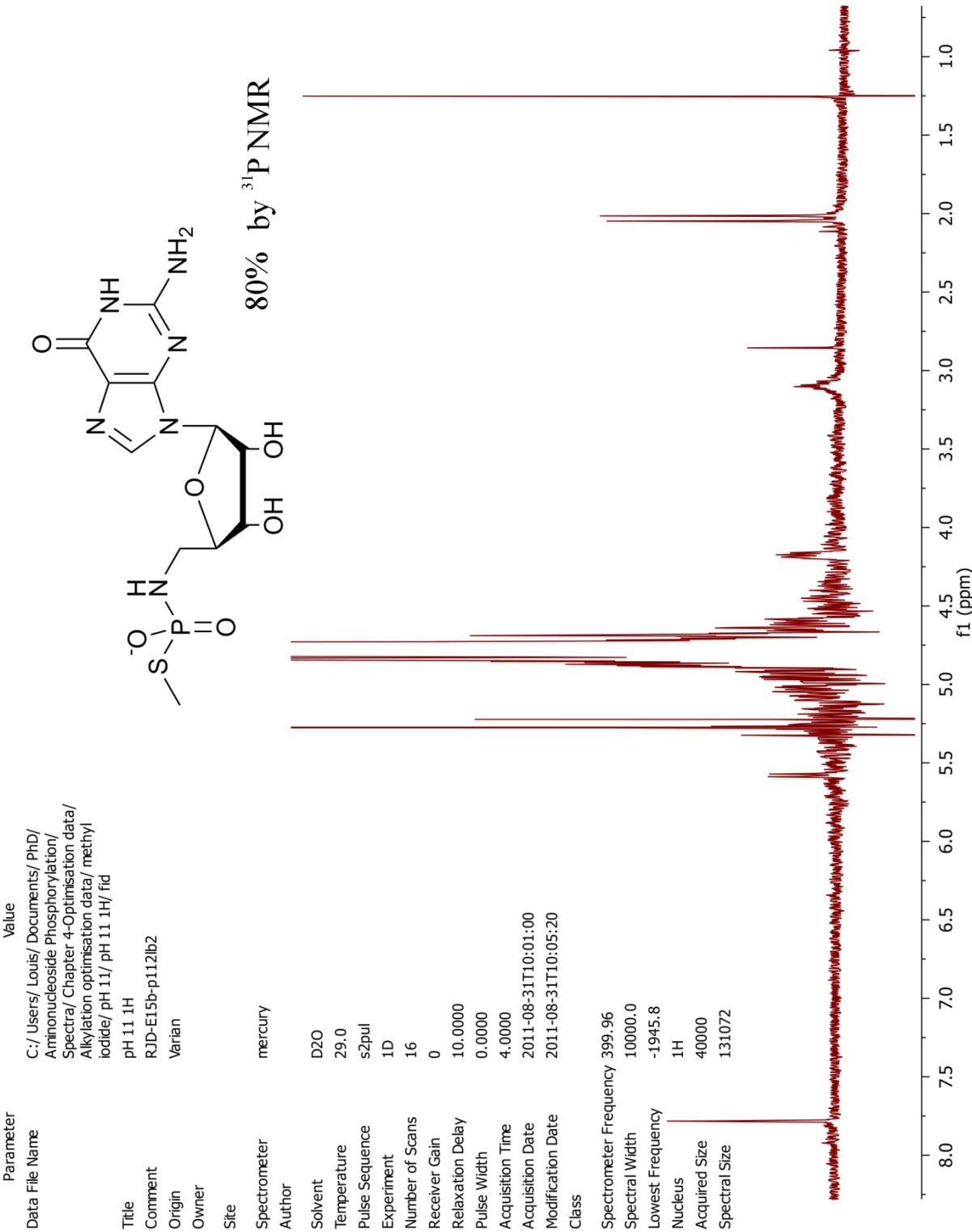
5'-Deoxyguanosine-5'-N-thiophosphoramidate Alkylation with Methyl Iodide, pH 10, ¹H NMR Spectrum



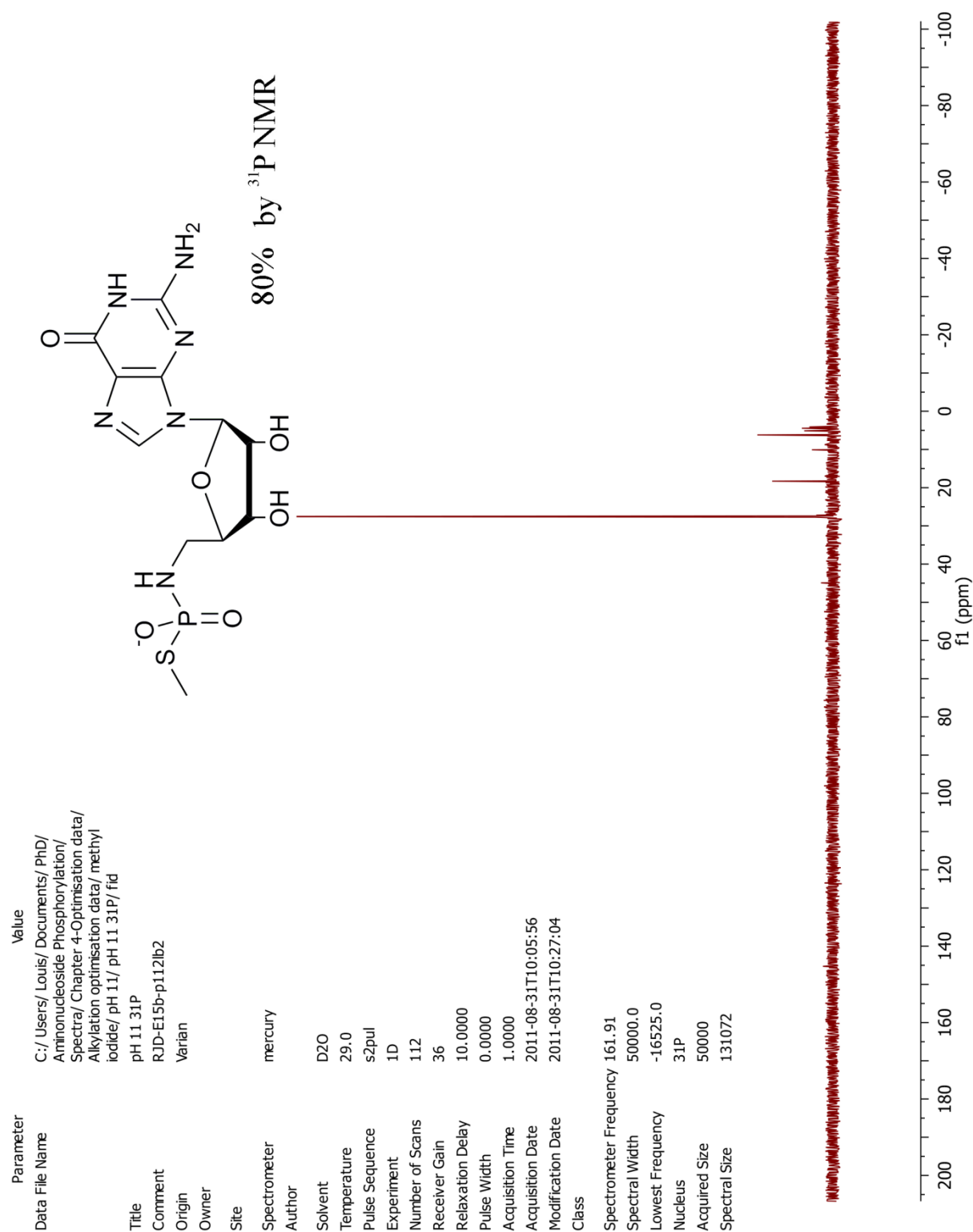
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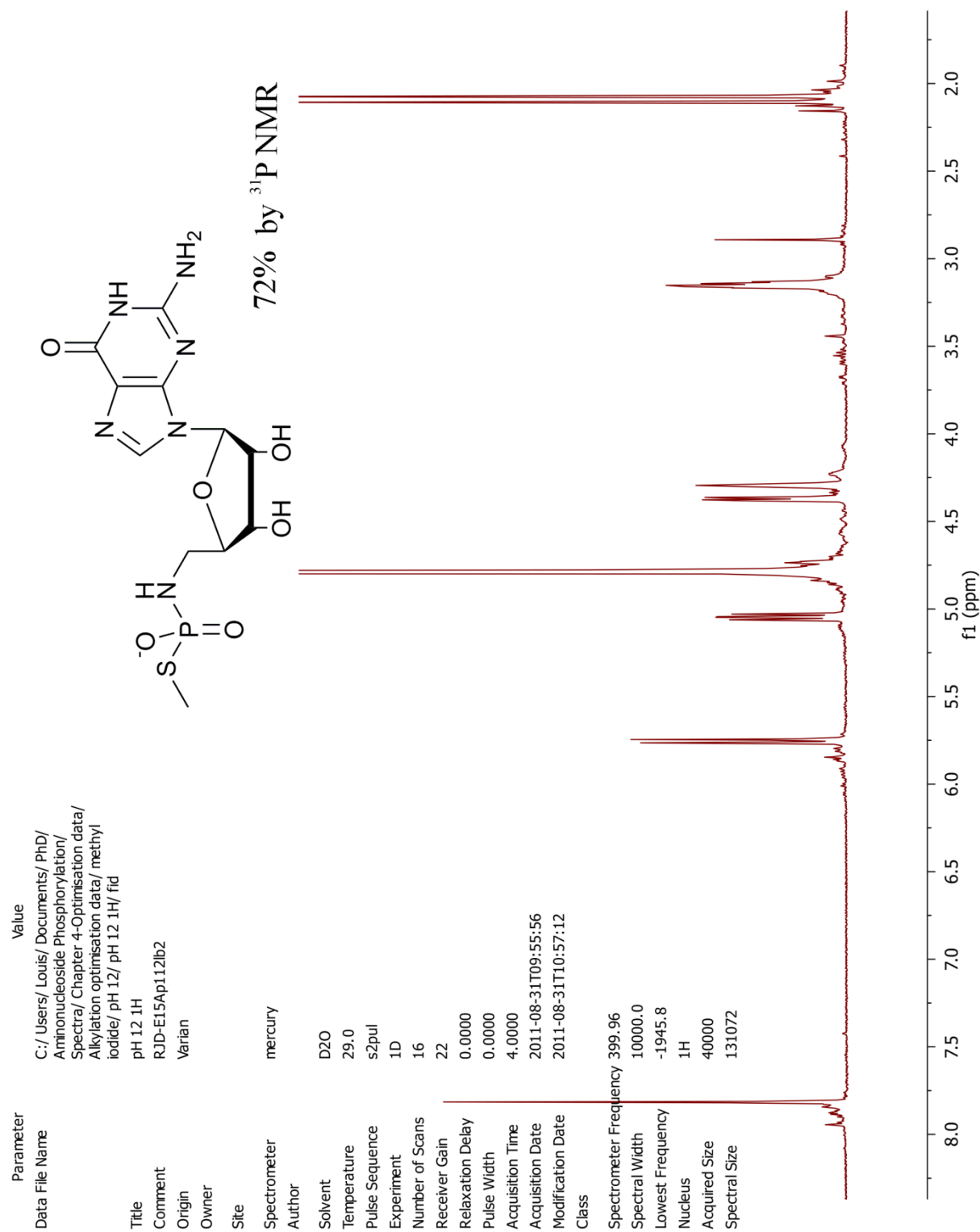
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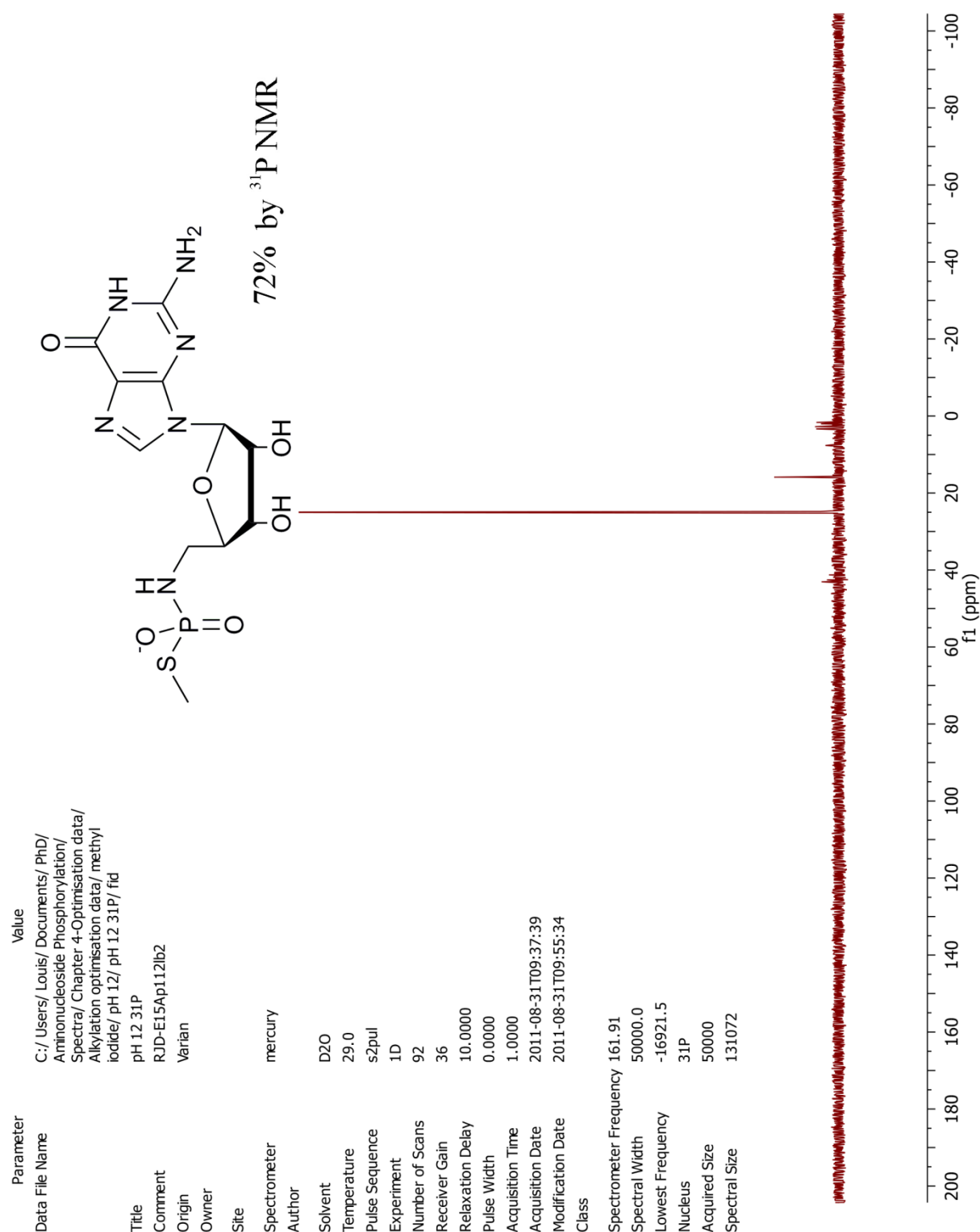
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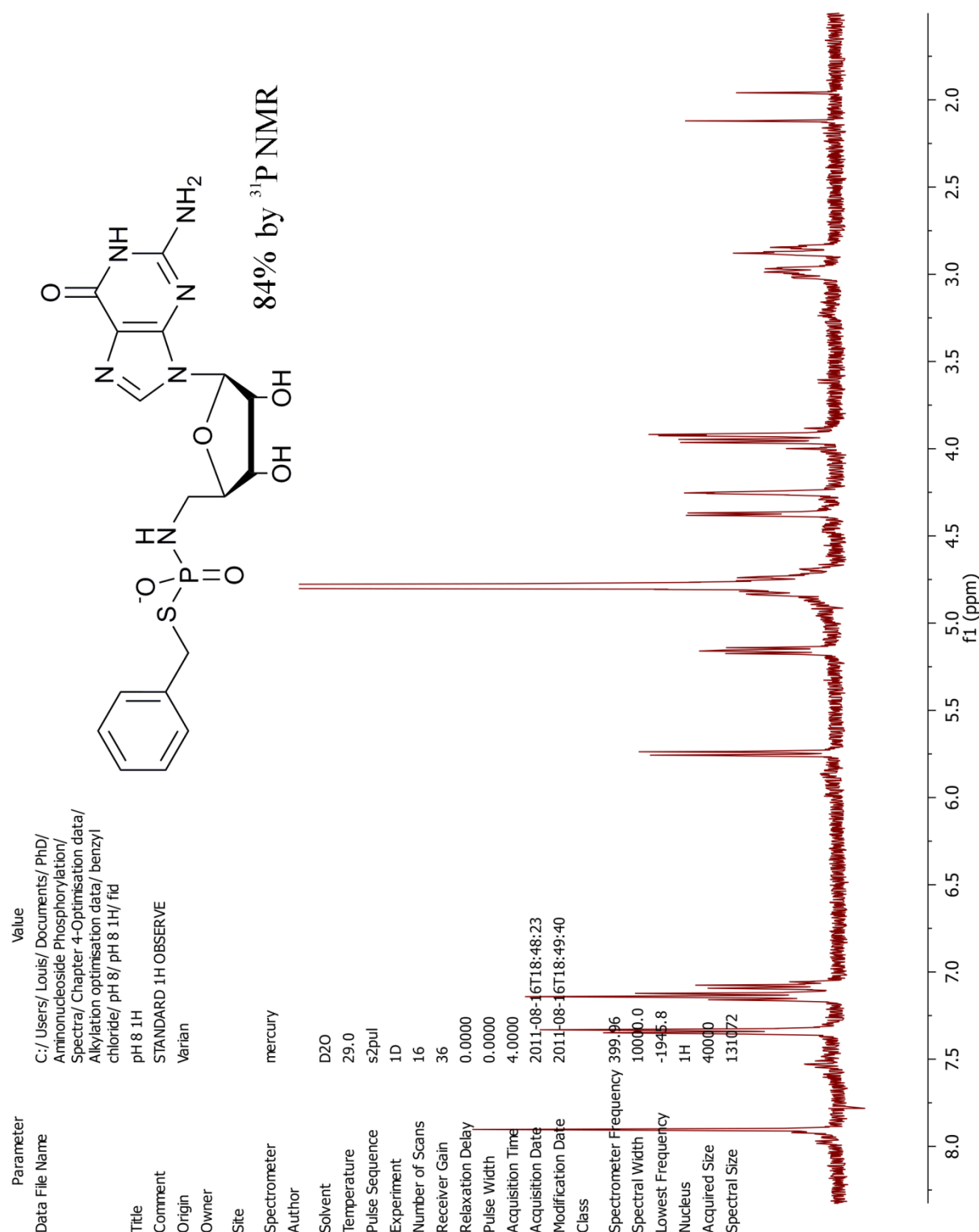
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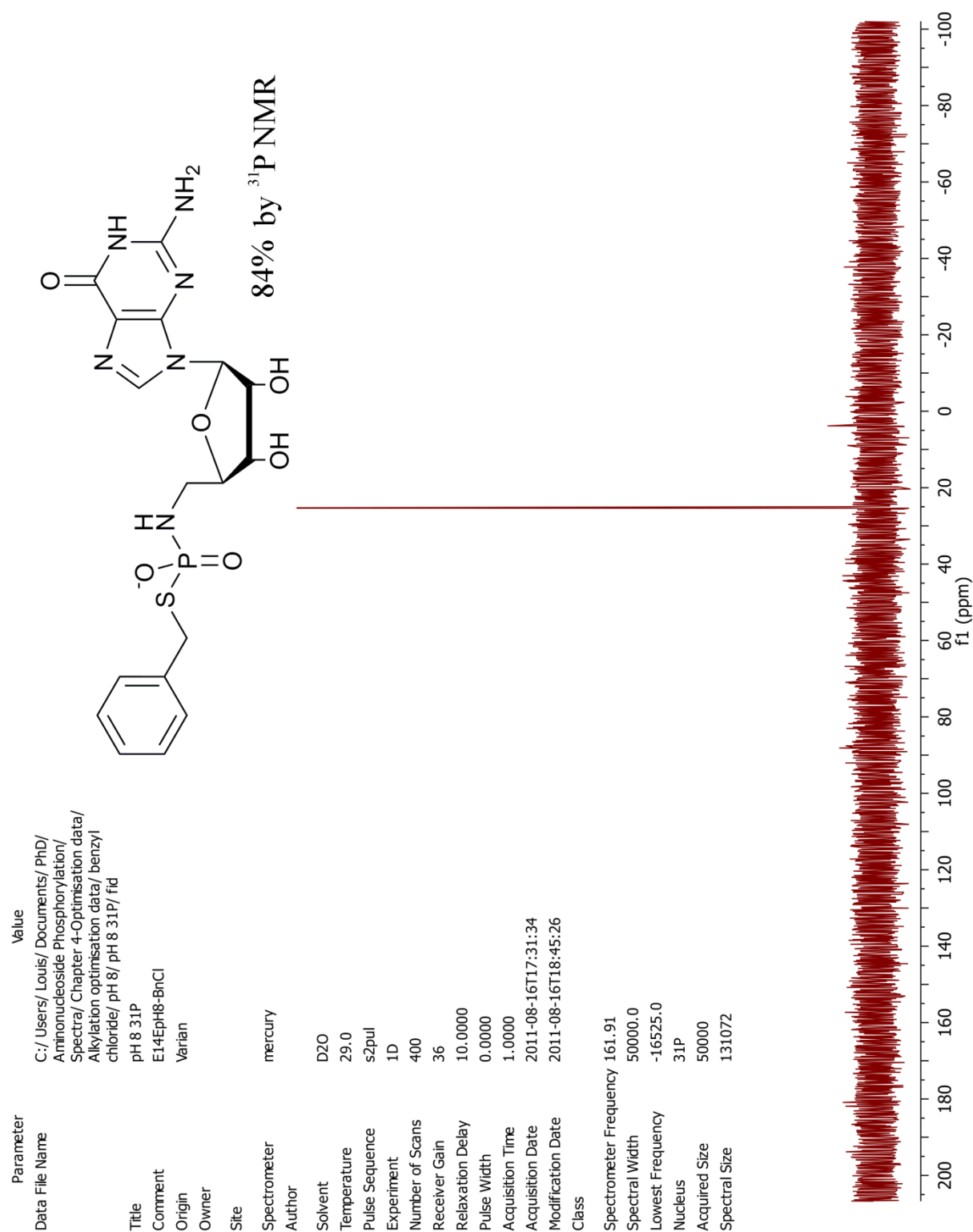
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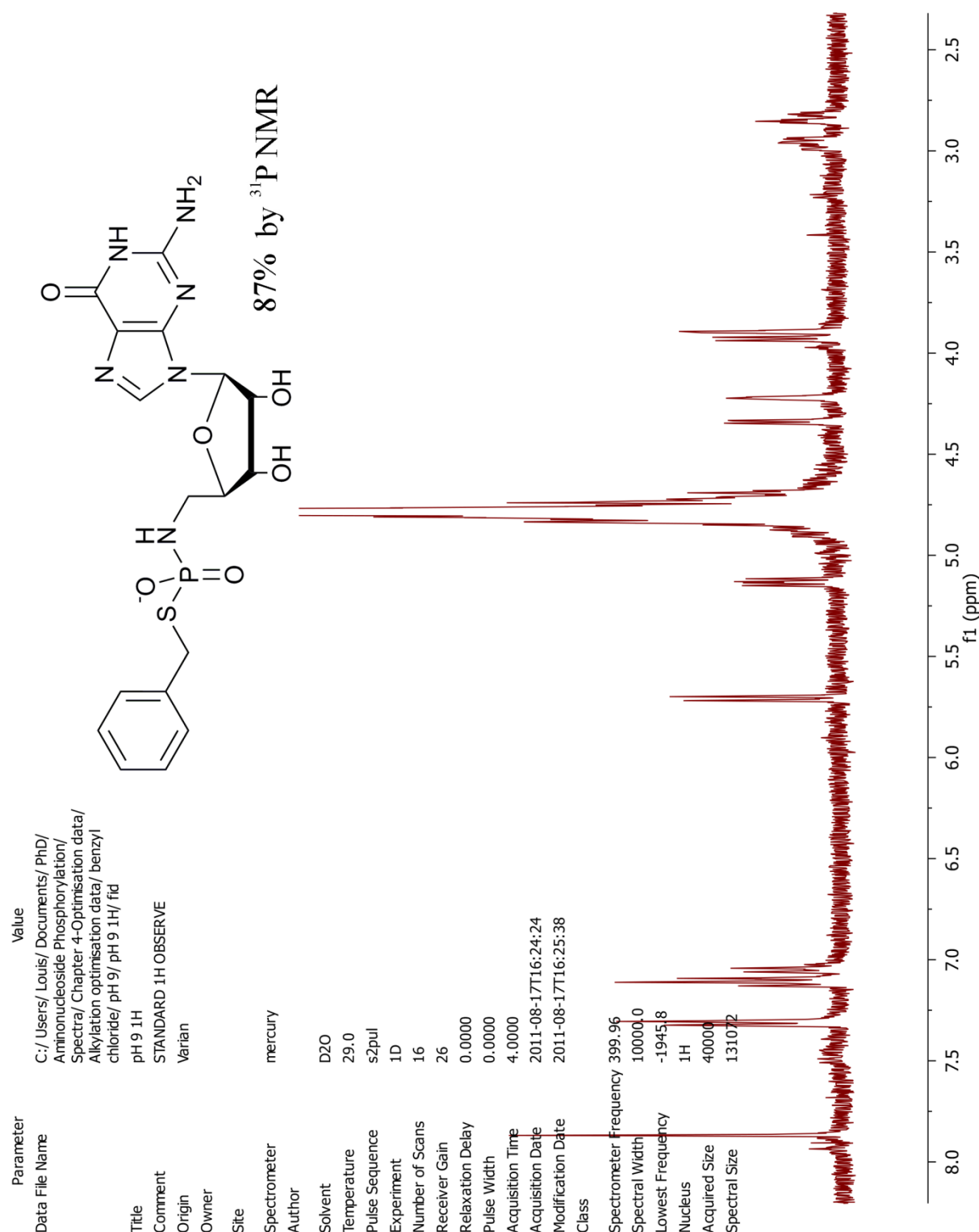
5'-Deoxyguanosine-5'-N-thiophosphoramidate Alkylation with Benzyl Chloride, pH 8, ¹H NMR Spectrum



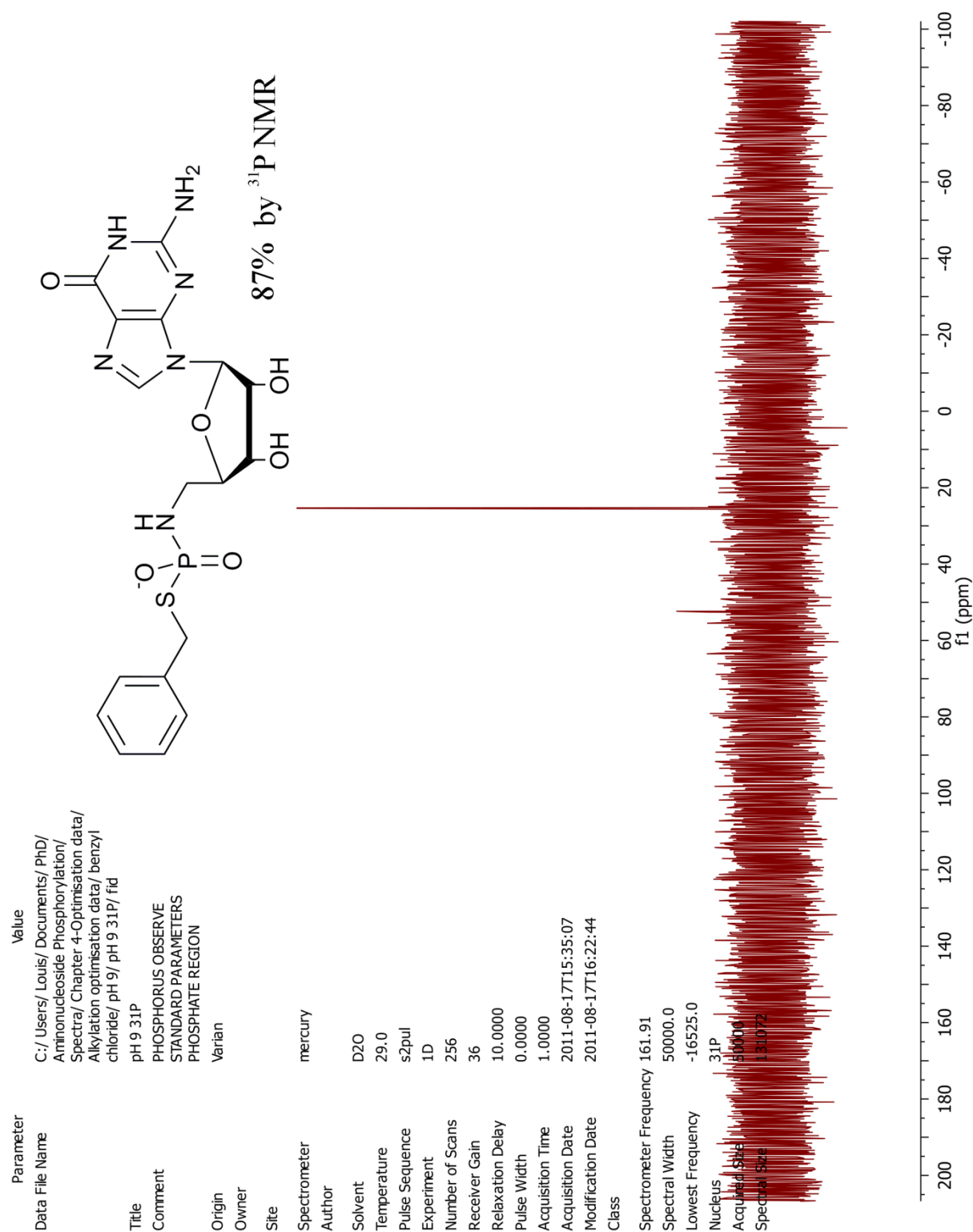
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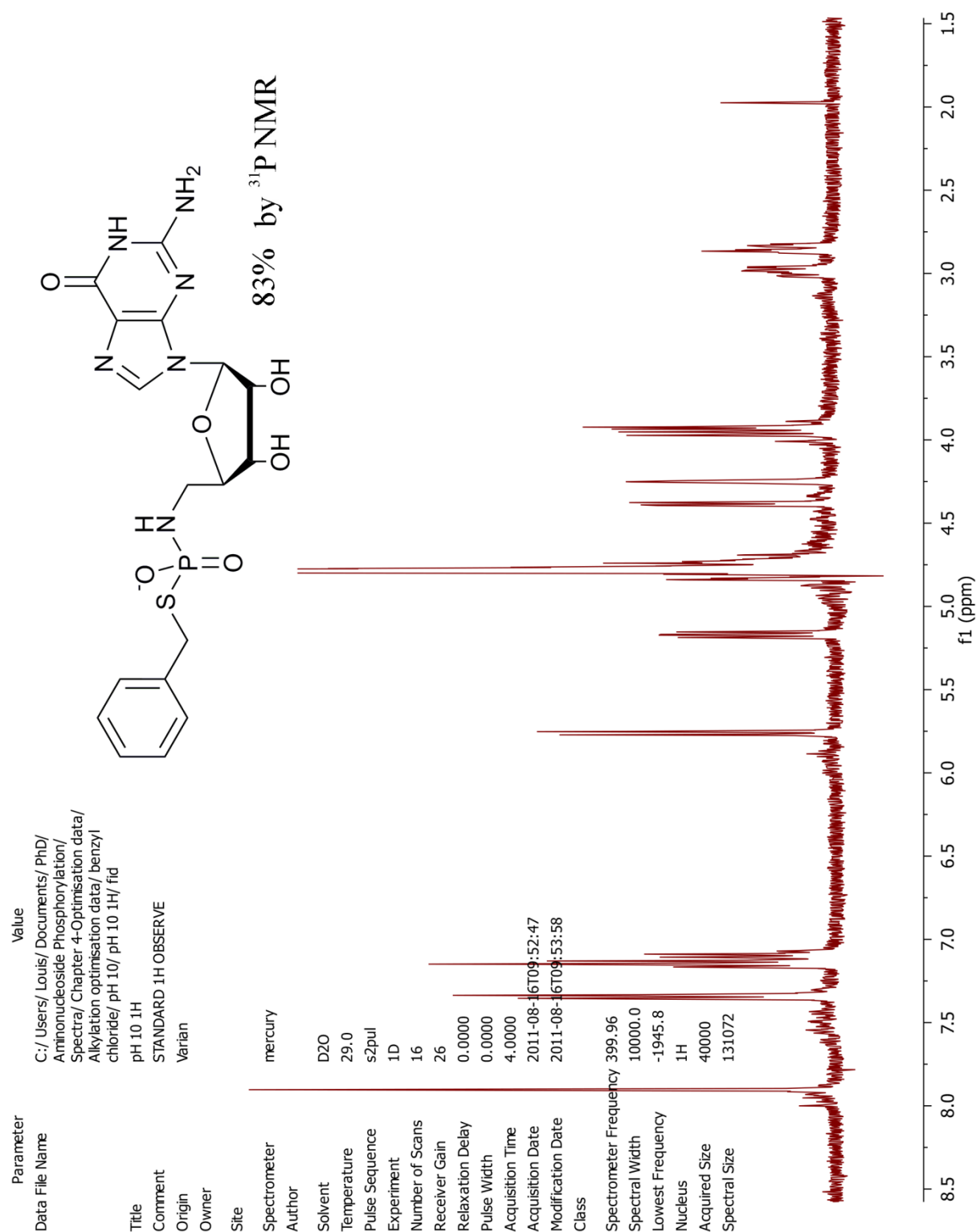
5'-Deoxyguanosine-5'-*N*-thiophosphoramidate Alkylation with Benzyl Chloride, pH 9, ¹H NMR Spectrum



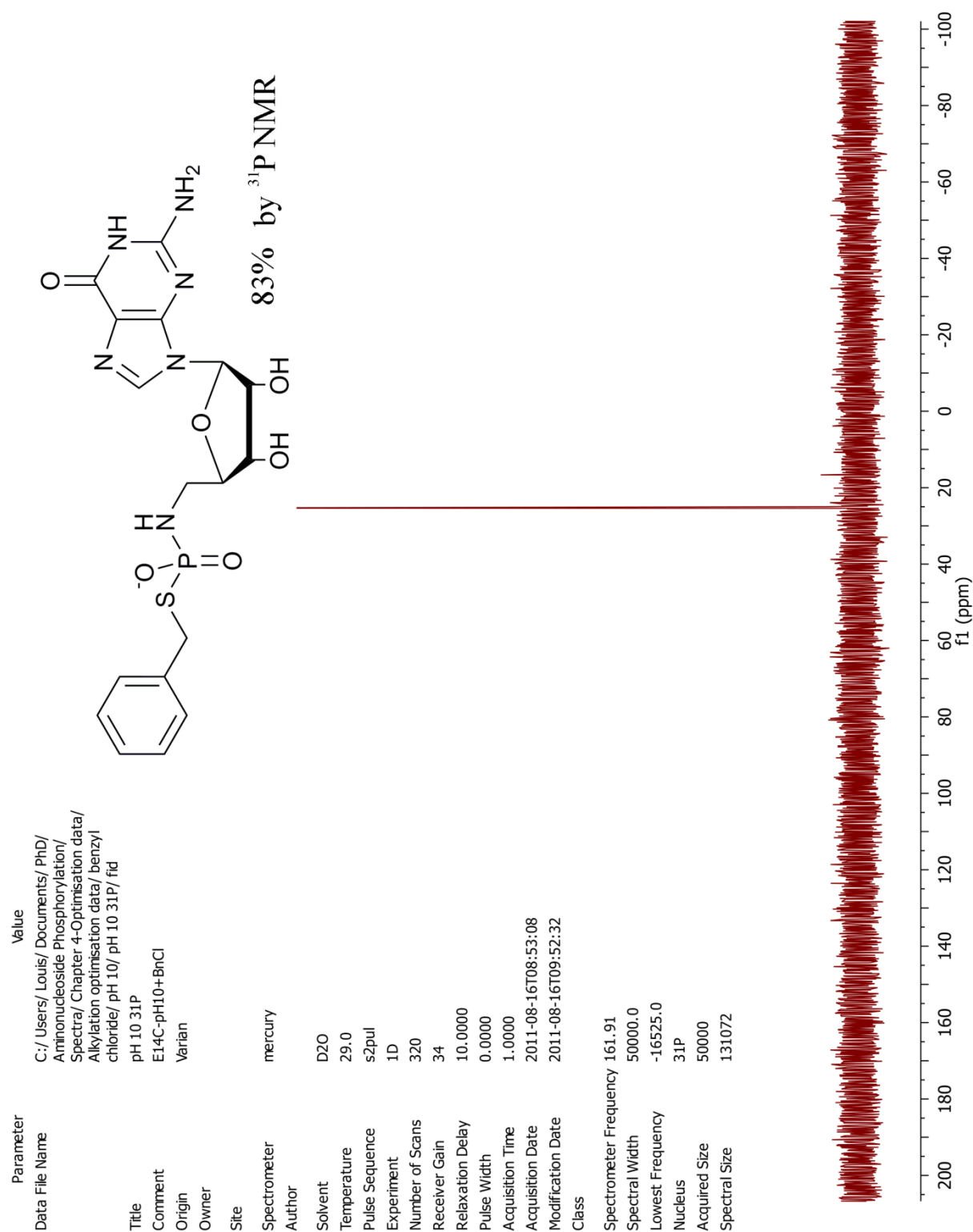
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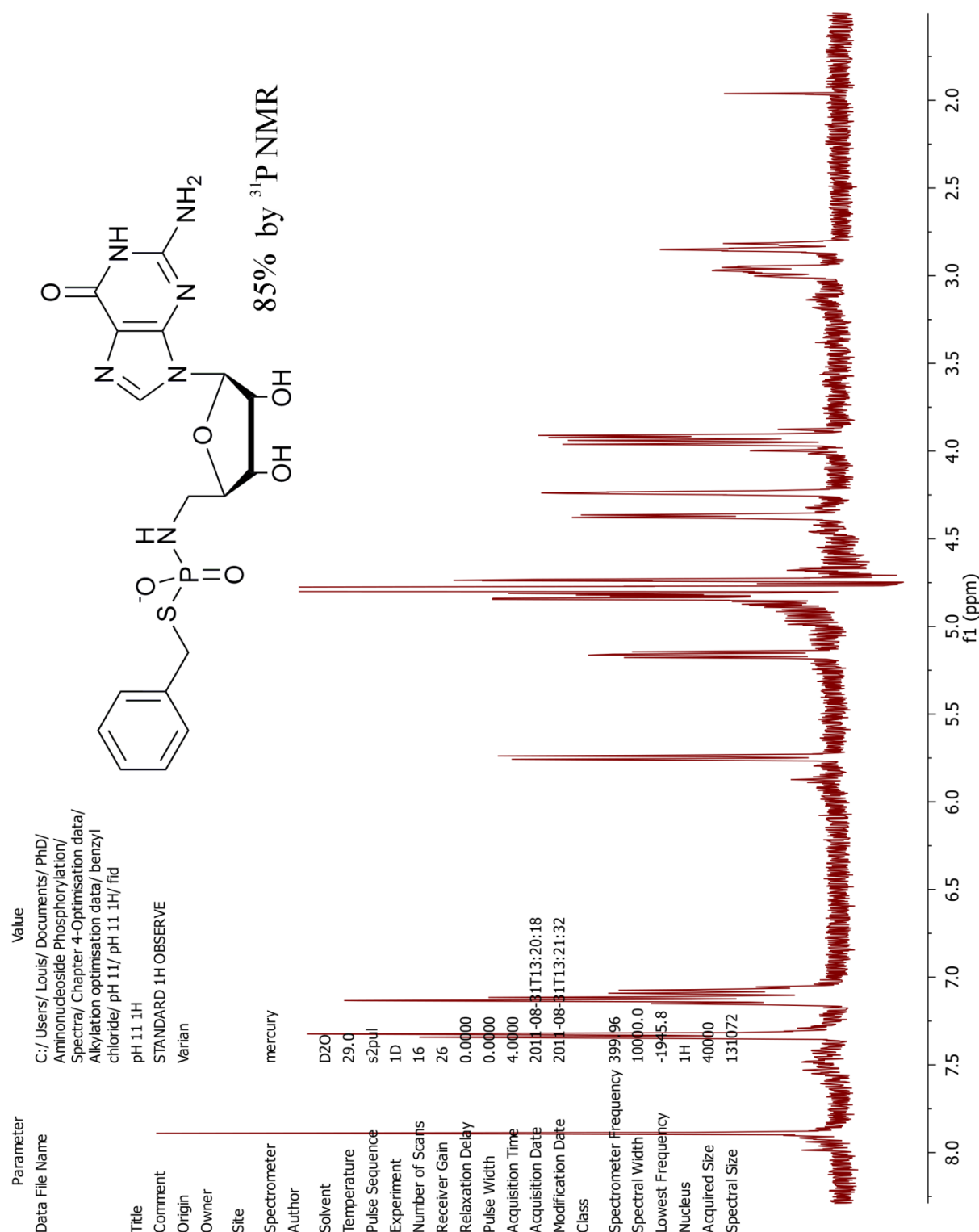
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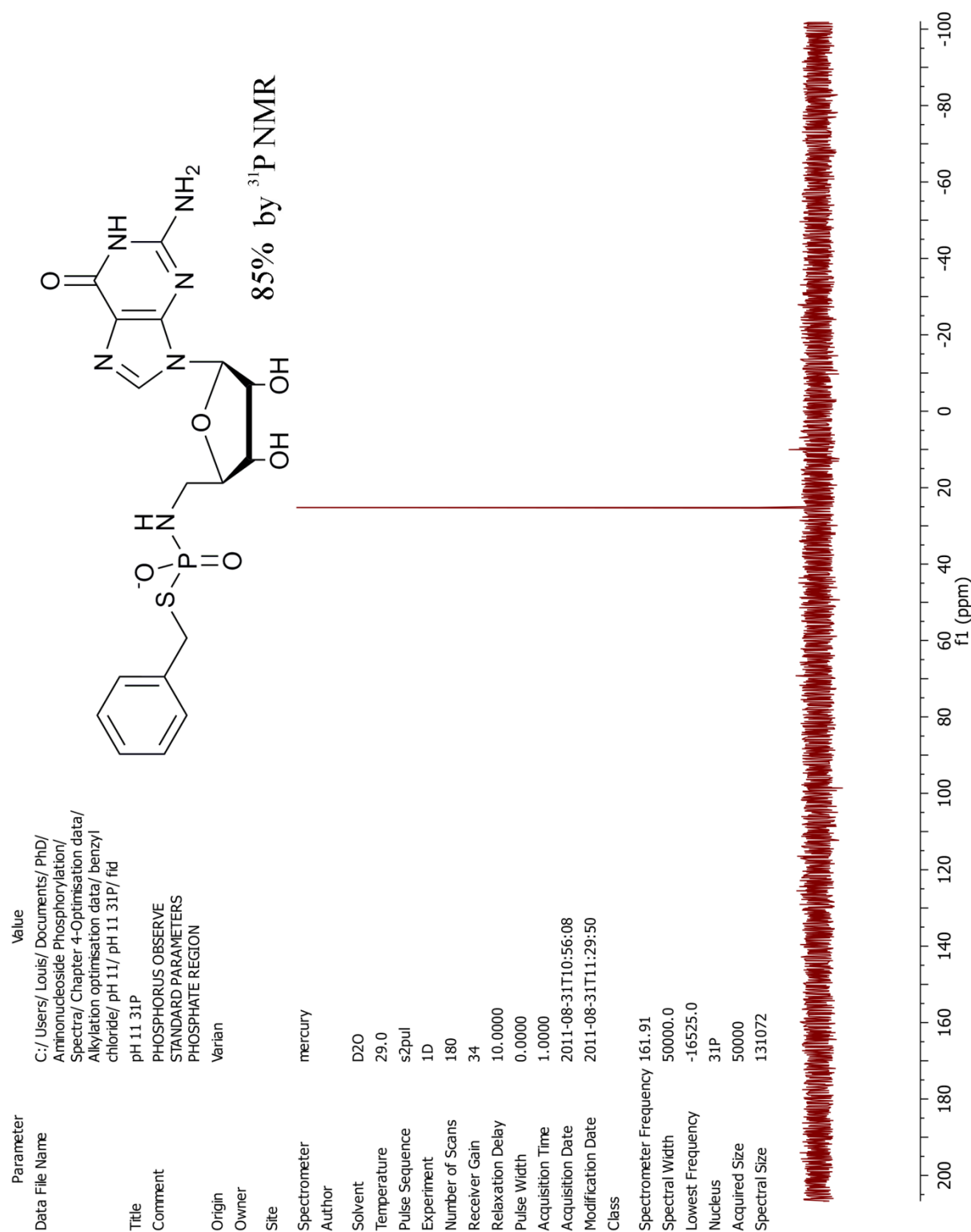
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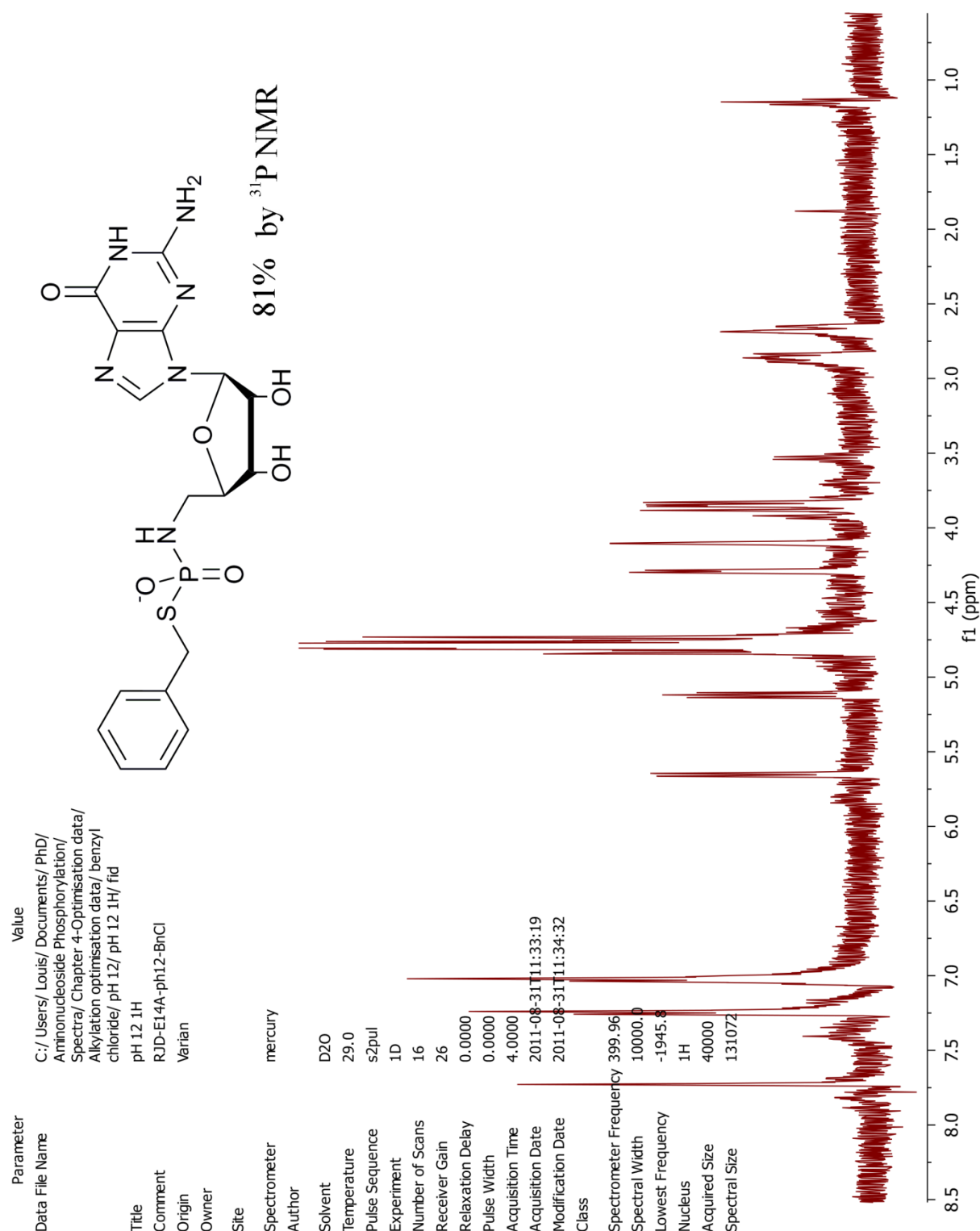
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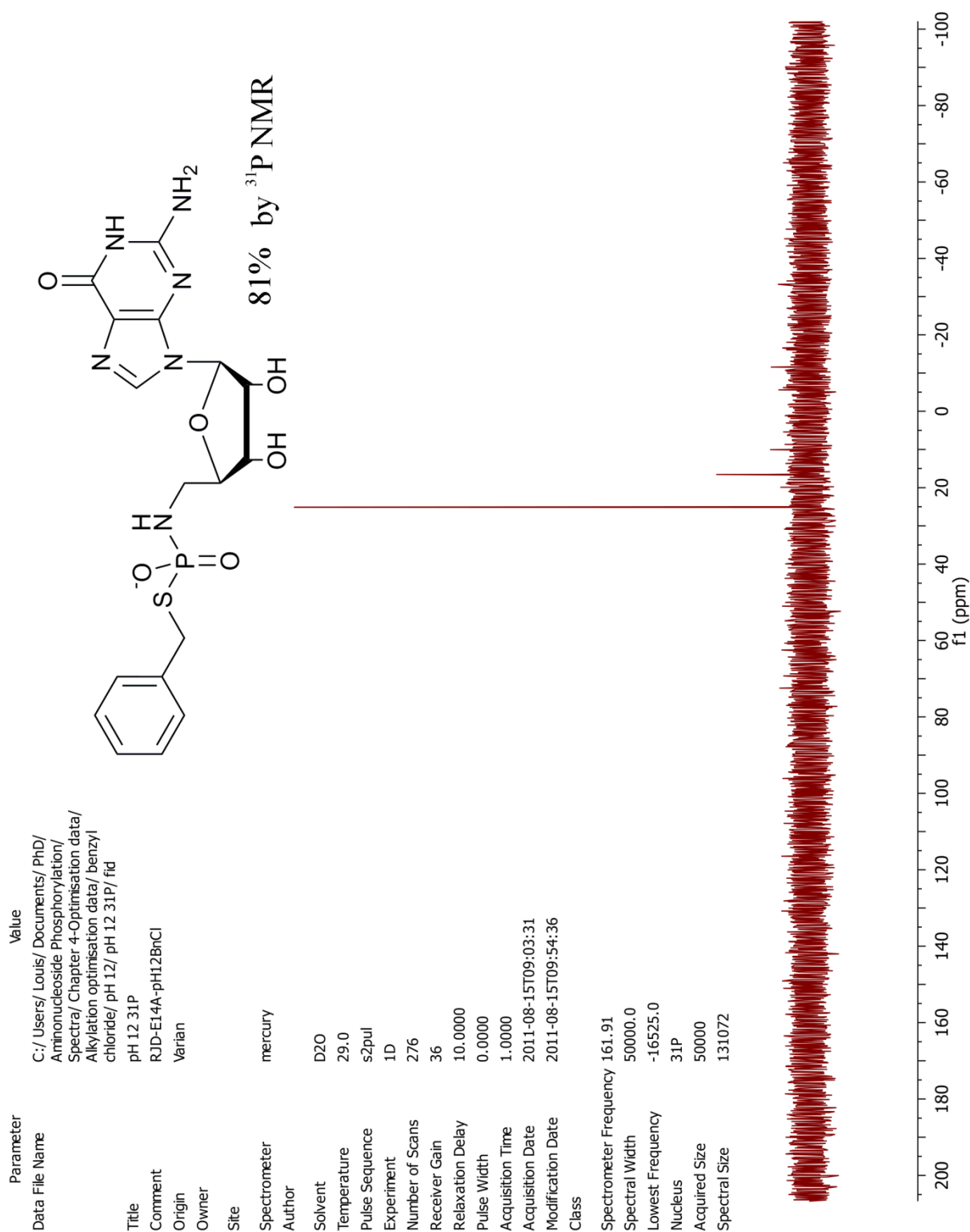
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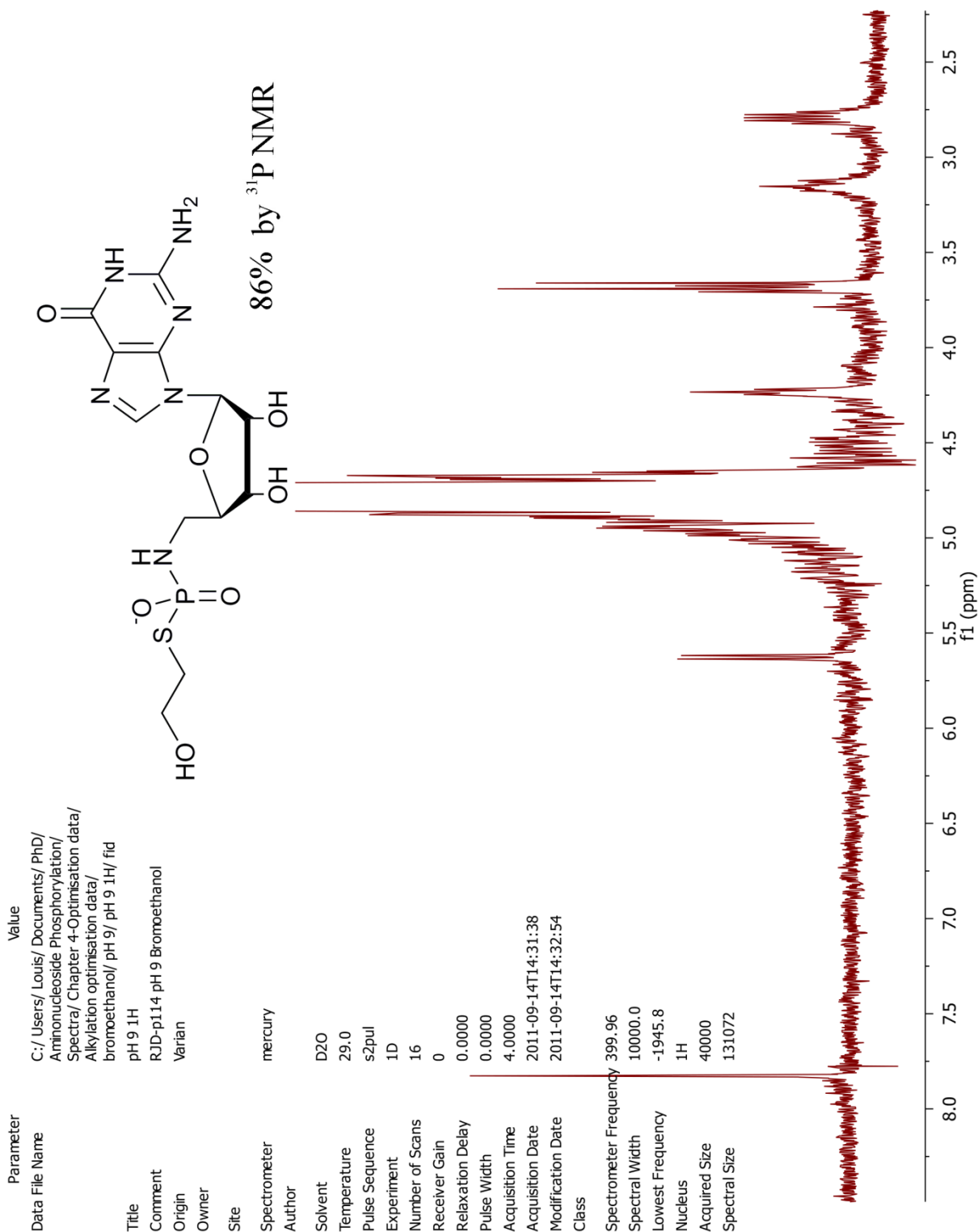
5'-Deoxyguanosine-5'-N-thiophosphoramidate Alkylation with Benzyl Chloride, pH 12, ¹H NMR Spectrum



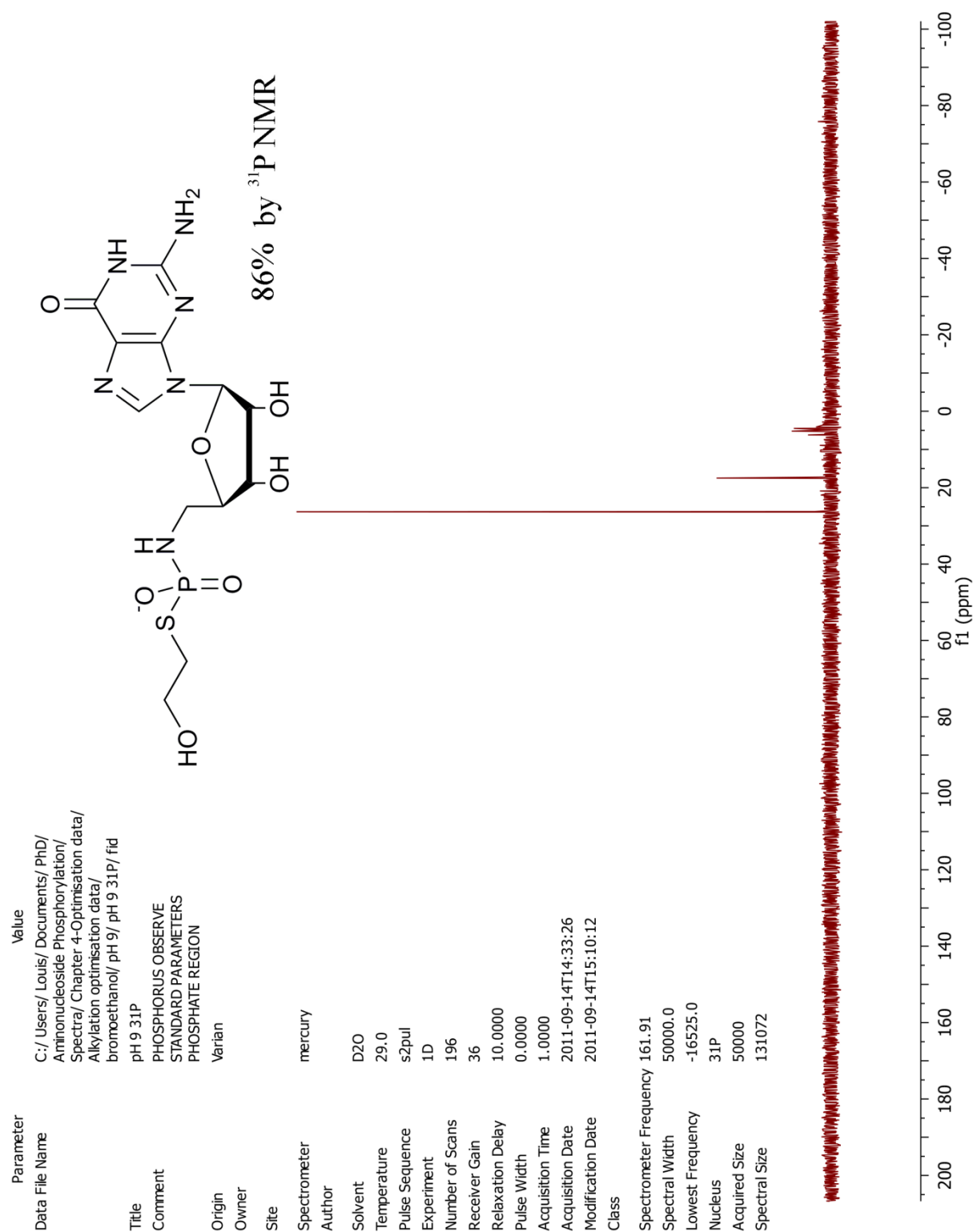
5'-Deoxyguanosine-5'-N-thiophosphoramidate Alkylation with Benzyl Chloride, pH 12, ^{31}P NMR Spectrum



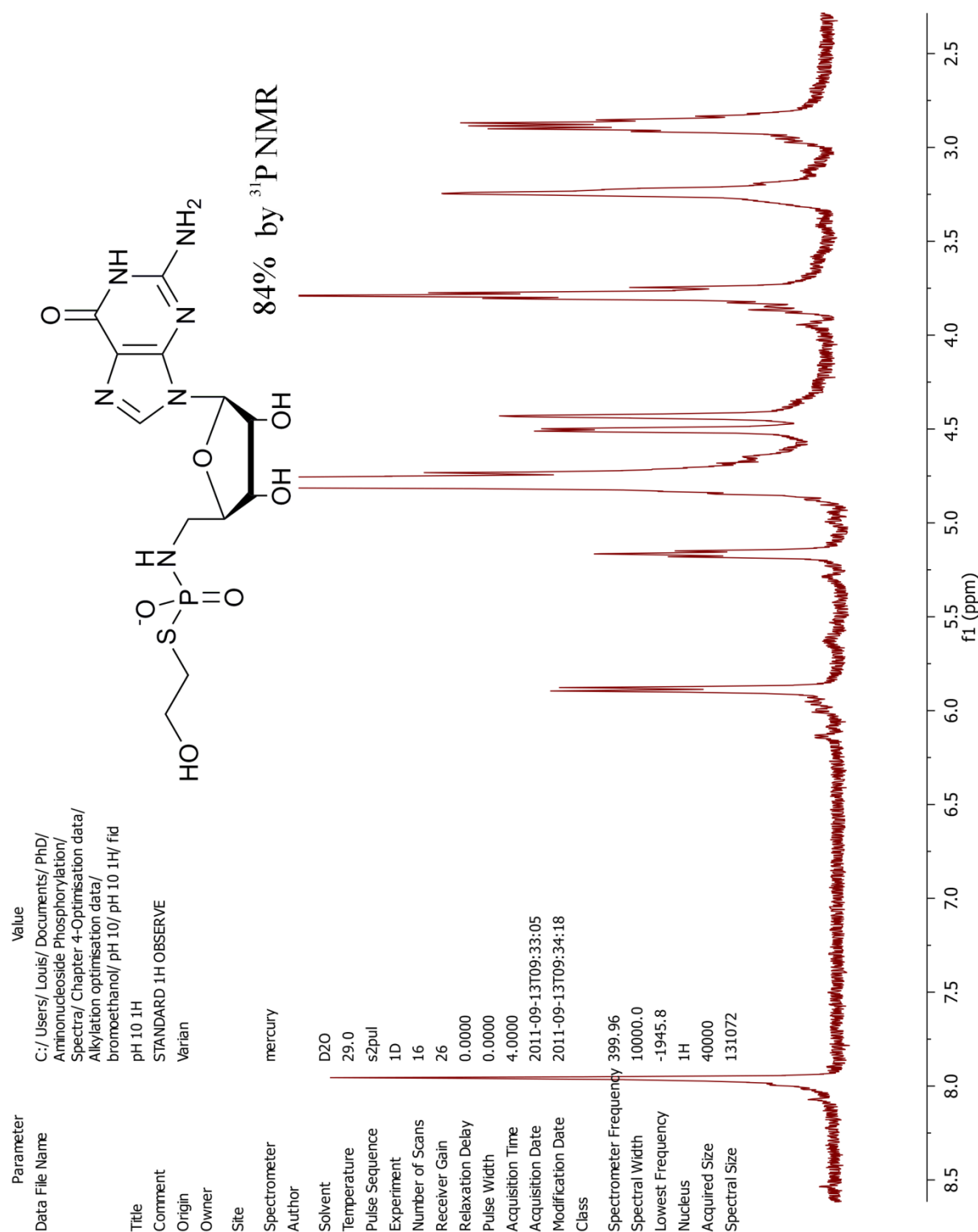
5'-Deoxyguanosine-5'-N-thiophosphoramidate Alkylation with 2-Bromoethanol, pH 9, ¹H NMR Spectrum



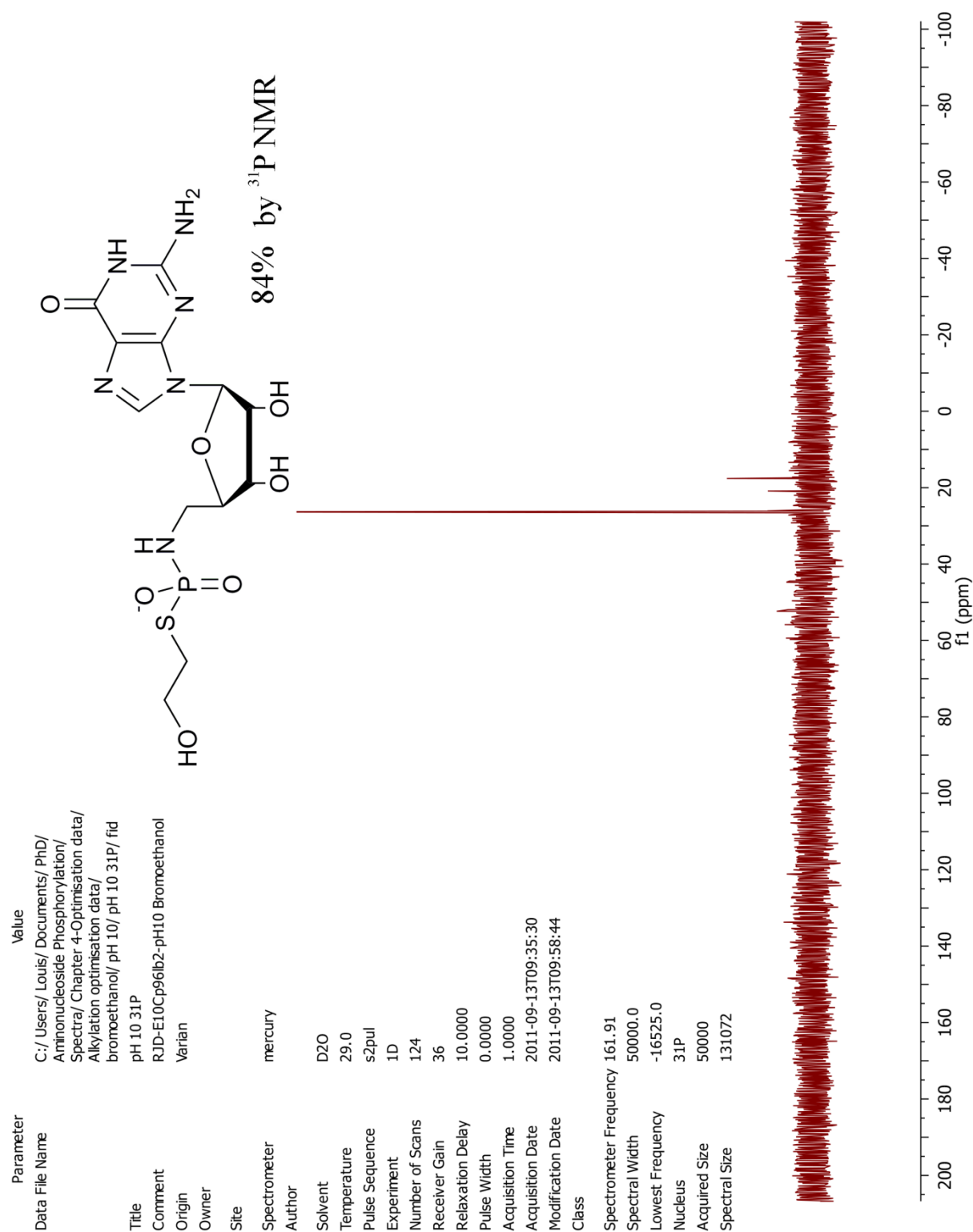
5'-Deoxyguanosine-5'-N-thiophosphoramidate Alkylation with 2-Bromoethanol, pH 9, ³¹P NMR Spectrum



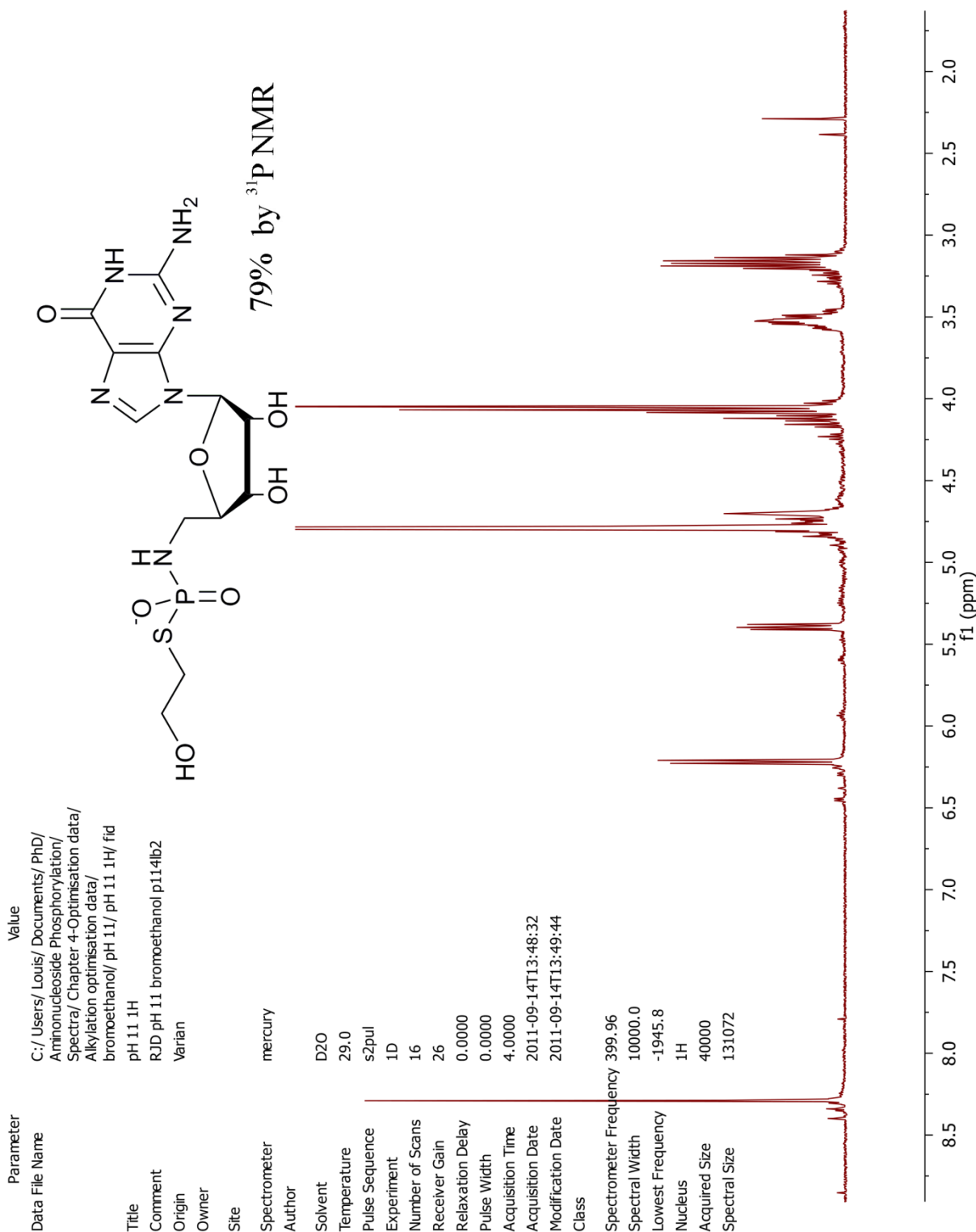
5'-Deoxyguanosine-5'-*N*-thiophosphoramidate Alkylation with 2-Bromoethanol, pH 10, ¹H NMR Spectrum



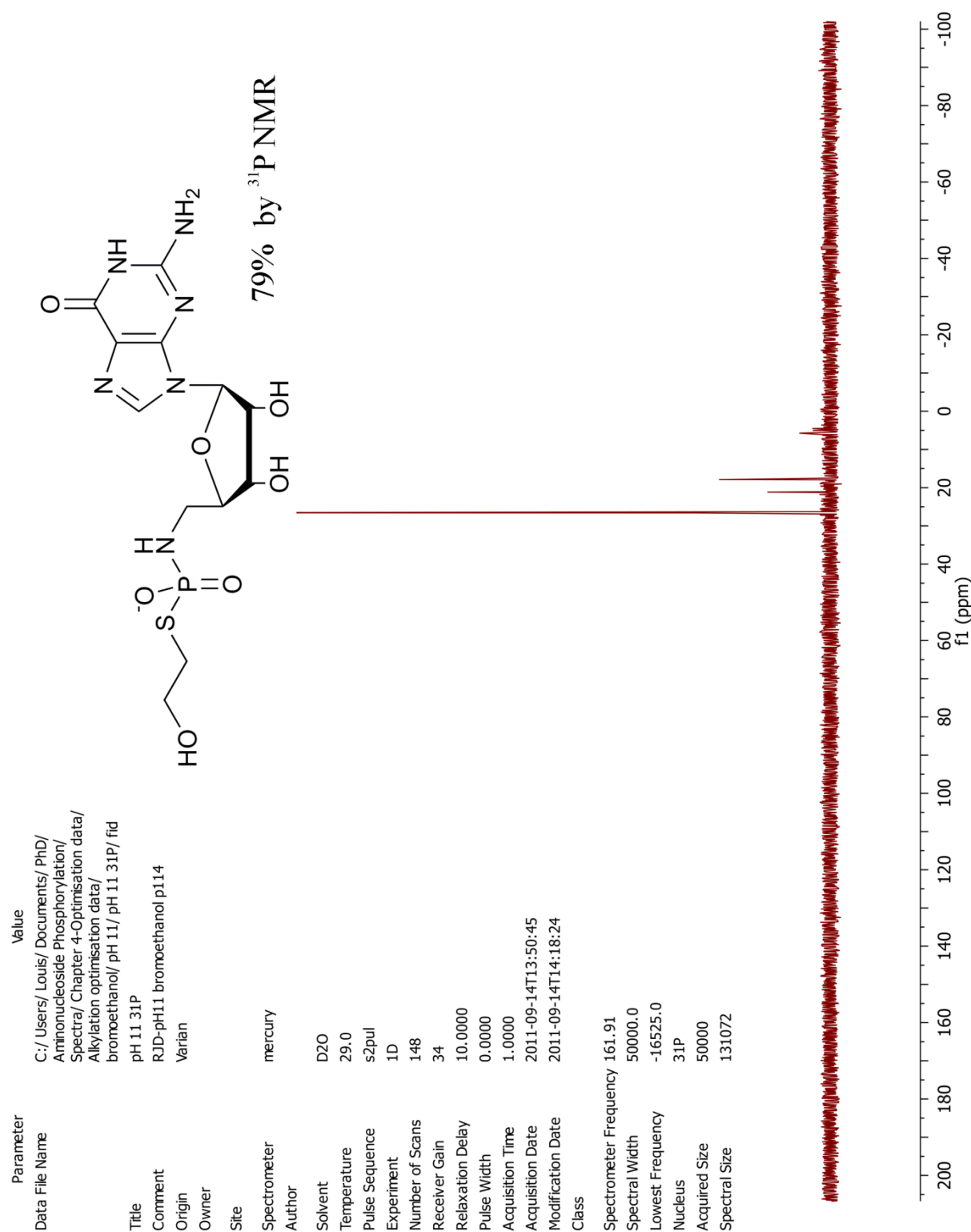
5'-Deoxyguanosine-5'-N-thiophosphoramidate Alkylation with 2-Bromoethanol, pH 10, ³¹P NMR Spectrum



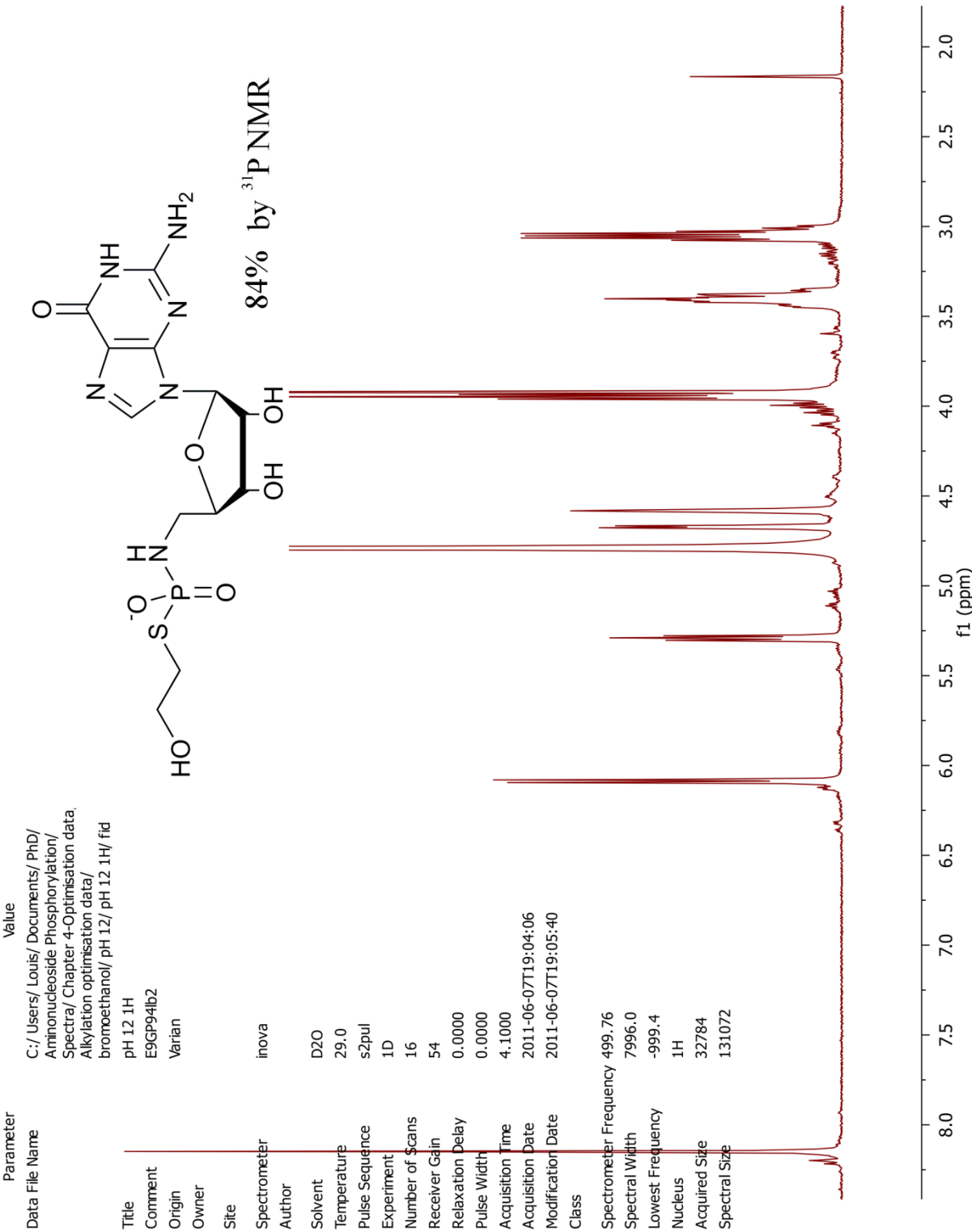
5'-Deoxyguanosine-5'-N-thiophosphoramidate Alkylation with 2-Bromoethanol, pH 11, ¹H NMR Spectrum



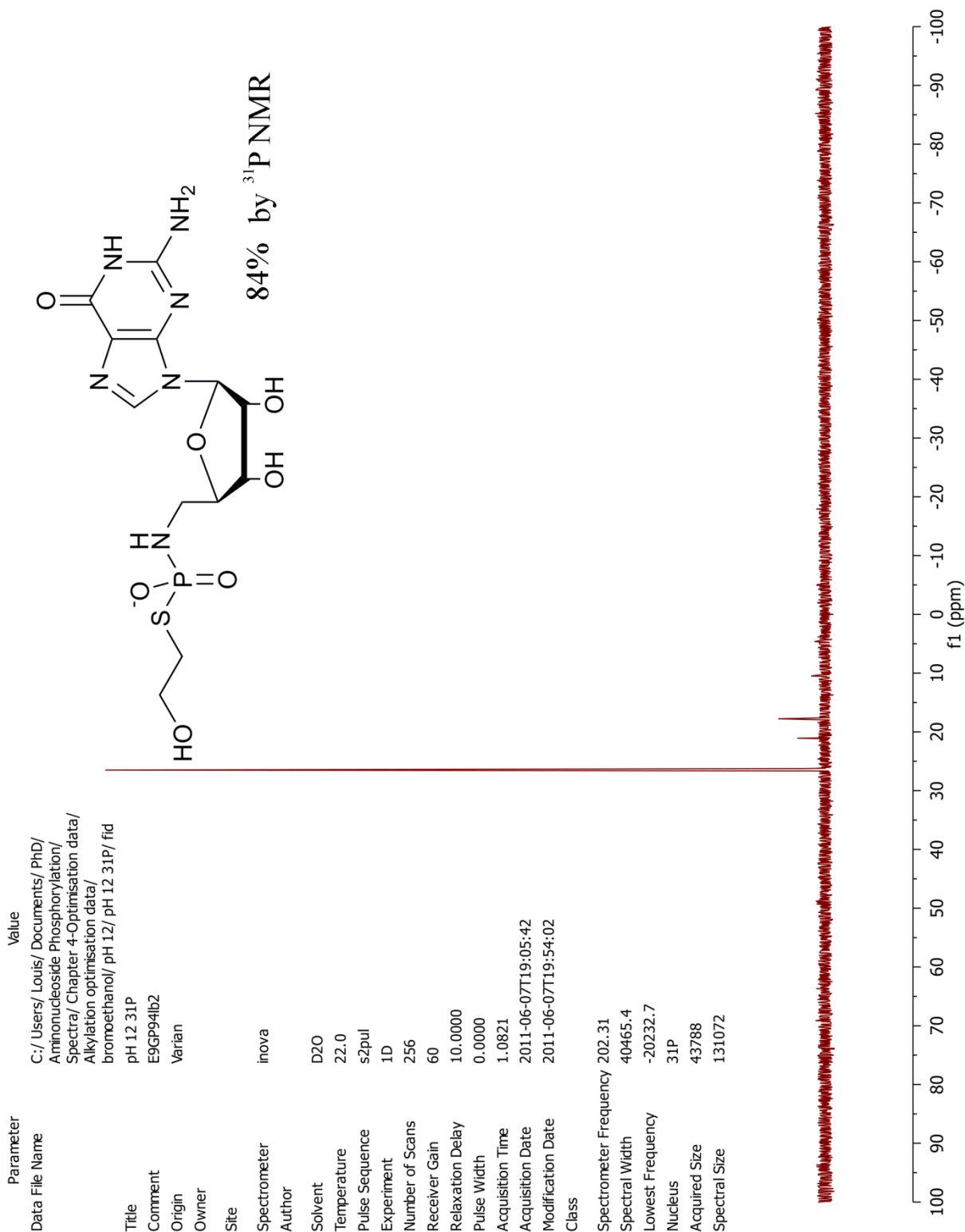
5'-Deoxyguanosine-5'-N-thiophosphoramidate Alkylation with 2-Bromoethanol, pH 11, ³¹P NMR Spectrum



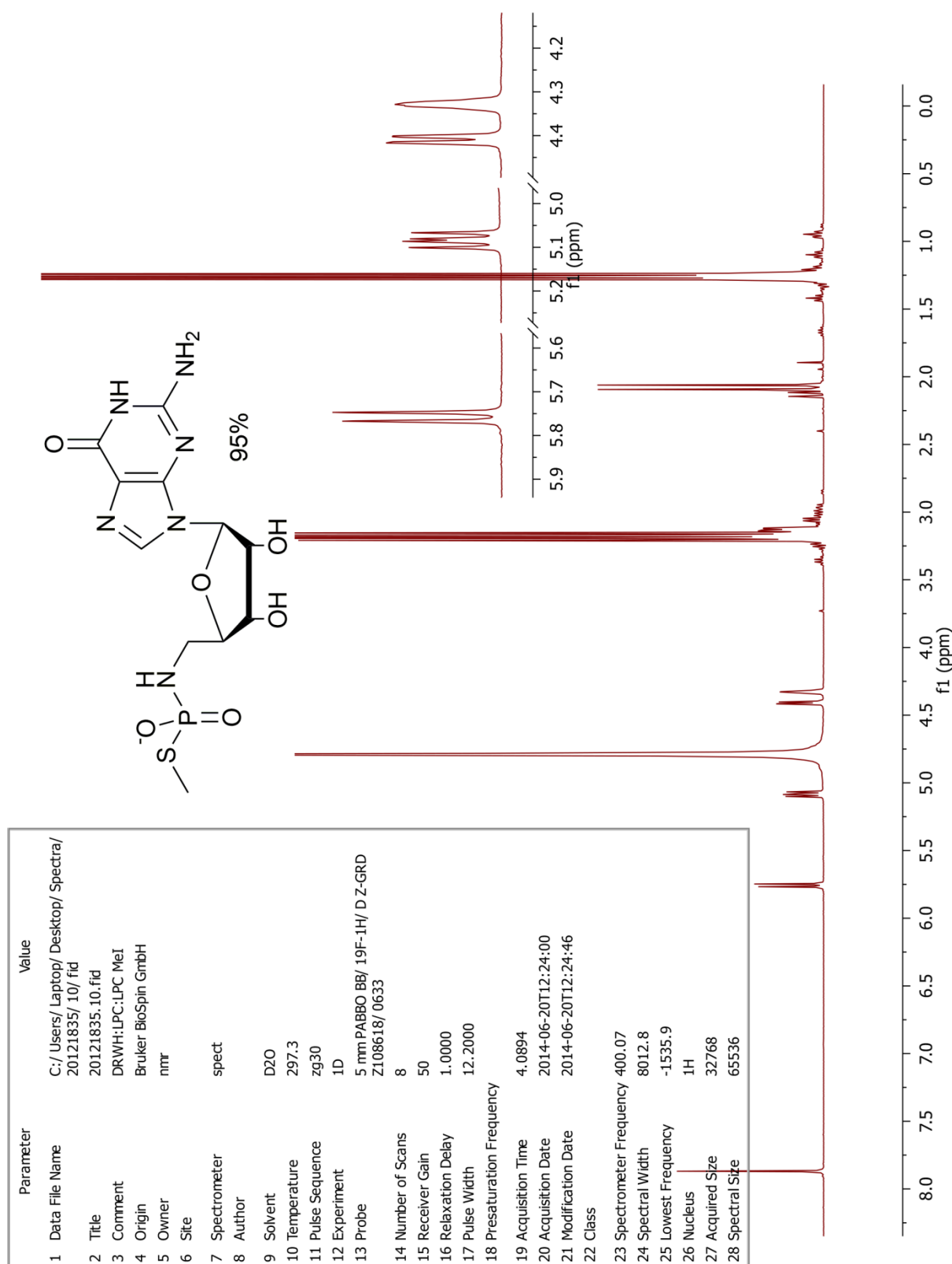
5'-Deoxyguanosine-5'-N-thiophosphoramidate Alkylation with 2-Bromoethanol, pH 12, ¹H NMR Spectrum



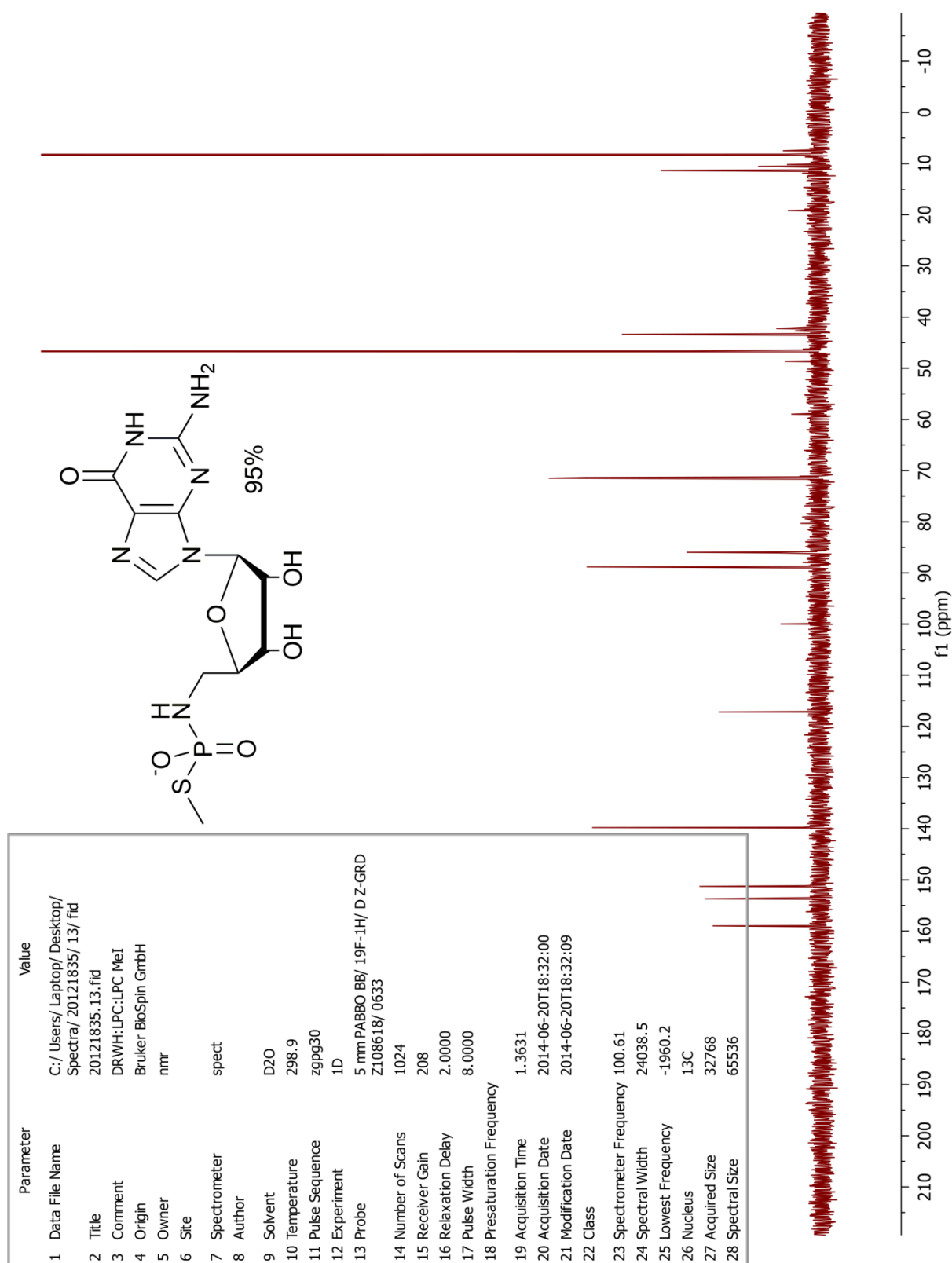
5'-Deoxyguanosine-5'-N-thiophosphoramidate Alkylation with 2-Bromoethanol, pH 12, ³¹P NMR Spectrum



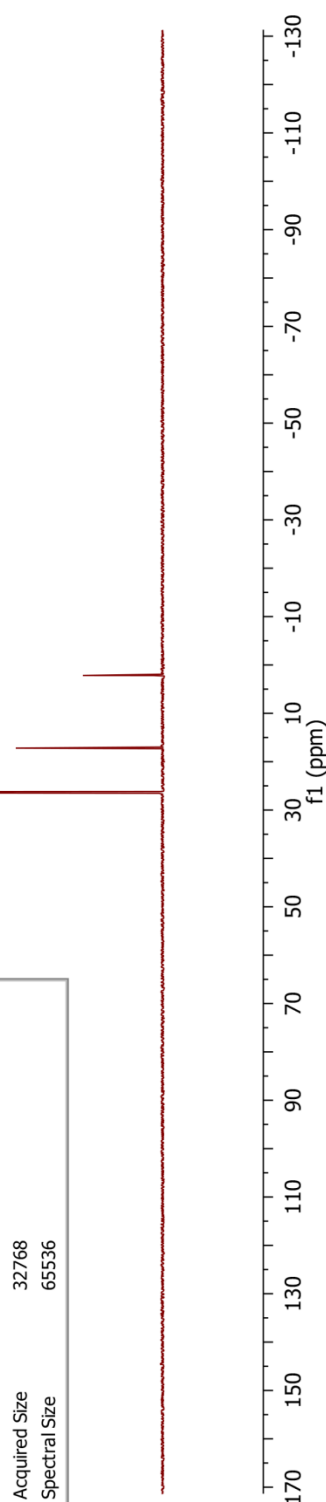
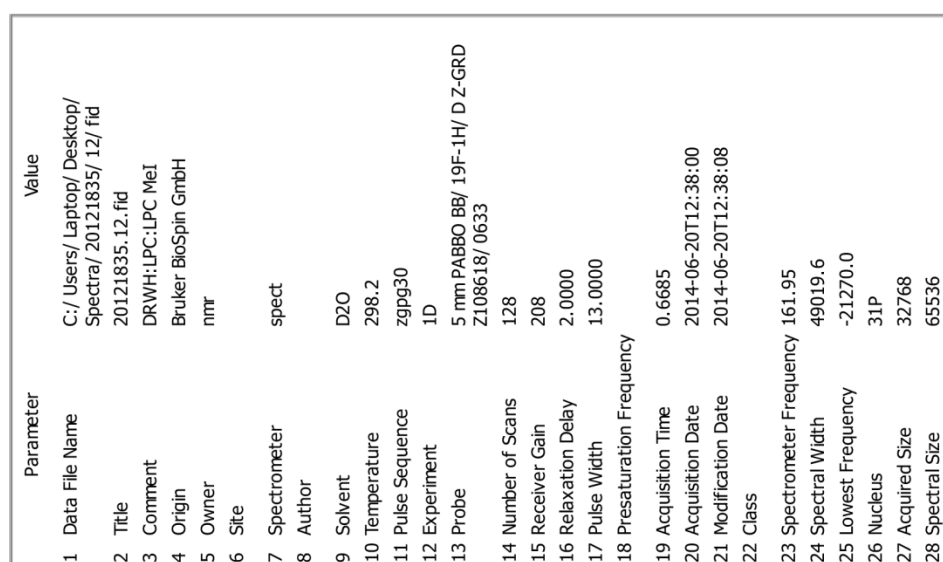
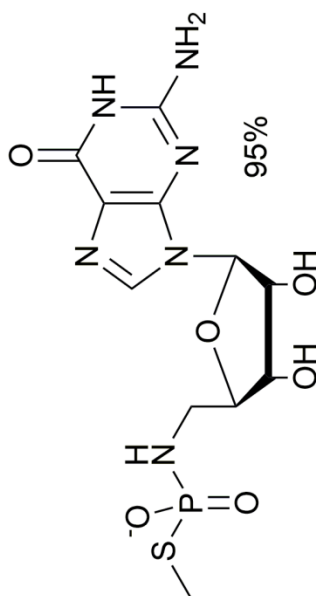
5'-Amino-5'-deoxyguanosine, *N,S*-methylthio - phosphoramidate, Triethylammonium salt ¹H NMR Spectrum



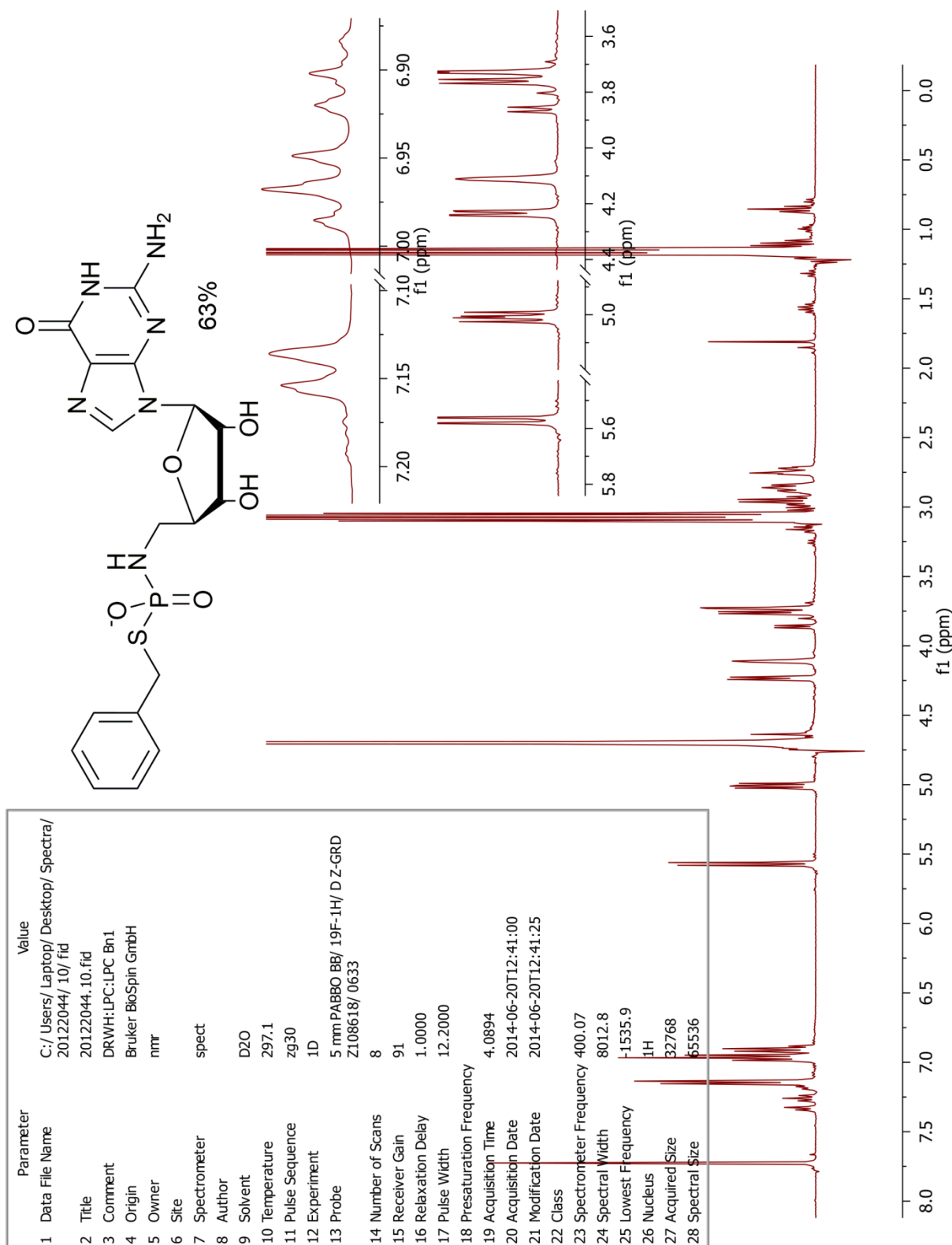
5'-Amino-5'-deoxyguanosine, *N,S*-methylthio - phosphoramidate, Triethylammonium salt ¹³C NMR Spectrum



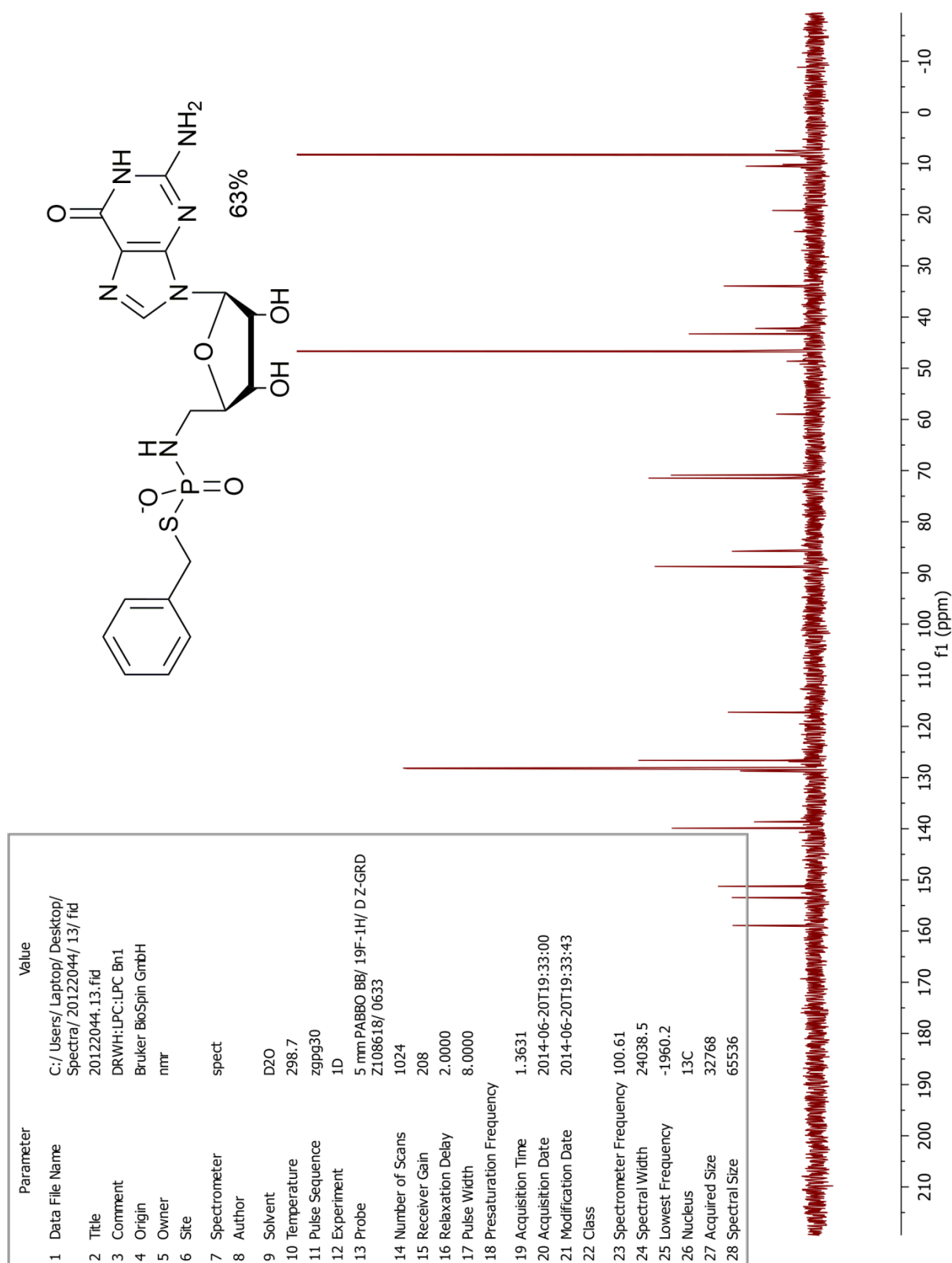
5'-Amino-5'-deoxyguanosine, *N,S*-methylthio -
phosphoramidate, Triethylammonium salt ³¹P NMR Spectrum



5'-Amino-5'-deoxyguanosine, *N*-,*S*-benzylthio - phosphoramidate, Triethylammonium salt ¹H NMR Spectrum

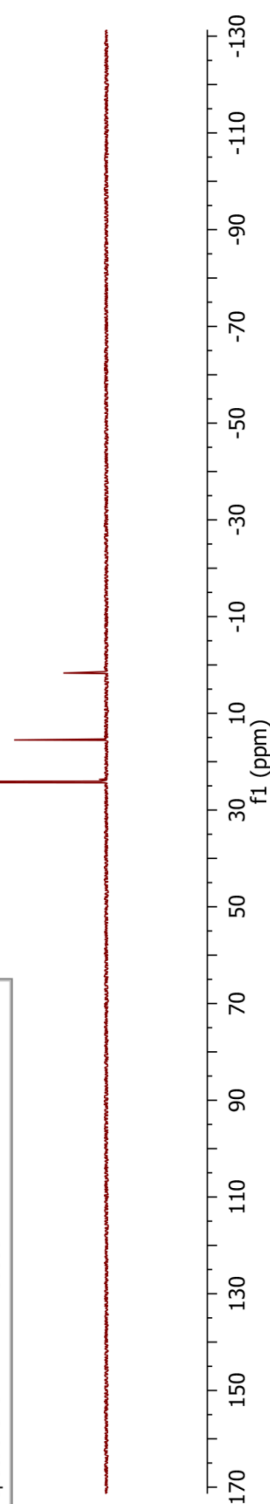
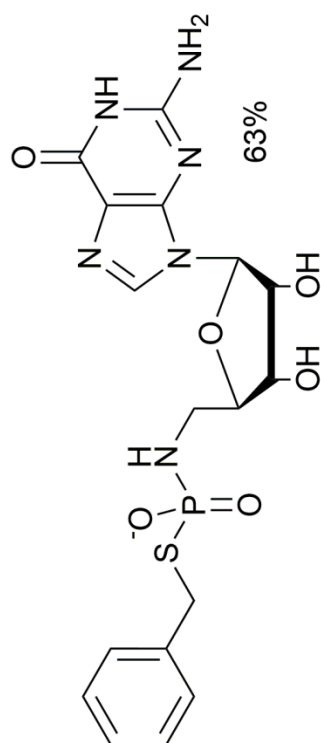


5'-Amino-5'-deoxyguanosine, *N,S*-benzylthio - phosphoramidate, Triethylammonium salt ¹³C NMR Spectrum

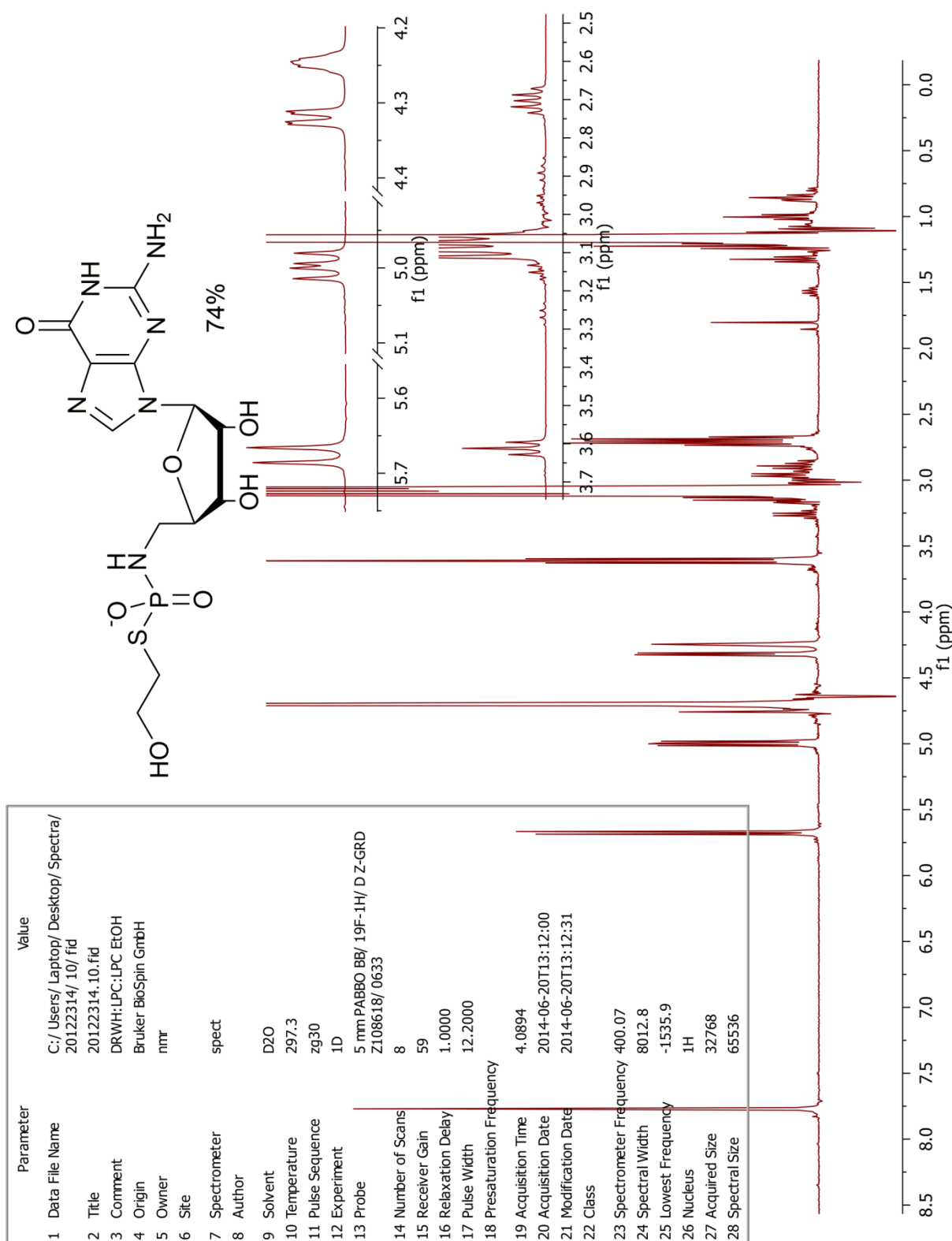


5'-Amino-5'-deoxyguanosine, *N,S*-benzylthio - phosphoramidate, Triethylammonium salt ³¹P NMR Spectrum

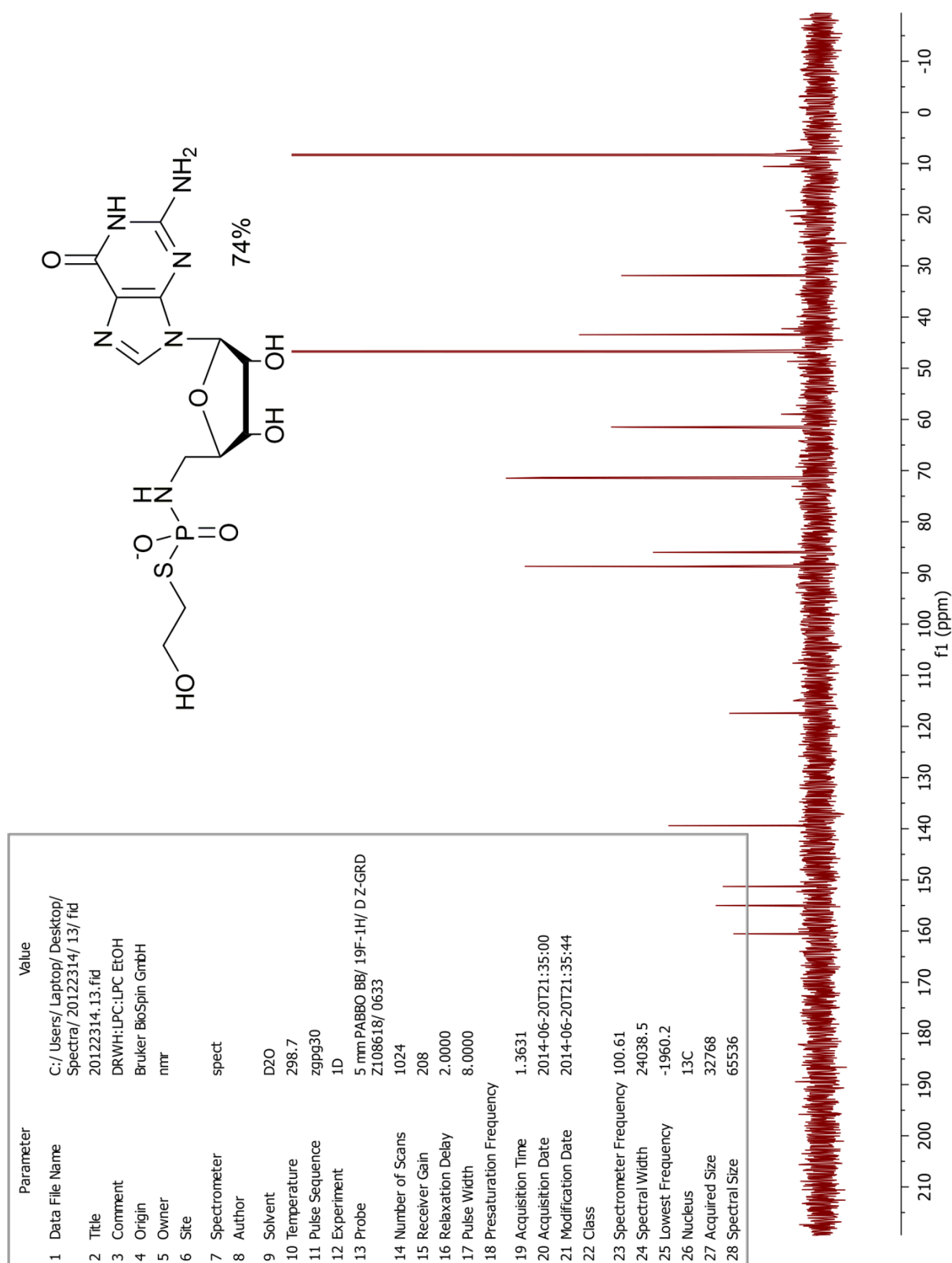
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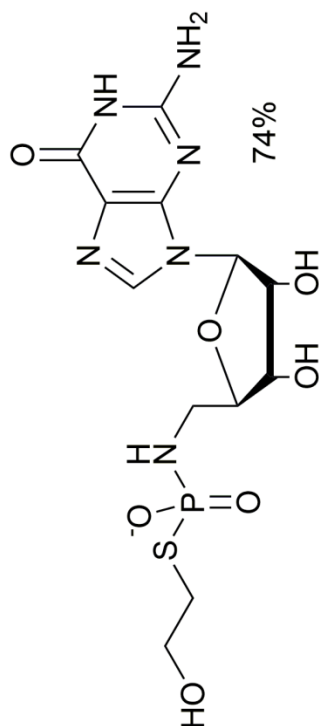
5'-Amino-5'-deoxyguanosine, *N,S*-ethan-2-olthio - phosphoramidate, Triethylammonium salt ¹H NMR Spectrum



5'-Amino-5'-deoxyguanosine, *N,S*-ethan-2-olthio - phosphoramidate, Triethylammonium salt ¹³C NMR Spectrum



5'-Amino-5'-deoxyguanosine, *N,S*-ethan-2-olthio - phosphoramidate, Triethylammonium salt ³¹P NMR Spectrum



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